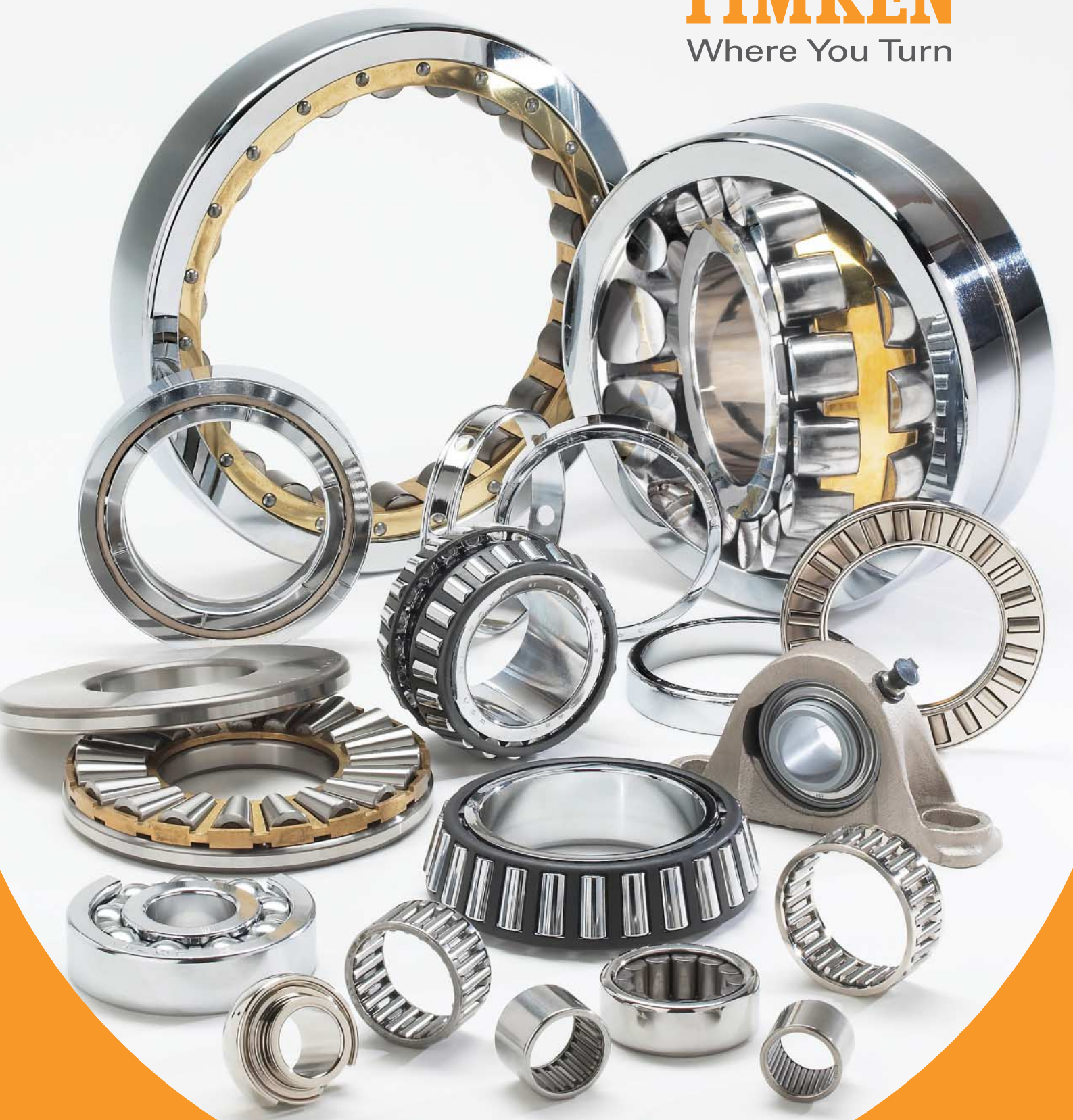
TIMKEN

Where You Turn



Timken® Products Catalog

TIMKEN
Where You Turn

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TIMKEN'S GLOBAL LOCATIONS

TIMKEN. WHERE YOU TURN.

The world turns to Timken for innovation to move ahead of the competition. Our contributions to advancing work and living standards – through innovations surrounding friction management and power transmission – are invaluable. We have played a role in virtually all major technologies that have shaped our age, from automobile travel to artificial hearts. You'll find our products wherever you turn – on land, sea and in space.

When customers turn to us, they are turning to a worldwide team of 26,000 associates. Because of our ability to help their products perform better, customers honor us with more than 300 awards each year. Whether it is a wheel assembly for a family vehicle, bearings for a roller coaster, repair services for rail bearings or steel for an aircraft engine shaft, we supply the products and services that help keep the world turning.

FRICTION MANAGEMENT SOLUTIONS – A TOTAL SYSTEM APPROACH

As needs change and advanced motion control systems evolve, Timken is leveraging its knowledge of friction management to offer a broader array of bearings, related products and integrated services to the marketplace. We supply quality products and services that extend beyond bearings to help all systems run smoothly.

We are committed to providing a wide array of friction management solutions. Customers can benefit by having Timken, a trusted name for more than 100 years, evaluate entire systems, not just individual components. This approach provides cost-effective solutions, while also helping to achieve specific objectives.

RESEARCH & DEVELOPMENT

Our bearing and steel manufacturing is strongly backed by Timken's technology centers. Each year, we commit more than $50 million to our global technology organization. We invest in people, attracting scholars, engineers and specialists from around the world. We invest in tools – computers, manufacturing equipment and state-of-the-art laboratories. And we invest in the future by identifying new concepts that will help Timken and its customers make their mark for years to come. Innovation is one of our core values.

The return on our technology investment has grown exponentially. Our associates increase the reliability of Timken® products and create designs that can set new performance standards. We refine processes and suggest improvements to enhance performance and reduce costs. We help customers solve their immediate system issues, while developing the systems of tomorrow.

Our teams of engineers and scientists are dedicated to using everything they know about friction management and power transmission. They translate the scientific aspects of metallurgy, bearing operating characteristics, lubrication, torque, noise, heat treatment, advanced processing concepts and application development into friction management solutions.

Because our teams are located at technology centers in North America, Europe and Asia – as well as in our manufacturing facilities and field offices on six continents – customers have access to ideas and resources to transform concepts into reality. Our research focuses on products, materials, processes and emerging technology to create new solutions.

BRANDS YOU CAN TRUST

Timken has built a strong tradition of quality, technology and innovation. A long list of customer certifications provides solid evidence that our products have earned customer trust. As our founder, Henry Timken, said, "Don't set your name to anything you will ever have cause to be ashamed of."

The Timken® brand also reflects the well-known quality of Torrington® and Fafnir® product lines. By leveraging the benefits of these brands – from design to distribution – Timken is giving customers expanded options and the security of knowing that each box contains an industry-trusted product.

ABOUT THE TIMKEN COMPANY

- Timken is a global Fortune 500 company.
- The company has ranked among the 250 largest U.S. industrial corporations since the 1920s, and it has been listed on the New York Stock Exchange since 1922.
- Timken has 13 technical and engineering centers in North America, Europe and Asia.
- Timken has more than 66 plants and 105 sales offices, customer service centers and distribution centers in 27 countries on six continents.

As a Timken customer, you receive an uncompromising standard of quality across the broadest range of bearings and related products. Brands like Timken, Torrington and Fafnir reflect an extensive line of tapered, needle, spherical, cylindrical, ball bearings and mounted units ideal for virtually every industrial application. Complementing our core products is an ever-growing line of friction management solutions including lubricants, single-point lubricators, maintenance tools, safety equipment, condition monitoring systems and repair services that help keep operations running smoothly.

CONDITION MONITORING DEVICES

From wireless units to online systems, condition monitoring devices give you powerful diagnostic tools to help detect potential bearing failure, while helping to maximize machine uptime and lowering maintenance costs.

SAFETY END CAPS

These easily installed caps offer a high degree of protection to maintenance personnel as well as to the bearings integrated within a housing.

HOUSED UNITS

Ball and spherical roller bearing pillow block units, featuring a unique sealing design, are easily installed.

LUBRICANTS

Industrial lubricant formulas contain a portfolio of greases, including formulations developed by our tribology experts. These lubricants keep bearings running smoothly in a variety of industrial conditions, including high heat, food processing and high speed. Timken also offers a line of single-point lubricators to simplify the delivery of grease.

REPAIR AND REPLACEMENT OPTIONS

By choosing to have bearings and other elements remanufactured, customers save money in replacement costs and maintain a steady supply of parts instead of purchasing new parts during downtimes. Timken provides bearing repair services for any type of roller bearing design, regardless of manufacturer.

MAINTENANCE HANDLING TOOLS

Convenient handling devices give technicians the tools they need to install, remove and service bearings. Products include: impact fitting tools, induction heaters and hydraulic pullers.

INDUSTRIAL SEALS

Timken industrial seals are available in small-bore sizes, zero- to 13-inches, as well as in metric and high-temperature varieties. We also provide tools to speed installation, deter seal and bearing damage and prevent premature seal leakage. The seals and tools can be applied in a full range of equipment used in thousands of applications, including manufacturing, off-highway, power transmission and oil refineries.

ABOUT THIS CATALOG

Timken offers an extensive range of bearings in both imperial and metric sizes. For your convenience, size ranges are indicated both in millimeters and inches. Contact your Timken sales representative to learn more about our complete line for the special needs of your application.

USING THIS CATALOG

We are committed to providing our customers with maximum service and quality. This catalog contains dimensions, tolerances and load ratings, as well as an engineering section describing fitting practices for shafts and housings, internal clearances, materials, and other features of bearings. It can provide valuable assistance in the initial consideration of the type and characteristics of the bearing which may be most suitable for your particular needs.

The data contained in this catalog is intended for reference purposes and will assist you in part number and external bearing dimension identification. Every effort has been made to ensure the accuracy of the information contained, but no liability can be accepted for errors, omissions or any other reason.

CATALOG FEATURES

Dimension and load rating data for the various types and styles of bearings is organized by size.

ISO, DIN, and ABMA, as used in this catalog, refer to the International Organization for Standardization, Deutsches Institut für Normung EV and the American Bearing Manufacturers Association.

TERMS AND CONDITIONS OF SALE

All products described in this catalog are sold subject to Timken's Terms and Conditions of Sale, copies of which are available from your Timken sales office.

It is understood that the buyer, in selecting and ordering from this catalog, which supersedes all previous editions, accepts all Terms and Conditions of Sale, outlined on page 8.

NOTE: *Product performance is affected by many factors beyond the control of The Timken Company. Therefore, the suitability and feasibility of all designs and product selection should be validated by you. This catalog is provided solely to give you, a customer of The Timken Company or its parent or affiliates, analysis tools and data to assist you in your design. No warranty, expressed or implied, including any warranty of fitness for a particular purpose, is made by Timken. Timken products are sold subject to the Limited Warranty which is set forth in Timken's terms and conditions of sale.*

LIMITED WARRANTY

We warrant for a period of one year from the date of shipment that our products shall be free of defects in material and workmanship, as shall be determined by our manufacturing standards, and shall conform to the description on the face of this acknowledgment. THE WARRANTY DESCRIBED HEREIN SHALL BE IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The terms contained herein constitute the entire agreement of the parties and the warranty representations of the seller. There are no other representations, warranties, or guarantees applicable to the sale of our products unless otherwise expressly agreed to by us in writing.

PURCHASER'S EXCLUSIVE REMEDY/SELLER'S EXPRESS LIMIT OF LIABILITY

Purchaser's exclusive remedy for any warranty claim, or for any claim arising out of the purchase or use of our products, shall be the replacement of said products. We will replace our products, without charge to the purchaser, f.o.b. our point of shipment. We will not be liable for any consequential, incidental, or other damages sustained by purchaser, including but not limited to, loss of profits or revenue, loss of use of product, cost of capital, cost of substituted product, facilities, services, or claims of purchaser's customers for any damages. Any warranty claim of purchaser must be made within one year of the date of shipment of the product. This exclusive remedy applies regardless of the nature of purchaser's claim, whether in contract, tort, express or implied warranty, negligence or strict liability, upon which damages are claimed and regardless of whether the same is due to our negligence or any defect in our product.

SPECIAL APPLICATIONS

Some products, such as for aerospace applications, are made to special standards, and only the original equipment manufacturer can determine if a particular bearing is suitable for use in their equipment.

WARNING

Proper maintenance and handling practices are critical. Failure to follow installation instructions and to maintain proper lubrication can result in equipment failure creating a risk of serious bodily harm.
Never spin a bearing with compressed air. The rollers may be forcefully expelled creating a risk of serious bodily harm.

SHELF LIFE AND STORAGE OF GREASE-LUBRICATED BEARINGS AND COMPONENTS SHELF LIFE POLICY

The Timken policy for the shelf life of grease lubricated rolling element bearings, components and assemblies is set forth below. The shelf life values are based on test data and experience. Shelf life should be distinguished from lubricated bearing/component service life as follows:

SHELF LIFE

The shelf life of the grease lubricated bearing/component is a measure of the anticipated aggregate usage (hereinafter referred as "Service Life"). Variations in lubricant bleed rates, oil migration, operating condition, installation conditions, temperature, humidity and extended storage make it impossible to accurately predict service life.

The bearing shelf life is related primarily to the lubricant's ability to maintain the bearing's original manufactured radial internal clearance and freedom to rotate.

The component shelf life is related to the ability of the component to function as originally intended.

The shelf life values, available from a Timken sales office, represent the period of time prior to use or installation. Due to the broad range of applications, Timken cannot anticipate the performance of the grease lubricant after the bearing or component is installed or placed in service.

These shelf life values are to be used as a maximum limit – assuming adherence to the Timken suggested storage and handling policy. Deviations from Timken's storage and handling policy may reduce shelf life. Any specification or operating practice that defines a shorter shelf life should be used.

TIMKEN DISCLAIMS RESPONSIBILITY FOR THE SHELF LIFE OF ANY BEARING/COMPONENT LUBRICATED BY ANOTHER PARTY.

STORAGE POLICY

The Timken policy suggests the following storage guidelines for its finished products (bearings, components, and assemblies, hereinafter referred to as "Products"):

- Unless directed otherwise by Timken, products should be kept in their original packaging until they are ready to be placed into service.
- Do not remove or alter any labels or stencil markings on the packaging.
- Products should be stored in such a way that the packaging is not pierced, crushed or otherwise damaged.
- After a Product is removed from its packaging, it should be placed into service as soon as possible.
- When removing a Product that is not individually packaged from a bulk pack container, the container should be resealed immediately after the Product is removed.
- Do not use Product that has exceeded its shelf life as defined in Timken's shelf life policy statement.
- The storage area temperature should be maintained between 0° C (32° F) and 40° C (104° F); temperature fluctuations should be minimized.
- The relative humidity should be maintained below 60 percent.
- The storage area should be kept free from airborne contaminants such as, but not limited to: dust, dirt, harmful vapors, etc.
- The storage area should be isolated from undue vibration.
- Extreme conditions of any kind should be avoided.

In as much as Timken is not familiar with a customer's particular storage conditions, these guidelines are strongly suggested. However, the customer may very well be required by circumstance or applicable government requirements to adhere to stricter storage requirements.

Most bearing types are typically shipped protected with a corrosion preventive compound that is not a lubricant. Such bearings may be used in oil lubricated applications without removal of the corrosion preventive compound. When using some specialized grease lubrication it is advisable to remove the corrosion preventive compound before packing the bearings with suitable grease.

Some bearing types in this catalog are pre-packed with general purpose grease suitable for their normal application. For instance, yoke and stud type track rollers are pre-packed with medium temperature grease. Frequent replenishment of the grease may be necessary for optimum performance. Care must be exercised in lubricant selection, however since different lubricants are often incompatible.

When specified by the customer, other bearings may be ordered pre-lubricated with suitable greases and oils.

Upon receipt of a bearing shipment, it should be ensured that the bearings are not removed from their packaging until they are ready for mounting so that they do not become corroded or contaminated. Bearings should be store in an appropriate atmosphere in order that they remain protected for the intended period.

Any questions concerning the shelf life or storage policy should be directed to your local sales office.

HOW TO ORDER A REPLACEMENT BEARING

The ordering of correct replacement bearings is vital to minimizing downtime and assuring the correct interchanges. Timken suggests that you follow these simple steps to identify your bearings and then proceed to the appropriate catalog section for correct bearing catalog number.

If no identification number is legible, measure the following dimensions:

1. Inner ring bore
2. Outer ring outside diameter
3. Inner width and outer width (not always the same dimension)
4. Shape of the outer ring: beveled vs. straight O.D.
5. List the unique features of the bearing or components such as: relubrication holes in the outer ring, wireloc (snap ring) groove in the outer ring O.D. Replacement and nomenclature information for Timken bearings is found under the "Introduction" section for each bearing type.

BALL BEARINGS

To identify: RADIAL BALL BEARINGS

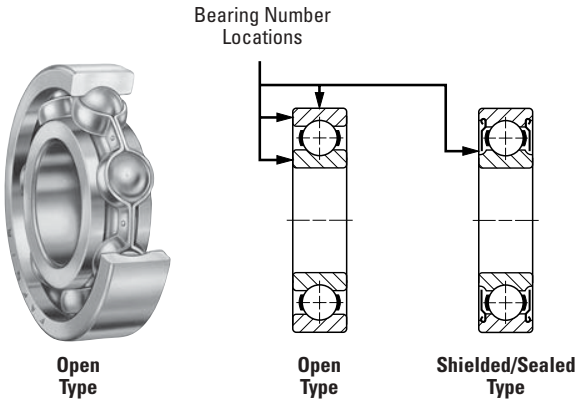
OPEN TYPE

The size and type of an open type (unshielded or unsealed) radial ball bearing is identified by the bearing number located on either the inner or outer ring face or bearing O.D. (e.g., 205K).

SHIELDED/SEALED TYPE

The size and type of a shielded/sealed type radial ball bearing is identified by the bearing number located on the shield or seal cap (e.g. 205PP).

For a comprehensive description of radial bearing nomenclature, see page D2, and for extra and superprecision ball bearings, see page D144.



To identify: WIDE INNER RING BALL BEARINGS

OPEN TYPE

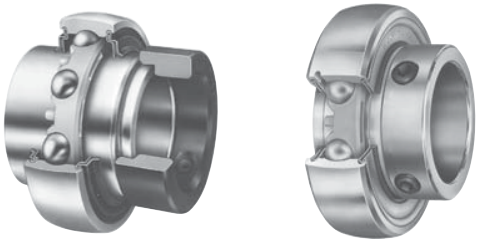
As a general rule, the complete bearing number is either marked on the outside diameter or on the inner ring face (e.g., SM1203K). This number, plus the appropriate suffix letter if applicable, constitutes the full bearing number (e.g., SM 1203KB).

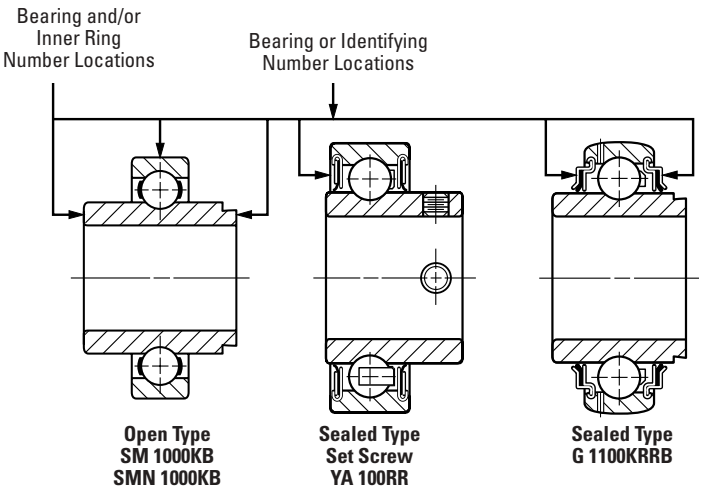
SEALED TYPE

In some cases, the complete bearing number is marked on the seal cap. In others, an identifying number is marked on the seal cap. Although not the full bearing number, this marking will help identify the bearing type (e.g., RA100/R indicates the (G)RA-RR(B) Series; 1100/R indicates the (G)1100KRR(B) Series).

Note: On bearings with self-locking collars, only the collar number is stamped on the collar (e.g., S1008K). This is not a bearing number and is used only to order the collar. It is not used when ordering replacement bearings.

For a comprehensive description of wide inner ring bearing nomenclature, see page D48.





ROLLER BEARINGS

To identify: SPHERICAL ROLLER BEARINGS

The basic bearing number, plus any applicable modification codes, is marked on the outer ring face (e.g., 22315 CJ W33).

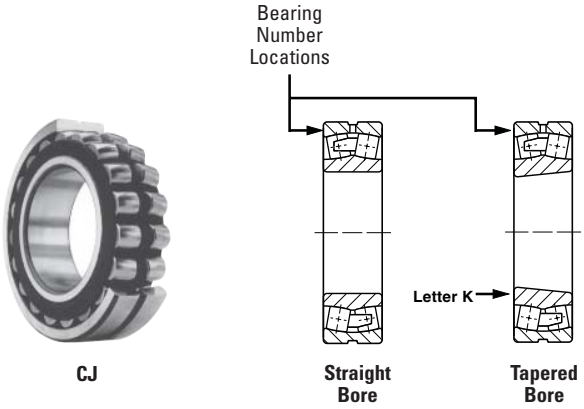
If the bearing has a tapered inner ring bore, the letter K is marked on the inner ring face (in addition to the above outer ring face marking).

Replacement bearings, if straight bore, should be ordered by specifying bearing number plus the suffix nomenclature marked on outside face (e.g., 22315 CJ W33).

Replacement bearings, if a tapered bore, should be ordered as described above, except include the suffix "K" following basic bearing number (e.g., 22315 CJ W33).

Note: Letter symbols marked on recessed pads on ring faces are not part of bearing nomenclature and therefore not relevant to replacement bearing number identification.

For a comprehensive description of spherical roller bearing nomenclature, see page B352.



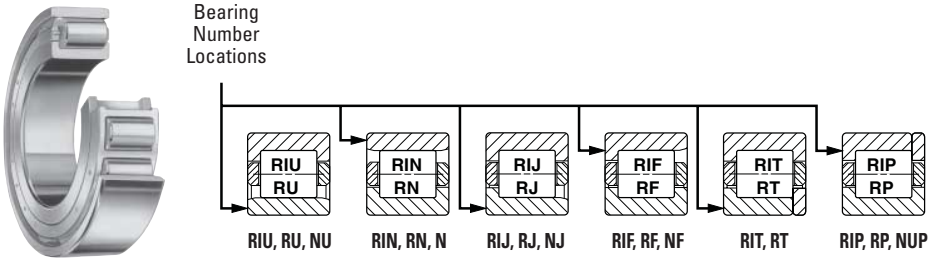
To identify: CYLINDRICAL ROLLER BEARINGS

The bearing number, plus radial clearance symbol and other applicable modification codes, is marked on the outer or inner ring faces as follows:

For types NU, NIU, NJ, NIJ, NT, NIT Series, the inner ring is marked (e.g. 160NIU92R3).

For types NN, NIN, NF, NIF, NP, NIP Series, the outer ring is marked (e.g., 160NN92R3).

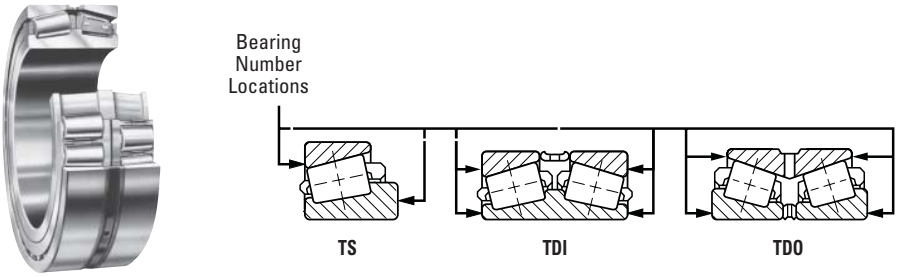
For a comprehensive description of radial cylindrical roller bearing nomenclature, see page B326.



To identify: TAPERED ROLLER BEARINGS

Inner ring (cone) part numbers are marked on a face, and outer ring (cup) part numbers on a face or the outside diameter surface.

For a comprehensive description of tapered roller bearings, see pages B15, B195, B237, B297 and B311.



The term "modification code" refers to additional information, describing details and requirements, for specific bearing applications. A basic Timken bearing part number may be produced in a variety of special modifications to meet different application needs. The word "modification" in this context refers to all changes from standard for both commercial and non-commercial applications. This meaning is different from the term "modified for use in military applications" referred to in the ITAR regulations.

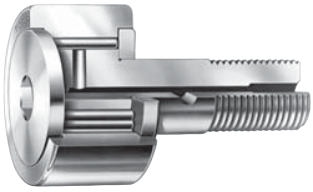
NEEDLE ROLLER BEARINGS

To identify: NEEDLE ROLLER AND CAGE RADIAL ASSEMBLY

As general rule, there are no identifiable markings on needle roller and cage radial assemblies to indicate the bearing part number. Parts are specified by bore diameter, outside diameter, and width (e.g. K24x28x10H).

To identify: STUD TYPE TRACK ROLLERS

The complete bearing part number is marked on the stud face or stamped on the face of the outer ring (e.g. KRE22.2RS). Yoke type track rollers (without stud, not shown) have the part stamped on the face of the inner or outer ring.



To identify: NEEDLE ROLLER THRUST BEARINGS

As general rule, there are no identifiable markings on needle roller and cage radial assemblies to indicate the bearing part number. Parts are specified by bore diameter and outside diameter (e.g. AXK1024).

To identify: COMBINATION BEARINGS

As general rule, there are no identifiable markings on combination bearings to indicate the bearing part number. Parts are specified by the product series and bore diameter (e.g. RAXZ510).

To identify: DRAWN CUP NEEDLE ROLLER BEARINGS AND DRAWN CUP ROLLER CLUTCHES

The complete bearing part number is stamped on the face of the outer ring (e.g. HK1412, FCL-10-K). Also, on clutch assemblies, the mounted clutch assembly engages when the housing is rotated relative to the shaft in the direction of the arrow and the word LOCK stamped on the outer ring.

To identify: NEEDLE/CYLINDRICAL ROLLERS

As general rule, there are no identifiable markings on loose rollers to indicate the part number. They are packaged in bulk or in strips. Loose rollers are specified by the product series, end geometry, diameter, and nominal length (e.g. NRO.B 1.5x11.8 G2).

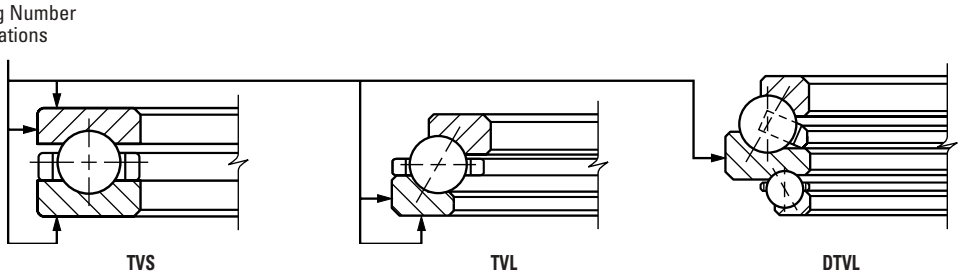
THRUST BEARINGS

To identify: THRUST BEARINGS

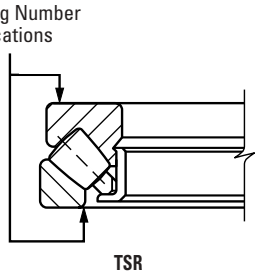
There are four basic designs of thrust bearings: ball, spherical roller, cylindrical roller and tapered roller.

All have assembly numbers marked on one or more components of the bearing.

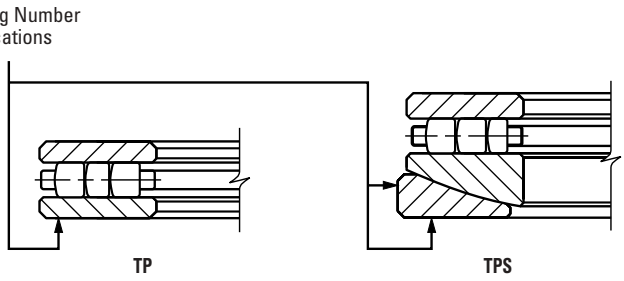
Thrust Ball



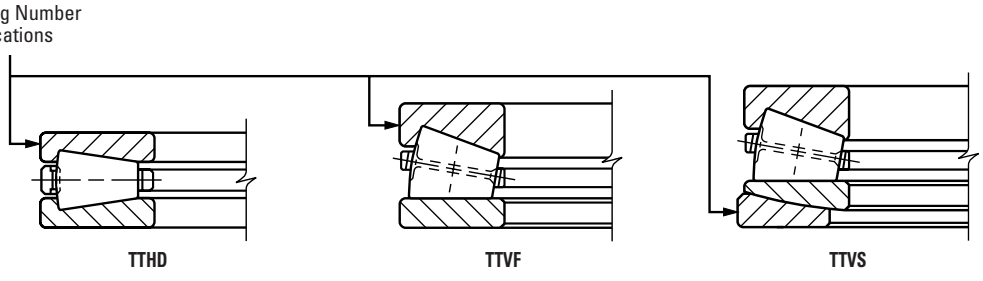
Thrust Spherical Roller



Thrust Cylindrical Roller



Thrust Tapered Roller



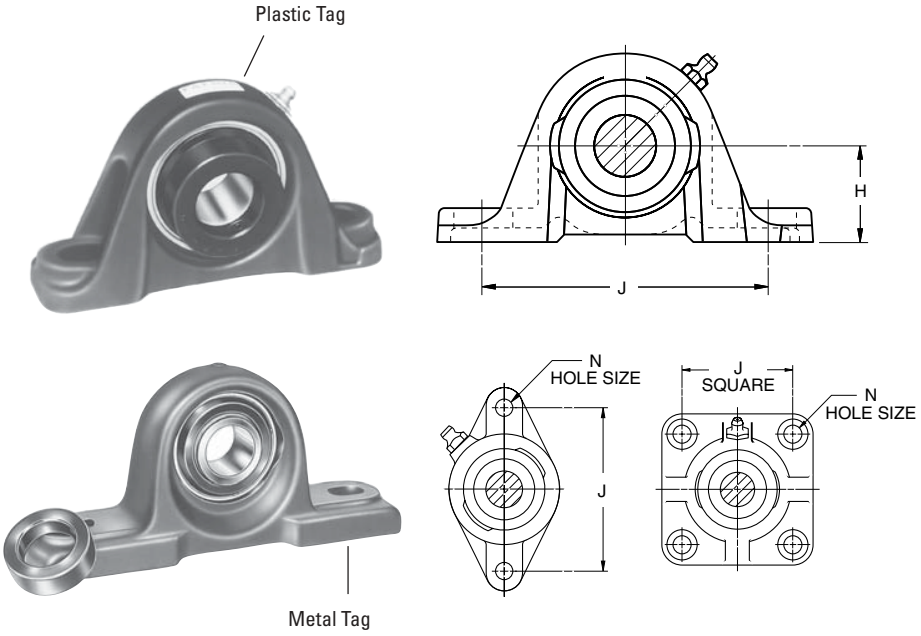
HOUSED UNITS

To identify: BALL BEARING PILLOW BLOCKS AND FLANGED UNITS

The housed unit is identified by a plastic or metal tag on the unit. All housed units are factory equipped with this tag. This identification number is the bearing housing assembly number which can be ordered from this catalog (e.g., RAK 1).

If the tag is removed from the housed unit, measure the bolt hole center dimensions (J), and (on pillow blocks) base to center height (H) . Also, note any number cast or stamping on the housing. On some sizes, check the bottom of the unit for this number. This is the "housing only" number and can be used along with the bearing number (see ball bearing description) to identify the two parts that make up the housed unit.

For a comprehensive description of pillow block and flanged unit nomenclature, see page B384.



To identify: SPHERICAL ROLLER BEARING PILLOW BLOCK

The end cap and/or base housing is marked with a pillow block housing number (e.g., SAF517). The pillow block assembly number is closely affiliated with the housing number (e.g., SAF 22517). Here, pillow block assembly uses the pillow block housing SAF517.

For a comprehensive description of spherical roller bearing pillow block nomenclature, see page B384.

A ENGINEERING

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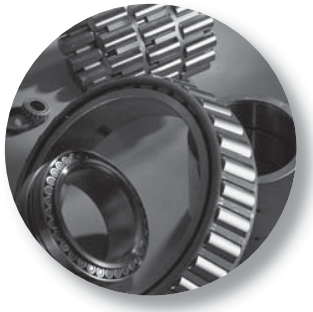
D BALL BEARINGS



ENGINEERING

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A ENGINEERING

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ENGINEERING

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INTRODUCTION

Timken is a leader in the advancement of bearing technology. Expert craftsmanship, well-equipped production facilities, and a continuing investment in technology programs ensure that our products are synonymous with quality and reliability. Today, our plants manufacture thousands of bearing types and sizes to handle a wide range of application requirements.

Anti-friction bearings inherently manage broad ranges of speed and many combinations of radial and thrust loads. Other important environmental conditions, such as low and high temperature, dust and dirt, moisture, and unusual mounting conditions, affect bearing operation.

This engineering section is not intended to be comprehensive, but does serve as a useful guideline in bearing selection. Where more complex bearing applications are involved, your Timken representative should be consulted. The following topics are covered within this section:

- Bearing types
- Cages
- Internal clearances
- Tolerances
- Shaft and housing fits and shoulders
- Load ratings and life calculations
- Lubrication
- Materials
- Limiting speeds
- Duplex bearings and preloading

BEARING SELECTION PROCESS

Bearing selection is a process for evaluating the suitability of bearings for specific industrial applications. The quality of the information available to make these selections will play a major role in determining the success of the bearing choice.

The first step in bearing selection is identifying the proper roller element type, whether it is a ball, needle, cylindrical, spherical or tapered roller bearing. Each roller bearing type has advantages and disadvantages that are specific to each design and will affect such things as the loads and speeds that the bearing can sustain in the application.

Next, assess the size constraints of the bearing envelope or available space. This is done by considering the minimum shaft diameter, maximum housing bore and available width within the application for the bearing. After the bearing envelope is defined, search the catalog for bearings with bores, outer diameters and widths that will fit within the bearing envelope. There may be several bearings with different load-carrying capacities available that fit within the envelope.

Determine which of these bearings will give the desired life in the application by performing a bearing life analysis for each bearing. The following sections in this catalog give a detailed explanation of how to perform bearing life analysis.

Once you have chosen the right bearing to handle the load requirements of your application, and the design options are chosen, the bearing selection is completed. These options include such features as cage type, cylindrical roller bearing flange arrangements, radial internal clearance or setting, precision level and lubrication. These options are selected based on the application's speed, temperature, mounting and loading conditions, and will enable you to achieve optimum bearing performance and life.

For a closer look, your Timken representative can provide you with expert computer analysis to give you the most detailed information for your bearing application.

Characteristic	Tapered Roller Bearing	Thrust Tapered Roller Bearing	Cylindrical Roller Bearing	Thrust Cylindrical Roller Bearing	Spherical Roller Bearing	Thrust Spherical Roller Bearing	Ball Bearing	Thrust Ball Bearing	Needle Roller Bearing	Thrust Needle Roller Bearing
Pure Radial Load	Excellent	Unsuitable	Excellent	Unsuitable	Excellent	Unsuitable	Good	Poor	Excellent	Unsuitable
Pure Axial Load	Good	Excellent	Unsuitable	Good	Fair	Excellent	Fair	Excellent	Unsuitable	Excellent
Combined Load	Excellent	Fair	Fair	Unsuitable	Excellent	Fair	Good	Poor	Unsuitable	Unsuitable
Moment Load	Fair	Poor	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Good	Poor	Fair	Unsuitable
High Stiffness	Excellent	Excellent	Good	Excellent	Good	Good	Fair	Good	Good	Excellent
Quiet Running	Fair	Fair	Good	Poor	Fair	Poor	Excellent	Good	Good	Fair
Low Friction	Fair	Fair	Good	Poor	Fair	Fair	Excellent	Excellent	Good	Good
Misalignment	Poor	Poor	Poor	Unsuitable	Excellent	Excellent	Good	Poor	Poor	Poor
Locating Position (Fixed)	Excellent	Good	Fair	Fair	Good	Good	Good	Excellent	Unsuitable	Excellent
Non-Locating Position (Floating)	Good	Unsuitable	Excellent	Unsuitable	Fair	Unsuitable	Good	Unsuitable	Good	Unsuitable
Speed	Good	Good	Good	Poor	Fair	Fair	Excellent	Excellent	Good	Poor

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BEARING TYPES AND CAGES

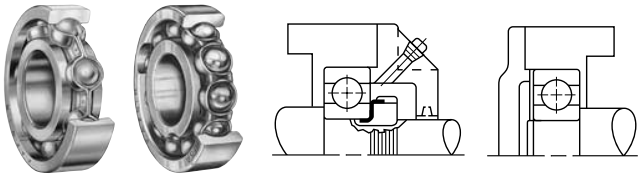
BEARING TYPES

RADIAL BALL BEARINGS

The basic types of Timken ball bearings are shown here. They are the non-filling slot or Conrad, which is identified by the suffix K and the filling slot designated by the suffix W.

The non-filling slot or Conrad bearing has uninterrupted raceway shoulders and is capable of supporting radial, thrust or combined loads. The filling slot type, which is assembled with more balls than a K-Type of the same size, has a greater capacity than the K-Type, but has limited thrust capacity due to the filling slots in the raceway shoulders.

Both K and W can be mounted with or without locknuts and either fixed or floating in their housings as illustrated here.



Suffix K | Suffix W | Fixed Mounting | Floating Mounting

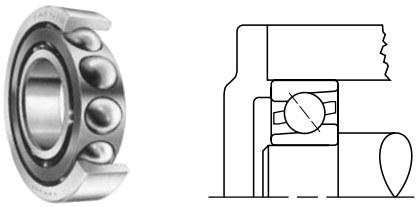
ANGULAR CONTACT BALL BEARINGS

Single-Row Type

Single-row, angular contact ball bearings are designed for combination loading with high thrust capacity in one direction, and are suggested for applications where the magnitude of the thrust component is high enough to preclude the use of radial type ball bearings. They are dimensionally interchangeable with single-row radial bearings of corresponding sizes.

The angular contact ball bearing has a relatively large contact angle, high race depths, and a maximum complement of balls assembled through a counterbore in the outer ring. These features provide bearings with significantly more thrust capacity than radial bearings of the same size.

Angular contact bearings are used in such applications as gear reducers, pumps, worm drives, vertical shafts and machine tool spindles, where they are frequently mounted in various duplex arrangements as described in the duplex section.

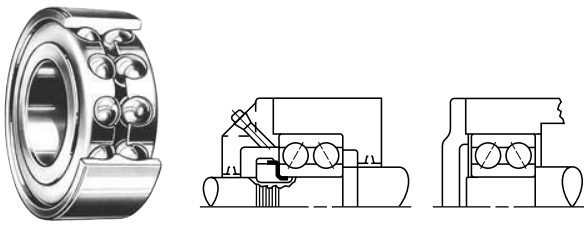


Single-Row

Double-Row Type

Double-row, angular contact ball bearings are used effectively where heavy radial, thrust or combined loads demand axial rigidity of the shaft. This type is similar to a duplex pair of single-row bearings by virtue of its two rows of balls and angular-contact construction, which provide greater axial and radial rigidity than can be obtained by using a single-row radial bearing.

With the exception of small sizes, double-row ball bearings are made in the filling slot construction, and therefore, do not have as much thrust capacity as equivalent size single-row, angular contact bearings mounted in duplex pairs. Fixed and floating mountings of double-row bearings are shown. Smaller sizes are supplied with polymeric retainers.



Fixed Mounting | Floating Mounting

Typical Mountings for Double Row, Angular contact Ball Bearings

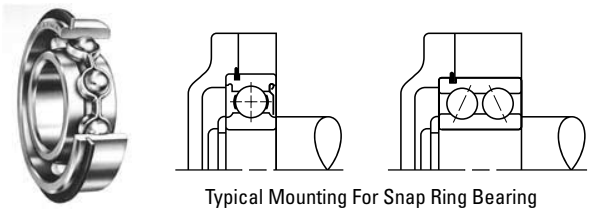
BEARING TYPES AND CAGES – *continued*

BALL BEARINGS WITH SNAP RINGS (WIRELOC)

Single-row radial bearings including those with seals or shields and open and shielded double-row types are available with snap rings, which provide a shoulder integral with the bearing, designed for mounting in through-bored housings. This feature is designated by adding the suffix "G" to the standard bearing number. Single shielded or sealed bearings with snap rings can be supplied with the snap ring on the same side or that opposite the shield or seal position.

These bearings are advantageous in automobile transmission design and in all applications where compactness is essential, or where it is difficult and costly to machine housing shoulders. The snap ring provides an adequate shoulder for the bearings without a sacrifice in bearing capacity. The thrust capacity of the snap ring in shear is considerably above the thrust capacity of the bearing.

Typical designs illustrating how mounting simplification can be accomplished through the use of snap ring bearings are shown (below).

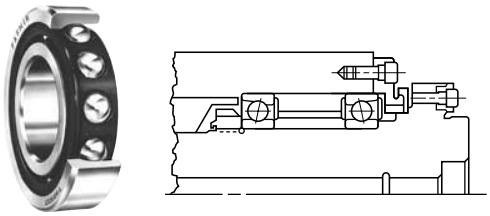


Typical Mounting For Snap Ring Bearing

SUPER PRECISION BALL BEARINGS

Every Timken Fafnir ball bearing manufactured is made to precision tolerances. The standard tolerances established by the Annular Bearing Engineers Committee (ABEC) are adhered to, and even the most liberal classification, ABEC 1 ensures a precision product by nature. Many applications in numerous types of machinery can be satisfactorily operated with ABEC 1 tolerance bearings.

However, for applications involving high speeds, extreme accuracy and rigidity in such equipment as high-grade machine tools, woodworking machines, gas turbines and sensitive precision instruments, a complete line of Timken Fafnir super precision ball bearings is manufactured to ABEC 7 and ABEC 9 tolerances.



Typical Application For Super Precision Bearing

BEARING TYPES AND CAGES – *continued*

BALL BEARINGS WITH LOCKING DEVICES

By virtue of their independent locking devices, these bearings are suitable for mounting on straight shafting (no shoulders, etc.). They are often supplied with spherical outer rings for self-alignment at mounting. Mounted alignment is usually required because these bearings are generally assembled into pillow blocks or flanged cartridges, or other housings bolted to pedestals or frames independent of each other.

Self-Locking (Eccentric) Collar

Timken invented the eccentric self-locking collar to facilitate mounting of wide inner ring bearings. The self-locking collar eliminates the need for locknuts, lockwashers, shoulders, sleeves and adapters.

The locking collar has a counterbored recess eccentric with the collar bore. This eccentric recess engages or mates with an eccentric cam end of the bearing inner ring when the bearing is assembled on the shaft.

The collar is engaged on the inner ring cam of the bearing. This assembly grips the shaft tightly with a positive binding action that increases with use. No adjustments of any kind are necessary. The collar setscrew provides supplementary locking.

Easiest of all to install, wide inner ring ball bearings with self-locking collars are available in various sizes. These bearings shown with various seal and inner ring width variations serve many purposes in farm and industrial applications.

RA-RR Series
Extended Inner Ring
with Locking Collar

Shroud-Seal KRRB Series
Wide Inner Ring
with Locking Collar

Setscrew Series Bearings

The GYA-RRB and the GY-KRRB series relubricatable and non-relubricatable bearings are extended inner ring and wide inner ring type bearings with specially designed setscrews to lock on shafting. Positive contact land-riding R-Seals provide protection against harmful contaminants and retain lubricant. Extended inner ring bearings are used when space is at a premium and overturning loads are not a problem. The new wide inner ring setscrew series is available when additional surface contact on the shaft is a requirement for added stability.

YA-RR Series

Concentric Collar

Using the concentric collar, the bearing is locked to the shaft by two setscrews, 120 degrees apart, tightened in the collar and passing through drilled holes in the inner ring. These units are suited for applications where space is limited and reversing shaft rotation is encountered.

GC-KRRB Series

BEARING TYPES AND CAGES – *continued*

NEEDLE ROLLER BEARINGS

Timken needle roller bearings are an economical alternative for applications requiring minimal space to carry a given load at a desired speed. Needle roller bearings can be an ideal choice because of their ability to handle a given level of speed and load capacity, yet have the smallest cross-section of all roller bearing types – and, at a very attractive price.

Timken offers both inch and metric nominal bearings in popular designs such as: drawn cups, radial caged needle rollers, machined ring, track rollers, thrust bearings, combined bearings, and drawn cup roller clutches. Most of these bearing types can be operated directly on a machined shaft of suitable quality, or with a matching inner ring where this requirement cannot be conventionally satisfied.

Radial Caged Needle Rollers

Timken Torrington needle roller and cage radial assemblies have a steel cage that provides both inward and outward retention for the needle rollers. The designs provide maximum cage strength consistent with the inherent high load ratings of needle roller bearings. Accurate guidance of the needle rollers by the cage bars allows for operation at high speeds. Needle roller and cage assemblies are manufactured with either one or two rows of needle rollers.

Drawn Cup Bearings

The outer ring in the form of a cup is accurately drawn, and no subsequent machining is performed to build the outer raceway. Drawn cup needle roller bearings are available in open ends or single, closed (to protect the shaft) end designs. They are also available with one or two integral seals. Other options include a single lubricating hole, and matching inner ring.

Heavy-Duty (Machined) Needle Roller Bearings

These bearings are available in a wide range of inch and metric sizes plus an array of design features including: integral seals, side flanges (or separate end washers), inner rings, oil holes, and single or double caged sets (or full complement) of rollers.

Track Rollers

Timken Torrington track rollers listed in this catalog have been designed with outer rings of large radial cross section to withstand heavy rolling and shock loads on track type or cam-controlled equipment. The outside diameters of the outer rings are either profiled or cylindrical. Profiled track rollers are designed to alleviate uneven bearing loading resulting from deflection, bending or misalignment in mounting. Stud type track rollers are available with or without lip contact seals, or with shields. Yoke type track rollers are designed for straddle mounting. Each yoke type is available with either needle roller and cage radial assemblies, or with a single (or double) full complement row of cylindrical or needle rollers.

Thrust Bearings

Needle roller and cage thrust assemblies are available in a variety of inch or metric sizes. All types have very small cross-sections. If the back up surfaces cannot be used as raceways, hardened washers are available. Thrust bearings are available with needle rollers or heavier cylindrical rollers for high load carrying capacity.

Combined (Radial and Thrust) Bearings

Timken combined bearings consist of a radial bearing (needle roller bearing) and a thrust bearing (needle or other roller bearing). Some combined bearings are constructed similar to drawn cups, but with an added thrust bearing component. Like other needle bearings, these combined bearings can be matched with an optional inner ring or thrust washer as the opposing raceway.

Roller Clutches

Drawn cup roller clutches transmit torque between the shaft and housing in one direction and allow free overrun in the opposite direction. When transmitting torque, either the shaft or the housing can be the input member. Applications are generally described as indexing, backstopping or overrunning.

In many respects, construction is similar to that of drawn cup bearings, utilizing the same low profile radial section as drawn cup bearings. The precisely formed interior ramps provide surfaces against which the needle rollers wedge to positively lock the clutch with the shaft when rotated in the proper direction. These ramps formed during the operation of drawing the cup, are case hardened to assure long wear life. The incorporation of ramp forming into the cup drawing operation is a Timken manufacturing innovation that contributes much to the low cost of the unit.

BEARING TYPES AND CAGES – *continued*

NEEDLE ROLLER BEARING SELECTION

Because of the possible combinations of roller complement orientation, bearing cross-section thickness, and raceway construction, needle roller bearings should be given extra consideration for roller bearing applications selection. The table below should be used as a general guideline for the application of Timken needle roller bearings.

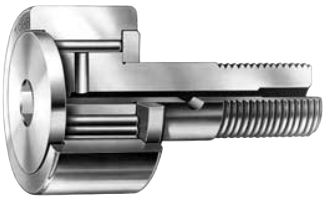
NEEDLE ROLLER BEARING CAPABILITY COMPARISON BASED ON SUITABLE OIL LUBRICATION

Bearing Design Bearing Capability	Needle Roller Type Assembly	Drawn Cup & Cage Radial Bearing Caged	Drawn Cup Needle Needle Roller Full Complement	Needle Roller Roller Bearing Inner Ring	Track Roller Bearing & Assembly	Needle Roller & Cage Thrust	Needle Rollers	Combination
Radial Load	High	Moderate	High	High	Moderate	None	Very high	High
Axial Load	None	None	None	None	Low	Very high	None	High
Limiting Speed	Very high	High	Moderate	Very high	Moderate	High	Moderate	Moderate
Slope Tolerance	Moderate	Moderate	Very low	Moderate	Moderate	Low	Very low	Low
Grease Life	High	High	Low	High	Moderate	Low	Low	Low
Friction	Very low	Very low	High	Very low	Low	Moderate	High	Moderate
Precision	Very high	Moderate	Moderate	High	High	High	Very high	High
Cross Section	Very low	Low	Low	Moderate	High	Very low	Very low	High
Cost	Low	Low	Low	High	High	Moderate	Very low	Very high

Radial Caged Needle Roller

Drawn Cup Needle Roller

Heavy-Duty Needle Roller



Track Roller

Thrust Needle Roller

Combined Needle Roller

Drawn Cup Roller Clutch

BEARING TYPES AND CAGES – *continued*

RADIAL SPHERICAL ROLLER BEARINGS

The principle styles of radial spherical roller bearings are offered by Timken: CJ, YM, YMB, VCF, VCSJ and VM.

CJ

YM / YMB

Tapered Bore Bearing with Adapter Sleeve Assembly

YM bearings offer the greatest range of sizes in all series. They combine Timken design experience with proven performance in many industries.

All of the newer styles (CJ, YM, YMB and VCF) offer higher load ratings for longer life. CJ bearings include a stamped steel cage and are suitable for a broad range of general service applications. For extreme conditions of use, the YM and YMB style, with a machined brass cage, should be considered.

The VCF-style spherical roller bearing uses a cage made of high-performance, glass-fiber reinforced polyamide. The maximum continuous operating temperature under normal working conditions is 120° C (250° F).

All styles are available in straight or tapered bores. Tapered bore bearings can be ordered by placing a "K" immediately after the numbers in the bearing description (e.g., 22311KYM).

Tapered bore bearings are available with adapter sleeve assemblies consisting of sleeve, locknut and washer. Adapter sleeve assemblies are designated SNW (e.g., SNW117).

Timken spherical roller bearings have been developed to accommodate radial and axial loads. The internal geometry allows the inner ring to accommodate misalignment. This capability is unique to spherical roller bearings allowing machine designers more tolerance and less restrictive assembly. Other data is listed.

Timken spherical roller bearings are available in ten dimensional series conforming to ISO and ANSI/ABMA standards. An illustration is presented below.

Optional features available with Timken spherical roller bearings:

W33 Lubrication Groove and Oil Holes

A lubrication groove and three oil holes are provided in the bearing outer ring. This eliminates the expense of machining a channel in the housing bore for introducing lubricant to the bearing. This design feature allows the lubricant to flow between the roller paths, through a single lubrication fitting. The lubricant moves laterally outward from the center of the bearing, reaching all contact surfaces and "flushing" the bearing. To order, add the suffix "W33" to the bearing number (e.g., 22216W33).

W22 Selected Outside Diameter Bearings

Bearings with selected outside diameters are required in some applications. Timken spherical roller bearings are available with reduced outside diameter tolerance. This allows a close control of the fit between the bearing and housing.

To specify this feature, add the suffix "W22" to the bearing number (e.g., 22216W22).

Additional features are available, consult your Timken representative for more information.

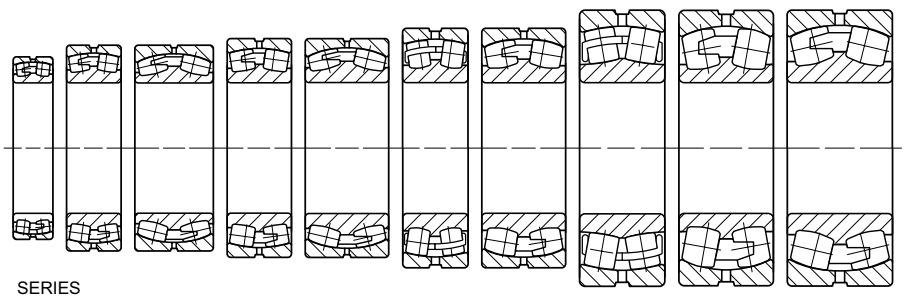
RADIAL CYLINDRICAL ROLLER BEARINGS

Standard Styles

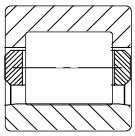
A Timken cylindrical roller bearing consists of an inner and outer ring, a roller retaining cage, and a complement of controlled contour cylindrical rollers. Depending on the type of bearing, either the inner or the outer ring has two roller guiding ribs. The other ring is separable from the assembly and has one rib or none. The ring with two ribs axially locates the position of the roller assembly. The ground diameters of these ribs may be used to support the roller cage. One of the ribs may be used to carry light thrust loads when an opposing rib is provided.

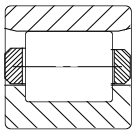
The decision as to which ring should be double-ribbed is normally determined by considering assembly and mounting procedures in the application.

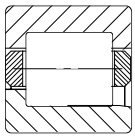
Types RU and RIU have double-ribbed outer and straight inner rings. Types RN and RIN have double-ribbed inner and straight outer rings. The use of either type at one position on a shaft is ideal for accommodating shaft expansion or contraction. The relative axial displacement of one ring to the other occurs with minimum friction while the bearing is rotating. These bearings may be used in two positions for shaft support if other means of axial location are provided.

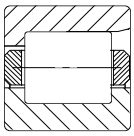


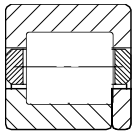
BEARING TYPES AND CAGES – *continued*

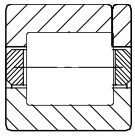

RIU, RU, NU


RIN, RN, N


RIJ, RJ, NJ


RIF, RF, NF


RIT, RT, NUP


RIP, RP, NP

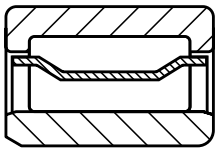
Types RJ and RIJ have double-ribbed outer and single-ribbed inner rings. Types RF and RIF have double-ribbed inner and single-ribbed outer rings. Both types can support heavy loads, as well as light unidirectional thrust loads. The thrust load is transmitted between the diagonally opposed rib faces in a sliding action. When limiting thrust conditions are approached, lubrication can become critical. Your Timken representative should be consulted for assistance in such applications. When thrust loads are very light, these bearings may be used in an opposed mounting to locate the shaft. In such cases, shaft endplay should be adjusted at time of assembly.

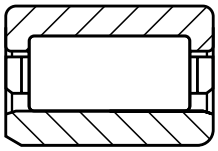
Types RT and RIT have double ribbed outer and single ribbed inner ring with a loose rib that allow the bearing to provide axial location in both directions. Types RP and RIP have a double-ribbed inner ring and a single-ribbed outer ring with a loose rib.

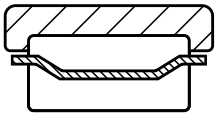
Types RT and RP (as well as RIT and RIP) can carry heavy radial loads and light thrust loads in both directions. Factors governing the thrust capacity are the same as for types RF and RJ bearings.

A type RT or RP bearing may be used in conjunction with type RN or RU bearings for applications where axial shaft expansion is anticipated. In such cases, the fixed bearing is usually placed nearest the drive end of the shaft to minimize alignment variations in the drive. Shaft endplay (or float) is determined by the axial clearance in the bearing.

The type NU, N, NJ, NF, NUP and NP are similar in construction to their 'R' counterparts, however, they conform to ISO and DIN standards for loose rib rings (thrust collars) and typical industry diameters over or under roller.


A-52xx-WS


A-52xx-WM


52xx-WS


A-52XX

5200 Metric Series

This series features enhanced radial load rating due to its internal design proportions. In this series, the outer ring is double-ribbed and the inner ring is full-width with a cylindrical O.D. The bearing also can be furnished without an inner ring for applications where radial space is limited. When so used, the shaft journal must be hardened to HRC 58 minimum, and the surface finished to 15 RMS maximum.

The bearing is usually furnished with a rugged stamped steel cage ("S" designation) and is land-riding on the outer ring ribs. The cage features depressed bars, which not only space rollers evenly, but retain them as a complete assembly with the outer ring. Cages of machined brass ("M" designation) are available for applications where reversing loads or high speeds might indicate their need. Outer rings are made from bearing quality alloy steel. The inner rings are deep-case hardened to accommodate the hoop stresses resulting from heavy press fits.

The standard bearing is furnished with radial internal clearances designated as R6, tabulated in Radial Cylindrical Roller Section. Other internal clearances can be supplied upon request. Proper roller guidance is assured by integral ribs and roller end clearance control.

BEARING TYPES AND CAGES – *continued*

TAPERED ROLLER BEARINGS

SINGLE-ROW BEARINGS

TS - Single-Row

This is the basic and the most widely used type of tapered roller bearing. It consists of the cone assembly and the cup. It is usually fitted as one of an opposing pair (see choice of mounting configuration). During equipment assembly, single-row bearings can be "set" to the required clearance (endplay) or preload condition to optimize performance.

TS

TSF - Single-row, with flanged cup

Variation on the basic single-row bearing-type TSF has a flanged cup to facilitate axial location and accurately aligned seats in a through-bored housing.

TSF

TWO-ROW BEARINGS

TDO - Double cup

This has a one-piece (double) cup and two single cones. It is usually supplied complete with a cone spacer as a pre-set assembly. This configuration gives a wide effective bearing spread and is frequently chosen for applications where overturning moments are a significant load component. TDO bearings can be used in fixed (locating) positions or allowed to float in the housing bore, for example to compensate for shaft expansion. TDODC or TDOCD cups also are available in most sizes. These cups have holes in the O.D. that permit the use of pins to prevent cup rotation in the housing.

TDI - Double cone
TDIT - Double cone with tapered bore

Both comprise a one-piece (double) cone and two single cups. They are usually supplied complete with a cup spacer as a pre-set assembly. TDI and TDIT bearings can be used at fixed (locating) positions on rotating shaft applications. For rotating housing applications, the double cone of Type TDI can be used to float on the stationary shaft. Type TDIT has a tapered bore to facilitate removal when an interference fit is essential, yet regular removal is required.

TDI

TDIT

TNA - Non-adjustable
TNASW - Non-adjustable with lubricant slots
TNASWE - Non-adjustable with lubricant slots and extended back face rib

These three bearing types are similar to the TDO – comprised of a one-piece (double) cup and two cones. The cone front faces are extended so they abut, eliminating the need for a separate cone spacer. Supplied with a built-in clearance to give a standard setting range, as listed, these bearings provide a solution for many fixed or floating bearing applications where optimum simplicity of assembly is required.

Types TNASW and TNASWE are variations having chamfers and slots on the front face of the cone to provide lubrication through the shaft. Type TNASWE have extended back face ribs on the cones which are ground on the O.D. to allow for the use of a seal or stamped closure – typically for use on stationary shaft applications.

TNA

TNASW

TNASWE

A

BEARING TYPES AND CAGES – *continued*

SPACER ASSEMBLIES

Any two single-row bearings (Type-TS) can be supplied as a two-row, pre-set, ready-to-fit assembly by the addition of spacers, machined to pre-determined dimensions and tolerances. This principle is adopted in two standard ranges of spacer assemblies listed in the main sections of this guide: types "SS" and "SR".

However, the concept can be applied to produce custom-made two-row bearings to suit specific applications. In addition to providing a bearing that automatically gives a pre-determined setting at assembly without the need for a manual setting, it is possible to modify the assembly width to suit an application, simply by varying the spacer lengths.

SS

SR

SS - Two single-row assembly

Often referred to as "snap-ring assemblies", Type-SS consist of two basic single-row bearings (Type-TS). They are supplied complete with cone and cup spacers to give a pre-determined bearing setting when assembled. Type-SS have a specified setting range to suit the duty of the application. They have a cone spacer and a snap-ring, which also serves as the cup spacer, to give axial location in a through-bored housing.

SR - Set-Right™ assembly

Type-SR are made to a standard setting range, based on Timken's Set-Right™ automated setting technique suitable for most industrial applications. They have two spacers and an optional snap-ring that may be used for axial location. Because both types are made up of popular sizes of single-row bearings, they provide a low cost option for many applications.

THERE ARE THREE BASIC TYPES OF SPACER ASSEMBLIES

TYPE 2TS-IM (INDIRECT MOUNTING)

These consist of two single-row bearings with a cone and cup spacer. In some applications the cup spacer is replaced by a shoulder in the bearing housing.

2TS-IM

TYPE 2TS-DM (DIRECT MOUNTING)

These consist of two single-row bearings, with cones abutting and a cup spacer. They are generally used at fixed (locating) positions on rotating shaft applications.

TYPE 2TS-TM (TANDEM MOUNTING)

Where combined radial and thrust load capacity is required, but the thrust component is beyond the capacity of a single bearing (within a given maximum O.D.), two single-row bearings can be mounted in tandem. Appropriate cone and cup spacers are supplied. Consult your Timken representative for the most effective and economical solution.

2TS-DM

2TS-TM

BEARING TYPES AND CAGES – *continued*

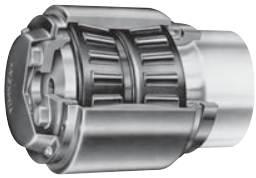
PACKAGED BEARINGS

PINION PAC™

UNIPAC™

UNIPAC–PLUS™

AP™



SP™

Pinion Pac™

The Pinion Pac™ bearing is a ready to install, pre-set and sealed package consisting of two rows of tapered roller bearings mounted in a carrier. It is custom designed for the final drive pinions of heavy commercial vehicles. The package gives the differential pinion builder considerable improvements in reliability, ease of assembly and supply logistics.

UNIPAC™

The UNIPAC™ bearing is a two-row tapered roller bearing, supplied as a maintenance free, pre-set, pre-lubricated and sealed package. Originally designed for the high-volume needs of passenger car wheels, the UNIPAC bearing now has wider application in wheel hubs of heavy vehicles as well as in industrial equipment.

The UNIPAC bearing provides improvements in reliability, ease of assembly and supply logistics.

UNIPAC-PLUS™

The UNIPAC-PLUS™ bearing is a ready-to-install, pre-set, sealed and lubricated-for-life two-row assembly with a flanged outer ring. It is a maintenance-free, heavy vehicle wheel package. The package enables a reduction in the wheel weight by eliminating the traditional wheel hub and has the advantage of improving reliability, assembly and supply logistics. An added advantage for disc-brake equipped axles is ease of mounting.

AP™ Bearing

The AP™ bearing is a self-contained assembly, made in a wide range of sizes. It consists of two single cones, a counterbored double cup, a backing ring, two radial seals, an end cap and cap screws. The AP bearing is supplied as a pre-set, pre-lubricated and sealed package.

SP™ Bearing

Similar in concept to AP bearings, the SP™ bearing is designed specifically for journal bearings on high-speed rail applications. The SP bearing type differs from the AP bearing in that SP bearings have labyrinth seals, are more compact in size, and are manufactured to metric boundary dimensions.

SEALED BEARINGS

TSL

The TSL incorporates a DUO-FACE® PLUS seal, making it an economical choice for grease lubricated applications at moderate speeds.

TSL

PRECISION BEARINGS

TS and TSF single-row bearings

These bearings are similar in design to the types described on page A11. They are only produced in high-precision quality, to be used in machine tool spindles, printing press cylinders and other applications where accuracy of rotation is required.

TSHR - Hydra-Rib™ bearing with preload adjustment device

For many applications, notably in the machine tool industry, bearings are required to run at high speeds with a controlled preload setting. The Hydra-Rib™ bearing has a "floating" cup rib controlled by hydraulic or pneumatic pressure, which ensures that the required bearing preload is maintained irrespective of the differential expansions or changes in loading taking place within the system.

TSHR

HIGH SPEED BEARINGS

TSMA - Single-row, with axial oil provision

Some applications require extreme high-speed capability, where special lubrication methods must be provided.

The TSMA is a single-row bearing with a special provision for lubrication of the critical roller-rib contact area to ensure adequate lubrication at high speeds. The concept works by capturing oil in a manifold (attached to the cone), which is then directed to the rib-roller contact area through holes drilled axially through the large cone rib. Consult your Timken representative for other high-speed bearing designs with specialized lubrication methods.

TSMA

TXR - Crossed roller bearing

A crossed roller bearing is two sets of bearing races and rollers brought together at right angles – with alternate rollers facing opposite directions – within a section height not much greater than that of a TS bearing. The steep angle, tapered geometry of the bearing causes the load-carrying center of each of the races to be projected along the axis, resulting in a total effective bearing spread many times greater than the width of the bearing itself. This type of bearing offers a high resistance to overturning moments.

The normal design of the bearing is type TXRDO, which has a double cup and two cones, with rollers spaced by polymer separators. Crossed roller bearings are manufactured in precision classes.

TXR

OTHER TWO-ROW BEARINGS

Type TDIE - Extended double cone
Type TDIA

These two-row bearings are designed for applications where it is required to lock the loose-fitted cone to a shaft, with provision also for effective closure or sealing – (typically on pillow blocks, disc-harrow and similar agricultural machinery shafts and line shafts).

Type TDIE is available in two forms: cylindrical bore with the cone extended at both ends and provisions for setscrews and locking collars at each end, or with an inherently self-locking square bore – ideal for farm machinery applications.

Type TDIA is similar to type TDIE with a cylindrical bore. There is a provision for a locking collar at one end only. The compact configuration is suited to pillow blocks and similar applications.

On all types, the hardened and ground O.D. of the cone extension provides an excellent surface for effective closure or sealing.

TDIE

TDIE (Square Bore)

TDIA

Type TNASWH - Non adjustable, heavy-duty, double cup
Type TNASWHF - Non adjustable, heavy-duty, with flanged double cup

These are two-row bearing assemblies with two cones and a one-piece cup, similar to type TNASWE listed in this guide.

The cups have a heavy wall section, allowing the bearings to be used directly as steady rest rollers, in sheet and strip levellers or, with a flange (Type-TNASWHF), as a complete wheel assembly for use on rails.

The cup is extended at both ends and counterbored to accept stamped closures. The bearings can be supplied with these ready-fitted as a unit assembly (but not pre-lubricated).

Rubbing seals are available for certain sizes.

TNASWHF

TNASWH

BEARING TYPES AND CAGES – *continued*

FOUR-ROW BEARING ASSEMBLIES

Four-row bearings combine the inherent high-load, radial/thrust capacity and direct/indirect mounting variations of tapered roller bearings into assemblies of maximum load rating in a minimum space. Their main application is on the roll necks of rolling mill equipment.

All four-row bearings are supplied as pre-set matched assemblies, with all components numbered to ensure correct installation sequence.

Type-TQO
Type-TQOW

These pairs of directly mounted bearings consist of two double cones, two single and one double cup, with a cone spacer and two cup spacers. These types are used on roll necks of low- and medium-speed rolling mills, applied to the necks with a loose fit. When the fillet and/or filler rings do not have lubrication slots, they are provided in the faces of the bearing cones (Type-TQOW). Slots in the cone spacer permit lubricant to flow from the bearing chamber to the roll neck. The cone spacers also are hardened to minimize face wear.

TQO

TQOW

Type-TQITS
Type-TQITSE

The main feature of these bearings is a tapered bore – the taper being matched and continuous through the cones. This permits an interference fit on the backup rolls of high-speed mills, where a loose cone fit of a straight bore type TQO bearing could result in excessive neck wear.

These four-row bearings consist of two pairs of indirectly mounted bearings: two single and one double cone, four single cups and three cup spacers. The relevant faces of the cones are extended so that they abut, eliminating the need for cone spacers. The indirect mounting of the bearing pairs increase the overall effective spread of the bearing, to give optimum stability and roll rigidity.

Type TQITSE is the same as TQITS, but has an extension to the large bore cone adjacent to the roll body. This not only provides a hardened, concentric and smooth surface for radial lip seals, but also improves roll neck rigidity by eliminating a fillet ring. This allows the centerline of the bearing to move closer to the roll body. It also permits shorter and less costly rolls.

TQITS

TQITSE

Sealed roll neck

The sealed roll neck bearing is similar to the TQO. A specially designed sealing arrangement is incorporated in the bearing to endure highly contaminated environments. The special seal design is built into the bearing to eliminate contamination from outside the bearing envelope and extend the useful life.

Sealed Roll Neck Bearing

THRUST BEARINGS

Standard types of thrust bearings manufactured by Timken are included in this section. Each type is designed to take thrust loads, but four types (TVL, DTVL, TTHD and TSR) accommodate radial loads as well. All types reflect advanced design concepts, with large rolling elements for maximum capacity. In roller thrust bearings, controlled contour rollers are used to insure uniform, full-length contact between rollers and raceways with resultant high capacity. Thrust bearings should operate under continuous load for satisfactory performance.

Type TVB – Grooved race thrust ball bearing
Type TVL – Angular contact thrust ball bearing
Type DTVL – Two direction angular contact thrust ball bearing
Type TP – Thrust cylindrical roller bearing
Type TPS – Self-aligning thrust cylindrical roller bearing
Type TTHD – Thrust tapered roller bearing
Type TSR – Thrust spherical roller bearing
Type TTVF – V-Flat thrust tapered roller bearing
Type TTVS – Self-aligning V-Flat thrust tapered roller bearing
Type TTSP – Steering pivot thrust cylindrical roller bearing

Thrust Ball Bearings

Thrust ball bearings are used for lighter loads and higher speeds than thrust roller bearings.

Type TVB ball thrust bearing is separable and consists of two hardened and ground steel washers with grooved raceways, and a cage that separates and retains precision-ground and lapped balls. The standard cage material is brass, but this may be varied according to the requirements of the application. Timken Standard Tolerances for Type TVB bearings are equivalent to ABEC 1 where applicable, but higher grades of precision are available.

Type TVB bearing provides axial rigidity in one direction and its use to support radial loads is not suggested. Usually the rotating washer is shaft-mounted. The stationary washer should be housed with sufficient O.D. clearance to allow the bearing to assume its proper operating position. In most sizes both washers have the same bore and O.D. The housing must be designed to clear the O.D. of the rotating washer, and it is necessary to step the shaft to clear the bore of the stationary washer.

Type TVL is a separable angular contact ball bearing primarily designed for unidirectional thrust loads. The angular contact design, however, will accommodate combined radial and thrust loads since the loads are transmitted angularly through the balls.

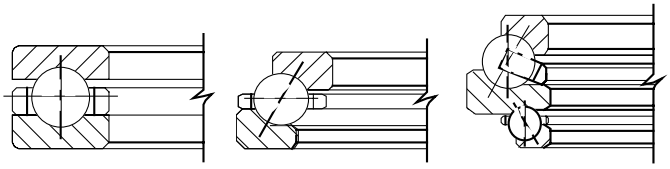
The bearing has two hardened and ground steel rings with ball grooves and a one-piece brass cage that spaces the ball complement. Although not strictly an angular ball bearing, the larger ring is still called the outer ring, and the smaller the inner ring. Timken Standard Tolerances for type TVL bearings are equivalent to ABEC 1 where applicable, but higher grades of precision are available.

Usually the inner ring is the rotating member and is shaft-mounted. The outer ring is normally stationary and should be mounted with O.D. clearance to allow the bearing to assume its proper operating position. If combined loads exist, the outer ring must be radially located in the housing.

Type TVL bearings should always be operated under thrust load. Normally, this presents no problem as the bearing is usually applied on vertical shafts in oil field rotary tables and machine tool indexing tables. If constant thrust load is not present, it should be imposed by springs or other built-in devices.

Low friction, cool running and quiet operation are advantages of this type of TVL bearing, which may be operated at relatively high speeds. The bearing also is less sensitive to misalignment than other types of rigid thrust bearings.

DTVL is similar in design to TVL except the DTVL has an additional washer and ball complement permitting it to carry moderate thrust in one direction and light thrust in the other direction.



TVB TVL DTVL

Thrust Cylindrical Roller Bearings

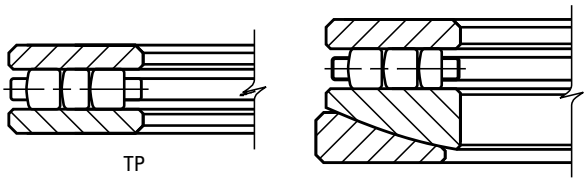
Thrust cylindrical roller bearings withstand heavy loads at relatively moderate speeds. Standard bearings can be operated at bearing O.D. peripheral speeds of 3000 fpm (15 m/s). Special design features can be incorporated into the bearing and mounting to attain higher operating speeds.

Because loads are usually high, extreme pressure (EP) lubricants should be used with roller thrust bearings. Preferably, the lubricant should be introduced at the bearing bore and distributed by centrifugal force.

All types of thrust roller bearings are made to Timken Standard Tolerances. Higher precision may be obtained when required.

Type TP thrust cylindrical roller bearing has two hardened and ground steel washers, with a cage retaining one or more controlled contour rollers in each pocket. When two or more rollers are used in a pocket, they are of different lengths and are placed in staggered position in adjacent cage pockets to create overlapping roller paths. This prevents wearing grooves in the raceways and prolongs bearing life.

Because of the simplicity of their design, Type TP bearings are economical. Since minor radial displacement of the raceways does not affect the operation of the bearing, its application is relatively simple and often results in manufacturing economies for the user. Shaft and housing seats, must be square to the axis of rotation to prevent initial misalignment problems.



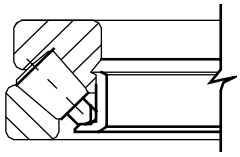
TP TPS

Type TPS bearings are the same as Type TP bearings except one washer is spherically ground to seat against an aligning washer, thus making the bearing adaptable to initial misalignment. Its use is not suggested for operating conditions where alignment is continuously changing (dynamic misalignment).

Thrust Spherical Roller Bearings

Type-TSR

The TSR thrust spherical roller bearing design achieves a high thrust capacity with low friction and continuous roller alignment. The bearings can accommodate pure thrust loads as well as combined radial and thrust loads. Typical applications are air regenerators, centrifugal pumps and deep well pumps. Maximum axial misalignment between inner and outer ring is ±2.5 degrees.



TSR

BEARING TYPES AND CAGES – *continued*

Thrust Tapered Roller Bearings

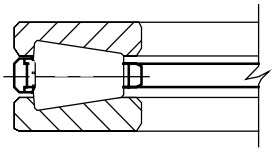
Type-TTHD

Type TTHD thrust tapered roller bearing has an identical pair of hardened and ground steel washers with conical raceways, and a complement of controlled contour tapered rollers equally spaced by a cage.

In the design of Type TTHD, the raceways of both washers and the tapered rollers have a common vertex at the bearing center. This assures true rolling motion.

TTHD bearings are well-suited for applications such as crane hooks, where extremely high thrust loads and heavy shock must be resisted and some measure of radial location obtained.

For very low-speed, heavily loaded applications, these bearings are supplied with a full complement of rollers for maximum capacity and are identified in the table of dimensions. For application review of the full complement Type TTHD bearing, consult your Timken representative.



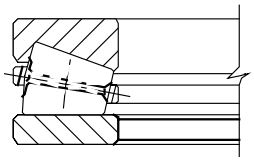
TTHD

Type-TTVF Type-TTVS Type-TTHDFL Type-TTHDSV Type-TTHDSX

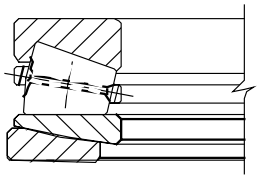
V-Flat Tapered Roller bearings (TTVF and TTVS) combine the best features of thrust tapered and cylindrical roller bearings, offering the highest possible capacity of any thrust bearing of its size. V-Flat design includes one flat washer and the second with a tapered raceway matching the rollers. Design was originally developed for screwdown applications in metal rolling mills where thrust loads exceeding one million pounds are common. These bearings have exceptional dynamic capacity within a given envelope and provide superior static capacity. They have been highly successful in heavily loaded extruders, in cone crushers and other applications where a wide range of operating conditions are found.

Most sizes utilize cages with hardened pins through the center of the rollers, allowing closer spacing of the rollers to maximize capacity. Smaller sizes have cast brass cages, carefully machined to permit full flow of lubricant.

Self-aligning V-Flat bearings (TTVS) employ the same basic roller and raceway design, except the lower washer is in two pieces, with the contacting faces spherically ground permitting self-alignment under conditions of initial misalignment. TTVS bearings should not be used if dynamic misalignment (changing under load) is expected.



TTVF



TTVS

TTHDFL

TTHDSV

TTHDSX

TTC - Cageless TTSP - Steering pivot

There are two basic types of Timken thrust bearings designed for specific fields of duty where the only load component is thrust, TTC and TTSP. The TTC bearing uses a full complement of rollers without a cage and is used when the speeds are slow. The TTSP bearing uses a cage and was designed for the oscillating motion of steering pivot positions.

TTC

TTSP

CAGES

Cages (sometimes referred to as rolling element separators or retainers) perform an important function in the proper operation of rolling bearings. They serve to maintain uniform rolling element spacing in the races of the inner and outer rings of the bearings as the rolling elements pass into and out of the load zones. Cage types in several materials and configurations have been developed by Timken to meet various service requirements. Temperature limitations are described later in this section.

Some of the materials from which cages are made include pressed steel, pressed brass, machined brass, machined steel and compositions of various synthetic materials.

STEEL CAGES FOR RADIAL BALL BEARINGS

Steel cages are generally ball-piloted and are available in the following types:

Pressed Steel Finger Type Cages (SR)

Light in weight and made from strong, cold rolled steel, the pressed steel cage because of its compactness is the optimum design for use in shielded and sealed bearings which must conform to ABEC boundary dimensions. This is a general purpose design and is frequently used for ABEC 1 ball bearing sizes.

Pressed Steel Welded Cages (WR)

The welded steel cage provides greater strength, increased rigidity, and better pocket alignment than the finger type. The projection welding of the cage halves eliminates weakening notches or holes and fingers or rivets. It assures better mating of cage halves circumferentially and radially.

This construction also provides more uniformity of ball to pocket clearance. Improved pocket geometry permits higher speeds, reduces cage wear, provides cooler operation, and improves and extends lubricant life. This cage is standard in most radial non-filling slot bearings of the open, shielded, and sealed types.

MOLDED CAGES FOR RADIAL BALL BEARINGS

Molded cages are either ball piloted or land piloted and are available in the following types:

Nylon (PRB)

One-piece molded snap-in 6/6 nylon cages are specially processed to provide:

- Toughness at moderately high and low temperatures
- Resistance to abrasion
- Resistance to organic solvents, oils and grease
- Natural lubricity
- Long term service at temperatures up to +120° C (+250° F)
- Dimensional stability

These cages offer superior performance in applications involving misalignment due to their greater flexibility.

PRB molded nylon cages provide uniformity of ball pocket clearances for consistent operation. They are suitable for temperatures up to +120° C (+250° F) continuous operation and can tolerate +150° C (+300° F) for short periods.

These cages are available in conrad (K) bearings and are standard for the more popular wide inner ring bearing series.

BEARING TYPES AND CAGES – *continued*

Reinforced Nylon (PRC)

Molded 6/6 nylon reinforced with 30 percent (by weight) glass fibers. This material is used primarily for one-piece ring piloted cages used in precision grades of angular contact bearings.

PRC cages offer outstanding strength and long term temperature resistance. Molded to very close tolerances and uniformity, combined with light weight design, they permit higher speeds and reduced noise. They are suitable for temperatures up to +150° C (+300° F).

PRC cages are usually the one piece outer piloted "L" type design, but are also available in one piece ball controlled designs.

Special Molded Cages

For very high speeds or very high temperature applications special materials can be used. Nylon with a PTFE additive is available for molded cages required for high speed applications. For applications involving high operating temperatures (up to +232° C, +450° F) molded cages made of fiber reinforced polyphenelyene sulfide can be made.

For availability of these special cages please consult your Timken representative.

Brass and Steel Cages

Brass cages are generally installed in bearings which are designed for use on heavily loaded applications, such as, deep well pumps, woodworking machinery, and heavy construction machinery. The following types of Timken brass cages are available:

Iron Silicon Brass Cage (SMBR) and Machined Steel Cage (MSR)

The SMBR and MSR cages are ring piloted. The advantages of these cages are high strength even at elevated temperatures (see chart on page A167) as well as high-speed capability due to the ring piloted construction. In many cases these cages are silver plated for use in applications requiring high reliability.

They are available in both ball and roller bearings.

Cast Brass Cage (BR)

This cage, a ball piloted brass retainer designated by the letters BR, utilizes two identical halves which are riveted together.

BR

MBR

Machined Brass Cage (MBR)

These cages are machined all over to provide ring riding surfaces and good static and dynamic balance. They are commonly incorporated as inner ring piloted designs in the 7000 angular contact product family. Because of their superior strength, these cages are generally used on heavily loaded applications such as, deep well pumps, woodworking machinery, and heavy construction machinery.

Composition Cages (CR)

Composition cages combine light weight, precision and oil-absorbing features which are particularly desirable for use on high speed applications. This (CR) cage, is a ring piloted type and is particularly associated with the outer-ring piloted , extra precision WN series bearings.

Special Cages

For certain very high contact angle, light section aircraft bearings, molded nylon "snake" cages are employed. Cages are also made with high temperature materials (see page A167) in the various configurations described above.

For availability of special cages please contact your Timken representative.

CAGES FOR SPHERICAL ROLLING BEARINGS

Brass Cages

YM Bearing cages are one-piece design centrifugally cast and precision machined. The rugged construction of this cage type provides an advantage in more severe applications. Due to its design this cage permits YM bearings to incorporate greater load carrying capabilities.

The open end design permits lubricant to reach all surfaces easily assuring ample lubrication and a cooler running bearing.

YM Cage

CJ

Stamped Steel Cages (CJ)

These cages are used in CJ bearings and are designed to permit extra load carrying capabilities in the bearing. Two independent cages, one for each row of rollers, are assembled in an individual bearing.

Pin Type Cages

Large diameter spherical roller bearings can be supplied with these cages. The design of pin type cages permits an increased roller complement thus giving the bearing enhanced load carrying ability. Consult your Timken representative for suggestions on the application of this cage.

CAGES FOR RADIAL CYLINDRICAL ROLLER BEARINGS

Brass Cages

These are primarily roller guided cages with cylindrical bored pockets. They are used with the standard style roller bearings.

Brass Cage

Stamped Steel Cages

Stamped steel cages of varying designs are available in the standard style cylindrical roller bearings.

The stamped steel cage for the 5200 series is a land riding cage piloted by the outer ring ribs. The cage features depressed bars which not only space rollers evenly but retain them as a complete assembly with the outer ring.

CAGES FOR TAPERED ROLLER BEARINGS

Stamped Steel Cages

The cages are of compact space savings design and in some cases permit increased load-carrying capabilities to be incorporated into the bearing. They are roller riding with bridges positioned above the pitch line to retain the rollers within the cone.

Machined Cages

These heavy section ruggedly constructed cages are fully machined and are land riding on the thrust and toe flange O.D. of the cone (inner ring). The bridges between the straight through machined roller pockets are staked above the pitch line to retain the rollers with the cone.

Pin Type Cages

This steel cage design features a pin which fits closely with a bored hole in the roller. The rollers can thus be retained with a minimum space between the rollers so that an increased complement of rollers can be incorporated. This results in greater load carrying capabilities in the bearing.

DETERMINATION OF APPLIED LOADS AND BEARING ANALYSIS

SUMMARY OF SYMBOLS USED TO DETERMINE APPLIED LOADS AND BEARING ANALYSIS

Symbol	Description	Units
a_1	Reliability Life Factor	
a_2	Material Life Factor	
a_3	Operating Condition Life Factor	
a_{3d}	Debris Life Factor	
a_{3h}	Hardness Life Factor	
a_{3k}	Load Zone Life Factor	
a_{3l}	Lubrication Life Factor	
a_{3m}	Misalignment Life Factor	
a_{3p}	Low Load Life Factor	
a_e	Effective Bearing Spread	mm, in.
b	Tooth Length	mm, in.
c_1, c_2	Linear Distance (positive or negative)	mm, in.
C	Dynamic Radial Load Rating	N, lbf
C_0	Static Load Rating	N, lbf
C_p	Specific Heat of Lubricant	J/(kg -C°), BTU/(lb x F°)
d	Bearing bore diameter	mm, in.
d_0	Mean inner race diameter	mm, in.
d_c	Distance Between Gear Centers	mm, in.
d_m	Mean Bearing Diameter	mm, in.
d_s	Shaft inside diameter	mm, in.
D	Bearing outside diameter	mm, in.
D_0	Mean outer race diameter	mm, in.
D_H	Housing outside diameter	mm, in.
D_m	Mean Diameter or Effective Working Diameter of a Sprocket, Pulley, Wheel or Tire Also, Tapered Roller Mean Large Rib Diameter	mm, in.
D_{mG}	Mean or Effective Working Diameter of the Gear	mm, in.
D_{mP}	Effective Working Diameter of the Pinion	mm, in.
D_{mW}	Effective Working Diameter of the Worm	mm, in.
D_{pG}	Pitch Diameter of the Gear	mm, in.
D_{pP}	Pitch Diameter of the Pinion	mm, in.
D_{pW}	Pitch Diameter of the Worm	mm, in.
e	Life Exponent	
f	Lubricant Flow Rate	L/min, U.S. pt/min
f_0	Viscous Dependent Torque Coefficient	
f_1	Load Dependent Torque Coefficient	
f_B	Belt or Chain Pull Factor	
F	General Term for Force	N, lbf
F_a	Applied Thrust (Axial) Load	N, lbf
F_{ai}	Induced Thrust (Axial) Load due to Radial Loading	N, lbf
F_{ac}	Induced Thrust (Axial) Load due to Centrifugal Loading	N, lbf
F_{aG}	Thrust Force on Gear	N, lbf
F_{aP}	Thrust Force on Pinion	N, lbf
F_{aW}	Thrust Force on Worm	N, lbf
f_B	Belt or Chain Pull	N, lbf
F_c	Centrifugal Force	N, lbf
F_r	Applied Radial Load	N, lbf
F_{sG}	Separating Force on Gear	N, lbf
F_{sP}	Separating Force on Pinion	N, lbf
F_{sW}	Separating Force on Worm	N, lbf
F_{te}	Tractive Effort on Vehicle Wheels	N, lbf
F_{tG}	Tangential Force on Gear	N, lbf
F_{tP}	Tangential Force on Pinion	N, lbf
F_{tW}	Tangential Force on Worm	N, lbf
F_W	Force of Unbalance	N, lbf
h	Horizontal (used as subscript)	
H	Power (kW or HP)	kW, HP
HF_s	Static Load Rating Adjustment Factor for Raceway Hardness	

Symbol	Description	Units
k	Centrifugal Force Constant	lbf/RPM^2
k_1	Bearing Torque Constant	
k_4, k_5, k_6	Dimensional Factor to calculate heat generation	
K	Tapered Roller Bearing Radial-to-Axial Dynamic Load Rating Factor	
l	Thrust Needle Roller Length	mm, in.
L	Lead. Axial Advance of a Helix for One Complete Revolution	mm, in.
L	Distance between bearing geometric center lines	mm, in.
m	Gearing Ratio	
M	Bearing Operating Torque or Moment	N-m, N-mm, lb-in.
n	Bearing Operating Speed or General Term for Speed	rot/min, RPM
n_G	Gear Operating Speed (RPM)	rot/min, RPM
n_P	Pinion Operating Speed (RPM)	rot/min, RPM
n_W	Worm Operating Speed (RPM)	rot/min, RPM
N_G	Number of Teeth in the Gear	
N_P	Number of Teeth in the Pinion	
N_S	Number of Teeth in the Sprocket	
P_0	Static Equivalent Load	N, lbf
P_0a	Static Equivalent Thrust (Axial) Load	N, lbf
P_0r	Static Equivalent Radial Load	N, lbf
P_r	Dynamic Equivalent Radial Load	N, lbf
Q	Generated Heat or Heat Dissipation Rate	W, BTU/min
T	Torque	N-m, lb-in.
v	Vertical (used as subscript)	
V	Linear Velocity or Speed	km/h, mph
V_r	Rubbing, Surface or Tapered Roller Bearing Rib Velocity	m/s, fpm
X	Dynamic Radial Load Factor	
X_0	Static Radial Load Factor	
Y	Dynamic Thrust (Axial) Load Factor	
Y_0	Static Thrust (Axial) Load Factor	
Υ_G	Bevel Gearing – Gear Pitch Angle	deg.
	Hypoid Gearing – Gear Root Angle	deg.
Υ_P	Bevel Gearing – Pinion Pitch Angle	deg.
	Hypoid Gearing – Pinion Face Angle	deg.
α	Coefficient of linear expansion	mm/mm/C°, in./in./F°
δ_S	Interference fit of inner race on shaft	mm, in.
δ_H	Interference fit of outer race in housing	mm, in.
η	Efficiency, Decimal Fraction	
$\theta1, \theta2, \theta3$	Gear Mesh Angles Relative to the Reference Plane	deg.
θi, θo	Oil inlet or outlet temperature	C°, F°
λ	Worm Gear Lead Angle	deg.
μ	Coefficient of Friction	
v	Lubricant Kinematic Viscosity	cSt
$\sigma0$	Approximate Maximum Contact Stress	MPa, psi
Φ_G	Normal Tooth Pressure Angle for the Gear	deg.
Φ_P	Normal Tooth Pressure Angle for the Pinion	deg.
ψ_G	Helix (Helical) or Spiral Angle for the Gear	deg.
ψ_P	Helix (Helical) or Spiral Angle for the Pinion	deg.
ΔT	Temperature difference between shaft/inner race + rollers and housing/bearing outer race	C°, F°
ρ	Lubricant Density	kg/m^3, lb/ft^3

DETERMINATION OF APPLIED LOADS

The following equations are used to determine the forces developed by machine elements commonly encountered in bearing applications.

GEARING

Spur gearing (Fig. A-1)

Tangential force

$$F_{tG} = \frac{(1.91 \times 10^7)\, H}{D_{pG} n_G} \text{ (newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{pG} n_G} \text{ (lbf-in.)}$$

Separating force

$F_{sG} = F_{tG} \tan \phi_G$

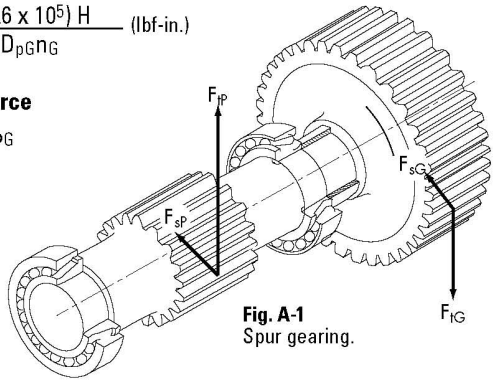


Fig. A-1
Spur gearing.

Single helical gearing (Fig. A-2)

Tangential force

$$F_{tG} = \frac{(1.91 \times 10^7)\, H}{D_{pG} n_G} \text{ (newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{pG} n_G} \text{ (lbf-in.)}$$

Separating force

$$F_{sG} = \frac{F_{tG} \tan \phi_G}{\cos \psi_G}$$

Thrust force

$F_{aG} = F_{tG} \tan \psi_G$

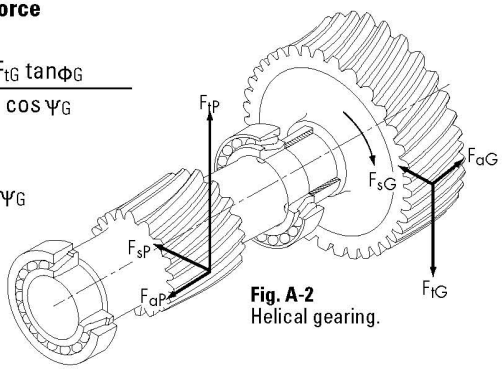


Fig. A-2
Helical gearing.

Straight bevel and zerol gearing with zero degrees spiral (Fig. A-3)

In straight bevel and zerol gearing, the gear forces tend to push the pinion and gear out of mesh, such that the direction of the thrust and separating forces are always the same regardless of direction of rotation. (Fig. A-3) In calculating the tangential force, (FtP or FtG), for bevel gearing, the pinion or gear mean diameter, (DmP or DmG), is used instead of the pitch diameter, (DpP or DpG). The mean diameter is calculated as follows:

$D_{mG} = D_{pG} - b \sin \gamma_G$ or $D_{mP} = D_{pP} - b \sin \gamma_P$

In straight bevel and zerol gearing

$F_{tP} = F_{tG}$

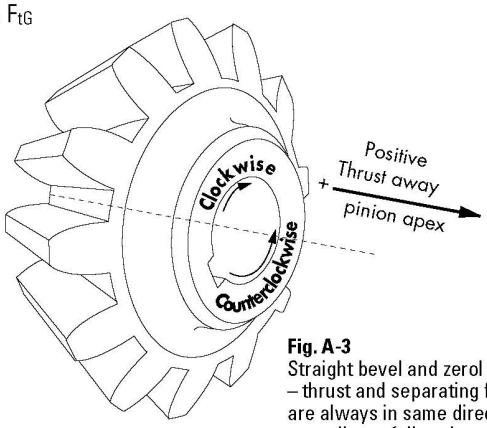


Fig. A-3
Straight bevel and zerol gears – thrust and separating forces are always in same direction regardless of direction of rotation.

Pinion

Tangential force

$$F_{tP} = \frac{(1.91 \times 10^7)\, H}{D_{mP} n_P} \text{ (newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{mP} n_P} \text{ (lbf-in.)}$$

Thrust force

$F_{\Phi P} = F_{tP} \tan \phi_P \sin \gamma_P$

Separating force

$F_{sP} = F_{tP} \tan \phi_P \cos \gamma_P$

DETERMINATION OF APPLIED LOADS AND BEARING ANALYSIS - *continued*

Straight bevel gear (Fig. A-4)

Tangential force

$$F_{tG} = \frac{(1.91 \times 10^7)\, H}{D_{mG}\, n_G} \text{ (newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{mG}\, n_G} \text{ (lbf-in.)}$$

Thrust force

$F_{aG} = F_{tG} \tan \phi_G \sin \gamma_G$

Separating force

$F_{sG} = F_{tG} \tan \phi_G \cos \gamma_G$

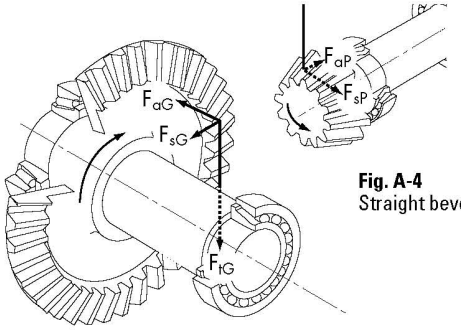


Fig. A-4
Straight bevel gearing.

Spiral bevel and hypoid gearing (Fig. A-5)

In spiral bevel and hypoid gearing, the direction of the thrust and separating forces depends upon spiral angle, hand of spiral, direction of rotation, and whether the gear is driving or driven (see Table 1). The hand of the spiral is determined by noting whether the tooth curvature on the near face of the gear (Fig. A-5) inclines to the left or right from the shaft axis. Direction of rotation is determined by viewing toward the gear or pinion apex.

In spiral bevel gearing

$F_{tP} = F_{tG}$

In hypoid gearing

$$F_{tP} = \frac{F_{tG} \cos \psi_P}{\cos \psi_G}$$

Hypoid pinion effective working diameter

$$D_{mP} = D_{mG} \left(\frac{N_p}{N_G}\right)\left(\frac{\cos \psi_G}{\cos \psi_P}\right)$$

Tangential force

$$F_{tG} = \frac{(1.91 \times 10^7)\, H}{D_{mG}\, n_G} \text{ (newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{mG}\, n_G} \text{ (lbf-in.)}$$

Hypoid gear effective working diameter

$D_{mG} = D_{pG} - b \sin \gamma_G$

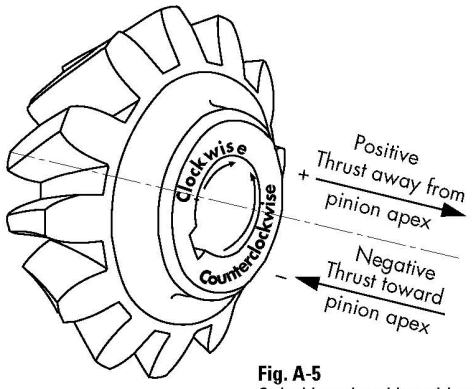


Fig. A-5
Spiral bevel and hypoid gears – the direction of thrust and separating forces depends upon spiral angle, hand of spiral, direction of rotation, and whether the gear is driving or driven.

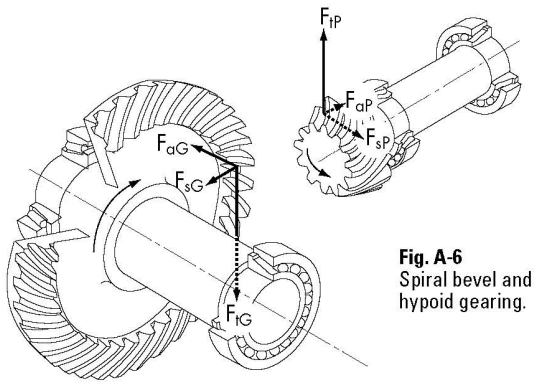


Fig. A-6
Spiral bevel and hypoid gearing.

DETERMINATION OF APPLIED LOADS AND BEARING ANALYSIS - *continued*

TABLE 1

SPIRAL BEVEL AND HYPOID GEARING EQUATIONS

Driving member rotation	Thrust force	Separating force
Right hand spiral clockwise or Left hand spiral counterclockwise	Driving member $F_{aP} = \frac{F_{tP}}{\cos \psi_P} (\tan \phi_P \sin \gamma_P - \sin \psi_P \cos \gamma_P)$	Driving member $F_{sP} = \frac{F_{tP}}{\cos \psi_P} (\tan \phi_P \cos \gamma_P + \sin \psi_P \sin \gamma_P)$
	Driven member $F_{aG} = \frac{F_{tG}}{\cos \psi_G} (\tan \phi_G \sin \gamma_G + \sin \psi_G \cos \gamma_G)$	Driven member $F_{sG} = \frac{F_{tG}}{\cos \psi_G} (\tan \phi_G \cos \gamma_G - \sin \psi_G \sin \gamma_G)$
Right hand spiral counterclockwise or Left hand spiral clockwise	Driving member $F_{aP} = \frac{F_{tP}}{\cos \psi_P} (\tan \phi_P \sin \gamma_P + \sin \psi_P \cos \gamma_P)$	Driving member $F_{sP} = \frac{F_{tP}}{\cos \psi_P} (\tan \phi_P \cos \gamma_P - \sin \psi_P \sin \gamma_P)$
	Driven member $F_{aG} = \frac{F_{tG}}{\cos \psi_G} (\tan \phi_G \sin \gamma_G - \sin \psi_G \cos \gamma_G)$	Driven member $F_{sG} = \frac{F_{tG}}{\cos \psi_G} (\tan \phi_G \cos \gamma_G + \sin \psi_G \sin \gamma_G)$

Straight worm gearing (Fig. A-7)

WORM

Tangential force

$$F_{tW} = \frac{(1.91 \times 10^7)\, H}{D_{pW}\, n_W} \text{ (newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{pW}\, n_W} \text{ (lbf-in.)}$$

Thrust force

$$F_{aW} = \frac{(1.91 \times 10^7)\, H\, \eta}{D_{pG}\, n_G} \text{ (newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H\, \eta}{D_{pG}\, n_G} \text{ (lbf-in.)}$$

or

$$F_{aW} = \frac{F_{tW}\, \eta}{\tan \lambda}$$

Separating force

$$F_{sW} = \frac{F_{tW} \sin \Phi}{\cos \Phi \sin \lambda + \mu \cos \lambda}$$

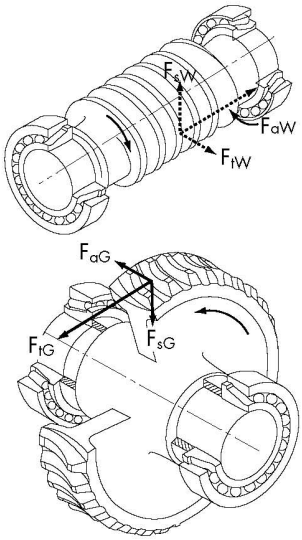


Fig. A-7
Straight worm gearing.

DETERMINATION OF APPLIED LOADS AND BEARING ANALYSIS - *continued*

Worm Gear

Tangential force

$$F_{tG} = \frac{(1.91 \times 10^7)\, H\, \eta}{D_{pG}\, n_G} \quad \text{(newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H\, \eta}{D_{pG}\, n_G} \quad \text{(lbf-in.)}$$

or

$$F_{tG} = \frac{F_{tW}\, \eta}{\tan \lambda}$$

Thrust force

$$F_{aG} = \frac{(1.91 \times 10^7)\, H}{D_{pW}\, n_W} \quad \text{(newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{pW}\, n_W} \quad \text{(lbf-in.)}$$

Separating force

$$F_{sG} = \frac{F_{tW} \sin \Phi}{\cos \Phi \sin \lambda + \mu \cos \lambda}$$

where:

$$\lambda = \tan^{-1}\left(\frac{D_{pG}}{m\, D_{pW}}\right) = \tan^{-1}\left(\frac{L}{\pi\, D_{pW}}\right)$$

$$\eta = \frac{\cos \Phi - \mu \tan \lambda}{\cos \Phi + \mu \cot \lambda}$$

Metric system

$$\mu^* = (5.34 \times 10^{-7})\, V_r^3 + \frac{0.146}{V_r^{0.09}} - 0.103$$

$$V_r = \frac{D_{pW}\, n_W}{(1.91 \times 10^4) \cos \lambda} \quad \text{(meters per second)}$$

Inch system

$$\mu^* = (7 \times 10^{-14})\, V_r^3 + \frac{0.235}{V_r^{0.09}} - 0.103$$

$$V_r = \frac{D_{pW}\, n_W}{3.82 \cos \lambda} \quad \text{(feet per minute)}$$

*Approximate coefficient of friction for the 0.015 to 15 m/s (3 to 3000 ft/min) rubbing velocity range.

Double enveloping worm gearing

Worm

Tangential force

$$F_{tW} = \frac{(1.91 \times 10^7)\, H}{D_{mW}\, n_W} \quad \text{(newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{mW}\, n_W} \quad \text{(lbf-in.)}$$

Thrust force

$$F_{aW} = 0.98\, F_{tG}$$

Use this value for calculating torque in subsequent gears and shafts. For bearing loading calculations, use the equation for F_{aW}.

Separating force

$$F_{sW} = \frac{0.98\, F_{tG} \tan \Phi}{\cos \lambda}$$

WORM GEAR

Tangential force

$$F_{tG} = \frac{(1.91 \times 10^7)\, H\, m\, \eta}{D_{pG}\, n_W} \quad \text{(newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H\, m\, \eta}{D_{pG}\, n_W} \quad \text{(lbf-in.)}$$

Use this value for F_{tG} for bearing loading calculations on worm gear shaft. For torque calculations, use the following F_{tG} equations.

or

$$F_{tG} = \frac{(1.91 \times 10^7)\, H\, \eta}{D_{pG}\, n_G} \quad \text{(newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H\, \eta}{D_{pG}\, n_G} \quad \text{(lbf-in.)}$$

Thrust force

$$F_{aG} = \frac{(1.91 \times 10^7)\, H}{D_{mW}\, n_W} \quad \text{(newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H}{D_{mW}\, n_W} \quad \text{(lbf-in.)}$$

Separating force

$$F_{sG} = \frac{0.98\, F_{tG} \tan \Phi}{\cos \lambda}$$

where:

η = efficiency (refer to manufacturer's catalog)

$D_{mW} = 2d_c - 0.98\, D_{pG}$

Lead angle at center of worm

$$\lambda = \tan^{-1}\left(\frac{D_{pG}}{m\, D_{pW}}\right) = \tan^{-1}\left(\frac{L}{\pi\, D_{pW}}\right)$$

DETERMINATION OF APPLIED LOADS AND BEARING ANALYSIS - *continued*

Belt and chain drive factors (Fig. A-8)

Due to the variations of belt tightness as set by various operators, an exact equation relating total belt pull to tension F1 on the tight side and tension F2 on the slack side (Fig. A-8) is difficult to establish. The following equation and Table 2 may be used to estimate the total pull from various types of belt and pulley, and chain and sprocket designs:

$$F_b = \frac{(1.91 \times 10^7)\, H\, f_B}{D_m\, n} \quad \text{(newtons)}$$

$$= \frac{(1.26 \times 10^5)\, H\, f_B}{D_m\, n} \quad \text{(lbf-in.)}$$

Standard roller chain sprocket mean diameter

$$D_m = \frac{P}{\sin\left(\frac{180}{N_s}\right)}$$

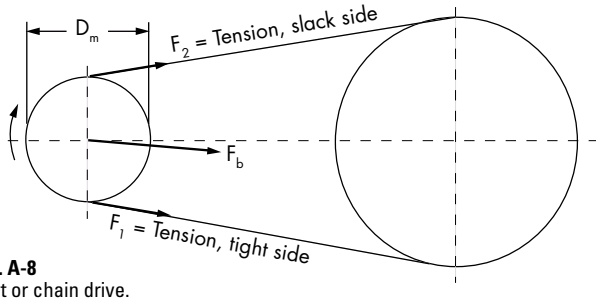


Fig. A-8
Belt or chain drive.

Type	f_B
Chains, single	1.00
Chains, double	1.25
"V" belts	1.50

Table 2
Belt or chain pull factor based on 180 degrees angle of wrap.

CENTRIFUGAL FORCE

Centrifugal force resulting from imbalance in a rotating member:

$$F_c = \frac{F_w\, r\, n^2}{8.94 \times 10^5} \quad \text{(newtons)}$$

$$= \frac{F_w\, r\, n^2}{3.52 \times 10^4} \quad \text{(lbf-in.)}$$

SHOCK LOADS

It is difficult to determine the exact effect that shock loading has on bearing life. The magnitude of the shock load depends on the masses of the colliding bodies, their velocities, and deformations at impact.

The effect on the bearing depends on how much of the shock is absorbed between the point of impact and the bearings, as well as whether the shock load is great enough to cause bearing damage. It also is dependent on frequency and duration of shock loads.

At a minimum, a suddenly applied load is equivalent to twice its static value. It may be considerably more than this, depending on the velocity of impact.

Shock involves a number of variables that generally are not known or easily determined. Therefore, it is good practice to rely on experience. The Timken Company has years of experience with many types of equipment under the most severe loading conditions. Your Timken representative should be consulted on any application involving unusual loading or service requirements.

GENERAL FORMULAS

Tractive effort and wheel speed

The relationships of tractive effort, power, wheel speed and vehicle speed are:

Metric system

$$H = \frac{F_{te}\, V}{3600} \quad \text{(kW)}$$

$$n = \frac{5300\, V}{D_m} \quad \text{(rev/min)}$$

Inch system

$$H = \frac{F_{te}\, V}{375} \quad \text{(HP)}$$

$$n = \frac{336\, V}{D_m} \quad \text{(rev/min)}$$

Torque to power relationship

Metric system

$$T = \frac{60\,000\, H}{2\pi\, n} \quad \text{(N-m)}$$

$$H = \frac{2\pi\, n\, T}{60\,000} \quad \text{(kW)}$$

Inch system

$$T = \frac{395\,877\, H}{2\pi\, n} \quad \text{(lbf-in.)}$$

$$H = \frac{2\pi\, n\, T}{395\,877} \quad \text{(HP)}$$

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE

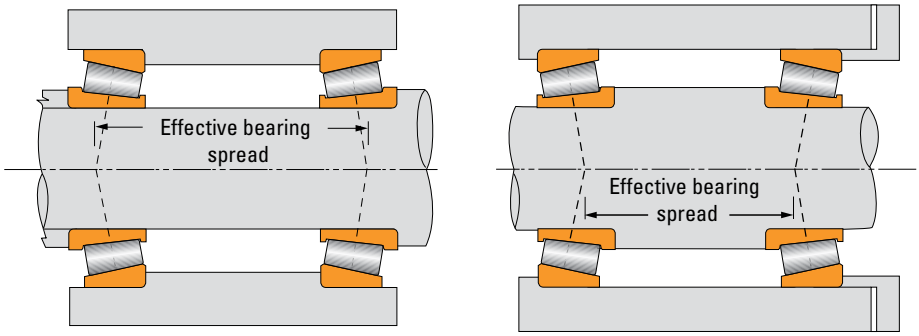
BEARING REACTIONS

Equations and procedure for determining bearing reactions follow.

Effective spread

When a load is applied to a tapered roller or angular contact ball bearing, the internal forces at each rolling element to outer raceway contact act normal to the raceway. These forces have radial and axial components. With the exception of the special case of pure thrust loads, the inner ring and the shaft will experience moments imposed by the asymmetrical axial components of the forces on the rollers.

It can be demonstrated mathematically that, if the shaft is modeled as being supported at its effective bearing center rather than at its geometric bearing center, the bearing moment may be ignored when calculating radial loads on the bearing. Only externally applied loads need to be considered, and moments are taken about the effective centers of the bearings to determine bearing loads or reactions. Fig. A-9 shows single-row bearings in a direct and indirect mounting configuration. The choice of whether to use direct or indirect mounting depends upon the application and duty.



INDIRECT MOUNTING – Tapered Roller Bearing (Back-to-Back – Angular Contact Ball Bearings)

DIRECT MOUNTING – Tapered Roller Bearing (Face-to-Face – Angular Contact Ball Bearings)

Fig. A-9
Choice of mounting configuration for single-row bearings, showing position of effective load carrying centers.

Shaft on two supports

Simple beam equations are used to translate the externally applied forces on a shaft into bearing reactions acting at the bearing effective centers.

With two-row tapered and angular contact ball bearings, the geometric center of the bearing is considered to be the support point except where the thrust force is large enough to unload one row. Then, the effective center of the loaded row is used as the point from which bearing load reactions are calculated. These approaches approximate the load distribution within a two-row bearing, assuming rigid shaft and housing. These are statically indeterminate problems in which shaft and support rigidity can significantly influence bearing loading and require the use of computer programs to solve.

Shaft on three or more supports

The equations of static equilibrium are insufficient to solve bearing reactions on a shaft having more than two supports. Such cases can be solved using computer programs if adequate information is available.

In such problems, the deflections of the shaft, bearings and housings affect the distribution of loads. Any variance in these parameters can significantly affect bearing reactions.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

CALCULATION EQUATIONS

Symbols Used		
a_e	Effective bearing spread	mm, in.
A, B, ...	Bearing position, used as subscripts	
c_1, c_2, ...	Linear distance (positive or negative)	mm, in.
D_{pG}	Pitch diameter of the gear	mm, in.
F	Applied force	N, lbf
F_r	Radial bearing load	N, lbf
h	Horizontal (used as subscript)	
M	Moment	N-mm, lbf-in.
v	Vertical (used as subscript)	
θ_1	Gear mesh angle relative to plane of reference defined in Figure A-10	degree
θ_2	Angle of applied force relative to plane of reference defined in Figure A-10	degree
θ_3	Angle of applied moment relative to plane of reference defined in Figure A-10	degree

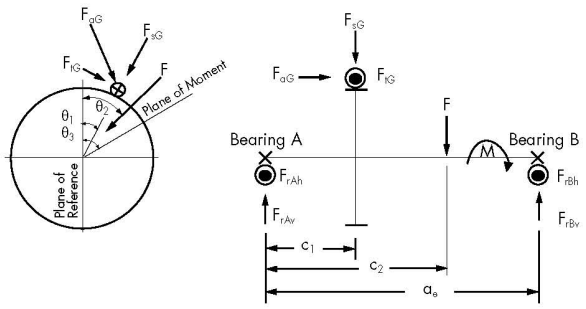


Fig. A-10
Bearing radial reactions.

Bearing radial loads are determined by:

1. Resolving forces applied to the shaft into horizontal and vertical components, relative to a convenient reference plane.
2. Taking moments about the opposite support.
3. Combining the horizontal and vertical reactions at each support into one resultant load.

Shown are equations for the case of a shaft on two supports with gear forces F_t (tangential), F_s (separating), and F_a (thrust), an external radial load F, and an external moment M. The loads are applied at arbitrary angles (θ_1, θ_2, and θ_3) relative to the reference plane indicated in Fig. A-10. Using the principle of superposition, the equations for vertical and horizontal reactions (F_{rv} and F_{rh}) can be expanded to include any number of gears, external forces or moments. Use signs as determined from gear force equation.

Care should be used when doing this to ensure proper supporting degrees of freedom are used. That is, tapered roller bearings and ball bearings support radial loads, moment loads and thrust loads in both directions. Spherical roller bearings will not support a moment load, but will support radial and thrust loads in both directions. Cylindrical roller bearings support radial and moment loading, but can only support slight thrust loads depending upon thrust flange configuration. Finally, needle roller bearings only support radial and moment loading.

Vertical reaction component at bearing position B

$$F_{rBv} = \frac{1}{a_e}\left[c_1 (F_{sG} \cos \theta_1 + F_{tG} \sin \theta_1) + \frac{1}{2}(D_{pG} - b \sin \gamma_G) F_{aG} \cos \theta_1 + c_2 F \cos \theta_2 + M \cos \theta_3\right]$$

Horizontal reaction component at bearing position B

$$F_{rBh} = \frac{1}{a_e}\left[c_1 (F_{sG} \sin \theta_1 - F_{tG} \cos \theta_1) + \frac{1}{2}(D_{pG} - b \sin \gamma_G) F_{aG} \sin \theta_1 + c_2 F \sin \theta_2 + M \sin \theta_3\right]$$

Vertical reaction component at bearing position A

$$F_{rAv} = F_{sG} \cos \theta_1 + F_{tG} \sin \theta_1 + F \cos \theta_2 - F_{rBv}$$

Horizontal reaction component at bearing position A

$$F_{rAh} = F_{sG} \sin \theta_1 - F_{tG} \cos \theta_1 + F \sin \theta_2 - F_{rBh}$$

Resultant radial reaction

$$F_{rA} = (F_{rAv}^2 + F_{rAh}^2)^{1/2}$$

$$F_{rB} = (F_{rBv}^2 + F_{rBh}^2)^{1/2}$$

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

Equivalent dynamic radial bearing loads (P_r)

To calculate the L_{10} life, it is necessary to calculate a dynamic equivalent radial load, designated by P_r. The dynamic equivalent radial load is defined as a single radial load that, if applied to the bearing, will result in the same life as the combined loading under which the bearing operates.

$$P_r = XF_r + Y_1F_a$$

Where,

P_r = Dynamic Equivalent Radial Load
F_r = Applied Radial Load
F_a = Applied Axial Load
X = Radial Load Factor
Y = Axial Load Factor

For spherical roller bearings, the values for X and Y can be determined using the equations below. Calculate the ratio of the axial load to the radial load. Compare this ratio to the e value for the bearing.

In equation form,

$P_r = F_r + Y_2 F_a$ for $F_a/F_r \le e$, and

$P_r = 0.67F_r + Y_2 F_a$ for $F_a/F_r > e$.

Note that values for e, Y_1 and Y_2 are available in the bearing tables.

Needle roller bearings are designed to carry radial load with zero thrust load under normal conditions. With the thrust load equal to zero equivalent radial load (Pr) is equal to the design radial load (Fr). Your Timken representative should be consulted on any applications where thrust load is involved, as the resulting increase in internal friction may require cooling to prevent increased operating temperatures.

For cylindrical roller bearings with purely radial applied load:

$P = F_r$ (kN)

Note: The maximum dynamic radial load that may be applied to a cylindrical roller bearing should be $\le C/3$.

If, in addition to the radial load, an axial load F_a acts on the bearing, this axial load is taken into consideration when calculating the life of a bearing (with $F_a \le F_{az}$; F_{az} is the allowable axial load).

Dimension Series	Load ratio	Equivalent Dynamic Load
10.. 2..E, 3..E	$F_a/F_r \le 0.11$	$P = F_r$
	$F_a/F_r > 0.11$	$P = 0.93 \cdot F_r + 0.69 \cdot F_a$
22..E, 23..E	$F_a/F_r \le 0.17$	$P = F_r$
	$F_a/F_r > 0.17$	$P = 0.93 \cdot F_r + 0.45 \cdot F_a$

Tapered roller bearings use the equations based on the number of rows and type of mounting utilized. For single-row bearings in direct or indirect mounting, the table on page A31 can be used based on the direction of the externally applied thrust load. Once the appropriate design is chosen, review the table and check the thrust condition to determine which thrust load and dynamic equivalent radial load calculations apply.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

For ball bearings, the dynamic equivalent radial load can be found in Table 3. The required Y factors are found in the Table 4.

TABLE 3

Bearing Description (ref.)	Contact Angle	Single-Row and Tandem Mountings	Double-Row and Preload Pair Mountings
Bearing Type and or Series		$K_T = \frac{F_a}{(\#\text{ of bearings}) \times C_o}$	$K_T = \frac{F_a}{C_o}$
RADIAL TYPE BALL BEARINGS		**Use larger of Resulting "P" Value***	
M9300K,MM9300K M9100K,MM9100K M200K,MM200K M300K,MM300K	0°	$P = F_r$ or $P = 0.56F_r + Y_1F_a$	$P = F_r + 1.20Y_1F_a$ or $P = 0.78F_r + 1.625Y_1F_a$
Small inch and Metric 9300,9100,200,300 and derivatives XLS Large Inch W and GW Tri-Ply	0°	$P = F_r$ or $P = 0.56F_r + Y_1F_a$	
WIDE INNER RING BALL BEARINGS HOUSED UNITS	0°	$P = F_r$ or $P = 0.56F_r + Y_1F_a$	
ANGULAR CONTACT BALL BEARINGS		**Use larger of Resulting "P" Value**	
7200K, 7200W 7300W, 7400W 5200K-5300W 5311W-5318W 5218W, 5220W, 5407W 5221W, 5214W	20°	$P = F_r$ or $P = 0.43F_r + F_a$	$P = F_r + 1.09F_a$ or $P = 0.70F_r + 1.63F_a$
5200, 5200W (see 20° exceptions) 5300, 5300W (see 20° exceptions) 5400, 5400W (see 20° exceptions)	30°	$P = F_r$ or $P = 0.39F_r + 0.76F_a$	$P = F_r + 0.78F_a$ or $P = 0.63F_r + 1.24F_a$
7200WN 7300WN 7400WN	40°	$P = F_r$ or $P = 0.35F_r + 0.57F_a$	$P = F_r + 0.55F_a$ or $P = 0.57F_r + 0.93F_a$
2M9300WI 2M9100WI,2MM9100WI 2M200WI, 2MM9100WI 2MM300WI	15°	$P = F_r$ or $P = 0.44F_r + Y_2F_a$	$P = F_r + 1.124Y_2F_a$ or $P = 0.72F_r + 1.625Y_2F_a$
2MM9100WO		$P = F_r$ or $P = 0.44F_r + Y_3F_a$	$P = F_r + 1.124Y_3F_a$ or $P = 0.72F_r + 1.625Y_3F_a$
3M9300WI 3M9100WI,3MM9100WI 3M200WI, 3MM200WI 3MM300WI	25°	$P = F_r$ or $P = 0.41F_r + 0.87F_a$	$P = F_r + 0.92F_a$ or $P = 0.67F_r + 1.41F_a$

*** Note:** If $P > C_0$ or $P > {}^1/_2\ C_E$ consult with your Timken representative on Life Calculations.

TABLE 4

K_T	Y_1	Y_2	Y_3
0.015	2.30	1.47	1.60
0.020	2.22	1.44	1.59
0.025	2.10	1.41	1.57
0.030	2.00	1.39	1.56
0.040	1.86	1.35	1.55
0.050	1.76	1.32	1.53
0.060	1.68	1.29	1.51
0.080	1.57	1.25	1.49
0.100	1.48	1.21	1.47
0.120	1.42	1.19	1.45
0.150	1.34	1.14	1.42
0.200	1.25	1.09	1.39
0.250	1.18	1.05	1.35
0.300	1.13	1.02	1.33
0.400	1.05	1.00	1.29
0.500	1.00	1.00	1.25
0.600	—	—	1.22
0.800	—	—	1.17
1.000	—	—	1.13
1.200	—	—	1.10

Equivalent Dynamic Thrust Bearing Loads (P_a)

For thrust ball, cylindrical and tapered roller bearings, the existence of radial loads introduces complex load calculations that must be carefully considered. If radial load is zero, the equivalent dynamic thrust load (P_a) will be equal to the applied thrust load (F_a). If any radial load is expected in the application, consult your Timken representative for advice on bearing selection.

For thrust angular contact ball bearings, the equivalent dynamic thrust load is determined by:

$$P_a = X_r F + YF_a$$

The minimum permissible thrust load to radial load ratios (F_a/F_r) and X and Y factors are listed in the bearing dimension tables in the thrust bearing section.

Thrust spherical roller bearing dynamic thrust loads are determined by:

$$P_a = 1.2F_r + F_a$$

Radial load (F_r) of a thrust spherical roller bearing is proportional to the applied axial load (F_a) with $F_r \leq 0.55\ F_a$. Because of the steep roller angle and the fact that the bearing is separable, a radial load will induce a thrust component ($F_{ai} = 1.2\ F_r$), that must be resisted by another thrust bearing on the shaft or by an axial load greater than F_{ai}.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

BEARING EQUIVALENT LOADS AND REQUIRED RATINGS FOR TAPERED ROLLER BEARINGS

Tapered roller bearings are ideally suited to carry all types of loadings - radial, thrust, and any combination of both. Due to the tapered design of the bearing, a radial load will induce a thrust reaction within the bearing which must be opposed by an equal or greater thrust load in order to keep the bearing cone and cup from separating. The ratio of the radial to the thrust load and the bearing included cup angle determine the load zone in a given bearing. The number of rollers in contact as a result of this ratio determines the load zone in the bearing. If all the rollers are in contact, the load zone is referred to as being 360 degrees.

When only radial load is applied to a tapered roller bearing, for convenience it is assumed in using the traditional calculation method that half the rollers support the load – the load zone is 180 degrees. In this case, induced bearing thrust is:

$$F_{a(180)} = \frac{0.47\ F_r}{K}$$

The equations for determining bearing thrust reactions and equivalent radial loads in a system of two single-row bearings are based on the assumption of a 180-degree load zone in one of the bearings and 180 degrees or more in the opposite bearing.

Dynamic Equivalent Radial Load

The basic dynamic radial load rating, C_{90}, is assumed to be the radial load carrying capacity with a 180-degree load zone in the bearing. When the thrust load on a bearing exceeds the induced thrust, $F_{a(180)}$, a dynamic equivalent radial load must be used to calculate bearing life.

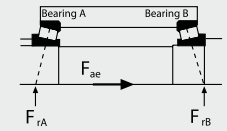
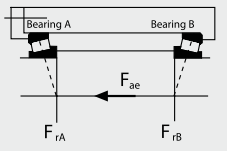
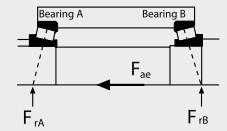
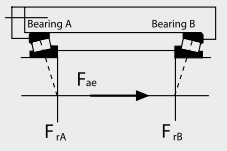
The dynamic equivalent radial load is that radial load which, if applied to a bearing, will give the same life as the bearing will attain under the actual loading.

The equations presented give close approximations of the dynamic equivalent radial load assuming a 180-degree load zone in one bearing and 180 degrees or more in the opposite bearing.

Tapered roller bearings use the equations based on the number of rows and type of mounting utilized. For single-row bearings in direct or indirect mounting, the following table can be used based on the direction of the externally applied thrust load. Once the appropriate design is chosen, review the table and check the thrust condition to determine which thrust load and dynamic equivalent radial load calculations apply.

SINGLE-ROW MOUNTING

To use this table for a single-row mounting, determine if bearings are direct or indirect mounted and to which bearing, A or B, thrust F_{ae} is applied. Once the appropriate design is established, follow across the page opposite that design, and check to determine which thrust load and dynamic equivalent radial load equations apply.

Design	Thrust Condition	Thrust Load	Dynamic Equivalent Radial Load
	$\frac{0.47\ F_{rA}}{K_A} \leq \left(\frac{0.47\ F_{rB}}{K_B} + F_{ae}\right)$	$F_{aA} = \frac{0.47\ F_{rB}}{K_B} + F_{ae}$ $F_{aB} = \frac{0.47\ F_{rB}}{K_B}$	$*P_A = 0.4\ F_{rA} + K_A\ F_{aA}$ $P_B = F_{rB}$
	$\frac{0.47\ F_{rA}}{K_A} > \left(\frac{0.47\ F_{rB}}{K_B} + F_{ae}\right)$	$F_{aA} = \frac{0.47\ F_{rA}}{K_A}$ $F_{aB} = \frac{0.47\ F_{rA}}{K_A} - F_{ae}$	$P_A = F_{rA}$ $*P_B = 0.4\ F_{rB} + K_B\ F_{aB}$
	$\frac{0.47}{K_B} \leq \left(\frac{0.47\ F_{rA}}{K_A} + F_{ae}\right)$	$F_{aA} = \frac{0.47\ F_{rA}}{K_A}$ $F_{aB} = \frac{0.47\ F_{rA}}{K_A} + F_{ae}$	$P_A = F_{rA}$ $*P_B = 0.4\ F_{rB} + K_B\ F_{aB}$
	$\frac{0.47\ F_{rB}}{K_B} > \left(\frac{0.47\ F_{rA}}{K_A} + F_{ae}\right)$	$F_{aA} = \frac{0.47\ F_{rB}}{K_B} - F_{ae}$ $F_{aB} = \frac{0.47\ F_{rB}}{K_B}$	$*P_A = 0.4\ F_{rA} + K_A\ F_{aA}$ $P_B = F_{rB}$

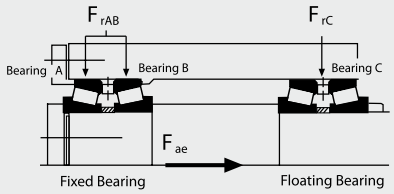
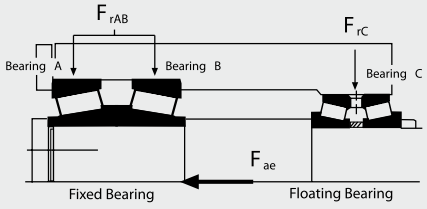
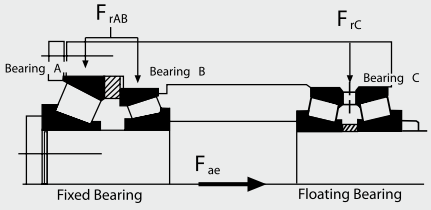
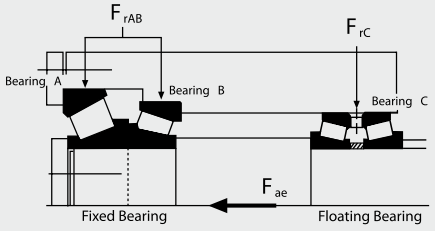
* If $P_A < F_{rA}$, use $P_A = F_{rA}$ and if $P_B < F_{rB}$, use $P_B = F_{rB}$.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

TWO-ROW MOUNTING, FIXED OR FLOATING (WITH NO EXTERNAL THRUST, $F_{AE} = 0$) SIMILAR BEARING SERIES

For double-row tapered roller bearings, the following table can be used. In this table, only bearing A has an applied thrust load. If bearing B has the applied thrust load, the A's in the equations should be replaced by B's and vice versa.

For two-row similar bearing series with no external thrust, $F_{ae}=0$, the dynamic equivalent radial load, P, equals F_{rAB} or F_{rC}. Since F_{rAB} or F_{rc} is the radial load on the two-row assembly, the two-row basic dynamic radial loads rating, $C_{90(2)}$, is to be used to calculate bearing life.

Design	Thrust Condition	Dynamic Equivalent Radial Load
SIMILAR BEARING SERIES, $K_A = K_B$ 	$F_{ae} \leq \frac{0.6\ F_{rAB}}{K_A}$	$P_A = 0.5\ F_{rAB} + 0.83\ K_A\ F_{ae}$ $P_B = 0.5\ F_{rAB} - 0.83\ K_A\ F_{ae}$
	$F_{ae} > \frac{0.6\ F_{rAB}}{K_A}$	$P_A = 0.4\ F_{rAB} + K_A\ F_{ae}$ $P_B = 0$
DISSIMILAR BEARING SERIES, $K_A \neq K_B$ 	$F_{ae} \leq \frac{0.6\ F_{rAB}}{K_A}$	$P_A = \frac{K_A}{K_A + K_B}\ (F_{rAB} + 1.67\ K_B\ F_{ae})$ $P_B = \frac{K_B}{K_A + K_B}\ (F_{rAB} - 1.67\ K_A\ F_{ae})$
	$F_{ae} > \frac{0.6\ F_{rAB}}{K_A}$	$P_A = 0.4\ F_{rAB} + K_A\ F_{ae}$ $P_B = 0$

Note: F_{rAB} is the radial load on the two-row assembly. The single-row basic dynamic radial load rating, C_{90}, is to be applied when calculating life based on the above equations.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

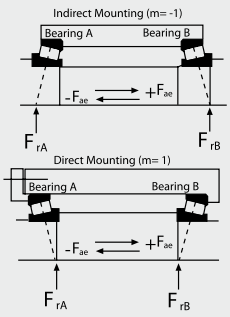
OPTIONAL APPROACH FOR DETERMINING DYNAMIC EQUIVALENT RADIAL LOADS

The following is a general approach to determining the dynamic equivalent radial loads. Here, a factor "m" has to be defined as +1 for direct-mounted single-row or two-row bearings or –1 for indirect mounted bearings. Also a sign convention is necessary for the external thrust F_{ae} as follows:

a. In case of external thrust applied to the shaft (typical rotating cone application), F_{ae} to the right is positive; to the left is negative.

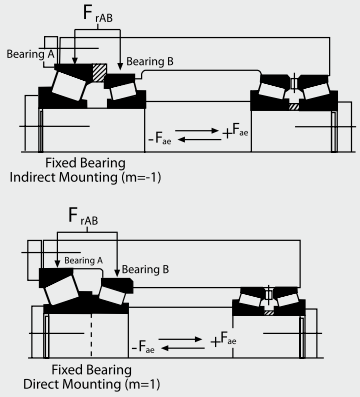
b. When external thrust is applied to the housing (typical rotating cup application) F_{ae} to the right is negative; to the left is positive.

1. SINGLE-ROW MOUNTING

Design	Thrust Condition	Thrust Load	Dynamic Equivalent Radial Load
	$\frac{0.47\ F_{rA}}{K_A} \leq \frac{0.47\ F_{rB}}{K_B} - m\ F_{ae}$	$F_{aA} = \frac{0.47\ F_{rB}}{K_B} - m\ F_{ae}$ $F_{aB} = \frac{0.47\ F_{rB}}{K_B}$	$P_A = 0.4\ F_{rA} + K_A\ F_{aA}$ $P_B = F_{rB}$
	$\frac{0.47\ F_{rA}}{K_A} > \frac{0.47\ F_{rB}}{K_B} - m\ F_{ae}$	$F_{aA} = \frac{0.47\ F_{rA}}{K_A}$ $F_{aB} = \frac{0.47\ F_{rA}}{K_A} + m\ F_{ae}$	$P_A = F_{rA}$ $P_B = 0.4\ F_{rB} + K_B\ F_{aB}$

Note: If $P_A < F_{rA}$, use $P_A = F_{rA}$ or if $P_B < F_{rB}$, use $P_B = F_{rB}$

2. TWO-ROW MOUNTING – FIXED BEARING WITH EXTERNAL THRUST, F_{ae} (SIMILAR OR DISSIMILAR SERIES)

Design	Thrust Condition	Dynamic Equivalent Radial Load
	$F_{ae} \leq \frac{0.6\ F_{rAB}}{K^*}$	$P_A = \frac{K_A}{K_A + K_B}(F_{rAB} - 1.67\ m\ K_B\ F_{ae})$ $P_B = \frac{K_B}{K_A + K_B}(F_{rAB} + 1.67\ m\ K_A\ F_{ae})$
	$F_{ae} > \frac{0.6\ F_{rAB}}{K^*}$	$P_A = 0.4\ F_{rAB} - m\ K_A\ F_{ae}$ $P_B = 0.4\ F_{rAB} + m\ K_B\ F_{ae}$

Note: F_{rAB} is the radial load on the two-row assembly. The single-row basic dynamic radial load rating, C_{90}, is to be applied when calculating life based on the above equations.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

When the loading is static, it is usually suggested that the applied load be no greater than the basic static load rating divided by the appropriate factor (HF_s) as shown in the table below.

Hardness Factors to Modify BASIC STATIC LOAD RATING

Raceway Hardness HRC	Hardness Factor HF_s
58	1.00
57	1.06
56	1.13
55	1.21
54	1.29
53	1.37
52	1.46
51	1.55
50	1.65
49	1.76
48	1.88
47	2.00
46	2.13
45	2.27
44	2.41
43	2.57
42	2.74
41	2.92
40	3.10

MINIMUM BEARING LOAD

Slippage can occur if loads are too light and, if accompanied by inadequate lubrication, cause damage to the bearings. The minimum load for radial cylindrical, spherical and full-complement needle roller bearings is P/C = 0.04 (P is the dynamic load and C is the basic dynamic load rating).

Thrust needle roller bearings also have an added design requirement such that the minimum thrust load is satisfied to prevent the rollers from skidding on the raceway. (The equation for the thrust loading force is different for needle rollers versus cylindrical rollers as noted):

(needle rollers) $F_{a\,min}=C_0/2200$ kN

(cylindrical rollers) $F_{a\,min}=0.1C_0/2200$ kN

Centrifugal force in thrust spherical roller bearings tends to propel the rollers outward. The bearing geometry converts this force to another induced thrust component which must be overcome by an axial load. This induced thrust (F_{ac}) is given by:

$$F_{ac} = kn^2 \times 10^{-5} \quad \text{(lbf)}$$

The minimum required working thrust load on a thrust spherical roller bearing ($F_{a\,min}$) is then computed by:

$$F_{a\,min} = 1.2\,F_r + F_{ac} \geq \frac{C_{0a}}{1000} \quad \text{(lbf)}$$

In addition to meeting the above calculated value, the minimum required working thrust load ($F_{a\,min}$) should be equal to or greater than 0.1 percent of the static thrust load rating (C_{0a}).

CYLINDRICAL ROLLER BEARING MAXIMUM ALLOWABLE AXIAL LOAD

Metric series cylindrical roller bearings of NUP, NP, NF, as well as NU or NJ designs with a thrust collar, can transmit axial loads if they are radially loaded at the same time. The allowable axial load ratio F_a/C of 0.1 maximum depends to a great extent on the magnitude of radial load, the operating speed, type of lubricant used, the operating temperature, and heat transfer conditions at the bearing location. The heat balance achieved at the bearing location is used as a basis for determination of the allowable axial load.

The nomogram on page A35 should be used to determine the allowable axial load F_{az} based on the following operating conditions:

- The axial load is of constant direction and magnitude
- Radial load ratio $F_r/C \leq 0.2$
- Ratio of axial load to radial load $F_a/F_r<0.4$
- The temperature of the bearing is 80° C (176° F) at an ambient temperature of 20° C (68° F).
- Lubricating oil is ISO VG 100 or greater using oil bath lubrication or circulating oil.
- As an alternative, the bearing may be lubricated with a grease using the above specified base oil and viscosity. Use of EP additives will be necessary, although considerably shorter relubrication intervals may be expected than with purely radially loaded radial cylindrical roller bearings.

Example of using the nomogram

From the lower part of the nomogram, determine the intersection point of the inner ring bore diameter and the dimension series of the bearing. From the upper part, the allowable axial load ratio F_{az}/C can be found as a function of the operating speed, n.

For a cylindrical roller radial bearing NU2207E.TVP
C = 63 kN; d = 35 mm
n = 2000 RPM
F_r = 10 kN

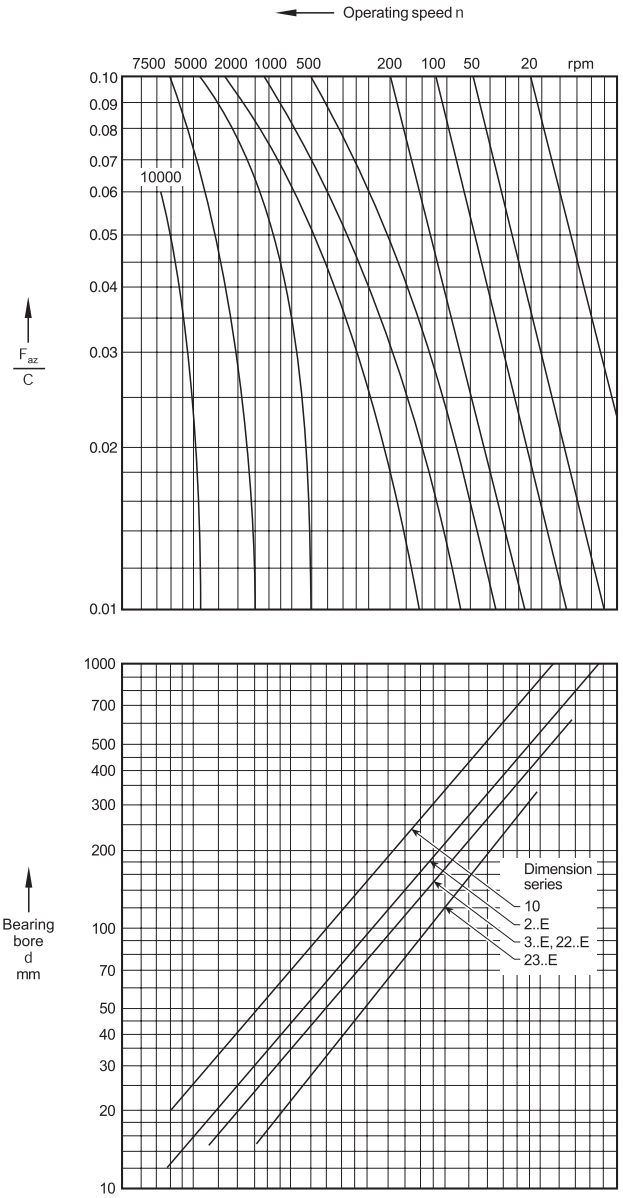
From the nomogram:
$F_{az}/C = 0.06$
Then $F_{az} = 0.06 \bullet 63$
The calculated allowable axial load F_{az} is 3.78 kN

It should be noted that an axial load as high as that determined by means of the nomogram should not be applied if an oil of rated kinematic viscosity lower than ISO VG 100 is used. Suitable EP additives, which are known for fatigue life improving qualities, may allow for an increase in applied axial load subject to thorough testing.

Higher applied axial loads

Axial loads greater than those determined by means of the nomogram may be considered, providing they are to be applied intermittently. Also, the bearing should be cooled using circulating oil lubrication and if the operating temperature, due to the internal friction and the higher axial load, exceeds 80° C (176° F), a more viscous oil must be used.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*



The basic dynamic load rating and the static load rating are commonly used for bearing selection. The basic dynamic load rating is used to estimate life of a rotating bearing. Static load ratings are used to determine the maximum permissible load that can be applied to a non-rotating bearing.

The basic philosophy of The Timken Company is to provide the most realistic bearing rating to assist our customers in the bearing selection process. Published ratings for Timken bearings include the basic dynamic radial load rating C. This value is based on a basic rating life of one million revolutions. Timken tapered roller bearings also include the basic dynamic load rating C_{90}, which is based on rating life of ninety million revolutions. The basic static radial load rating is C_0.

Static load rating

The basic static radial load rating and thrust load rating for Timken bearings are based on a maximum contact stress within a non-rotating bearing of 4000 MPa (580 ksi) for roller bearings and 4200 MPa (607 ksi) for ball bearings, at the center of contact on the most heavily loaded rolling element.

The 4000 MPa (580 ksi) or 4200 MPa (607 ksi) stress levels may cause visible light brinell marks on the bearing raceways. This degree of marking will not have a measurable effect on fatigue life when the bearing is subsequently rotating under a lower application load. If sound, vibration or torque are critical, or if a pronounced shock load is present, a lower load limit should be applied. For more information on selecting a bearing for static load conditions, consult your Timken representative.

STATIC RADIAL AND/OR AXIAL EQUIVALENT LOADS

The static equivalent radial and/or axial loading is dependent on the bearing type selected. For bearings designed to accommodate only radial or thrust loading, the static equivalent load is equivalent to the applied load.

For all bearings, the maximum contact stress can be approximated using the static equivalent load and the static rating.

For roller bearings:

$$\sigma_0 = 4000 \cdot \left(\frac{P_0}{C_0}\right)^{1/2} \text{ MPa}$$

$$\sigma_0 = 580 \cdot \left(\frac{P_0}{C_0}\right)^{1/2} \text{ ksi}$$

For ball bearings:

$$\sigma_0 = 4200 \cdot \left(\frac{P_0}{C_0}\right)^{1/3} \text{ MPa}$$

$$\sigma_0 = 607 \cdot \left(\frac{P_0}{C_0}\right)^{1/3} \text{ ksi}$$

Radial ball bearings

The dynamic equivalent radial load is used for comparison with the static load rating. Refer to the Dynamic Equivalent Radial and/or Axial Loads section.

Thrust ball bearings

Similar to radial ball bearings, thrust ball bearings use the same equation for equivalent static and dynamic loading.

$$P_{0a} = X \cdot F_r + Y \cdot F_a$$

The X and Y factors are listed in the bearing tables along with the minimum required thrust load-to-radial load ratio for maintaining proper operation.

Radial spherical roller bearings

The load factors X_0 and Y_0, which are listed in the bearing tables, are used with the following equation to estimate the static radial equivalent load.

$$P_{0r} = X_0 \cdot F_r + Y_0 \cdot F_a$$

Thrust spherical roller bearings

The following equation is used for thrust spherical roller bearings.

$$P_{0a} = F_a + 2.7\ F_r$$

Thrust spherical roller bearings require a minimum thrust load for proper operation. P_{oa} = should not be greater than 0.5 C_{oa}. If conditions exceed this, consult your Timken representative.

Tapered roller bearings

To determine the static equivalent radial load for a single-row mounting, first determine the thrust load, (F_a), then use the equations in this section, depending on the appropriate thrust load condition.

Needle roller bearings

Because radial needle roller bearings are not designed to accept thrust loading, their equation to determine static radial equivalent load is:

$$P_{0r} = F_r$$

Thrust needle roller bearings are not designed to accept radial loading, so their equation to determine static thrust equivalent load is:

$$P_{0a} = F_a$$

Static equivalent radial load (two-row bearings)

The bearing data tables do not include static rating for two-row bearings. The two-row static radial rating can be estimated as:

$$C_{o(2)} = 2C_o$$

where:

$C_{o(2)}$ = two-row static radial rating
C_o = static radial load rating of a single row bearing, type TS, from the same series

Thrust Condition	Net Bearing Thrust Load	Static Equivalent Radial Load (P_0)
$\frac{0.47\ F_{rA}}{K_A} \le \frac{0.47\ F_{rB}}{K_B} + F_{ae}$	$F_{aA} = \frac{0.47\ F_{rB}}{K_B} + F_{ae}$ $F_{aB} = \frac{0.47\ F_{rB}}{K_B}$	$P_{0B} = F_{rB}$ for $F_{aA} < 0.6\ F_{rA} / K_A$ $P_{0A} = 1.6\ F_{rA} - 1.269\ K_A\ F_{aA}$ for $F_{aA} > 0.6\ F_{rA} / K_A$ $P_{0A} = 0.5\ F_{rA} + 0.564\ K_A\ F_{aA}$
$\frac{0.47\ F_{rA}}{K_A} > \frac{0.47\ F_{rB}}{K_B} + F_{ae}$	$F_{aA} = \frac{0.47\ F_{rA}}{K_A}$ $F_{aB} = \frac{0.47\ F_{rA}}{K_A} - F_{ae}$	for $F_{aB} > 0.6\ F_{rB} / K_B$ $P_{0B} = 0.5\ F_{rB} + 0.564\ K_B\ F_{aB}$ for $F_{aB} < 0.6\ F_{rB} / K_B$ $P_{0B} = 1.6\ F_{rB} - 1.269\ K_B\ F_{aB}$ $P_{0A} = F_{rA}$

Please refer to illustrations on page A169.

where:

F_r = applied radial load
F_a = net bearing thrust load. F_{aA} and F_{aB} calculated from equations.

Note: Use the values of P_o calculated for comparison with the static rating, C_o, even if P_o is less than the radial applied, F_r.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

Static equivalent radial load (two-row bearings)

The bearing data tables do not include static rating for two-row bearings. The two-row static radial rating can be estimated as:

$C_{o(2)} = 2C_o$

where:

$C_{o(2)}$ = two-row static radial rating
C_o = static radial load rating of a single row bearing, type TS, from the same series

BEARING LIFE

Many different performance criteria exist that dictate how a bearing should be selected. These include bearing fatigue life, rotational precision, power requirements, temperature limits, speed capabilities, sound, etc. This publication deals primarily with bearing life as related to material associated fatigue. Bearing life is defined here as the length of time, or number of revolutions, until a fatigue spall of 6 mm^2 (0.01 $in.^2$) develops. Since metal fatigue is a statistical phenomenon, the life of an individual bearing is impossible to precisely predetermine. Bearings that may appear to be identical can exhibit considerable life scatter when tested under identical conditions. Thus it is necessary to base life predictions on a statistical evaluation of a large number of bearings operating under similar conditions. The Weibull distribution function is commonly used to predict the life of a population of bearings at any given reliability level.

RATING LIFE

Rating life, (L_{10}), is the life that 90 percent of a group of apparently identical bearings will complete or exceed before a fatigue spall develops. The L_{10} life also is associated with 90 percent reliability for a single bearing under a certain load.

BEARING LIFE EQUATIONS

Traditionally, the L_{10} life has been calculated as follows for bearings under radial or combined loading where the dynamic equivalent radial load, (P_r), has been determined:

$$L_{10} = \left(\frac{C}{P_r}\right)^e (1x10^6) \text{ revolutions}$$

or,

$$L_{10} = \left(\frac{C}{P_r}\right)^e \left(\frac{1x10^6}{60n}\right) \text{ hours}$$

For thrust bearings, the above equations change to the following.

$$L_{10} = \left(\frac{C_a}{P_a}\right)^e (1x10^6) \text{ revolutions}$$

or,

$$L_{10} = \left(\frac{C_a}{P_a}\right)^e \left(\frac{1x10^6}{60n}\right) \text{ hours}$$

e = 3 for ball bearings
= $^{10}/_{3}$ for roller bearings

Tapered roller bearings often use a dynamic load rating based on ninety million cycles, as opposed to one million cycles, changing the equations as follows.

$$L_{10} = \left(\frac{C_{90}}{P_r}\right)^{10/3} (90x10^6) \text{ revolutions}$$

or,

$$L_{10} = \left(\frac{C_{90}}{P_r}\right)^{10/3} \left(\frac{90x10^6}{60n}\right) \text{ hours}$$

and

$$L_{10} = \left(\frac{C_{90a}}{P_a}\right)^{10/3} (90x10^6) \text{ revolutions}$$

or,

$$L_{10} = \left(\frac{C_{90a}}{P_a}\right)^{10/3} \left(\frac{90x10^6}{60n}\right) \text{ hours}$$

As the first set of equations for radial bearings with dynamic ratings based on one million revolutions is the most common form of the equations, this will be used through the rest of this section. The equivalent dynamic load equations and the life adjustment factors are applicable to all forms of the life equation.

With increased emphasis on the relationship between the reference conditions and the actual environment in which the bearing operates in the machine, the traditional life equations have been expanded to include certain additional variables that affect bearing performance. The approach whereby these factors, including a factor for useful life, are considered in the bearing analysis and selection, has been termed Bearing Systems Analysis (BSA).

The ISO/ABMA expanded bearing life equation is:

$$L_{10a} = a_1 a_2 a_3 L_{10}$$

Where,

a_1 = Reliability Life Factor
a_2 = Material Life Factor
a_3 = Operating Condition Life Factor
(to be specified by the manufacturer)

The Timken expanded bearing life equation is:

$$L_{10a} = a_1 a_2 a_{3d} a_{3h} a_{3k} a_{3l} a_{3m} a_{3p} \left(\frac{C}{F_r}\right)^e (1x10^6)$$

Where,

a_1 = Reliability Life Factor
a_2 = Material Life Factor
a_{3d} = Debris Life Factor
a_{3h} = Hardness Life Factor
a_{3k} = Load Zone Life Factor
a_{3l} = Lubrication Life Factor
a_{3m} = Misalignment Life Factor
a_{3p} = Low Load Life Factor

Reliability Life Factor (a_1)

The equation for the life adjustment factor for reliability is:

$$a_1 = 4.26 \cdot \left(\ln \frac{100}{R}\right)^{2/3} + 0.05$$

ln = natural logarithm (base e)

To adjust the calculated L_{10} life for reliability, multiply by the a_1 factor. If 90 (90 percent reliability) is substituted for R in the above equation, $a_1 = 1$. For R = 99 (99 percent reliability), $a_1 = 0.25$. The following table lists the reliability factor for commonly used reliability values.

R (percent)	L_n	a1
90	L_{10}	1.00
95	L_5	0.64
96	L_4	0.55
97	L_3	0.47
98	L_2	0.37
99	L_1	0.25
99.5	$L_{0.5}$	0.175
99.9	$L_{0.1}$	0.093

Note that the equation for reliability adjustment assumes there is a short minimum life below which the probability of bearing damage is minimal (e.g., zero probability of bearing damage producing a short life). Extensive bearing fatigue life testing has shown the minimum life, below which the probability of bearing damage is negligible, to be larger than shown above. For a more accurate prediction of bearing lives at high levels of reliability, consult your Timken representative.

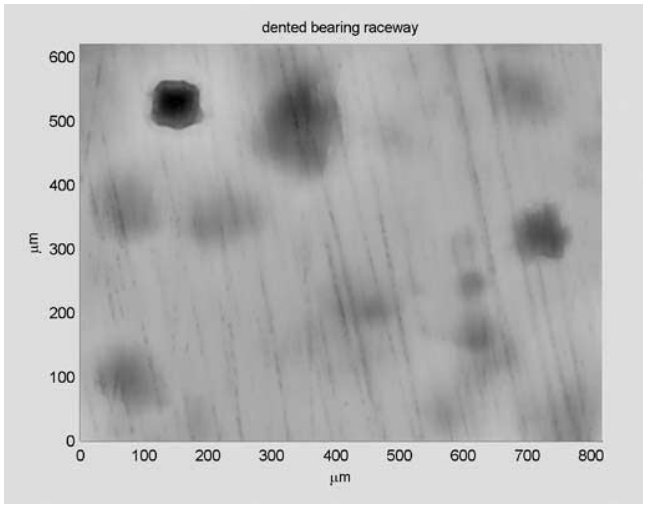
Material Life Factor (a_2)

The life adjustment factor for bearing material, (a_2), for standard Timken bearings manufactured from bearing quality steel is 1.0. Bearings also are manufactured from premium steels, containing fewer and smaller inclusion impurities than standard steels and providing the benefit of extending bearing fatigue life (e.g., DuraSpexx™). Application of the material life factor requires that fatigue life is limited by nonmetallic inclusions, that contact stresses are approximately less than 2400 MPa (350 ksi), and adequate lubrication is provided. It is important to note that improvements in material cannot offset poor lubrication in an operating bearing system. Consult your Timken representative for applicability of the material factor.

Debris Life Factor (a_{3d})

Debris within a lubrication system reduces the life of a roller bearing by creating indentations on the contacting surfaces, leading to stress risers. The Timken life rating equations were developed based on test data obtained with 40 µm oil filtration, and measured ISO cleanliness levels of approximately 15/12, which is typical of cleanliness levels found in normal industrial machinery. When more or less debris is present within the system, the fatigue life predictions can be adjusted according to the measured or expected ISO lubricant cleanliness level to more accurately reflect the expected bearing performance.

As opposed to determining the debris life factor based on filtration and ISO cleanliness levels, a Debris Signature Analysis™ can be performed for more accurate bearing performance predictions. The Debris Signature Analysis is a process for determining the effects of the actual debris present in your system on the bearing performance. The typical way in which this occurs is through measurements of dented/bruised surfaces on actual bearings run in a given application. This type of analysis can be beneficial because different types of debris cause differing levels of performance, even when they are of the same size and amount in the lubricant. Soft, ductile particles can cause less performance degradation than hard, brittle particles. Hard, ductile particles are typically most detrimental to bearing life. Brittle particles can break down, thus not affecting performance to as large of a degree as hard ductile particles. For more information on Debris Signature Analysis or the availability of Debris Resistant bearings for your application, consult your Timken representative.



Surface map of a bearing raceway with debris denting.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

Hardness Life Factor (a_{3h})

Both the dynamic and static load ratings of Timken bearings are based on a minimum raceway hardness equivalent to 58 on the Rockwell C scale (HRC) [ASTM E-18]. If the raceway hardness must be decreased, these load ratings also will be decreased. For Timken bearings supplied as a full assembly, the hardness life factor will be unity. For bearing applications designed to use the shaft or housing surfaces as raceways, this factor can be used to estimate performance when the required 58 HRC minimum hardness cannot be achieved.

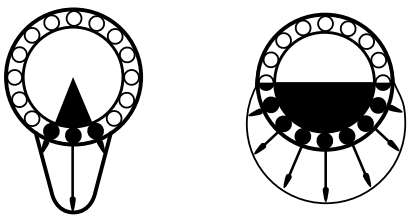
The effective raceway hardness affects the life of a bearing application as shown in the following table. If values for raceway hardness below 45 HRC are required, consult your Timken representative.

Raceway Hardness (HRC)	a_{3h}
58	1.00
57	0.81
56	0.66
55	0.53
54	0.43
53	0.35
52	0.28
51	0.22
50	0.18
49	0.14
48	0.11
47	0.09
46	0.07
45	0.06

Load Zone Life Factor (a_{3k})

The fatigue life of a bearing is a function of the stresses in rollers and raceways and the number of stress cycles that the loaded bearing surfaces experience in one bearing revolution. The stresses depend on applied load and on how many rollers support that load. The number of stress cycles depends on bearing geometry and, again, on how many rollers support the load. Therefore, life for a given external load is related to the loaded arc, or load zone, of the bearing.

The load zone in a bearing is dominated by the internal clearance, either radial or axial depending on the bearing type. Neglecting preload, less clearance in a bearing results in a larger load zone and subsequently longer bearing life.



Bearing Load Zones and Roller-Raceway Contact Loading.

Using the dynamic equivalent load (Pr) instead of the applied radial load (Fr) in the equation for L_{10a} roughly approximates the load zone factor for combined loading only. If a more accurate assessment of the load zone adjusted life is necessary (e.g., including the effects of internal clearance or fitting practice), consult your Timken representative.

Lubrication Life Factor (a_{3l})

The influence of lubrication film due to elastohydrodynamic (EHL) lubrication on bearing performance is related to the reduction or prevention of asperity (metal-metal) contact between the bearing surfaces. Extensive testing has been done at Timken Research to quantify the effects of the lubrication related parameters on bearing life. It has been found that the roller and raceway surface finish, relative to lubricant film thickness, has the most notable effect on improving bearing performance. Factors such as bearing geometry, material, loads and load zones also play an important role in bearing performance.

The following equation provides a method to calculate the lubrication factor for a more accurate prediction of the influence of lubrication on bearing life (L_{10a}).

$$a_{3l} = C_g \cdot C_l \cdot C_j \cdot C_s \cdot C_v \cdot C_{gr}$$

Where:

C_g = geometry factor
C_l = load factor
C_j = load zone factor
C_s = speed factor
C_v = viscosity factor
C_{gr} = grease lubrication factor

Note: The a_{3l} maximum is 2.88 for all bearings. The a_{3l} minimum is 0.200 for case carburized bearings and 0.126 for through hardened bearings.

A lubricant contamination factor is not included in the lubrication factor because Timken endurance tests are typically run with a 40 µm filter to provide a realistic level of lubricant cleanness for most applications.

Geometry factor - C_g

C_g is given for most part numbers in the bearing tables. The geometry factor also includes the material effects and load zone considerations for non-tapered roller bearings, as these also are inherent to the bearing design. However, it should be noted that the primary effect of the load zone is on roller load distributions and contact stresses within the bearing, which are not quantified within the lubrication factor. Refer to the previous section Load Zone Life Factor (a_{3k}) for more information.

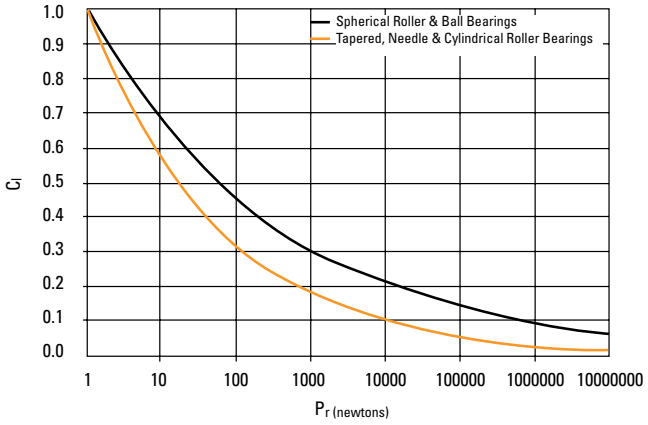
Note that the geometry factor (C_g) factor is not applicable to our DuraSpexx™ product. For more information on our DuraSpexx™ product, consult your Timken representative.

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

Load factor - C_l

The C_l factor is obtained from the following figure. Note that the factor is different based on the type of bearing utilized. P_r is the equivalent load applied to the bearing in Newtons and is determined in the Equivalent Bearing Loads (P_r) section.

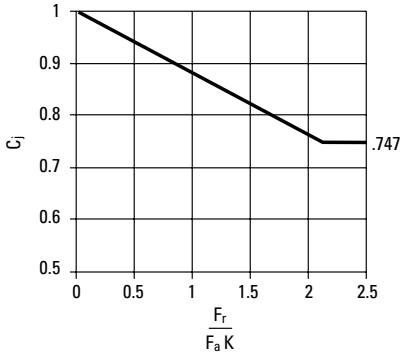
LOAD FACTOR (C_L) VS. EQUIVALENT BEARING LOAD (P_R)



Load zone factor - C_j

As mentioned previously, for all non-tapered roller bearings the load zone factor is unity. For tapered roller bearings, the load zone factor can be taken from the graph based on the thrust load applied to that bearing.

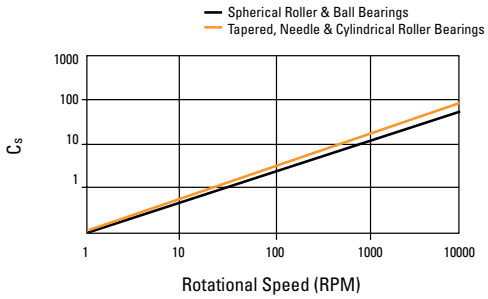
LOAD ZONE FACTOR (C_J) VS. TAPERED BEARING THRUST LOAD (F_A)



Speed factor - C_s

C_s is determined from the following figure, where rev/min (RPM) is the rotational speed of the inner ring relative to the outer ring.

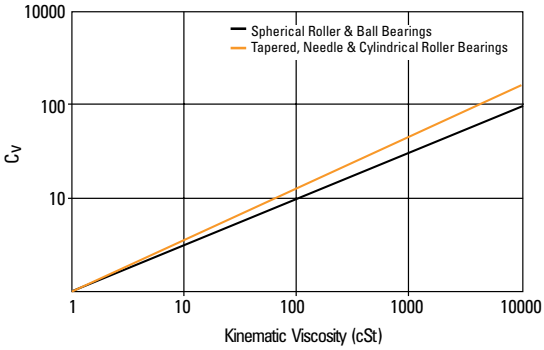
SPEED FACTOR (C_S) VS. ROTATIONAL SPEED



Viscosity factor - C_v

The lubricant kinematic viscosity [centistokes (cSt)] is taken at the operating temperature of the bearing. The operating viscosity can be estimated by using the figure in the Speed, Heat and Torque section. The viscosity factor (C_v) can then be determined from the following figure.

VISCOSITY FACTOR (C_V) VS. KINEMATIC VISCOSITY



Grease lubrication factor – C_{gr}

For grease lubrication, the EHL lubrication film becomes depleted of oil over time and is reduced in thickness. Consequently, a reduction factor (C_{gr}) should be used to adjust for this effect.

C_{gr}= 0.79

Misalignment life factor (a_{3m})

The effect of bearing life depends on the magnitude of the angle of misalignment, on the internal bearing geometry, and on the applied loads.

The misalignment life factor for spherical bearings is equal to one, a_{3m}=1, due to the self-aligning capabilities of a spherical roller bearing. The allowable misalignment in a spherical roller bearing is between 1 degree and 2.5 degrees, depending upon the series of the bearing as detailed in the following table. Life will be reduced if these limits are exceeded, due to roller-raceway contact truncation.

MAXIMUM PERMISSIBLE MISALIGNMENTS FOR SPHERICAL ROLLER BEARINGS BASED ON SERIES

Bearing Series	Maximum Misalignment
238	±1.0°
222, 230, 231, 239, 249	±1.5°
223, 240	±2.0°
232, 241	±2.5°

BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

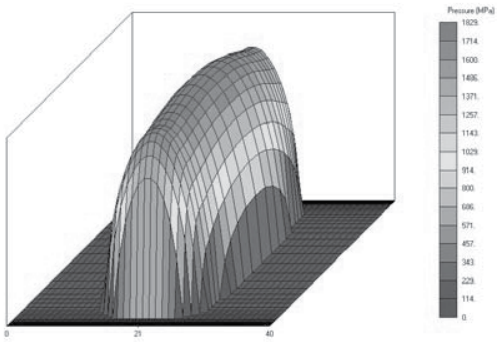
For needle roller bearings, the following table gives the misalignment limitations based on bearing width.

Bearing Width		Maximum Slope	
mm	inches	Caged	Full Complement
> 50	> 2	0.0005	0.0005
25-50	1-2	0.0010	0.0005
< 25	< 1	0.0015	0.0010

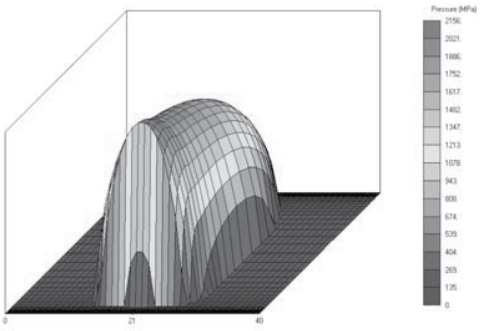
For all other bearing types, accurate alignment of the shaft relative to the housing is critical for best performance. The life prediction using the method defined in this publication is relatively accurate up to the limits listed within, based on bearing type. The base condition for which the load rating of the roller bearings are defined is 0.0005 radians misalignment.

For cylindrical roller bearings, the misalignment factor also is a measure of the effect of bearing axial load on life. Axial loading of the bearing causes a moment to be generated about the roller center, thus shifting the roller-raceway contact stresses toward the end of the roller, similar to bearing misalignment.

Performance of all Timken bearings under various levels of misalignment, radial and axial load can be predicted using sophisticated computer programs. Using these programs, Timken engineers can design special bearing contact profiles to accommodate the conditions of radial load, axial load and/or bearing misalignment in your application. Consult your Timken representative for more information.



Roller-inner raceway contact stress without misalignment.



Roller-inner raceway contact stress with high misalignment and special profile.

Needle rollers with relieved ends

Needle roller bearing life is affected by the distribution of contact stress between roller and raceways. Even when non-profiled needle rollers are loaded under conditions of ideal alignment, the contact stress is not uniform along the length of the rollers, but rather is concentrated towards the ends. Misalignment causes even greater roller contact stress. This effect is illustrated below.

Needle Roller – Cylindrical

Needle Roller- Relieved Ends
(exaggerated for clarity)

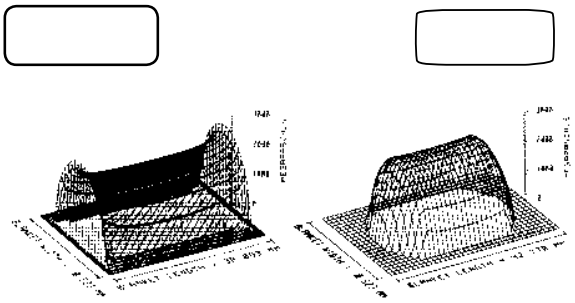


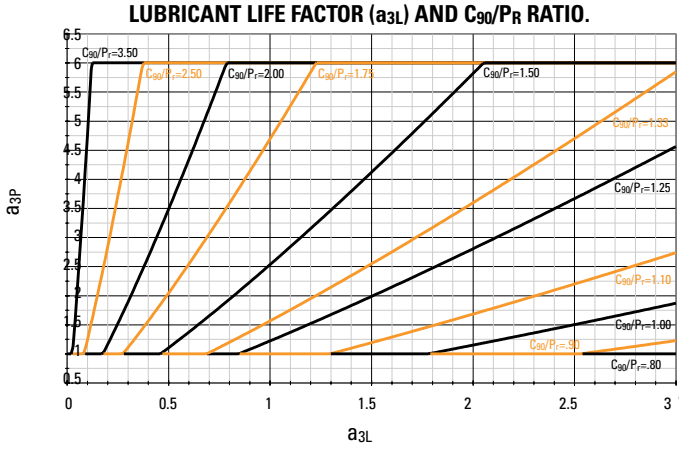
Fig. A-11
Comparative Stress Patterns

The use of needle rollers with relieved ends helps to reduce stress concentration at the ends of rollers, both under misalignment or ideal alignment, and results in more uniform stress distribution and optimum bearings performance.

Low load life factor (a_{3p})

Bearing life tests at the Timken Technology Center have shown greatly extended bearing fatigue life performance is achievable when the bearing contact stresses are low and the lubricant film is sufficient to fully separate the micro-scale textures of the contacting surfaces. Mating the test data with sophisticated computer programs for predicting bearing performance, Timken engineers have developed a low load factor for use in the catalog to predict the life increase expected when operating under low bearing loads. The following figure shows the low load factor (a_{3p}) as a function of the lubricant life factor (a_{3l}) and the ratio of bearing dynamic rating to the bearing equivalent load.

**LOW LOAD FACTOR (a_{3P}) VS.
LUBRICANT LIFE FACTOR (a_{3L}) AND C_{90}/P_R RATIO.**



BEARING REACTIONS, DYNAMIC EQUIVALENT LOADS & BEARING LIFE - *continued*

LIFE - THRUST SPHERICAL, CYLINDRICAL AND TAPERED ROLLER BEARINGS

The life formula, below , is the radial roller bearing life equation restated in terms of thrust instead of radial ratings and radial equivalent loads.

$$L_{10} = \frac{16667}{n}\left[\frac{C_t}{T_e}\right]^{10/3} \text{(Hours)}$$

The calculations of bearing life may also be performed by using logarithmic factors for rotational speed (N_f) and life (L_f) based on the formula:

$$L_{10} = 500\,(L_f)^{10/3} \text{ (Hours)}$$

where $L_f = \left[\frac{C_t\, n_f}{T_e}\right]$

where $N_f = \left[\frac{1}{.03n}\right]^{3/10}$

Referring back to the above equation it may be advisable, as previously noted with radial bearings, under certain operating conditions to include an application factor a_3 and calculate life according to the formula:

$$L_{10} = \frac{16667}{n}\, a_3 \left[\frac{C_t}{T_e}\right]^{10/3} \text{ or } L_{10} = 500\, a_3\, (L_f)^{10/3} \text{(Hours)}$$

a_3 is the factor based on application conditions. Under optimum conditions $a_3 = 1$. Depending on lubricant contamination, temperatures, impact loading and load reversals a3 may be less than 1 and as low as 0.05. Consult your Timken representative for assistance with your specific application requirements.

LIFE - THRUST BALL BEARINGS

$$L_{10} = \frac{16667}{n}\left[\frac{C_t}{T_e}\right]^{3} \text{(Hours)}$$

It may be advisable under certain operating conditions to include an application factor a_3 and calculate life according to the formula:

$$L_{10} = \frac{16667}{n}\, a_3 \left[\frac{C_t}{T_e}\right]^{3} \text{(Hours)}$$

a_3, the life factor based on application conditions, can be assigned values as described above.

BEARING TOLERANCES, INCH & METRIC

TOLERANCES

Standards defining practices for ball and roller bearing usage are listed in the following tables. These standards are provided for use in selecting bearings for general applications in conjunction with the bearing mounting and fitting practices offered in later sections.

RADIAL BALL, SPHERICAL AND CYLINDRICAL ROLLER BEARINGS

Depending on your specific application requirements, various degrees of bearing accuracy may be required.

Timken maintains ball diameter and sphericity tolerances, close control of race contours and internal clearances, accuracy of cage construction, and unusually fine surface finishes.

STANDARD ABEC / RBEC TOLERANCES - INNER RING

All tolerances in number of micrometers (µm) and ten-thousandths inch (.0001")

Bearing Bore		Bore Numbers Reference	Bore Diameter Δ_{dmp} +0.000 mm +0.0000"					Width Variation V_{Bs}					Raceway Radial Runout K_{ia}					Face Runout With Bore S_d			Raceway Axial Runout S_{ia}			Width Inner & Outer Rings Δ_{Bs} & Δ_{Cs} +0.000 mm +0.0000"	
			ABEC					ABEC					ABEC					ABEC			ABEC			ABEC	
mm			RBEC					RBEC					RBEC					RBEC			RBEC			RBEC	
over	incl.		1	3	5	7	9	1	3	5	7	9	1	3	5	7	9	5	7	9	5	7	9	1, 3	5, 7, 9
			mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
			-8	**-7**	**-5**	**-4**	**-2.5**	**15**	**15**	**5**	**2.5**	**1.5**	**10**	**6**	**4**	**2.5**	**1.5**	**7**	**3**	**1.5**	**7**	**3**	**1.5**	**-120**	**-40**
2.5	10	30-39	-3	-3	-2	-1.5	-1	6	6	2	1	0.5	4	2.5	1.5	1	0.5	3	1	0.5	3	1	0.5	-50	-15
			-8	**-7**	**-5**	**-4**	**-2.5**	**20**	**20**	**5**	**2.5**	**1.5**	**10**	**7**	**4**	**2.5**	**1.5**	**7**	**3**	**1.5**	**7**	**3**	**1.5**	**-120**	**-80**
10	18	00-03	-3	-3	-2	-1.5	-1	8	8	2	1	0.5	4	3	1.5	1	0.5	3	1	0.5	3	1	0.5	-50	-30
			-10	**-8**	**-6**	**-5**	**-2.5**	**20**	**20**	**5**	**2.5**	**1.5**	**13**	**8**	**4**	**3**	**2.5**	**8**	**4**	**1.5**	**8**	**4**	**2.5**	**-120**	**-120**
18	30	04-06	-4	-3	-2.5	-2	-1	8	8	2	1	0.5	5	3	1.5	1	1	3	1.5	0.5	3	1.5	1	-50	-50
			-12	**-10**	**-8**	**-6**	**-2.5**	**20**	**20**	**5**	**3**	**1.5**	**15**	**10**	**5**	**4**	**2.5**	**8**	**4**	**1.5**	**8**	**4**	**2.5**	**-120**	**-120**
30	50	07-10	-4.5	-4	-3	-2.5	-1	8	8	2	1	0.5	6	4	2	1.5	1	3	1.5	0.5	3	1.5	1	-50	-50
			-15	**-12**	**-9**	**-7**	**-4**	**25**	**25**	**6**	**4**	**1.5**	**20**	**10**	**5**	**4**	**2.5**	**8**	**5**	**1.5**	**8**	**5**	**2.5**	**-150**	**-150**
50	80	11-16	-6	-4.5	-3.5	-3	-1.5	10	10	2.5	1.5	0.5	8	4	2	1.5	1	3	2	0.5	3	2	1	-60	-60
			-20	**-15**	**-10**	**-8**	**-5**	**25**	**25**	**7**	**4**	**2.5**	**25**	**13**	**6**	**5**	**2.5**	**9**	**5**	**2.5**	**9**	**5**	**2.5**	**-200**	**-200**
80	120	17-24	-8	-6	-4	-3	-2	10	10	3	1.5	1	10	5	2.5	2	1	3.5	2	1	3.5	2	1	-80	-80
			-25	**-18**	**-13**	**-10**	**-7**	**30**	**30**	**8**	**5**	**2.5**	**30**	**18**	**8**	**6**	**2.5**	**10**	**6**	**2.5**	**10**	**7**	**2.5**	**-250**	**-250**
120	150	26-30	-10	-7	-5	-4	-3	12	12	3	2	1	12	7	3	2.5	1	4	2.5	1	4	3	1	-100	-100
			-25	**-18**	**-13**	**-10**	**-7**	**30**	**30**	**8**	**5**	**4**	**30**	**18**	**8**	**6**	**5**	**10**	**6**	**4**	**10**	**7**	**5**	**-250**	**-250**
150	180	32-36	-10	-7	-5	-4	-3	12	12	3	2	1.5	12	7	3	2.5	2	4	2.5	1.5	4	3	2	-100	-100
			-30	**-22**	**-15**	**-12**	**-8**	**30**	**30**	**10**	**6**	**5**	**40**	**20**	**10**	**8**	**5**	**11**	**7**	**5**	**13**	**8**	**5**	**-300**	**-300**
180	250	38-50	-12	-8.5	-6	-4.5	-3	12	12	4	2.5	2	16	8	4	3	2	4.5	3	2	5	3	2	-120	-120
			-35	**-25**	**-18**	—	—	**35**	**35**	**13**	—	—	**50**	**25**	**13**	—	—	**13**	—	—	**15**	—	—	**-350**	**-350**
250	315	52-60	-14	-10	-7	—	—	14	14	5	—	—	20	10	5	—	—	5	—	—	6	—	—	-140	-140
			-40	**-30**	**-23**	—	—	**40**	**40**	**15**	—	—	**60**	**30**	**15**	—	—	**15**	—	—	**20**	—	—	**-400**	**-400**
315	400	64-80	-16	-12	-9	—	—	16	16	6	—	—	24	12	6	—	—	6	—	—	8	—	—	-160	-160
			-45	**-35**	—	—	—	**50**	**45**	—	—	—	**65**	**35**	—	—	—	—	—	—	—	—	—	**-450**	—
400	500		-18	-14	—	—	—	20	18	—	—	—	26	14	—	—	—	—	—	—	—	—	—	-180	—
			-50	**-40**	—	—	—	**60**	**50**	—	—	—	**70**	**40**	—	—	—	—	—	—	—	—	—	**-500**	—
500	630		-20	-16	—	—	—	24	20	—	—	—	28	16	—	—	—	—	—	—	—	—	—	-200	—
			-75	—	—	—	—	**70**	—	—	—	—	**80**	—	—	—	—	—	—	—	—	—	—	**-750**	—
630	800		-30	—	—	—	—	28	—	—	—	—	31	—	—	—	—	—	—	—	—	—	—	-300	—

The tolerances in this table are in conformance with ANSI ABMA Standard 20 - 1987.

ABMA / ISO Symbols - Inner Ring

- Δ_{dmp} Single plane mean bore diameter deviation from basic bore diameter, e.g., bore tolerance for a basically tapered bore, Δ_{dmp} refers only to the theoretical small bore end of the bore
- K_{ia} Radial runout of assembled bearing inner ring, e.g., radial runout of raceway
- V_{Bs} Inner ring width variation, e.g., parallelism
- S_d Inner ring reference face runout with bore, e.g., squareness - bore to face
- S_{ia} Axial runout of assembled bearing inner ring, e.g., lateral (axial) runout of raceway
- Δ_{Bs} Single inner ring width deviation from basic, e.g., width tolerance

ABMA / ISO Symbols - Outer Ring

- Δ_{Dmp} Single plane mean outside diameter deviation from basic outside diameter, e.g., O.D. tolerance
- K_{ea} Radial runout of assembled bearing outer ring, e.g., radial runout of raceway
- V_{Cs} Outer ring width variation, e.g., parallelism
- S_D Outside cylindrical surface runout with outer ring reference face, e.g., squareness O.D. to face
- S_{ea} Axial runout of assembled bearing outer ring, e.g., lateral (axial) runout of raceway
- Δ_{Cs} Outer ring width deviation from basic, e.g., width tolerance

BEARING TOLERANCES, INCH & METRIC - *continued*

These standards, coupled with proprietary design, material and processing specifications, ensure that our bearings offer the maximum performance.

Among the tolerance classes, ABEC 1 applies to ball bearings for normal usage. The other classes ABEC 3, 5, 7, 9 apply to ball bearings of increased precision as required. RBEC 1 applies to roller bearings for normal usage. RBEC 3 and 5 apply to roller bearings of increased precision as required.

STANDARD ABEC / RBEC TOLERANCES - OUTER RING

All tolerances in number of micrometers (µm) and ten-thousandths inches (.0001")

Bearing O.D.		Ball Bearing Sizes	Outside Diameter (1) Δ_{Dmp} +0.000 mm +0.0000"					Width Variation V_{Cs}				Raceway Radial Runout K_{ea}					Raceway Axial Runout S_{ea}			Outside Diameter With Face S_D		
			ABEC					ABEC				ABEC					ABEC			ABEC		
mm			RBEC					RBEC				RBEC					RBEC			RBEC		
over	incl.		1	3	5	7	9	1, 3	5	7	9	1	3	5	7	9	5	7	9	5	7	9
			mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
0	18	30-39	**-8** -3	**-7** -3	**-5** -2	**-4** -1.5	**-2.5** -1	**15** 6	**5** 2	**2.5** 1	**1.5** 0.5	**15** 6	**8** 4	**5** 2	**3** 1	**1.5** 0.5	**8** 3	**5** 2	**1.5** 0.5	**8** 3	**4** 1.5	**1.5** 0.5
18	30	**9300-9303** 9100-9101 200	**-9** -3.5	**-8** -3	**-6** -2.5	**-5** -2	**-4** -1.5	**20** 8	**5** 2	**2.5** 1	**1.5** 0.5	**15** 6	**9** 4	**6** 2.5	**4** 1.5	**2.5** 1	**8** 3	**5** 2	**2.5** 1	**8** 3	**4** 1.5	**1.5** 0.5
30	50	**200-204** 9304-9306 9102-9105 300-303	**-11** -4.5	**-9** -3.5	**-7** -3	**-6** -2.5	 -1.5	**20** 8	**5** 2	**2.5** 1	**1.5** 0.5	**20** 8	**10** 4	**7** 3	**5** 2	**2.5** 1	**8** 3	**5** 2	**2.5** 1	**8** 3	**4** 1.5	**1.5** 0.5
50	80	**205-208** 9307-9312 9106-9110 304-307	**-13** -5	**-11** -4.5	**-9** -3.5	**-7** -3	**-4** -1.5	**25** 10	**6** 2.5	**3** 1	**1.5** 0.5	**25** 10	**13** 5	**8** 3	**5** 2	**4** 1.5	**10** 4	**5** 2	**4** 1.5	**8** 3	**4** 1.5	**1.5** 0.5
80	120	**209-213** 9313-9317 9111-9115 308-311	**-15** -6	**-13** -5	**-10** -4	**-8** -3	**-5** -2	**25** 10	**8** 3	**4** 1.5	**2.5** 1	**35** 14	**18** 7	**10** 4	**6** 2.5	**5** 2	**11** 4.5	**6** 2.5	**5** 2	**9** 3.5	**5** 2	**2.5** 1
120	150	**214-217** 9318-9322 9116-9120 312-314	**-18** -7	**-15** -6	**-11** -4.5	**-9** -3.5	**-5** -2	**30** 12	**8** 3	**5** 2	**2.5** 1	**40** 16	**20** 8	**11** 4.5	**7** 3	**5** 2	**13** 5	**7** 3	**5** 2	**10** 4	**5** 2	**2.5** 1
150	180	**218-220** 9323-9326 9121-9326 315-317	**-25** -10	**-18** -7	**-13** -5	**-10** -4	**-7** -3	**30** 12	**8** 3	**5** 2	**2.5** 1	**45** 18	**23** 9	**13** 5	**8** 3	**5** 2	**14** 5.5	**8** 3	**5** 2	**10** 4	**5** 2	**2.5** 1
180	250	**318-322** 9126-9132 220-228	**-30** -12	**-20** -8	**-15** -6	**-11** -4.5	**-8** -3	**30** 12	**10** 4	**7** 3	**4** 1.5	**50** 20	**25** 10	**15** 6	**10** 4	**7** 3	**15** 6	**10** 4	**7** 3	**11** 4.5	**7** 3	**4** 1.5
250	315	**324-328** 9134-9140 230-234	**-35** -14	**-25** -10	**-18** -7	**-13** -5	**-8** -3	**35** 14	**11** 4.5	**7** 3	**5** 2	**60** 24	**30** 12	**18** 7	**11** 4.5	**7** 3	**18** 7	**10** 4	**7** 3	**13** 5	**8** 3	**5** 2
315	400	**330-338** 9144-9152 236-244	**-40** -16	**-28** -11	**-20** -8	**-15** -6	**-10** -4	**40** 16	**13** 5	**8** 3	**7** 3	**70** 28	**35** 14	**20** 8	**13** 5	**8** 3	**20** 8	**13** 5	**8** 3	**13** 5	**10** 4	**7** 3
400	500	**340-348** 9156-9164 246-256	**-45** -18	**-33** -13	**-23** -9	— —	— —	**45** 18	**15** 6	— —	— —	**80** 31	**40** 16	**23** 9	— —	— —	**23** 9	— —	— —	**15** 6	— —	— —
500	630	**352-356** 9180 260-264	**-50** -20	**-38** -15	**-28** -11	— —	— —	**50** 20	**18** 7	— —	— —	**100** 39	**50** 20	**25** 10	— —	— —	**25** 10	— —	— —	**18** 7	— —	— —
630	800		**-75** -30	**-45** -18	**-35** -14	— —	— —	— —	**20** 8	— —	— —	**120** 47	**60** 24	**30** 12	— —	— —	**30** 12	— —	— —	**20** 8	— —	— —
800	1000		**-100** -40	**-60** -24	— —	— —	— —	— —	— —	— —	— —	**140** 55	**75** 30	— —	— —	— —	— —	— —	— —	— —	— —	— —
1000	1250		**-125** -50	— —	— —	— —	— —	— —	— —	— —	— —	**160** 63	— —	— —	— —	— —	— —	— —	— —	— —	— —	— —

The tolerances in this table are in conformance with ANSI ABMA Standard 20 - 1987.

(1) D_{min} (the smallest single diameter of an O.D.) and D_{max} (the largest single diameter of an O.D.) may fall outside limits shown $\frac{D_{min} + D_{max}}{2}$ must be within outside diameter tabulated.

For further details see ABMA Standard 20.

BEARING TOLERANCES, INCH & METRIC - *continued*

TOLERANCES OF CYLINDRICAL ROLLER AND NEEDLE ROLLER BEARINGS

The tolerances given in the following table apply to inner rings of metric series cylindrical roller and needle roller radial bearing types in which their rings are precision finished.

Bore Diameter

V_{dsp} Difference between the largest and the smallest of the single bore diameters in a single radial plane.

V_{dmp} Difference between the largest and smallest of the mean bore diameters in a single radial plane of an individual ring.

TABLE 5

TOLERANCES OF CYLINDRICAL ROLLER AND NEEDLE ROLLER RADIAL BEARINGS – INNER RING – METRIC SERIES

Tolerance in micrometers (0.001 mm)

		Tolerance class P0 (normal tolerance)				Tolerance class P6				Tolerance class P5		
		Variation V_{dsp} *diameter series			Variation	Variation V_{dsp} *diameter series			Variation	Variation V_{dsp} *diameter series		Variation
>	≤	9	0	2 & 3	V_{dmp}	9	0	2 & 3	V_{dmp}	9	0, 2 & 3	V_{dmp}
2.5	10	10	8	6	6	9	7	5	5	5	4	3
10	18	10	8	6	6	9	7	5	5	5	4	3
18	30	13	10	8	8	10	8	6	6	6	5	3
30	50	15	12	9	9	13	10	8	8	8	6	4
50	80	19	19	11	11	15	15	9	9	9	7	5
80	120	25	25	15	15	19	19	11	11	10	8	5
120	180	31	31	19	19	23	23	14	14	13	10	7
180	250	38	38	23	23	28	28	17	17	15	12	8
250	315	44	44	26	26	31	31	19	19	18	14	9
315	400	50	50	30	30	38	38	23	23	23	18	12
400	500	56	56	34	34	44	44	26	26			

* No values have been established for diameter series 8.

TOLERANCE TERMS, SYMBOLS AND DEFINITIONS
Axes, planes etc.

Inner ring (or shaft washer) axis: Axis of the cylinder inscribed in a basically cylindrical bore. The inner ring (or shaft washer) axis is also the bearing axis.

Outer ring (or housing washer) axis: Axis of the cylinder circumscribed around a basically cylindrical outside surface.

Radial plane: Plane perpendicular to the bearing or ring axis. It is, however, acceptable to consider radial planes referred to in the definitions as being parallel with the plane tangential to the reference face of a ring or the back face of a thrust bearing washer.

Radial direction: Direction through the bearing or ring axis in a radial plane.

Axial plane: Plane containing the bearing or ring axis.

Axial direction: Direction parallel with the bearing or ring axis. It is, however, acceptable to consider axial directions referred to in the definitions as being perpendicular to the plane tangential to the reference face of a ring or back face of a thrust bearing washer.

Reference face: Face designated by the manufacturer of the bearings, and which may be the datum for measurements.

NOTE: The reference face for measurement is generally taken as the unmarked face. In case of symmetrical rings when it is not possible to identify the reference face, the tolerances are deemed to comply relative to either face, but not both. The reference face of a shaft and housing washer as a thrust bearing is that face intended to support axial load and is generally opposite the raceway face.

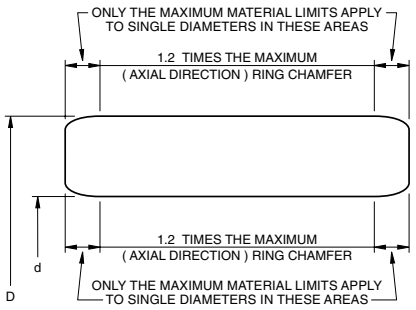
Outer ring flange back face: That side of an outer ring flange which is intended to support axial load.

Middle of raceway: Point or line on a raceway surface, halfway between the two edges of the raceway.

Raceway contact diameter: Diameter of the theoretical circle through the nominal points of contact between the rolling elements and raceway.

NOTE: For roller bearings, the nominal point of contact is generally at the middle of the roller.

Diameter deviation near ring faces: In radial planes, nearer the face of a ring than 1.2 times the maximum (axial direction) ring chamfer, only the maximum material limits apply.



BEARING TOLERANCES, INCH & METRIC - *continued*

The tolerances given in the following table apply to outer rings of metric series cylindrical roller and needle roller radial bearing types in which their rings are precision finished.

TABLE 6

TOLERANCES OF CYLINDRICAL ROLLER AND NEEDLE ROLLER RADIAL BEARINGS – OUTER RING – METRIC SERIES

Tolerance in micrometers (0.001 mm)

		Tolerance class P0 (normal tolerance)				Tolerance class P6				Tolerance class P5		
		Variation V_{Dsp} *diameter series			Variation	**Variation V_{Dsp} *diameter series			Variation	Variation V_{Dsp} *diameter series		Variation
>	≤	9	0	2 & 3	V_{Dmp}	9	0	2 & 3	V_{Dmp}	9	0, 2 & 3	V_{Dmp}
6	18	10	8	6	6	9	7	5	6	5	4	3
18	30	12	9	7	7	10	8	6	7	6	5	3
30	50	14	11	8	8	11	9	7	8	7	5	4
50	80	16	13	10	10	14	11	8	10	9	7	5
80	120	19	19	11	11	16	16	10	11	10	8	5
120	150	23	23	14	14	19	19	11	14	11	8	6
150	180	31	31	19	19	23	23	14	15	13	10	7
180	250	38	38	23	23	25	25	15	19	15	11	8
250	315	44	44	26	26	31	31	19	21	18	14	9
315	400	50	50	30	30	35	35	21	25	20	15	10
400	500	56	56	34	34	41	41	25		23	17	12

* No values have been established for diameter series 8.
** Applies before inserting and after removal of internal snap ring.

Outside Diameter

V_{Dmp} Difference between the largest and the smallest of the mean outside diameters in a single radial plane of an individual ring.

V_{Dsp} Difference between the largest and smallest of the single outside diameters in a single radial plane.

BEARING TOLERANCES, INCH & METRIC - *continued*

TOLERANCES OF CYLINDRICAL ROLLER THRUST BEARINGS

The tolerances given in the following tables apply to thrust washers used in metric series cylindrical roller thrust bearings of dimension series 811 and 812.

TABLE 7

TOLERANCES OF CYLINDRICAL ROLLER THRUST BEARINGS – SHAFT PILOTED WASHER – METRIC SERIES

Dimensions in mm		Dimensions in micrometers (0.001 mm)											
		Tolerance class P0 (normal tolerance)				Tolerance class P6				Tolerance class P5			
Nominal bore diameter		Deviation		Variation	Wall thickness Variation	Deviation		Variation	Wall thickness Variation	Deviation		Variation	Wall thickness Variation
>	≤	Δ_{dmp}		V_{dsp}	S_i*	Δ_{dmp}		V_{dsp}	S_i*	Δ_{dmp}		V_{dmp}	S_i*
	18	0	-8	6	10	0	-8	6	5	0	-8	6	3
18	30	0	-10	8	10	0	-10	8	5	0	-10	8	3
30	50	0	-12	9	10	0	-12	9	6	0	-12	9	3
50	80	0	-15	11	10	0	-15	11	7	0	-15	11	4
80	120	0	-20	15	15	0	-20	15	8	0	-20	15	4
120	180	0	-25	19	15	0	-25	19	9	0	-25	19	5
180	250	0	-30	23	20	0	-30	23	10	0	-30	23	5
250	315	0	-35	26	25	0	-35	26	13	0	-35	26	7
315	400	0	-40	30	30	0	-40	30	15	0	-40	30	7
400	500	0	-45	34	30	0	-45	34	18	0	-45	34	9

* The values of the wall thickness variation S_e, for the Housing Piloted washer are identical to S_i for the Shaft Piloted washers.

TABLE 8

TOLERANCES OF CYLINDRICAL ROLLER THRUST BEARINGS – HOUSING PILOTED WASHER – METRIC SERIES

Dimensions in mm		Tolerances in micrometers (0.001 mm)								
Nominal outside diameter		Tolerance class P0 (normal tolerance)			Tolerance class P6			Tolerance class P5		
		Deviation		Variation	Deviation		Variation	Deviation		Variation
>	≤	Δ_{Dmp}		V_{Dsp}	Δ_{Dmp}		V_{Dsp}	Δ_{Dmp}		V_{Dsp}
	30	0	-13	10	0	-13	10	0	-13	10
30	50	0	-16	12	0	-16	12	0	-16	12
50	80	0	-19	14	0	-19	14	0	-19	14
80	120	0	-22	17	0	-22	17	0	-22	17
120	180	0	-25	19	0	-25	19	0	-25	19
180	250	0	-30	23	0	-30	23	0	-30	23
250	315	0	-35	26	0	-35	26	0	-35	26
315	400	0	-40	30	0	-40	30	0	-40	30
400	500	0	-45	34	0	-45	34	0	-45	34

ABMA / ISO Symbols - Inner Ring

Δ_{dmp} Single plane mean bore diameter deviation from basic bore diameter, e.g., bore tolerance for a basically tapered bore, Δ_{dmp} refers only to the theoretical small bore end of the bore.

V_{dsp} Difference between the largest and the smallest of the single bore diameters in a single radial plane.

V_{dmp} Difference between the largest and smallest of the mean bore diameters in a single radial plane of an individual ring.

ABMA / ISO Symbols - Outer Ring

Δ_{Dmp} Single plane mean outside diameter deviation from basic outside diameter, e.g., O.D. tolerance.

V_{Dsp} Difference between the largest and smallest of the single outside diameters in a single radial plane.

BEARING TOLERANCES, INCH & METRIC - *continued*

TOLERANCES FOR NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

Tolerances for the bore diameters and outside diameters of inch thrust assemblies are given in Table 9.

TABLE 9

TOLERANCES FOR BORE (D_{C1}) AND OUTSIDE (D_C) DIAMETERS OF NOMINAL INCH (NTA) NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

Needle roller Bore Diameter (D_w)	Deviations			
	Diameter (D_{c1})		Outside Diameter (D_c)	
(nominal)	inch		inch	
inch	low	high	high	low
0.0781	+0.002	+0.007	-0.010	-0.020
0.1250	+0.002	+0.010	-0.010	-0.025

Bore Inspection Procedure for Assembly

The bore diameter (Dc_1) of the assembly should be checked with "go" and "no go" plug gages. The "go" plug gage size is the minimum bore diameter of the assembly. The "no go" plug gage size is the maximum bore diameter of the assembly.

The assembly, under its own free weight, must fall freely from the "go" plug gage. The "no go" plug gage must not enter the bore. Where the "no go" plug gage can be forced through the bore, the assembly must not fall from the gage under its own weight.

THRUST BEARINGS

The tolerances in this table conform to ANSI/ABMA Standard 21.2.

Certain applications for Timken cylindrical roller bearings may require special precision tolerances. Timken has for many years offered two high-precision tolerance standards which augment the ABMA tolerance system. If your application requires precision beyond ABMA tolerances, consult your Timken representative about extraprecision and ultraprecision tolerances.

TOLERANCES FOR THRUST WASHERS

Tolerances for the outside diameters and bore diameters of nominal inch thrust washers are given in Tables 10 and 11.

TABLE 10

TOLERANCES FOR BORE DIAMETER (d) OF NOMINAL INCH (TRA, TRB, ETC.) THRUST WASHERS.

Nominal bore diameter		Deviations	
inch		inch	
>	≤	low	high
0.24	2.25	+0.002	+0.012
2.25	5.25	+0.002	+0.017

TABLE 11

TOLERANCES FOR OUTSIDE DIAMETER (d_1) OF NOMINAL INCH (TRA, TRB ETC.) THRUST WASHERS.

Nominal O.D.		Deviations	
inch		inch	
>	≤	high	low
0.24	5.25	-0.010	-0.030

THRUST CYLINDRICAL ROLLER BEARINGS

TYPE TP

Bore			O.D.			Height		
Bearing Bore		Tolerance	Bearing O.D.		Tolerance	Bearing Bore		Tolerance
over	incl.	+0.0	over	incl.	-0	over	incl.	+0.0
mm	mm	mm	mm	mm	mm	mm	mm	mm
in.	in.	in.	in.	in.	in.	in.	in.	in.
50.800	76.200	-0.025	127.000	254.000	+0.038	0.000	50.800	-0.152
2.0000	3.0000	-0.0010	5.0000	10.0000	+0.0015	0.0000	2.0000	-0.0060
76.200	88.900	-0.030	254.000	457.200	+0.051	50.800	76.200	-0.203
3.0000	3.5000	-0.0012	10.0000	18.0000	+0.0020	2.0000	3.0000	-0.0080
88.900	228.600	-0.038	457.200	660.400	+0.640	76.200	152.400	-0.254
3.5000	9.0000	-0.0015	18.0000	26.0000	+0.0025	3.0000	6.0000	-0.0100
228.600	304.800	-0.046	660.400	863.600	+0.076	152.400	254.000	-0.381
9.0000	12.0000	-0.0018	26.0000	34.0000	+0.0030	6.0000	10.0000	-0.0150
304.800	457.200	-0.051	863.600	1117.600	+0.102	254.000	457.200	-0.508
12.0000	18.0000	-0.0020	34.0000	44.0000	+0.0040	10.0000	18.0000	-0.0200
457.200	558.800	-0.064				457.200	762.000	-0.635
18.0000	22.0000	-0.0025				18.0000	30.0000	-0.0250
558.800	762.000	-0.076						
22.0000	30.0000	-0.0030						

TYPES TPS

Bore			O.D.			Height		
Bearing Bore		Tolerance	Bearing O.D.		Tolerance	Bearing Bore		Tolerance
over	incl.	+0.0	over	incl.	-0	over	incl.	+0.0
mm	mm	mm	mm	mm	mm	mm	mm	mm
in.	in.	in.	in.	in.	in.	in.	in.	in.
50.800	76.200	-0.025	127.000	266.700	+0.048	0.000	50.800	-0.203
2.0000	3.0000	-0.0010	5.0000	10.5000	+0.0019	0.0000	2.0000	-0.0080
76.200	88.900	-0.030	266.700	323.850	+0.053	50.800	76.200	-0.254
3.0000	3.5000	-0.0012	10.5000	12.7500	+0.0021	2.0000	3.0000	-0.0100
88.900	228.600	-0.038	323.850	431.800	+0.058	76.200	152.400	-0.381
3.5000	9.0000	-0.0015	12.7500	17.0000	+0.0023	3.0000	6.0000	-0.0150
228.600	304.800	-0.046	431.800	685.800	+0.064	152.400	254.000	-0.508
9.0000	12.0000	-0.0018	17.0000	27.0000	+0.0025	6.0000	10.0000	-0.0200
304.800	457.200	-0.051	685.800	889.000	+0.076	254.000	457.200	-0.635
12.0000	18.0000	-0.0020	27.0000	35.0000	+0.0030	10.0000	18.0000	-0.0250
457.200	558.800	-0.064				457.200	762.000	-0.762
18.0000	22.0000	-0.0025				18.0000	30.0000	-0.0300
558.800	762.000	-0.076						
22.0000	30.0000	-0.0030						

The tolerances in this table conform to ANSI/ABMA Standard 21.2.

BEARING TOLERANCES, INCH & METRIC - *continued*

THRUST BALL BEARINGS

TYPE TVB

Bore			O.D.			Height			
Bearing Bore		Tolerance	Bearing O.D.		Tolerance	Bearing Bore		Tolerance	
over	incl.	-0	over	incl.	+0.0	over	incl.	Max.	Min.
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
0.000	**171.450**	**+0.127**	**0.000**	**134.938**	**-0.051**	**0.000**	**46.038**	**+0.127**	**-0.127**
0.0000	6.7500	+0.0050	0.0000	5.3125	-0.0020	0.0000	1.8125	+0.0050	-0.0050
171.450	**508.000**	**+0.178**	**134.938**	**441.325**	**-0.076**	**46.038**	**304.800**	**+0.254**	**-0.254**
6.7500	20.0000	+0.0070	5.3125	17.3750	-0.0030	1.8125	12.0000	+0.0100	-0.0100
			441.325	**1000.000**	**-0.102**	**304.800**	**508.000**	**+0.381**	**-0.381**
			17.3750	39.3701	-0.0040	12.0000	20.0000	+0.0150	-0.0150

TYPES TVL & DTVL

Bore			O.D.			Height	
Bearing Bore		Tolerance	Bearing O.D.		Tolerance	Bearing Bore	Tolerance
over	incl.	-0	over	incl.	+0.0		
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.		mm in.
0.000	**504.825**	**-0.076**	**0.000**	**584.000**	**-0.076**		**±.381**
0.0000	19.8750	-0.0030	0.0000	23.0000	-0.0030	All Sizes	±.0150
504.825	**1524.000**	**-0.127**	**584.000**	**1778.000**	**-0.127**		
19.8750	60.0000	-0.0050	23.0000	70.0000	-0.0050		

The tolerances in this table conform to ANSI/ABMA Standard 2.

THRUST SPHERICAL ROLLER BEARINGS

Inner Ring				Outer Ring				Height			
Bore		Tolerance		O.D.		Tolerance		Bore Diameter		Tolerance	
		Bore	Radial Runout			O.D.	Radial Runout				
over	incl.	-0.000 mm +0.0000		over	incl.	-0.000 mm +0.0000		over	incl.	plus	minus
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
80.000	**120.000**	**-0.020**	**0.025**	**120.000**	**150.000**	**-0.020**	**0.041**	**80.000**	**120.000**	**0.094**	**0.254**
3.1496	4.7244	-0.0008	0.0010	4.7244	5.9055	-0.0080	0.0016	3.1496	4.7244	0.0037	0.0100
120.000	**180.000**	**-0.025**	**0.030**	**150.000**	**180.000**	**-0.025**	**0.046**	**120.000**	**180.000**	**0.109**	**0.300**
4.7244	7.0866	-0.0010	0.0012	5.9055	7.0866	-0.0010	0.0018	4.7244	7.0866	0.0043	0.0118
180.000	**250.000**	**-0.030**	**0.041**	**180.000**	**250.000**	**-0.030**	**0.051**	**180.000**	**250.000**	**0.130**	**0.366**
7.0866	9.8425	-0.0012	0.0016	7.0866	9.8425	-0.0012	0.0020	7.0866	9.8425	0.0051	0.0144
250.000	**315.000**	**-0.036**	**0.051**	**250.000**	**315.000**	**-0.036**	**0.061**	**250.000**	**315.000**	**0.155**	**0.434**
9.8425	12.4016	-0.0014	0.0020	9.8425	12.4016	-0.0014	0.0024	9.8425	12.4016	0.0061	0.0171
315.000	**400.000**	**-0.041**	**0.061**	**315.000**	**400.000**	**-0.041**	**0.071**	**315.000**	**400.000**	**0.170**	**0.480**
12.4016	15.7480	-0.0016	0.0024	12.4016	15.7480	-0.0016	0.0028	12.4016	15.7480	0.0067	0.0189
400.000	**500.000**	**-0.046**	**0.066**	**400.000**	**500.000**	**-0.046**	**0.081**	**400.000**	**500.000**	**0.185**	**0.526**
15.7480	19.6850	-0.0018	0.0026	15.7480	19.6850	-0.0018	0.0032	15.7480	19.6850	0.0073	0.0207
500.000	**630.000**	**-0.051**	**0.071**	**500.000**	**630.000**	**-0.051**	**0.102**	**500.000**		**0.203**	**0.584**
19.6850	24.8031	-0.0020	0.0028	19.6850	24.8031	-0.0020	0.0040	19.6850	and up	0.0080	0.0230
630.000	**800.000**	**-0.076**	**0.081**	**630.000**	**800.000**	**-0.076**	**0.119**				
24.8031	31.4961	-0.0030	0.0032	24.8031	31.4961	-0.0030	0.0047				
800.000	**1000.000**	**-0.102**	**0.089**	**800.000**	**1000.000**	**-0.102**	**0.140**				
31.4961	39.3701	-0.0040	0.0035	31.4961	39.3701	-0.0040	0.0055				
1000.000	**1250.000**	**-0.127**	**0.102**	**1000.000**	**1250.000**	**-0.127**	**0.163**				
39.3701	49.2126	-0.0050	0.0040	39.3701	49.2126	-0.0050	0.0064				
			1250.000	**1600.000**	**-0.165**	**0.193**					
			49.2126	62.9921	-0.0065	0.0076					
			1600.000	**2000.000**	**-0.203**	**0.229**					
			62.9921	78.7402	-0.0080	0.009					

BEARING TOLERANCES, INCH & METRIC - *continued*

TOLERANCES FOR NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

Pages C234 to C237 list the nominal outside diameter, bore diameter and needle roller diameter for the FNT and AXK Series of needle roller and cage thrust assemblies and also the nominal outside diameter and bore diameter of the series AS, LS, WS and GS thrust washers. Thickness tolerances for the AS and LS thrust washers are also included.

Tolerances for the outside and bore diameters of series FNT and AXK needle roller and cage thrust assemblies are given in Table 12. The needle rollers in any one assembly have a group tolerance of 2 µm.

TABLE 12

TOLERANCES FOR BORE DIAMETER (D_{c1}) AND OUTSIDE DIAMETER (D_c) OF SERIES FNT AND AXK NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

D_{c1} mm		Deviations of min. bore dia. (E11) µm		D_c mm		Deviations of max. outside dia. (c12) µm	
>	≤	low	high	>	≤	high	low
3	6	+20	+95	18	30	-110	-320
6	10	+25	+115	30	40	-120	-370
10	18	+32	+142	40	50	-130	-380
18	30	+40	+170	50	65	-140	-440
30	50	+50	+210	65	80	-150	-450
50	80	+60	+250	80	100	-170	-520
80	120	+72	+292	100	120	-180	-530
				120	140	-200	-600

Bore inspection procedure for assembly

If an inspection of the bore diameter is desired, the bore diameter (D_{c1}) of the assembly should be checked with "go" and "no go" plug gages. The "go" plug gage size is the minimum bore diameter of the assembly. The "no go" plug gage size is the maximum bore diameter of the assembly.

The assembly, under its own weight, must fall freely from the "go" plug gage. The "no go" plug gage must not enter the bore. Where the "no go" plug gage can be forced through the bore, the assembly must not fall from the gage under its own weight.

Tolerances for thrust washers

Tolerances for the outside and bore diameters of series AS thrust washers are given in Table 13. Thickness tolerance for series AS thrust washers is +0.05 mm.

TABLE 13

TOLERANCES FOR BORE DIAMETER (d) AND OUTSIDE DIAMETER (d_1) OF SERIES AS THRUST WASHERS.

d mm		Deviations of min. bore dia. (E12) µm		d_1 mm		Deviations of max. outside dia. (e13) µm	
>	≤	low	high	>	≤	high	low
3	6	+20	+140	18	30	-40	-370
6	10	+25	+175	30	50	-50	-440
10	18	+32	+212	50	80	-60	-520
18	30	+40	+250	80	120	-72	-612
30	50	+50	+300	120	180	-85	-715
50	80	+60	+360	180	250	-100	-820
80	120	+72	+422				
120	180	+85	+485				

Tolerances for the outside and bore diameters of series LS heavy thrust washers are given in Table 14. Thickness tolerances for series LS heavy thrust washers are given in tabular pages.

TABLE 14

TOLERANCES FOR BORE DIAMETER (d) AND OUTSIDE DIAMETER (d_1) OF SERIES LS HEAVY THRUST WASHERS.

d mm		Deviations of min. bore dia. (E12) µm		d_1 mm		Deviations of max. outside dia. (a12) µm	
>	≤	low	high	>	≤	high	low
3	6	+20	+140	18	30	-300	-510
6	10	+25	+175	30	40	-310	-560
10	18	+32	+212	40	50	-320	-570
18	30	+40	+250	50	65	-340	-640
30	50	+50	+300	65	80	-360	-660
50	80	+60	+360	80	100	-380	-730
80	120	+72	+422	100	120	-410	-760
120	180	+85	+485	120	140	-460	-860
				140	160	-520	-920
				160	180	-580	-980
				180	200	-660	-1120

Bore inspection procedure for series AS and LS thrust washers

If an inspection of the thrust washer bore diameter (d) is desired, it should be checked with "go" and "no go" plug gages. The "go" plug gage size is the minimum bore diameter of the thrust washer. The "no go" plug gage size is the maximum bore diameter of the thrust washer.

The thrust washer, under its own weight, must fall freely from the "go" plug gage. The "no go" plug gage must not enter the bore. Where the "no go" plug gage can be forced through the bore, the thrust washer must not fall from the gage under its own weight.

BEARING TOLERANCES, INCH & METRIC - *continued*

TAPERED ROLLER BEARINGS

Timken tapered roller bearings are manufactured to a number of specifications or "classes" that define tolerances on dimensions such as bore, O.D., width and runout. The Timken Company produces bearings to both inch and metric systems. The boundary dimension tolerances applicable to these two categories of bearings differ.

The major difference between the two tolerance systems is that inch bearings have historically been manufactured to positive bore and O.D. tolerances, whereas metric bearings have been manufactured to negative tolerances.

Metric system bearings (ISO and "J" prefix parts)

Timken manufactures metric system bearings to six tolerance classes. Classes K and N are often referred to as standard classes. Class N has more closely controlled bearing width tolerances than K. Classes C, B, A and AA are "precision" classes. These tolerances lie within those currently specified in ISO 492 with the exception of a small number of dimensions indicated in the tables. The differences normally have an insignificant effect on the mounting and performance of tapered roller bearings.

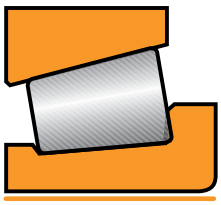
The following table illustrates the current ISO bearing class that corresponds approximately to each of The Timken Company metric bearing classes.

For the exact comparison, please consult your Timken representative.

BEARING CLASS						
Metric Inch	K 4	N 2	C 3	B 0	A 00	AA 000
ISO/DIN	Normal	6X	P5	P4	P2	–

METRIC BEARING TOLERANCES (µm)

CONE BORE			Bearing Class: Standard K		Standard N		Precision C		Precision B		Precision A		Precision AA	
Bearing types	Bore, mm over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	10	18	0	-12	0	-12	0	-7	0	-5	0	-5	0	-5
	18	30	0	-12	0	-12	0	-8	0	-6	0	-6	0	-6
	30	50	0	-12	0	-12	0	-10	0	-8	0	-8	0	-8
	50	80	0	-15	0	-15	0	-12	0	-9	0	-8	0	-8
	80	120	0	-20	0	-20	0	-15	0	-10	0	-8	0	-8
TS	120	180	0	-25	0	-25	0	-18	0	-13	0	-8	0	-8
	180	250	0	-30	0	-30	0	-22	0	-15	0	-8	0	-8
TSF	250	265	0	-35	0	-35	0	-22	0	-15	0	-8	0	-8
	265	315	0	-35	0	-35	0	-22	0	-15	0	-8	0	-8
SR[1]	315	400	0	-40	0	-40	0	-25	–	–	–	–	–	–
	400	500	0	-45	0	-45	0	-25	–	–	–	–	–	–
	500	630	0	-50	–	–	0	-30	–	–	–	–	–	–
	630	800	0	-80	–	–	0	-40	–	–	–	–	–	–
	800	1000	0	-100	–	–	0	-50	–	–	–	–	–	–
	1000	1200	0	-130	–	–	0	-60	–	–	–	–	–	–
	1200	1600	0	-150	–	–	0	-80	–	–	–	–	–	–
	1600	2000	0	-200	–	–	–	–	–	–	–	–	–	–
	2000		0	-250	–	–	–	–	–	–	–	–	–	–

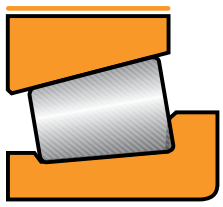


[1]SR assemblies are manufactured to tolerance class N only.

BEARING TOLERANCES, INCH & METRIC - *continued*

METRIC BEARING TOLERANCES (µm)

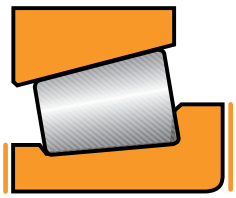
CUP O.D.			Bearing Class: Standard K		Standard N		Precision C		Precision B		Precision A		Precision AA	
Bearing types	O. D., mm over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	10	18	–	–	–	–	–	–	–	–	0	-8	0	-8
	18	30	0	-12	0	-12	0	-8	0	-6	0	-8	0	-8
	30	50	0	-14	0	-14	0	-9	0	-7	0	-8	0	-8
	50	80	0	-16	0	-16	0	-11	0	-9	0	-8	0	-8
	80	120	0	-18	0	-18	0	-13	0	-10	0	-8	0	-8
TS	120	150	0	-20	0	-20	0	-15	0	-11	0	-8	0	-8
	150	180	0	-25	0	-25	0	-18	0	-13	0	-8	0	-8
TSF	180	250	0	-30	0	-30	0	-20	0	-15	0	-8	0	-8
	250	265	0	-35	0	-35	0	-25	0	-18	0	-8	0	-8
SR[1]	265	315	0	-35	0	-35	0	-25	0	-18	0	-8	0	-8
	315	400	0	-40	0	-40	0	-28	0	-18	–	–	–	–
	400	500	0	-45	0	-45	0	-30	–	–	–	–	–	–
	500	630	0	-50	0	-50	0	-35	–	–	–	–	–	–
	630	800	0	-80	–	–	0	-40	–	–	–	–	–	–
	800	1000	0	-100	–	–	0	-50	–	–	–	–	–	–
	1000	1200	0	-130	–	–	0	-60	–	–	–	–	–	–
	1200	1600	0	-165	–	–	0	-80	–	–	–	–	–	–
	1600	2000	0	-200	–	–	–	–	–	–	–	–	–	–
	2000		0	-250	–	–	–	–	–	–	–	–	–	–



[1]SR assemblies are manufactured to tolerance class N only.

METRIC BEARING TOLERANCES (µm)

CONE WIDTH			Bearing Class: Standard K		Standard N		Precision C		Precision B		Precision A		Precision AA	
Bearing types	Bore, mm over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	10	50	0	-100	0	-50	0	-200	0	-200	0	-200	0	-200
	50	120	0	-150	0	-50	0	-300	0	-300	0	-300	0	-300
	120	180	0	-200	0	-50	0	-300	0	-300	0	-300	0	-300
TS	180	250	0	-200	0	-50	0	-350	0	-350	0	-350	0	-350
	250	265	0	-200	0	-50	0	-350	0	-350	0	-350	0	-350
TSF	265	315	0	-200	0	-50	0	-350	0	-350	0	-350	0	-350
	315	500	0	-250	0	-50	0	-350	–	–	–	–	–	–
	500	630	0	-250	–	–	0	-350	–	–	–	–	–	–
	630	1200	0	-300	–	–	0	-350	–	–	–	–	–	–
	1200	1600	0	-350	–	–	0	-350	–	–	–	–	–	–
	1600		0	-350	–	–	–	–	–	–	–	–	–	–



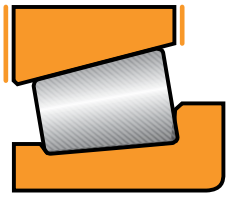
BEARING TOLERANCES, INCH & METRIC - *continued*

METRIC BEARING TOLERANCES (µm)

Bearing Class

CUP WIDTH			Standard				Precision							
			K		N		C		B		A		AA	
Bearing types	O. D., mm over	incl.	Max.	▲ Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	10	80	0	-150	0	-100	0	-150	0	-150	0	-150	0	-150
	80	150	0	-200	0	-100	0	-200	0	-200	0	-200	0	-200
	150	180	0	-200	0	-100	0	-250	0	-250	0	-250	0	-250
	180	250	0	-250	0	-100	0	-250	0	-250	0	-250	0	-250
TS	250	265	0	-250	0	-100	0	-300	0	-300	0	-300	0	-300
	265	315	0	-250	0	-100	0	-300	0	-300	0	-300	0	-300
TSF	315	400	0	-250	0	-100	0	-300	0	-300	–	–	–	–
	400	500	0	-300	0	-100	0	-350	–	–	–	–	–	–
	500	800	0	-300	0	-100	0	-350	–	–	–	–	–	–
	800	1200	0	-350	–	–	0	-400	–	–	–	–	–	–
	1200	1600	0	-400	–	–	0	-400	–	–	–	–	–	–
	1600		0	-400	–	–	–	–	–	–	–	–	–	–

▲These differ slightly from tolerances in ISO 492. These differences normally have an insignificant effect on the mounting and performance of tapered roller bearings. The 30000 series ISO bearings are also available with the above parameter according to ISO 492.

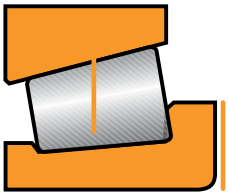


METRIC BEARING TOLERANCES (µm)

Bearing Class

CONE STAND			Standard				Precision							
			K		N		C		B		A		AA	
Bearing types	Bore, mm over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	10	80	+100	0	+50	0	+100	-100	*	*	*	*	*	*
	80	120	+100	-100	+50	0	+100	-100	*	*	*	*	*	*
	120	180	+150	-150	+50	0	+100	-100	*	*	*	*	*	*
TS	180	250	+150	-150	+50	0	+100	-150	*	*	*	*	*	*
	250	265	+150	-150	+100	0	+100	-150	*	*	*	*	*	*
TSF	265	315	+150	-150	+100	0	+100	-150	*	*	–	–	–	–
	315	400	+200	-200	+100	0	+150	-150	–	–	–	–	–	–
	400		*	*	*	*	*	*	–	–	–	–	–	–

* These sizes manufactured as matched assemblies only.



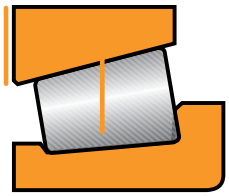
Cone Stand. Cone stand is a measure of the variation in cone raceway size and taper and roller diameter and taper which is checked by measuring the axial location of the reference surface of a master cup or other type gage with respect to the reference face of the cone.

METRIC BEARING TOLERANCES (µm)

Bearing Class

CUP STAND			Standard				Precision							
			K		N		C		B		A		AA	
Bearing types	Bore, mm over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	10	18	+100	0	+50	0	+100	-100	*	*	*	*	*	*
	18	80	+100	0	+50	0	+100	-100	*	*	*	*	*	*
	80	120	+100	-100	+50	0	+100	-100	*	*	*	*	*	*
TS	120	265	+200	-100	+100	0	+100	-150	*	*	*	*	*	*
	265	315	+200	-100	+100	0	+100	-150	*	*	–	–	–	–
TSF[1]	315	400	+200	-200	+100	0	+100	-150	–	–	–	–	–	–
	400		*	*	*	*	*	*	–	–	–	–	–	–

* These sizes manufactured as matched assemblies only.
[1]Stand for flanged cup is measured from flange backface (seating face).

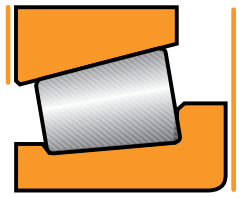


Cup Stand. Cup stand is a measure of the variation in cup I.D. size and taper which is checked by measuring the axial location of the reference surface of a master plug or other type gage with respect to the reference face of the cup.

BEARING TOLERANCES, INCH & METRIC - *continued*

METRIC BEARING TOLERANCES (µm)

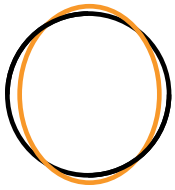
OVERALL BEARING WIDTH			Bearing Class: Standard K		Standard N		Precision C		Precision B		Precision A		Precision AA	
Bearing types	Bore, mm over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	10	80	+200	0	+100	0	+200	-200	+200	-200	+200	-200	+200	-200
	80	120	+200	-200	+100	0	+200	-200	+200	-200	+200	-200	+200	-200
	120	180	+350	-250	+150	0	+350	-250	+200	-250	+200	-250	+200	-250
	180	250	+350	-250	+150	0	+350	-250	+200	-300	+200	-300	+200	-300
	250	265	+350	-250	+200	0	+350	-300	+200	-300	+200	-300	+200	-300
TS	265	315	+350	-250	+200	0	+350	-300	+200	-300	+200	-300	+200	-300
	315	500	+400	-400	+200	0	+350	-300	–	–	–	–	–	–
TSF[2]	500	800	+400	-400	–	–	+350	-400	–	–	–	–	–	–
	800	1000	+450	-450	–	–	+350	-400	–	–	–	–	–	–
	1000	1200	+450	-450	–	–	+350	-450	–	–	–	–	–	–
	1200	1600	+450	-450	–	–	+350	-500	–	–	–	–	–	–
	1600		+450	-450	–	–	–	–	–	–	–	–	–	–
SR[3]	10	500	–	–	0	-150	–	–	–	–	–	–	–	–



[2] For bearing type TSF the tolerance applies to the dimension T_1.
[3] SR assemblies are manufactured to tolerance class N only.

METRIC BEARING TOLERANCES (µm)

ASSEMBLED BEARING MAXIMUM RADIAL RUNOUT			Bearing Class: Standard K	Standard N	Precision C	Precision B	Precision A	Precision AA
Bearing types	O.D., mm over	incl.	K	N	C	B	A	AA
	10	18	–	–	–	–	1.9	1
	18	30	18	18	5	3	1.9	1
	30	50	20	20	6	3	1.9	1
	50	80	25	25	6	4	1.9	1
	80	120	35	35	6	4	1.9	1
	120	150	40	40	7	4	1.9	1
	150	180	45	45	8	4	1.9	1
	180	250	50	50	10	5	1.9	1
TS	250	265	60	60	11	5	1.9	1
	265	315	60	60	11	5	1.9	1
TSF	315	400	70	70	13	5	–	–
	400	500	80	80	18	–	–	–
SR[1]	500	630	100	–	25	–	–	–
	630	800	120	–	35	–	–	–
	800	1000	140	–	50	–	–	–
	1000	1200	160	–	60	–	–	–
	1200	1600	180	–	80	–	–	–
	1600	2000	200	–	–	–	–	–
	2000		200	–	–	–	–	–



[1] SR assemblies are manufactured to tolerance class N only.

BEARING TOLERANCES, INCH & METRIC - *continued*

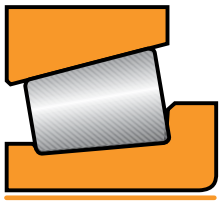
INCH SYSTEM BEARINGS

Inch system bearings are manufactured to a number of tolerance classes. Classes 4 and 2 are often referred to as "standard" classes.

Class 2 has certain tolerances more closely controlled than class 4 and thus may be required for specific applications. Classes 3, 0, 00 and 000 are "precision" classes.

INCH BEARING TOLERANCES (µm AND 0.0001 INCH)

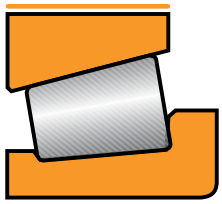
CONE BORE			Bearing Class: Standard 4		Standard 2		Precision 3		Precision 0		Precision 00		Precision 000	
Bearing types	**Bore, mm** (in.) over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	0	**76.200**	**+13**	**0**	**+13**	**0**	**+13**	**0**	**+13**	**0**	**+8**	**0**	**+8**	**0**
	0	3.0000	+5	0	+5	0	+5	0	+5	0	+3	0	+3	0
TS	**76.200**	**304.800**	**+25**	**0**	**+25**	**0**	**+13**	**0**	**+13**	**0**	**+8**	**0**	**+8**	**0**
TSF	3.0000	12.0000	+10	0	+10	0	+5	0	+5	0	+3	0	+3	0
TSL[1]	**304.800**	**609.600**	–	–	**+51**	**0**	**+25**	**0**	–	–	–	–	–	–
SS	12.0000	24.0000	–	–	+20	0	+10	0	–	–	–	–	–	–
TDI	**609.600**	**914.400**	**+76**	**0**	–	–	**+38**	**0**	–	–	–	–	–	–
TDIT	24.0000	36.0000	+30	0	–	–	+15	0	–	–	–	–	–	–
TDO	**914.400**	**1219.200**	**+102**	**0**	–	–	**+51**	**0**	–	–	–	–	–	–
TNA	36.0000	48.0000	+40	0	–	–	+20	0	–	–	–	–	–	–
	1219.200		**+127**	**0**	–	–	**+76**	**0**	–	–	–	–	–	–
	48.0000		+50	0	–	–	+30	0	–	–	–	–	–	–



[1] For TSL bearings these are the normal tolerances of cone bore. However, bore size can be slightly reduced at large end due to tight fit assembly of the seal on the rib. This should not have any effect on the performance of the bearing.

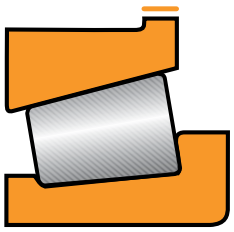
INCH BEARING TOLERANCES (µm AND 0.0001 INCH)

CUP O.D.			Bearing Class: Standard 4		Standard 2		Precision 3		Precision 0		Precision 00		Precision 000	
Bearing types	**Bore, mm** (in.) over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
TS	**0**	**304.800**	**+25**	**0**	**+25**	**0**	**+13**	**0**	**+13**	**0**	**+8**	**0**	**+8**	**0**
TSF	0	12.0000	+10	0	+10	0	+5	0	+5	0	+3	0	+3	0
TSL	**304.800**	**609.600**	**+51**	**0**	**+51**	**0**	**+25**	**0**	–	–	–	–	–	–
SS	12.0000	24.0000	+20	0	+20	0	+10	0	–	–	–	–	–	–
TDI	**609.600**	**914.400**	**+76**	**0**	**+76**	**0**	**+38**	**0**	–	–	–	–	–	–
TDIT	24.0000	36.0000	+30	0	+30	0	+15	0	–	–	–	–	–	–
TDO	**914.400**	**1219.200**	**+102**	**0**	–	–	**+51**	**0**	–	–	–	–	–	–
TNA	36.0000	48.0000	+40	0	–	–	+20	0	–	–	–	–	–	–
TNASW	**1219.200**		**+127**	**0**	–	–	**+76**	**0**	–	–	–	–	–	–
TNASWE	48.0000		+50	0	–	–	+30	0	–	–	–	–	–	–



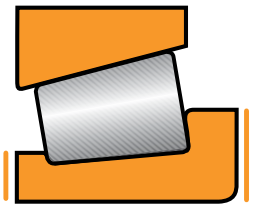
BEARING TOLERANCES, INCH & METRIC - *continued*

INCH BEARING TOLERANCES (µm AND 0.0001 INCH)



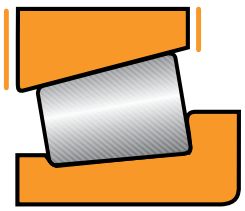
OUTER RACE FLANGE O.D.			Bearing Class: Standard 4		Standard 2		Precision 3		Precision 0		Precision 00		Precision 000	
Bearing types	O.D., mm (in.) over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
			+51	**0**	**+52**	**0**	**+51**	**0**	**+51**	**0**	**+51**	**0**	**+51**	**0**
			+20	0	+20	0	+20	0	+20	0	+20	0	+20	0
TSF	**304.800** 12.0000	**609.600** 24.0000	**+76** +30	**0** 0	**+76** +30	**0** 0	**+76** +30	**0** 0	– –	– –	– –	– –	– –	– –
	609.600 24.0000	**914.400** 36.0000	**+102** +40	**0** 0	**+102** +40	**0** 0	**+102** +40	**0** 0	– –	– –	– –	– –	– –	– –
	914.400 36.0000		**+127** +40	**0** 0	– –	– –	**+127** +50	**0** 0	– –	– –	– –	– –	– –	– –

INCH BEARING TOLERANCES (µm AND 0.0001 INCH)



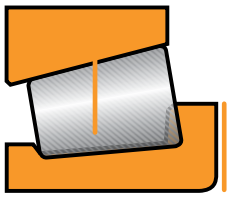
INNER RACE WIDTH			Bearing Class: Standard 4		Standard 2		Precision 3		Precision 0		Precision 00		Precision 000	
Bearing types	O.D., mm (in.) over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
TS TSF TSL SS TDI TDIT TDO	All Sizes		**+76** +30	**-254** -100	**+76** +30	**-254** -100	**+76** +30	**-254** -100	**+76** +30	**-254** -100	**+76** +30	**-254** -100	**+76** +30	**-254** -100

INCH BEARING TOLERANCES (µm AND 0.0001 INCH)



OUTER RACE WIDTH			Bearing Class: Standard 4		Standard 2		Precision 3		Precision 0		Precision 00		Precision 000	
Bearing types	O.D., mm (in.) over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
All Types	All Sizes		**+51** +20	**-254** -100	**+51** +20	**-254** -100	**+51** +20	**-254** -100	**+51** +20	**-254** -100	**+51** +20	**-254** -100	**+51** +20	**-254** -100

BEARING TOLERANCES, INCH & METRIC - *continued*



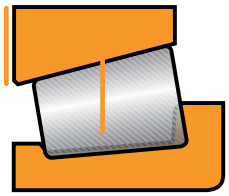
Cone Stand. Cone stand is a measure of the variation in cone raceway size and taper and roller diameter and taper which is checked by measuring the axial location of the reference surface of a master cup or other type gage with respect to the reference face of the cone.

INCH BEARING TOLERANCES (µm AND 0.0001 INCH)

CONE STAND			Bearing Class											
			Standard				Precision							
			4		2		3		0		00		000	
Bearing types	O.D., mm (in.) over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	0	**101.600**	**+102**	**0**	**+102**	**0**	**+102**	**-102**	*	*	*	*	*	*
	0	4.0000	+40	0	+40	0	+40	-40	*	*	*	*	*	*
TS	**101.600**	**266.700**	**+152**	**-152**	**+102**	**0**	**+102**	**-102**	*	*	*	*	*	*
TSL	4.0000	10.5000	+60	-60	+40	0	+40	-40	*	*	*	*	*	*
SS	**266.700**	**304.800**	**+152**	**-152**	**+102**	**0**	**+102**	**-102**	*	*	–	–	–	–
TDI[1]	10.5000	12.0000	+60	-60	+40	0	+40	-40	*	*	–	–	–	–
TDIT[1]	**304.800**	**406.400**	–	–	**+178**	**-178**	**+102**	**-102**	–	–	–	–	–	–
TDO	12.0000	16.0000	–	–	+70	-70	+40	-40	–	–	–	–	–	–
	406.400		*	*	*	*	*	*	–	–	–	–	–	–
	16.0000		*	*	*	*	*	*	–	–	–	–	–	–

* These sizes manufactured as matched assemblies only.

[1] For class 2, TDI and TDIT bearings with cone bore of 101.600 to 304.800 mm (4 in. to 12 in.), the cone stand is ±102 (±40).



Cup Stand. Cup stand is a measure of the variation in cup I.D. size and taper which is checked by measuring the axial location of the reference surface of a master plug or other type gage with respect to the reference face of the cup.

INCH BEARING TOLERANCES (µm AND 0.0001 INCH)

CUP STAND			Bearing Class											
			Standard				Precision							
			4		2		3		0		00		000	
Bearing types	Bore, mm (in.) over	incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	0	**101.600**	**+102**	**0**	**+102**	**0**	**+102**	**-102**	*	*	*	*	*	*
	0	4.0000	+40	0	+40	0	+40	-40	*	*	*	*	*	*
TS	**101.600**	**266.700**	**+203**	**-102**	**+102**	**0**	**+102**	**-102**	*	*	*	*	*	*
TSF[1]	4.0000	10.5000	+80	-40	+40	0	+40	-40	*	*	*	*	*	*
TSL	**266.700**	**304.800**	**+203**	**-102**	**+102**	**0**	**+102**	**-102**	*	*	–	–	–	–
SS	10.5000	12.0000	+80	-40	+40	0	+40	-40	*	*	–	–	–	–
TDI	**304.800**	**406.400**	–	–	**+203**	**-203**	**+102**	**-102**	–	–	–	–	–	–
TDIT	12.0000	16.0000	–	–	+80	-80	+40	-40	–	–	–	–	–	–
	406.400		*	*	*	*	*	*	–	–	–	–	–	–
	16.0000		*	*	*	*	*	*	–	–	–	–	–	–

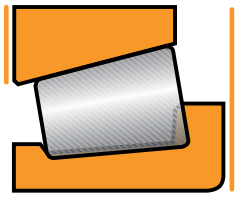
* These sizes manufactured as matched assemblies only.

[1] Stand for flanged cup is measured from flange backface (seating face).

BEARING TOLERANCES, INCH & METRIC - *continued*

INCH BEARING TOLERANCES (µm AND 0.0001 INCH)

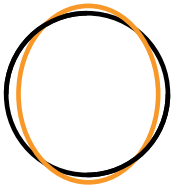
OVERALL BEARING WIDTH	Bore, mm (in.) over	Bore, mm (in.) incl.	O.D., mm (in.) over	O.D., mm (in.) incl.	Bearing Class: Standard 4 Max.	Standard 4 Min.	Standard 2 Max.	Standard 2 Min.	Precision 3 Max.	Precision 3 Min.	Precision 0 Max.	Precision 0 Min.	Precision 00 Max.	Precision 00 Min.	Precision 000 Max.	Precision 000 Min.
Bearing types																
	0	**101.600**	–	–	**+203**	**0**	**+203**	**0**	**+203**	**-203**	**+203**	**-203**	**+203**	**-203**	**+203**	**-203**
	0	4.0000	–	–	+80	0	+80	0	+80	-80	+80	-80	+80	-80	+80	-80
	101.600	**304.800**	–	–	**+356**	**-254**	**+203**	**0**	**+203**	**-203**	**+203**	**-203**	**+203**	**-203**	**+203**	**-203**
TS	4.0000	12.0000	–	–	+140	-100	+80	0	+80	-80	+80	-80	+80	-80	+80	-80
TSF[1]	**304.800**	**609.600**	**0**	**508.000**	–	–	**+381**	**-381**	**+203**	**-203**	–	–	–	–	–	–
TSL	12.0000	24.0000	0	20.0000	–	–	+150	-150	+80	–80	–	–	–	–	–	–
	304.800	**609.600**	**508.000**		–	–	**+381**	**-381**	**+381**	**-381**	–	–	–	–	–	–
	12.0000	24.0000	20.0000		–	–	+150	-150	+150	-150	–	–	–	–	–	–
	609.600		–	–	**+381**	**-381**	–	–	**+381**	**-381**	–	–	–	–	–	–
	24.0000		–	–	+150	-150	–	–	+150	-150	–	–	–	–	–	–
TNA	**0**	**127.000**	–	–	–	–	**+254**	**0**	**+254**	**0**	–	–	–	–	–	–
TNASW	0	5.0000	–	–	–	–	+100	0	+100	0	–	–	–	–	–	–
TNASWE	**127.000**		–	–	–	–	**+762**	**0**	**+762**	**0**	–	–	–	–	–	–
	5.0000		–	–	–	–	+300	0	+300	0	–	–	–	–	–	–
	0	**101.600**	–	–	**+406**	**0**	**+406**	**0**	**+406**	**-406**	**+406**	**-406**	**+406**	**-406**	**+406**	**-406**
	0	4.0000	–	–	+160	0	+160	0	+160	-160	+160	-160	+160	-160	+160	-160
	101.600	**304.800**	–	–	**+711**	**-508**	**+406**	**-203**	**+406**	**-406**	**+406**	**-406**	**+406**	**-406**	**+406**	**-406**
TDI	4.0000	12.0000	–	–	+280	-200	+160	-80	+160	-160	+160	-160	+160	-160	+160	-160
TDIT	**304.800**	**609.600**	**0**	**508.000**	–	–	**+762**	**-762**	**+406**	**-406**	–	–	–	–	–	–
TDO	12.0000	24.0000	0	20.0000	–	–	+300	-300	+160	-160	–	–	–	–	–	–
	304.800	**609.600**	**508.000**		–	–	**+762**	**-762**	**+762**	**-762**	–	–	–	–	–	–
	12.0000	24.0000	20.0000		–	–	+300	-300	+300	-300	–	–	–	–	–	–
	609.600		–	–	**+762**	**-762**	–	–	**+762**	**-762**	–	–	–	–	–	–
	24.0000		–	–	+300	-300	–	–	+300	-300	–	–	–	–	–	–
SS	**0**	**101.600**	–	–	**+457**	**-51**	**+457**	**-51**	–	–	–	–	–	–	–	–
	0	4.0000	–	–	+180	-20	+180	-20	–	–	–	–	–	–	–	–



[1] For bearing type TSF the tolerance applies to the dimension T_1.

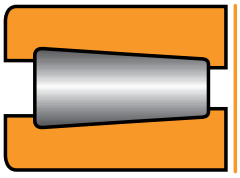
INCH BEARING TOLERANCES (µm AND 0.0001 INCH)

ASSEMBLED BEARING MAXIMUM RADIAL RUNOUT	O.D., mm (in.) over	O.D., mm (in.) incl.	Bearing Class: Standard 4 Max.	Standard 4 Min.	Standard 2 Max.	Standard 2 Min.	Precision 3 Max.	Precision 3 Min.	Precision 0 Max.	Precision 0 Min.	Precision 00 Max.	Precision 00 Min.	Precision 000 Max.	Precision 000 Min.
Bearing types														
TS	**0**		**51**		**38**		**8**		**4**		**2**		**1**	
TSF	0		20		15		3		1.5		0.75		0.40	
TSL	**266.700**	**304.800**	**51**		**38**		**8**		**4**		**2**		**1**	
SS	10.5000	12.0000	20		15		3		1.5		0.75		0.40	
TDI	**304.800**	**609.600**	**51**		**38**		**18**		–		–		–	
TDIT	12.0000	24.0000	20		15		7		–		–		–	
TDO	**609.600**	**914.400**	**76**		**51**		**51**		–		–		–	
TNA	24.0000	36.0000	30		20		20		–		–		–	
TNASW	**914.400**		**76**		–		**76**		–		–		–	
TNASWE	36.0000		30		–		30		–		–		–	

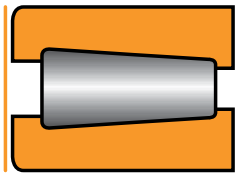


BEARING TOLERANCES, INCH & METRIC - *continued*

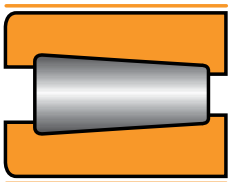
THRUST TAPERED ROLLER BEARING (TTHD, TTVF, TTVS) TOLERANCES (µm AND 0.0001in.)



BORE		BEARING CLASS			
		Standard 2		Precision 3	
Range, mm (in.)					
over	incl.	Max.	Min.	Max.	Min.
0 0	**304.800** 12.0000	**+25** +10	**0** 0	**+13** +5	**0** 0
304.800 12.0000	**609.600** 24.0000	**+51** +20	**0** 0	**+25** +10	**0** 0
609.600 24.0000	**914.400** 36.0000	**+76** +30	**0** 0	**+38** +15	**0** 0
914.400 36.0000	**1219.200** 48.0000	**+102** +40	**0** 0	**+51** +20	**0** 0
1219.200 48.0000		**+127** +50	**0** 0	**+76** +30	**0** 0

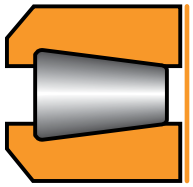


OUTSIDE DIAMETER		BEARING CLASS			
		Standard 2		Precision 3	
Range, mm (in.)					
over	incl.	Max.	Min.	Max.	Min.
0 0	**304.800** 12.0000	**+25** +10	**0** 0	**+13** +5	**0** 0
304.800 12.0000	**609.600** 24.0000	**+51** +20	**0** 0	**+25** +10	**0** 0
609.600 24.0000	**914.400** 36.0000	**+76** +30	**0** 0	**+38** +15	**0** 0
914.400 36.0000	**1219.200** 48.0000	**+102** +40	**0** 0	**+51** +20	**0** 0
1219.200 48.0000		**+127** +50	**0** 0	**+76** +30	**0** 0

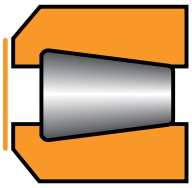


WIDTH	BEARING CLASS			
	Standard 2		Precision 3	
	Max.	Min.	Max.	Min.
All sizes	**+381** +150	**-381** -150	**+203** +80	**-203** -80

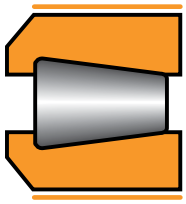
THRUST TAPERED ROLLER BEARING (TTC, TTSP – CLASS 4) TOLERANCES (µm AND 0.0001 inch)



BORE		DEVIATION	
Range, mm (in.)			
over	incl.	Max.	Min.
0 0	**25.400** 1.0000	**+76** +30	**-76** -30
25.400 1.0000	**76.200** 3.0000	**+102** +40	**-102** -40
76.200 3.0000		**+127** +50	**-127** -50



OUTSIDE DIAMETER		DEVIATION	
Range, mm (in.)			
over	incl.	Max.	Min.
0 0	**127.000** 5.0000	**+254** +100	**0** 0
127.000 5.0000	**203.200** 8.0000	**+381** +150	**0** 0
203.200 8.0000		**+508** +200	**0** 0



WIDTH		DEVIATION	
Range, mm (in.)			
over	incl.	Max.	Min.
0 0	**76.200** 3.0000	**+254** +100	**-254** -100
76.200 3.0000	**127.000** 5.0000	**+381** +150	**-381** -150
127.000 5.0000		**+508** +200	**-508** -200

BEARING TOLERANCES, INCH & METRIC - *continued*

The following tables provide standard ISO tolerance information. They are provided for general use and are referenced throughout this catalog.

ISO TOLERANCES FOR HOLES – METRIC

Diameters mm		Deviations in µm											
		B10		B11		B12		C9		C10		C11	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
3	6	+188	+140	+215	+140	+260	+140	+100	+70	+118	+70	+145	+70
6	10	+208	+150	+240	+150	+300	+150	+116	+80	+138	+80	+170	+80
10	18	+220	+150	+260	+150	+330	+150	+138	+95	+165	+95	+205	+95
18	30	+244	+160	+290	+160	+370	+160	+162	+110	+194	+110	+240	+110
30	40	+270	+170	+330	+170	+420	+170	+182	+120	+220	+120	+280	+120
40	50	+280	+180	+340	+180	+430	+180	+192	+130	+230	+130	+290	+130
50	65	+310	+190	+380	+190	+490	+190	+214	+140	+260	+140	+330	+140
65	80	+320	+200	+390	+200	+500	+200	+224	+150	+270	+150	+340	+150
80	100	+360	+220	+440	+220	+570	+220	+257	+170	+310	+170	+390	+170
100	120	+380	+240	+460	+240	+590	+240	+267	+180	+320	+180	+400	+180
120	140	+420	+260	+510	+260	+660	+260	+300	+200	+360	+200	+450	+200
140	160	+440	+280	+530	+280	+680	+280	+310	+210	+370	+210	+460	+210
160	180	+470	+310	+560	+310	+710	+310	+330	+230	+390	+230	+480	+230
180	200	+525	+340	+630	+340	+800	+340	+355	+240	+425	+240	+530	+240
200	225	+565	+380	+670	+380	+840	+380	+375	+260	+445	+260	+550	+260
225	250	+605	+420	+710	+420	+880	+420	+395	+280	+465	+280	+570	+280
250	280	+690	+480	+800	+480	+1000	+480	+430	+300	+510	+300	+620	+300
280	315	+750	+540	+860	+540	+1060	+540	+460	+330	+540	+330	+650	+330
315	355	+830	+600	+960	+600	+1170	+600	+500	+360	+590	+360	+720	+360
355	400	+910	+680	+1040	+680	+1250	+680	+540	+400	+630	+400	+760	+400
400	450	+1010	+760	+1160	+760	+1390	+760	+595	+440	+690	+440	+840	+440
450	500	+1090	+840	+1240	+840	+1470	+840	+635	+480	+730	+480	+880	+480

Diameters mm		Deviations in µm									
		E9		E10		E11		E12		E13	
>	≤	high	low	high	low	high	low	high	low	high	low
3	6	+50	+20	+68	+20	+95	+20	+140	+20	+200	+20
6	10	+61	+25	+83	+25	+115	+25	+175	+25	+245	+25
10	18	+75	+32	+102	+32	+142	+32	+212	+32	+302	+32
18	30	+92	+40	+124	+40	+170	+40	+250	+40	+370	+40
30	50	+112	+50	+150	+50	+210	+50	+300	+50	+440	+50
50	80	+134	+60	+180	+60	+250	+60	+360	+60	+520	+60
80	120	+159	+72	+212	+72	+292	+72	+422	+72	+612	+72
120	180	+185	+85	+245	+85	+335	+85	+485	+85	+715	+85
180	250	+215	+100	+285	+100	+390	+100	+560	+100	+820	+100
250	315	+240	+110	+320	+110	+430	+110	+630	+110	+920	+110
315	400	+265	+125	+355	+125	+485	+125	+695	+125	+1015	+125
400	500	+290	+135	+385	+135	+535	+135	+765	+135	+1105	+135

Diameters mm		Deviations in µm							
		F5		F6		F7		F8	
>	≤	high	low	high	low	high	low	high	low
3	6	+15	+10	+18	+10	+22	+10	+28	+10
6	10	+19	+13	+22	+13	+28	+13	+35	+13
10	18	+24	+16	+27	+16	+34	+16	+43	+16
18	30	+29	+20	+33	+20	+41	+20	+53	+20
30	50	+36	+25	+41	+25	+50	+25	+64	+25
50	80	+43	+30	+49	+30	+60	+30	+76	+30
80	120	+51	+36	+58	+36	+71	+36	+90	+36
120	180	+61	+43	+68	+43	+83	+43	+106	+43
180	250	+70	+50	+79	+50	+96	+50	+122	+50
250	315	+79	+56	+88	+56	+108	+56	+137	+56
315	400	+87	+62	+98	+62	+119	+62	+151	+62
400	500	+95	+68	+108	+68	+131	+68	+165	+68

ISO TOLERANCES FOR HOLES – METRIC

Diameters mm		Deviations in µm					
		G5		G6		G7	
>	≤	high	low	high	low	high	low
3	6	+9	+4	+12	+4	+16	+4
6	10	+11	+5	+14	+5	+20	+5
10	18	+14	+6	+17	+6	+24	+6
18	30	+16	+7	+20	+7	+28	+7
30	50	+20	+9	+25	+9	+34	+9
50	80	+23	+10	+29	+10	+40	+10
80	120	+27	+12	+34	+12	+47	+12
120	180	+32	+14	+39	+14	+54	+14
180	250	+35	+15	+44	+15	+61	+15
250	315	+40	+17	+49	+17	+69	+17
315	400	+43	+18	+54	+18	+75	+18
400	500	+47	+20	+60	+20	+83	+20

Diameters mm		Deviations in µm									
		H4		H5		H6		H7		H8	
>	≤	high	low	high	low	high	low	high	low	high	low
3	6	+4	0	+5	0	+8	0	+12	0	+18	0
6	10	+4	0	+6	0	+9	0	+15	0	+22	0
10	18	+5	0	+8	0	+11	0	+18	0	+27	0
18	30	+6	0	+9	0	+13	0	+21	0	+33	0
30	50	+7	0	+11	0	+16	0	+25	0	+39	0
50	80	+8	0	+13	0	+19	0	+30	0	+46	0
80	120	+10	0	+15	0	+22	0	+35	0	+54	0
120	180	+12	0	+18	0	+25	0	+40	0	+63	0
180	250	+14	0	+20	0	+29	0	+46	0	+72	0
250	315	+16	0	+23	0	+32	0	+52	0	+81	0
315	400	+18	0	+25	0	+36	0	+57	0	+89	0
400	500	+20	0	+27	0	+40	0	+63	0	+97	0

Diameters mm		Deviations in µm							
		H9		H10		H11		H12	
>	≤	high	low	high	low	high	low	high	low
3	6	+30	0	+48	0	+75	0	+120	0
6	10	+36	0	+58	0	+90	0	+150	0
10	18	+43	0	+70	0	+110	0	+180	0
18	30	+52	0	+84	0	+130	0	+210	0
30	50	+62	0	+100	0	+160	0	+250	0
50	80	+74	0	+120	0	+190	0	+300	0
80	120	+87	0	+140	0	+220	0	+350	0
120	180	+100	0	+160	0	+250	0	+400	0
180	250	+115	0	+185	0	+290	0	+460	0
250	315	+130	0	+210	0	+320	0	+520	0
315	400	+140	0	+230	0	+360	0	+570	0
400	500	+155	0	+250	0	+400	0	+630	0

BEARING TOLERANCES, INCH & METRIC - *continued*

ISO TOLERANCES FOR HOLES – METRIC

Diameters mm		Deviations in µm						Deviations in µm					
		J6		J7		J8		K6		K7		K8	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
3	6	+5	-3	+6	-6	+10	-8	+2	-6	+3	-9	+5	-13
6	10	+5	-4	+8	-7	+12	-10	+2	-7	+5	-10	+6	-16
10	18	+6	-5	+10	-8	+15	-12	+2	-9	+6	-12	+8	-19
18	30	+8	-5	+12	-9	+20	-13	+2	-11	+6	-15	+10	-23
30	50	+10	-6	+14	-11	+24	-15	+3	-13	+7	-18	+12	-27
50	80	+13	-6	+18	-12	+28	-18	+4	-15	+9	-21	+14	-32
80	120	+16	-6	+22	-13	+34	-20	+4	-18	+10	-25	+16	-38
120	180	+18	-7	+26	-14	+41	-22	+4	-21	+12	-28	+20	-43
180	250	+22	-7	+30	-16	+47	-25	+5	-24	+13	-33	+22	-50
250	315	+25	-7	+36	-16	+55	-26	+5	-27	+16	-36	+25	-56
315	400	+29	-7	+39	-18	+60	-29	+7	-29	+17	-40	+28	-61
400	500	+33	-7	+43	-20	+66	-31	+8	-32	+18	-45	+29	-68

Diameters mm		Deviations in µm						Deviations in µm					
		M5		M6		M7		N6		N7		N8	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
3	6	-3	-8	-1	-9	0	-12	-5	-13	-4	-16	-2	-20
6	10	-4	-10	-3	-12	0	-15	-7	-16	-4	-19	-3	-25
10	18	-4	-12	-4	-15	0	-18	-9	-20	-5	-23	-3	-30
18	30	-5	-14	-4	-17	0	-21	-11	-24	-7	-28	-3	-36
30	50	-5	-16	-4	-20	0	-25	-12	-28	-8	-33	-3	-42
50	80	-6	-19	-5	-24	0	-30	-14	-33	-9	-39	-4	-50
80	120	-8	-23	-6	-28	0	-35	-16	-38	-10	-45	-4	-58
120	180	-9	-27	-8	-33	0	-40	-20	-45	-12	-52	-4	-67
180	250	-11	-31	-8	-37	0	-46	-22	-51	-14	-60	-5	-77
250	315	-13	-36	-9	-41	0	-52	-25	-57	-14	-66	-5	-86
315	400	-14	-39	-10	-46	0	-57	-26	-62	-16	-73	-5	-94
400	500	-16	-43	-10	-50	0	-63	-27	-67	-17	-80	-6	-103

Diameters mm		Deviations in µm				Deviations in µm					
		P6		P7		R6		R7		R8	
>	≤	high	low	high	low	high	low	high	low	high	low
3	6	-9	-17	-8	-20	-12	-20	-11	-23	-15	-33
6	10	-12	-21	-9	-24	-16	-25	-13	-28	-19	-41
10	18	-15	-26	-11	-29	-20	-31	-16	-34	-23	-50
18	30	-18	-31	-14	-35	-24	-37	-20	-41	-28	-61
30	50	-21	-37	-17	-42	-29	-45	-25	-50	-34	-73
50	65	-26	-45	-21	-51	-35	-54	-30	-60	-41	-87
65	80	-26	-45	-21	-51	-37	-56	-32	-62	-43	-89
80	100	-30	-52	-24	-59	-44	-66	-38	-73	-51	-105
100	120	-30	-52	-24	-59	-47	-69	-41	-76	-54	-108
120	140	-37	-61	-28	-68	-56	-81	-48	-88	-63	-126
140	160	-36	-61	-28	-68	-58	-83	-50	-90	-65	-128
160	180	-36	-61	-28	-68	-61	-86	-53	-93	-68	-131
180	200	-41	-70	-33	-79	-68	-97	-60	-106	-77	-149
200	225	-41	-70	-33	-79	-71	-100	-63	-109	-80	-152
225	250	-41	-70	-33	-79	-75	-104	-67	-113	-84	-156
250	280	-47	-79	-36	-88	-85	-117	-74	-126	-94	-175
280	315	-47	-79	-36	-88	-89	-121	-78	-130	-98	-179
315	355	-51	-87	-41	-98	-97	-133	-87	-144	-108	-197
355	400	-51	-87	-41	-98	-103	-139	-93	-150	-114	-203
400	450	-55	-95	-45	-108	-113	-153	-103	-166	-126	-223
450	500	-55	-95	-45	-108	-119	-159	-109	-172	-132	-229

ISO TOLERANCES FOR SHAFTS – METRIC

Diameters mm		Deviations in µm							
		a10		a11		a12		a13	
>	≤	high	low	high	low	high	low	high	low
—	3	-270	-310	-270	-330	-270	-370	-270	-410
3	6	-270	-318	-270	-345	-270	-390	-270	-450
6	10	-280	-338	-280	-370	-280	-430	-280	-500
10	18	-290	-360	-290	-400	-290	-470	-290	-560
18	30	-300	-384	-300	-430	-300	-510	-300	-630
30	40	-310	-410	-310	-470	-310	-560	-310	-700
40	50	-320	-420	-320	-480	-320	-570	-320	-710
50	65	-340	-460	-340	-530	-340	-640	-340	-800
65	80	-360	-480	-360	-550	-360	-660	-360	-820
80	100	-380	-520	-380	-600	-380	-730	-380	-920
100	120	-410	-550	-410	-630	-410	-760	-410	-950
120	140	-460	-620	-460	-710	-460	-860	-460	-1090
140	160	-520	-680	-520	-770	-520	-920	-520	-1150
160	180	-580	-740	-580	-830	-580	-980	-580	-1210
180	200	-660	-845	-660	-950	-660	-1120	-660	-1380
200	225	-740	-925	-740	-1030	-740	-1200	-740	-1460
225	250	-820	-1005	-820	-1110	-820	-1280	-820	-1540
250	280	-920	-1130	-920	-1240	-920	-1440	-920	-1730
280	315	-1050	-1260	-1050	-1370	-1050	-1570	-1050	-1860
315	355	-1200	-1430	-1200	-1560	-1200	-1770	-1200	-2090
355	400	-1350	-1580	-1350	-1710	-1350	-1920	-1350	-2240

Diameters mm		Deviations in µm						Deviations in µm					
		c11		c12		c13		e11		e12		e13	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
—	3	-60	-120	-60	-160	-60	-200	-14	-74	-14	-114	-14	-154
3	6	-70	-145	-70	-190	-70	-250	-20	-95	-20	-140	-20	-200
6	10	-80	-170	-80	-230	-80	-300	-25	-115	-25	-175	-25	-245
10	18	-95	-205	-95	-275	-95	-365	-32	-142	-32	-212	-32	-302
18	30	-110	-240	-110	-320	-110	-440	-40	-170	-40	-250	-40	-370
30	40	-120	-280	-120	-370	-120	-510	-50	-210	-50	-300	-50	-440
40	50	-130	-290	-130	-380	-130	-520	-50	-210	-50	-300	-50	-440
50	65	-140	-330	-140	-440	-140	-600	-60	-250	-60	-360	-60	-520
65	80	-150	-340	-150	-450	-150	-610	-60	-250	-60	-360	-60	-520
80	100	-170	-390	-170	-520	-170	-710	-72	-292	-72	-422	-72	-612
100	120	-180	-400	-180	-530	-180	-720	-72	-292	-72	-422	-72	-612
120	140	-200	-450	-200	-600	-200	-830	-85	-335	-85	-485	-85	-715
140	160	-210	-460	-210	-610	-210	-840	-85	-335	-85	-485	-85	-715
160	180	-230	-480	-230	-630	-230	-860	-85	-335	-85	-485	-85	-715
180	200	-240	-530	-240	-700	-240	-960	-100	-390	-100	-560	-100	-820
200	225	-260	-550	-260	-720	-260	-980	-100	-390	-100	-560	-100	-820
225	250	-280	-570	-280	-740	-280	-1000	-100	-390	-100	-560	-100	-820
250	280	-300	-620	-300	-820	-300	-1110	-110	-430	-110	-630	-110	-920
280	315	-330	-650	-330	-850	-330	-1140	-110	-430	-110	-630	-110	-920
315	355	-360	-720	-360	-930	-360	-1250	-125	-485	-125	-695	-125	-1015

BEARING TOLERANCES, INCH & METRIC - *continued*

ISO TOLERANCES FOR SHAFTS – METRIC

Diameters mm		Deviations in µm						Deviations in µm					
		f5		f6		f7		g5		g6		g7	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
—	3	-6	-10	-6	-12	-6	-16	-2	-6	-2	-8	-2	-12
3	6	-10	-15	-10	-18	-10	-22	-4	-9	-4	-12	-4	-16
6	10	-13	-19	-13	-22	-13	-28	-5	-11	-5	-14	-5	-20
10	18	-16	-24	-16	-27	-16	-34	-6	-14	-6	-17	-6	-24
18	30	-20	-29	-20	-33	-20	-41	-7	-16	-7	-20	-7	-28
30	50	-25	-36	-25	-41	-25	-50	-9	-20	-9	-25	-9	-34
50	80	-30	-43	-30	-49	-30	-60	-10	-23	-10	-29	-10	-40
80	120	-36	-51	-36	-58	-36	-71	-12	-27	-12	-34	-12	-47
120	180	-43	-61	-43	-68	-43	-83	-14	-32	-14	-39	-14	-54
180	250	-50	-70	-50	-79	-50	-96	-15	-35	-15	-44	-15	-61
250	315	-56	-79	-56	-88	-56	-108	-17	-40	-17	-49	-17	-69
315	400	-62	-87	-62	-98	-62	-119	-18	-43	-18	-54	-18	-75

Diameters mm		Deviations in µm									
		h4		h5		h6		h7		h8	
>	≤	high	low	high	low	high	low	high	low	high	low
—	3	0	-3	0	-4	0	-6	0	-10	0	-14
3	6	0	-4	0	-5	0	-8	0	-12	0	-18
6	10	0	-4	0	-6	0	-9	0	-15	0	-22
10	18	0	-5	0	-8	0	-11	0	-18	0	-27
18	30	0	-6	0	-9	0	-13	0	-21	0	-33
30	50	0	-7	0	-11	0	-16	0	-25	0	-39
50	80	0	-8	0	-13	0	-19	0	-30	0	-46
80	120	0	-10	0	-15	0	-22	0	-35	0	-54
120	180	0	-12	0	-18	0	-25	0	-40	0	-63
180	250	0	-14	0	-20	0	-29	0	-46	0	-72
250	315	0	-16	0	-23	0	-32	0	-52	0	-81
315	400	0	-18	0	-25	0	-36	0	-57	0	-89

Diameters mm		Deviations in µm									
		h9		h10		h11		h12		h13	
>	≤	high	low	high	low	high	low	high	low	high	low
—	3	0	-25	0	-40	0	-60	0	-100	0	-140
3	6	0	-30	0	-48	0	-75	0	-120	0	-180
6	10	0	-36	0	-58	0	-90	0	-150	0	-220
10	18	0	-43	0	-70	0	-110	0	-180	0	-270
18	30	0	-52	0	-84	0	-130	0	-210	0	-330
30	50	0	-62	0	-100	0	-160	0	-250	0	-390
50	80	0	-74	0	-120	0	-190	0	-300	0	-460
80	120	0	-87	0	-140	0	-220	0	-350	0	-540
120	180	0	-100	0	-160	0	-250	0	-400	0	-630
180	250	0	-115	0	-185	0	-290	0	-460	0	-720
250	315	0	-130	0	-210	0	-320	0	-520	0	-810
315	400	0	-140	0	-230	0	-360	0	-570	0	-890

BEARING TOLERANCES, INCH & METRIC - *continued*

ISO TOLERANCES FOR SHAFTS – METRIC

Diameters mm		Deviations in µm						Deviations in µm					
		j5		j6		j7		k5		k6		k7	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
—	3	+2	-2	+4	-2	+6	-4	+4	0	+6	0	+10	0
3	6	+3	-2	+6	-2	+8	-4	+6	+1	+9	+1	+13	+1
6	10	+4	-2	+7	-2	+10	-5	+7	+1	+10	+1	+16	+1
10	18	+5	-3	+8	-3	+12	-6	+9	+1	+12	+1	+19	+1
18	30	+5	-4	+9	-4	+13	-8	+11	+2	+15	+2	+23	+2
30	50	+6	-5	+11	-5	+15	-10	+13	+2	+18	+2	+27	+2
50	80	+6	-7	+12	-7	+18	-12	+15	+2	+21	+2	+32	+2
80	120	+6	-9	+13	-9	+20	-15	+18	+3	+25	+3	+38	+3
120	180	+7	-11	+14	-11	+22	-18	+21	+3	+28	+3	+43	+3
180	250	+7	-13	+16	-13	+25	-21	+24	+4	+33	+4	+50	+4
250	315	+7	-16	+16	-16	+26	-26	+27	+4	+36	+4	+56	+4
315	400	+7	-18	+18	-18	+29	-28	+29	+4	+40	+4	+61	+4

Diameters mm		Deviations in µm						Deviations in µm					
		m5		m6		m7		n5		n6		n7	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
—	3	+6	+2	+8	+2	+12	+2	+8	+4	+10	+4	+14	+4
3	6	+9	+4	+12	+4	+16	+4	+13	+8	+16	+8	+20	+8
6	10	+12	+6	+15	+6	+21	+6	+16	+10	+19	+10	+25	+10
10	18	+15	+7	+18	+7	+25	+7	+20	+12	+23	+12	+30	+12
18	30	+17	+8	+21	+8	+29	+8	+24	+15	+28	+15	+36	+15
30	50	+20	+9	+25	+9	+34	+9	+28	+17	+33	+17	+42	+17
50	80	+24	+11	+30	+11	+41	+11	+33	+20	+39	+20	+50	+20
80	120	+28	+13	+35	+13	+48	+13	+38	+23	+45	+23	+58	+23
120	180	+33	+15	+40	+15	+55	+15	+45	+27	+52	+27	+67	+27
180	250	+37	+17	+46	+17	+63	+17	+51	+31	+60	+31	+77	+31
250	315	+43	+20	+52	+20	+72	+20	+57	+34	+66	+34	+86	+34
315	400	+46	+21	+57	+21	+78	+21	+62	+37	+73	+37	+94	+37

Diameters mm		Deviations in µm					
		p6		r6		r7	
>	≤	high	low	high	low	high	low
3	6	-	-	-	-	-	-
6	10	-	-	-	-	-	-
10	18	-	-	-	-	-	-
18	30	-	-	-	-	-	-
30	50	-	-	-	-	-	-
50	65	-	-	-	-	-	-
65	80	-	-	-	-	-	-
80	100	+59	+37	-	-	-	-
100	120	+59	+37	-	-	-	-
120	140	+68	+43	+90	+65	-	-
140	160	+68	+43	+90	+65	-	-
160	180	+68	+43	+90	+65	-	-
180	200	+79	+50	+106	+77	-	-
200	225	+79	+50	+109	+80	+126	+80
225	250	+79	+50	+113	+84	+130	+84
250	280	+88	+56	+126	+94	+146	+94
280	315	+88	+56	+130	+98	+150	+98
315	355	+98	+62	+144	+108	+165	+108
355	400	+98	+62	+150	+114	+171	+114
400	450	+108	+68	+166	+126	+189	+126
450	500	+108	+68	+172	+132	+195	+132

BEARING TOLERANCES, INCH & METRIC - *continued*

ISO TOLERANCES FOR HOLES – INCH

Diameters inches		Deviations in inches						Deviations in inches					
		B10		B11		B12		C9		C10		C11	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
0.1181	0.2362	+0.0074	+0.0055	+0.0085	+0.0055	+0.0102	+0.0055	+0.0039	+0.0028	+0.0046	+0.0028	+0.0057	+0.0028
0.2362	0.3937	+0.0082	+0.0059	+0.0094	+0.0059	+0.0118	+0.0059	+0.0046	+0.0031	+0.0054	+0.0031	+0.0067	+0.0031
0.3937	0.7087	+0.0087	+0.0059	+0.0102	+0.0059	+0.0130	+0.0059	+0.0054	+0.0037	+0.0065	+0.0037	+0.0081	+0.0037
0.7087	1.1811	+0.0096	+0.0063	+0.0114	+0.0063	+0.0146	+0.0063	+0.0064	+0.0043	+0.0076	+0.0043	+0.0094	+0.0043
1.1811	1.5748	+0.0106	+0.0067	+0.0130	+0.0067	+0.0165	+0.0067	+0.0072	+0.0047	+0.0087	+0.0047	+0.0110	+0.0047
1.5748	1.9685	+0.0110	+0.0071	+0.0134	+0.0071	+0.0169	+0.0071	+0.0076	+0.0051	+0.0091	+0.0051	+0.0114	+0.0051
1.9685	2.5591	+0.0122	+0.0075	+0.0150	+0.0075	+0.0193	+0.0075	+0.0084	+0.0055	+0.0102	+0.0055	+0.0120	+0.0055
2.5591	3.1496	+0.0126	+0.0079	+0.0154	+0.0079	+0.0197	+0.0079	+0.0088	+0.0059	+0.0106	+0.0059	+0.0134	+0.0059
3.1496	3.9370	+0.0142	+0.0087	+0.0173	+0.0087	+0.0224	+0.0087	+0.0101	+0.0067	+0.0122	+0.0067	+0.0154	+0.0067
3.9370	4.7244	+0.0150	+0.0094	+0.0181	+0.0094	+0.0232	+0.0094	+0.0105	+0.0071	+0.0126	+0.0071	+0.0157	+0.0071
4.7244	5.5118	+0.0165	+0.0102	+0.0201	+0.0102	+0.0260	+0.0102	+0.0118	+0.0079	+0.0142	+0.0079	+0.0177	+0.0079
5.5118	6.2992	+0.0173	+0.0110	+0.0209	+0.0110	+0.0268	+0.0110	+0.0122	+0.0083	+0.0146	+0.0083	+0.0181	+0.0083
6.2992	7.0866	+0.0185	+0.0122	+0.0220	+0.0122	+0.0280	+0.0122	+0.0130	+0.0091	+0.0154	+0.0091	+0.0189	+0.0091
7.0866	7.8740	+0.0207	+0.0134	+0.0248	+0.0134	+0.0315	+0.0134	+0.0140	+0.0094	+0.0167	+0.0094	+0.0209	+0.0094
7.8740	8.8583	+0.0222	+0.0150	+0.0264	+0.0150	+0.0331	+0.0150	+0.0148	+0.0102	+0.0175	+0.0102	+0.0217	+0.0102
8.8583	9.8425	+0.0238	+0.0165	+0.0280	+0.0165	+0.0346	+0.0165	+0.0156	+0.0110	+0.0183	+0.0110	+0.0224	+0.0110
9.8425	11.0236	+0.0272	+0.0189	+0.0315	+0.0189	+0.0394	+0.0189	+0.0169	+0.0118	+0.0201	+0.0118	+0.0244	+0.0118
11.0236	12.4016	+0.0295	+0.0213	+0.0339	+0.0213	+0.0417	+0.0213	+0.0181	+0.0130	+0.0213	+0.0130	+0.0256	+0.0130
12.4016	13.9764	+0.0327	+0.0236	+0.0378	+0.0236	+0.0461	+0.0236	+0.0197	+0.0142	+0.0232	+0.0142	+0.0283	+0.0142
13.9764	15.7480	+0.0358	+0.0268	+0.0409	+0.0268	+0.0492	+0.0268	+0.0213	+0.0157	+0.0248	+0.0157	+0.0299	+0.0157
15.7480	17.7165	+0.0398	+0.0299	+0.0457	+0.0299	+0.0547	+0.0299	+0.0234	+0.0173	+0.0272	+0.0173	+0.0331	+0.0173
17.71654	19.6850	+0.0429	+0.0331	+0.0488	+0.0331	+0.0579	+0.0331	+0.0250	+0.0189	+0.0287	+0.0189	+0.0346	+0.0189

Diameters inches		Deviations in inches									
		E9		E10		E11		E12		E13	
>	≤	high	low	high	low	high	low	high	low	high	low
0.1181	0.2362	+0.0020	+0.0008	+0.0027	+0.0008	+0.0037	+0.0008	+0.0055	+0.0008	+0.0079	+0.0008
0.2362	0.3937	+0.0024	+0.0010	+0.0033	+0.0010	+0.0045	+0.0010	+0.0069	+0.0010	+0.0096	+0.0010
0.3937	0.7087	+0.0030	+0.0013	+0.0040	+0.0013	+0.0056	+0.0013	+0.0083	+0.0013	+0.0119	+0.0013
0.7087	1.1811	+0.0036	+0.0016	+0.0049	+0.0016	+0.0067	+0.0016	+0.0098	+0.0016	+0.0146	+0.0016
1.1811	1.9685	+0.0044	+0.0020	+0.0059	+0.0020	+0.0083	+0.0020	+0.0118	+0.0020	+0.0173	+0.0020
1.9685	3.1496	+0.0053	+0.0024	+0.0071	+0.0024	+0.0098	+0.0024	+0.0142	+0.0024	+0.0205	+0.0024
3.1496	4.7244	+0.0063	+0.0028	+0.0083	+0.0028	+0.0115	+0.0028	+0.0166	+0.0028	+0.0241	+0.0028
4.7244	7.0866	+0.0073	+0.0033	+0.0096	+0.0033	+0.0132	+0.0033	+0.0191	+0.0033	+0.0281	+0.0033
7.0866	9.8425	+0.0085	+0.0039	+0.0112	+0.0039	+0.0154	+0.0039	+0.0220	+0.0039	+0.0323	+0.0039
9.8425	12.4016	+0.0094	+0.0043	+0.0126	+0.0043	+0.0169	+0.0043	+0.0248	+0.0043	+0.0362	+0.0043
12.4016	15.7480	+0.0104	+0.0049	+0.0140	+0.0049	+0.0191	+0.0049	+0.0274	+0.0049	+0.0400	+0.0049
15.7480	19.6850	+0.0114	+0.0053	+0.0152	+0.0053	+0.0211	+0.0053	+0.0301	+0.0053	+0.0435	+0.0053

Diameters inches		Deviations in inches							
		F5		F6		F7		F8	
>	≤	high	low	high	low	high	low	high	low
0.1181	0.2362	+0.0006	+0.0004	+0.0007	+0.0004	+0.0009	+0.0004	+0.0011	+0.0004
0.2362	0.3937	+0.0007	+0.0005	+0.0009	+0.0005	+0.0011	+0.0005	+0.0014	+0.0005
0.3937	0.7087	+0.0009	+0.0006	+0.0011	+0.0006	+0.0013	+0.0006	+0.0017	+0.0006
0.7087	1.1811	+0.0011	+0.0008	+0.0013	+0.0008	+0.0016	+0.0008	+0.0021	+0.0008
1.1811	1.9685	+0.0014	+0.0010	+0.0016	+0.0010	+0.0020	+0.0010	+0.0025	+0.0010
1.9685	3.1496	+0.0017	+0.0012	+0.0019	+0.0012	+0.0024	+0.0012	+0.0030	+0.0012
3.1496	4.7244	+0.0020	+0.0014	+0.0023	+0.0014	+0.0028	+0.0014	+0.0035	+0.0014
4.7244	7.0866	+0.0024	+0.0017	+0.0027	+0.0017	+0.0033	+0.0017	+0.0042	+0.0017
7.0866	9.8425	+0.0028	+0.0020	+0.0031	+0.0020	+0.0038	+0.0020	+0.0048	+0.0020
9.8425	12.4016	+0.0031	+0.0022	+0.0035	+0.0022	+0.0043	+0.0022	+0.0054	+0.0022
12.4016	15.7480	+0.0034	+0.0024	+0.0039	+0.0024	+0.0047	+0.0024	+0.0059	+0.0024
15.7480	19.6850	+0.0037	+0.0027	+0.0043	+0.0027	+0.0052	+0.0027	+0.0065	+0.0027

ISO TOLERANCES FOR HOLES – INCH

Diameters inches		Deviations in inches					
		G5		G6		G7	
>	≤	high	low	high	low	high	low
0.1181	0.2362	+0.0004	+0.0002	+0.0005	+0.0002	+0.0006	+0.0002
0.2362	0.3937	+0.0004	+0.0002	+0.0006	+0.0002	+0.0008	+0.0002
0.3937	0.7087	+0.0006	+0.0002	+0.0007	+0.0002	+0.0009	+0.0002
0.7087	1.1811	+0.0006	+0.0003	+0.0008	+0.0003	+0.0011	+0.0003
1.1811	1.9685	+0.0008	+0.0004	+0.0010	+0.0004	+0.0013	+0.0004
1.9685	3.1496	+0.0009	+0.0004	+0.0011	+0.0004	+0.0016	+0.0004
3.1496	4.7244	+0.0011	+0.0005	+0.0013	+0.0005	+0.0019	+0.0005
4.7244	7.0866	+0.0013	+0.0006	+0.0015	+0.0006	+0.0021	+0.0006
7.0866	9.8425	+0.0014	+0.0006	+0.0017	+0.0006	+0.0024	+0.0006
9.8425	12.4016	+0.0016	+0.0007	+0.0019	+0.0007	+0.0027	+0.0007
12.4016	15.7480	+0.0017	+0.0007	+0.0021	+0.0007	+0.0030	+0.0007
15.7480	19.6850	+0.0019	+0.0008	+0.0024	+0.0008	+0.0033	+0.0008

Diameters inches		Deviations in inches									
		H4		H5		H6		H7		H8	
>	≤	high	low	high	low	high	low	high	low	high	low
0.1181	0.2362	+0.0002	0	+0.0002	0	+0.0003	0	+0.0005	0	+0.0007	0
0.2362	0.3937	+0.0002	0	+0.0002	0	+0.0004	0	+0.0006	0	+0.0009	0
0.3937	0.7087	+0.0002	0	+0.0003	0	+0.0004	0	+0.0007	0	+0.0011	0
0.7087	1.1811	+0.0002	0	+0.0004	0	+0.0005	0	+0.0008	0	+0.0013	0
1.1811	1.9685	+0.0003	0	+0.0004	0	+0.0006	0	+0.0010	0	+0.0015	0
1.9685	3.1496	+0.0003	0	+0.0005	0	+0.0007	0	+0.0012	0	+0.0018	0
3.1496	4.7244	+0.0004	0	+0.0006	0	+0.0009	0	+0.0014	0	+0.0021	0
4.7244	7.0866	+0.0005	0	+0.0007	0	+0.0010	0	+0.0016	0	+0.0025	0
7.0866	9.8425	+0.0006	0	+0.0008	0	+0.0011	0	+0.0018	0	+0.0028	0
9.8425	12.4016	+0.0006	0	+0.0009	0	+0.0013	0	+0.0020	0	+0.0032	0
12.4016	15.7480	+0.0007	0	+0.0010	0	+0.0014	0	+0.0022	0	+0.0035	0
15.7480	19.6850	+0.0008	0	+0.0011	0	+0.0016	0	+0.0025	0	+0.0038	0

Diameters inches		Deviations in inches							
		H9		H10		H11		H12	
>	≤	high	low	high	low	high	low	high	low
0.1181	0.2362	+0.0012	0	+0.0019	0	+0.0030	0	+0.0047	0
0.2362	0.3937	+0.0014	0	+0.0023	0	+0.0035	0	+0.0059	0
0.3937	0.7087	+0.0017	0	+0.0028	0	+0.0043	0	+0.0071	0
0.7087	1.1811	+0.0020	0	+0.0033	0	+0.0051	0	+0.0083	0
1.1811	1.9685	+0.0024	0	+0.0039	0	+0.0063	0	+0.0098	0
1.9685	3.1496	+0.0029	0	+0.0047	0	+0.0075	0	+0.0118	0
3.1496	4.7244	+0.0034	0	+0.0055	0	+0.0087	0	+0.0138	0
4.7244	7.0866	+0.0039	0	+0.0063	0	+0.0098	0	+0.0157	0
7.0866	9.8425	+0.0045	0	+0.0073	0	+0.0114	0	+0.0181	0
9.8425	12.4016	+0.0051	0	+0.0083	0	+0.0126	0	+0.0205	0
12.4016	15.7480	+0.0055	0	+0.0091	0	+0.0142	0	+0.0224	0
15.7480	19.6850	+0.0061	0	+0.0098	0	+0.0157	0	+0.0248	0

BEARING TOLERANCES, INCH & METRIC - *continued*

ISO TOLERANCES FOR HOLES – INCH

Diameters inches		Deviations in inches						Deviations in inches					
		J6		J7		J8		K6		K7		K8	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
0.1181	0.2362	+0.00020	-0.00012	+0.00024	-0.00024	+0.00039	-0.00031	+0.00008	-0.00024	+0.00012	-0.00035	+0.00020	-0.00051
0.2362	0.3937	+0.00020	-0.00016	+0.00031	-0.00028	+0.00047	-0.00039	+0.00008	-0.00028	+0.00020	-0.00039	+0.00024	-0.00063
0.3937	0.7087	+0.00024	-0.00020	+0.00039	-0.00031	+0.00059	-0.00047	+0.00008	-0.00035	+0.00024	-0.00047	+0.00031	-0.00075
0.7087	1.1811	+0.00031	-0.00020	+0.00047	-0.00035	+0.00079	-0.00051	+0.00008	-0.00043	+0.00024	-0.00059	+0.00039	-0.00091
1.1811	1.9685	+0.00039	-0.00024	+0.00055	-0.00043	+0.00094	-0.00059	+0.00012	-0.00051	+0.00028	-0.00071	+0.00047	-0.00106
1.9685	3.1496	+0.00051	-0.00024	+0.00071	-0.00047	+0.00110	-0.00071	+0.00016	-0.00059	+0.00035	-0.00083	+0.00055	-0.00126
3.1496	4.7244	+0.00063	-0.00024	+0.00087	-0.00051	+0.00134	-0.00079	+0.00016	-0.00071	+0.00039	-0.00098	+0.00063	-0.00150
4.7244	7.0866	+0.00071	-0.00028	+0.00102	-0.00055	+0.00161	-0.00087	+0.00016	-0.00083	+0.00047	-0.00110	+0.00079	-0.00169
7.0866	9.8425	+0.00087	-0.00028	+0.00118	-0.00063	+0.00185	-0.00098	+0.00020	-0.00094	+0.00051	-0.00130	+0.00087	-0.00197
9.8425	12.4016	+0.00098	-0.00028	+0.00142	-0.00063	+0.00217	-0.00102	+0.00020	-0.00106	+0.00063	-0.00142	+0.00098	-0.00220
12.4016	15.7480	+0.00114	-0.00028	+0.00154	-0.00071	+0.00236	-0.00114	+0.00028	-0.00114	+0.00067	-0.00157	+0.00110	-0.00240
15.7480	19.6850	+0.00130	-0.00028	+0.00169	-0.00079	+0.00259	-0.00122	+0.00031	-0.00126	+0.00071	-0.00177	+0.00114	-0.00268

Diameters inches		Deviations in inches						Deviations in inches					
		M5		M6		M7		N6		N7		N8	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
0.1181	0.2362	-0.00012	-0.00031	-0.00004	-0.00035	0	-0.00047	-0.0002	-0.0005	-0.0002	-0.0006	-0.0001	-0.0008
0.2362	0.3937	-0.00016	-0.00039	-0.00012	-0.00047	0	-0.00059	-0.0003	-0.0006	-0.0002	-0.0007	-0.0001	-0.0010
0.3937	0.7087	-0.00016	-0.00047	-0.00016	-0.00059	0	-0.00071	-0.0004	-0.0008	-0.0002	-0.0009	-0.0001	-0.0012
0.7087	1.1811	-0.00020	-0.00055	-0.00016	-0.00067	0	-0.00083	-0.0004	-0.0009	-0.0003	-0.0011	-0.0001	-0.0014
1.1811	1.9685	-0.00020	-0.00063	-0.00016	-0.00079	0	-0.00098	-0.0005	-0.0011	-0.0003	-0.0013	-0.0001	-0.0017
1.9685	3.1496	-0.00024	-0.00075	-0.00020	-0.00094	0	-0.00118	-0.0006	-0.0013	-0.0004	-0.0015	-0.0002	-0.0020
3.1496	4.7244	-0.00031	-0.00091	-0.00024	-0.00110	0	-0.00138	-0.0006	-0.0015	-0.0004	-0.0018	-0.0002	-0.0023
4.7244	7.0866	-0.00035	-0.00106	-0.00031	-0.00130	0	-0.00157	-0.0008	-0.0018	-0.0005	-0.0020	-0.0002	-0.0026
7.0866	9.8425	-0.00043	-0.00122	-0.00031	-0.00146	0	-0.00181	-0.0009	-0.0020	-0.0006	-0.0024	-0.0002	-0.0030
9.8425	12.4016	-0.00051	-0.00142	-0.00035	-0.00161	0	-0.00205	-0.0000	-0.0022	-0.0006	-0.0026	-0.0002	-0.0034
12.4016	15.7480	-0.00055	-0.00154	-0.00039	-0.00181	0	-0.00224	-0.0010	-0.0024	-0.0006	-0.0029	-0.0002	-0.0037
15.7480	19.6850	-0.00063	-0.00169	-0.00039	-0.00197	0	-0.00248	-0.0011	-0.0026	-0.0007	-0.0031	-0.0002	-0.0041

Diameters inches		Deviations in inches				Deviations in inches					
		P6		P7		R6		R7		R8	
>	≤	high	low	high	low	high	low	high	low	high	low
0.1181	0.2362	-0.0004	-0.0007	-0.0003	-0.0008	-0.0005	-0.0008	-0.0004	-0.0009	-0.0006	-0.0013
0.2362	0.3937	-0.0005	-0.0008	-0.0004	-0.0009	-0.0006	-0.0010	-0.0005	-0.0011	-0.0007	-0.0016
0.3937	0.7087	-0.0006	-0.0010	-0.0004	-0.0011	-0.0008	-0.0012	-0.0006	-0.0013	-0.0009	-0.0020
0.7087	1.1811	-0.0007	-0.0012	-0.0006	-0.0014	-0.0009	-0.0015	-0.0008	-0.0016	-0.0011	-0.0024
1.1811	1.9685	-0.0008	-0.0015	-0.0007	-0.0017	-0.0011	-0.0018	-0.0010	-0.0020	-0.0013	-0.0029
1.9685	2.5591	-0.0010	-0.0018	-0.0008	-0.0020	-0.0014	-0.0021	-0.0012	-0.0024	-0.0016	-0.0034
2.5591	3.1496	-0.0010	-0.0018	-0.0008	-0.0020	-0.0015	-0.0022	-0.0013	-0.0024	-0.0017	-0.0035
3.1496	3.9370	-0.0012	-0.0020	-0.0009	-0.0023	-0.0017	-0.0026	-0.0015	-0.0029	-0.0020	-0.0041
3.9370	4.7244	-0.0012	-0.0020	-0.0009	-0.0023	-0.0019	-0.0027	-0.0016	-0.0030	-0.0021	-0.0043
4.7244	5.5118	-0.0014	-0.0024	-0.0011	-0.0027	-0.0022	-0.0032	-0.0019	-0.0035	-0.0025	-0.0050
5.5118	6.2992	-0.0014	-0.0024	-0.0011	-0.0027	-0.0023	-0.0033	-0.0020	-0.0035	-0.0026	-0.0050
6.2992	7.0866	-0.0014	-0.0024	-0.0011	-0.0027	0.0024	-0.0034	-0.0021	-0.0037	-0.0027	-0.0052
7.0866	7.8740	-0.0016	-0.0028	-0.0013	-0.0031	-0.0027	-0.0038	-0.0024	-0.0042	-0.0030	-0.0059
7.8740	8.8583	-0.0016	-0.0028	-0.0013	-0.0031	0.0028	-0.0039	-0.0025	-0.0043	-0.0031	-0.0060
8.8583	9.8425	-0.0016	-0.0028	-0.0013	-0.0031	-0.0030	-0.0041	-0.0026	-0.0044	-0.0033	-0.0061
9.8425	11.0236	-0.0019	-0.0031	-0.0014	-0.0035	-0.0033	-0.0046	-0.0029	-0.0050	-0.0037	-0.0069
11.0236	12.4016	-0.0019	-0.0031	-0.0014	-0.0035	-0.0035	-0.0048	-0.0031	-0.0051	-0.0039	-0.0070
12.4016	13.9764	-0.0020	-0.0034	-0.0016	-0.0039	-0.0038	-0.0052	-0.0034	-0.0057	-0.0043	-0.0078
13.9764	15.7480	-0.0020	-0.0034	-0.0016	-0.0039	-0.0041	-0.0055	-0.0037	-0.0059	-0.0045	-0.0080
15.7480	17.7165	-0.0022	-0.0037	-0.0018	-0.0043	-0.0044	-0.0060	-0.0041	-0.0065	-0.0050	-0.0088
17.7165	19.6850	-0.0022	-0.0037	-0.0018	-0.0043	-0.0047	-0.0063	-0.0043	-0.0068	-0.0052	-0.0090

ISO TOLERANCES FOR SHAFTS – INCH

Diameters inches		Deviations in inches							
		a10		a11		a12		a13	
>	≤	high	low	high	low	high	low	high	low
–	0.1181	-0.0106	-0.0122	-0.0106	-0.0130	-0.0106	-0.0146	-0.0106	-0.0161
0.1181	0.2362	-0.0106	-0.0125	-0.0106	-0.0136	-0.0106	-0.0154	-0.0106	-0.0177
0.2362	0.3937	-0.0110	-0.0133	-0.0110	-0.0146	-0.0110	-0.0169	-0.0110	-0.0197
0.3937	0.7087	-0.0114	-0.0142	-0.0114	-0.0157	-0.0114	-0.0185	-0.0114	-0.0220
0.7087	1.1811	-0.0118	-0.0151	-0.0118	-0.0169	-0.0118	-0.0201	-0.0118	-0.0248
1.1811	1.5748	-0.0122	-0.0161	-0.0122	-0.0185	-0.0122	-0.0220	-0.0122	-0.0276
1.5748	1.9685	-0.0126	-0.0165	-0.0126	-0.0189	-0.0126	-0.0224	-0.0126	-0.0280
1.9685	2.5591	-0.0134	-0.0181	-0.0134	-0.0209	-0.0134	-0.0252	-0.0134	-0.0315
2.5591	3.1496	-0.0142	-0.0189	-0.0142	-0.0217	-0.0142	-0.0260	-0.0142	-0.0323
3.1496	3.9370	-0.0150	-0.0205	-0.0150	-0.0236	-0.0150	-0.0287	-0.0150	-0.0362
3.9370	4.7244	-0.0161	-0.0217	-0.0161	-0.0248	-0.0161	-0.0299	-0.0161	-0.0374
4.7244	5.5118	-0.0181	-0.0244	-0.0181	-0.0280	-0.0181	-0.0339	-0.0181	-0.0429
5.5118	6.2992	-0.0205	-0.0268	-0.0205	-0.0303	-0.0205	-0.0362	-0.0205	-0.0453
6.2992	7.0866	-0.0228	-0.0291	-0.0228	-0.0327	-0.0228	-0.0386	-0.0228	-0.0476
7.0866	7.8740	-0.0260	-0.0333	-0.0260	-0.0374	-0.0260	-0.0441	-0.0260	-0.0543
7.8740	8.8583	-0.0291	-0.0364	-0.0291	-0.0406	-0.0291	-0.0472	-0.0291	-0.0575
8.8583	9.8425	-0.0323	-0.0396	-0.0323	-0.0437	-0.0323	-0.0504	-0.0323	-0.0606
9.8425	11.0236	-0.0362	-0.0445	-0.0362	-0.0488	-0.0362	-0.0567	-0.0362	-0.0681
11.0236	12.4016	-0.0413	-0.0496	-0.0413	-0.0539	-0.0413	-0.0618	-0.0413	-0.0732
12.4016	13.9764	-0.0472	-0.0563	-0.0472	-0.0614	-0.0472	-0.0697	-0.0472	-0.0823
13.9764	15.7480	-0.0531	-0.0622	-0.0531	-0.0673	-0.0531	-0.0756	-0.0531	-0.0882

Diameters inches		Deviations in inches						Deviations in inches					
		c11		c12		c13		e11		e12		e13	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
—	0.1181	-0.0024	-0.0047	-0.0024	-0.0063	-0.0024	-0.0079	-0.0006	-0.0029	-0.0006	-0.0045	-0.0006	-0.0061
0.1181	0.2362	-0.0028	-0.0057	-0.0028	-0.0075	-0.0028	-0.0098	-0.0008	-0.0037	-0.0008	-0.0055	-0.0008	-0.0079
0.2362	0.3937	-0.0031	-0.0067	-0.0031	-0.0091	-0.0031	-0.0118	-0.0010	-0.0045	-0.0010	-0.0069	-0.0010	-0.0096
0.3937	0.7087	-0.0037	-0.0081	-0.0037	-0.0108	-0.0037	-0.0144	-0.0013	-0.0056	-0.0013	-0.0083	-0.0013	-0.0119
0.7087	1.1811	-0.0043	-0.0094	-0.0043	-0.0126	-0.0043	-0.0173	-0.0016	-0.0067	-0.0016	-0.0098	-0.0016	-0.0146
1.1811	1.5748	-0.0047	-0.0110	-0.0047	-0.0146	-0.0047	-0.0201	-0.0020	-0.0083	-0.0020	-0.0118	-0.0020	-0.0173
1.5748	1.9685	-0.0051	-0.0114	-0.0051	-0.0150	-0.0051	-0.0205	-0.0020	-0.0083	-0.0020	-0.0118	-0.0020	-0.0173
1.9685	2.5591	-0.0055	-0.0130	-0.0055	-0.0173	-0.0055	-0.0236	-0.0024	-0.0098	-0.0024	-0.0142	-0.0024	-0.0205
2.5591	3.1496	-0.0059	-0.0134	-0.0059	-0.0177	-0.0059	-0.0240	-0.0024	-0.0098	-0.0024	-0.0142	-0.0024	-0.0205
3.1496	3.9370	-0.0067	-0.0154	-0.0067	-0.0205	-0.0067	-0.0280	-0.0028	-0.0115	-0.0028	-0.0166	-0.0028	-0.0241
3.9370	4.7244	-0.0071	-0.0157	-0.0071	-0.0209	-0.0071	-0.0283	-0.0028	-0.0115	-0.0028	-0.0166	-0.0028	-0.0241
4.7244	5.5118	-0.0079	-0.0177	-0.0079	-0.0236	-0.0079	-0.0327	-0.0033	-0.0132	-0.0033	-0.0191	-0.0033	-0.0281
5.5118	6.2992	-0.0083	-0.0181	-0.0083	-0.0240	-0.0083	-0.0331	-0.0033	-0.0132	-0.0033	-0.0191	-0.0033	-0.0281
6.2992	7.0866	-0.0091	-0.0189	-0.0091	-0.0248	-0.0091	-0.0339	-0.0033	-0.0132	-0.0033	-0.0191	-0.0033	-0.0281
7.0866	7.8740	-0.0094	-0.0209	-0.0094	-0.0276	-0.0094	-0.0378	-0.0039	-0.0154	-0.0039	-0.0220	-0.0039	-0.0323
7.8740	8.8583	-0.0102	-0.0217	-0.0102	-0.0283	-0.0102	-0.0386	-0.0039	-0.0154	-0.0039	-0.0220	-0.0039	-0.0323
8.8583	9.8425	-0.0110	-0.0224	-0.0110	-0.0291	-0.0110	-0.0394	-0.0039	-0.0154	-0.0039	-0.0220	-0.0039	-0.0323
9.8425	11.0236	-0.0118	-0.0244	-0.0118	-0.0323	-0.0118	-0.0437	-0.0043	-0.0169	-0.0043	-0.0248	-0.0043	-0.0362
11.0236	12.4016	-0.0130	-0.0256	-0.0130	-0.0335	-0.0130	-0.0449	-0.0043	-0.0169	-0.0043	-0.0248	-0.0043	-0.0362
12.4016	13.9764	-0.0142	-0.0283	-0.0142	-0.0366	-0.0142	-0.0492	-0.0049	-0.0191	-0.0049	-0.0274	-0.0049	-0.0400
13.9764	15.7480	-0.0157	-0.0299	-0.0157	-0.0382	-0.0157	-0.0508	-0.0049	-0.0191	-0.0049	-0.0274	-0.0049	-0.0400

BEARING TOLERANCES, INCH & METRIC - *continued*

ISO TOLERANCES FOR SHAFTS – INCH

Diameters inches		Deviations in inches						Deviations in inches					
		f5		f6		f7		g5		g6		g7	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
—	0.1181	-0.0002	-0.0004	-0.0002	-0.0005	-0.0002	-0.0006	-0.0001	-0.0002	-0.0001	-0.0003	-0.0001	-0.0005
0.1181	0.2362	-0.0004	-0.0006	-0.0004	-0.0007	-0.0004	-0.0009	-0.0002	-0.0004	-0.0002	-0.0005	-0.0002	-0.0006
0.2362	0.3937	-0.0005	-0.0007	-0.0005	-0.0009	-0.0005	-0.0011	-0.0002	-0.0004	-0.0002	-0.0006	-0.0002	-0.0008
0.3937	0.7087	-0.0006	-0.0009	-0.0006	-0.0011	-0.0006	-0.0013	-0.0002	-0.0006	-0.0002	-0.0007	-0.0002	-0.0009
0.7087	1.1811	-0.0008	-0.0011	-0.0008	-0.0013	-0.0008	-0.0016	-0.0003	-0.0006	-0.0003	-0.0008	-0.0003	-0.0011
1.1811	1.9685	-0.0010	-0.0014	-0.0010	-0.0016	-0.0010	-0.0020	-0.0004	-0.0008	-0.0004	-0.0010	-0.0004	-0.0013
1.9685	3.1496	-0.0012	-0.0017	-0.0012	-0.0019	-0.0012	-0.0024	-0.0004	-0.0009	-0.0004	-0.0011	-0.0004	-0.0016
3.1496	4.7244	-0.0014	-0.0020	-0.0014	-0.0023	-0.0014	-0.0028	-0.0005	-0.0011	-0.0005	-0.0013	-0.0005	-0.0019
4.7244	7.0866	-0.0017	-0.0024	-0.0017	-0.0027	-0.0017	-0.0033	-0.0006	-0.0013	-0.0006	-0.0015	-0.0006	-0.0021
7.0866	9.8425	-0.0020	-0.0028	-0.0020	-0.0031	-0.0020	-0.0038	-0.0006	-0.0014	-0.0006	-0.0017	-0.0006	-0.0024
9.8425	12.4016	-0.0022	-0.0031	-0.0022	-0.0035	-0.0022	-0.0043	-0.0007	-0.0016	-0.0007	-0.0019	-0.0007	-0.0027
12.4016	15.7480	-0.0024	-0.0034	-0.0024	-0.0039	-0.0024	-0.0047	-0.0007	-0.0017	-0.0007	-0.0021	-0.0007	-0.0030

Diameters inches		Deviations in inches									
		h4		h5		h6		h7		h8	
>	≤	high	low	high	low	high	low	high	low	high	low
—	0.1181	0	-0.00012	0	-0.00016	0	-0.00024	0	-0.0004	0	-0.0006
0.1181	0.2362	0	-0.00016	0	-0.00020	0	-0.00031	0	-0.0005	0	-0.0007
0.2362	0.3937	0	-0.0002	0	-0.00024	0	-0.0004	0	-0.0006	0	-0.0009
0.3937	0.7087	0	-0.0002	0	-0.00031	0	-0.0004	0	-0.0007	0	-0.0011
0.7087	1.1811	0	-0.0002	0	-0.0004	0	-0.0005	0	-0.0008	0	-0.0013
1.1811	1.9685	0	-0.0003	0	-0.0004	0	-0.0006	0	-0.0010	0	-0.0015
1.9685	3.1496	0	-0.0003	0	-0.0005	0	-0.0007	0	-0.0012	0	-0.0018
3.1496	4.7244	0	-0.0004	0	-0.0006	0	-0.0009	0	-0.0014	0	-0.0021
4.7244	7.0866	0	-0.0005	0	-0.0007	0	-0.0010	0	-0.0016	0	-0.0025
7.0866	9.8425	0	-0.0006	0	-0.0008	0	-0.0011	0	-0.0018	0	-0.0028
9.8425	12.4016	0	-0.0006	0	-0.0009	0	-0.0013	0	-0.0020	0	-0.0032
12.4016	15.7480	0	-0.0007	0	-0.0010	0	-0.0014	0	-0.0022	0	-0.0035

Diameters inches		Deviations in inches									
		h9		h10		h11		h12		h13	
>	≤	high	low	high	low	high	low	high	low	high	low
—	0.1181	0	-0.0010	0	-0.0016	0	-0.0024	0	-0.0039	0	-0.0055
0.1181	0.2362	0	-0.0012	0	-0.0019	0	-0.0030	0	-0.0047	0	-0.0071
0.2362	0.3937	0	-0.0014	0	-0.0023	0	-0.0035	0	-0.0059	0	-0.0087
0.3937	0.7087	0	-0.0017	0	-0.0028	0	-0.0043	0	-0.0071	0	-0.0106
0.7087	1.1811	0	-0.0020	0	-0.0033	0	-0.0051	0	-0.0083	0	-0.0130
1.1811	1.9685	0	-0.0024	0	-0.0039	0	-0.0063	0	-0.0098	0	-0.0154
1.9685	3.1496	0	-0.0029	0	-0.0047	0	-0.0075	0	-0.0118	0	-0.0181
3.1496	4.7244	0	-0.0034	0	-0.0055	0	-0.0087	0	-0.0138	0	-0.0213
4.7244	7.0866	0	-0.0039	0	-0.0063	0	-0.0098	0	-0.0157	0	-0.0248
7.0866	9.8425	0	-0.0045	0	-0.0073	0	-0.0114	0	-0.0181	0	-0.0283
9.8425	12.4016	0	-0.0051	0	-0.0083	0	-0.0126	0	-0.0205	0	-0.0319
12.4016	15.7480	0	-0.0055	0	-0.0091	0	-0.0142	0	-0.0224	0	-0.0350

BEARING TOLERANCES, INCH & METRIC - *continued*

ISO TOLERANCES FOR SHAFTS – INCH

Diameters inches		Deviations in inches						Deviations in inches					
		j5		j6		j7		k5		k6		k7	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
—	0.1181	+0.00008	-0.00008	+0.00016	-0.00008	+0.00024	-0.00016	+0.00016	0	+0.00024	0	+0.00039	0
0.1181	0.2362	+0.00012	-0.00008	+0.00024	-0.00008	+0.00031	-0.00016	+0.00024	+0.00004	+0.00035	+0.00004	+0.00051	+0.00004
0.2362	0.3937	+0.00016	-0.00008	+0.00028	-0.00008	+0.00039	-0.00020	+0.00028	+0.00004	+0.00039	+0.00004	+0.00063	+0.00004
0.3937	0.7087	+0.00020	-0.00012	+0.00031	-0.00012	+0.00047	-0.00024	+0.00035	+0.00004	+0.00047	+0.00004	+0.00075	+0.00004
0.7087	1.1811	+0.00020	-0.00016	+0.00035	-0.00016	+0.00051	-0.00031	+0.00043	+0.00008	+0.00059	+0.00008	+0.00091	+0.00008
1.1811	1.9685	+0.00024	-0.00020	+0.00043	-0.00020	+0.00059	-0.00039	+0.00051	+0.00008	+0.00071	+0.00008	+0.00106	+0.00008
1.9685	3.1496	+0.00024	-0.00028	+0.00047	-0.00028	+0.00071	-0.00047	+0.00059	+0.00008	+0.00083	+0.00008	+0.00126	+0.00008
3.1496	4.7244	+0.00024	-0.00035	+0.00051	-0.00035	+0.00079	-0.00059	+0.00071	+0.00012	+0.00098	+0.00012	+0.00150	+0.00012
4.7244	7.0866	+0.00028	-0.00043	+0.00055	-0.00043	+0.00087	-0.00071	+0.00083	+0.00012	+0.00110	+0.00012	+0.00169	+0.00012
7.0866	9.8425	+0.00028	-0.00051	+0.00063	-0.00051	+0.00098	-0.00083	+0.00094	+0.00016	+0.00130	+0.00016	+0.00197	+0.00016
9.8425	12.4016	+0.00028	-0.00063	+0.00063	-0.00063	+0.00102	-0.00102	+0.00106	+0.00016	+0.00142	+0.00016	+0.00220	+0.00016
12.4016	15.7480	+0.00028	-0.00071	+0.00071	-0.00071	+0.00114	-0.00110	+0.00114	+0.00016	+0.00157	+0.00016	+0.00240	+0.00016

Diameters inches		Deviations in inches						Deviations in inches					
		m5		m6		m7		n5		n6		n7	
>	≤	high	low	high	low	high	low	high	low	high	low	high	low
—	0.1181	+0.00024	+0.00008	+0.00031	+0.00008	+0.00047	+0.00008	+0.0003	+0.0002	+0.0004	+0.0002	+0.0006	+0.0002
0.1181	0.2362	+0.00035	+0.00016	+0.00047	+0.00016	+0.00063	+0.00016	+0.0005	+0.0003	+0.0006	+0.0003	+0.0008	+0.0003
0.2362	0.3937	+0.00047	+0.00024	+0.00059	+0.00024	+0.00083	+0.00024	+0.0006	+0.0004	+0.0007	+0.0004	+0.0010	+0.0004
0.3937	0.7087	+0.00059	+0.00028	+0.00071	+0.00028	+0.00098	+0.00028	+0.0008	+0.0005	+0.0009	+0.0005	+0.0012	+0.0005
0.7087	1.1811	+0.00067	+0.00031	+0.00083	+0.00031	+0.00114	+0.00031	+0.0009	+0.0006	+0.0011	+0.0006	+0.0014	+0.0006
1.1811	1.9685	+0.00079	+0.00035	+0.00098	+0.00035	+0.00134	+0.00035	+0.0011	+0.0007	+0.0013	+0.0007	+0.0017	+0.0007
1.9685	3.1496	+0.00094	+0.00043	+0.00118	+0.00043	+0.00161	+0.00043	+0.0013	+0.0008	+0.0015	+0.0008	+0.0020	+0.0008
3.1496	4.7244	+0.00110	+0.00051	+0.00138	+0.00051	+0.00189	+0.00051	+0.0015	+0.0009	+0.0018	+0.0009	+0.0023	+0.0009
4.7244	7.0866	+0.00130	+0.00059	+0.00157	+0.00059	+0.00217	+0.00059	+0.0018	+0.0011	+0.0020	+0.0011	+0.0026	+0.0011
7.0866	9.8425	+0.00146	+0.00067	+0.00181	+0.00067	+0.00248	+0.00067	+0.0020	+0.0012	+0.0024	+0.0012	+0.0030	+0.0012
9.8425	12.4016	+0.00169	+0.00079	+0.00205	+0.00079	+0.00283	+0.00079	+0.0022	+0.0013	+0.0026	+0.0013	+0.0034	+0.0013
12.4016	15.7480	+0.00181	+0.00083	+0.00224	+0.00083	+0.00307	+0.00083	+0.0024	+0.0015	+0.0029	+0.0015	+0.0037	+0.0015

Diameters inches		Deviations in inches					
		p6		r6		r7	
>	≤	high	low	high	low	high	low
0.1181	0.2362	-	-	-	-	-	-
0.2362	0.3937	-	-	-	-	-	-
0.3937	0.7087	-	-	-	-	-	-
0.7087	1.1811	-	-	-	-	-	-
1.1811	1.9685	-	-	-	-	-	-
1.9685	2.5591	-	-	-	-	-	-
2.5591	3.1496	-	-	-	-	-	-
3.1496	3.9370	+0.0023	+0.0015	-	-	-	-
3.9370	4.7244	+0.0023	+0.0015	-	-	-	-
4.7244	5.5118	+0.0027	+0.0017	+0.0035	+0.0026	-	-
5.5118	6.2992	+0.0027	+0.0017	+0.0035	+0.0026	-	-
6.2992	7.0866	+0.0027	+0.0017	+0.0035	+0.0026	-	-
7.0866	7.8740	+0.0031	+0.0020	+0.0042	+0.0030	-	-
7.8740	8.8583	+0.0031	+0.0020	+0.0043	+0.0031	+0.0050	+0.0031
8.8583	9.8425	+0.0031	+0.0020	+0.0044	+0.0033	+0.0051	+0.0033
9.8425	11.0236	+0.0035	+0.0022	+0.0050	+0.0037	+0.0057	+0.0037
11.0236	12.4016	+0.0035	+0.0022	+0.0051	+0.0039	+0.0059	+0.0039
12.4016	13.9764	+0.0039	+0.0024	+0.0057	+0.0043	+0.0065	+0.0043
13.9764	15.7480	+0.0039	+0.0024	+0.0059	+0.0045	+0.0067	+0.0045
15.7480	17.7165	+0.0043	+0.0027	+0.0065	+0.0050	+0.0074	+0.0050
17.7165	19.6850	+0.0043	+0.0027	+0.0068	+0.0052	+0.0077	+0.0052

MOUNTING DESIGNS

Correct bearing mounting and fitting practices are key components of proper bearing setting. Setting is the amount of clearance or interference within a mounted bearing. Bearing internal clearance is affected by the tightness of the fit to the inner and outer races. Proper bearing setting is crucial to bearing life and performance. Although clearance is required for most mounted bearings, application dependant factors include load, speed, bearing position, installation method, materials of construction, runout accuracy, thermal considerations, hoop stress, and shaft and housing design. This section provides tables and discussion to aid in selection of the proper bearing mounting and fitting procedures to optimize performance in general applications. For special applications, please consult your Timken representative for review.

RADIAL BALL BEARINGS

In the manufacture of rolling element bearings, it is standard practice to assemble rings and rolling elements with a specified internal clearance. This characteristic is necessary to absorb the effect of press fitting the bearing rings at mounting.

Internal clearance is sometimes utilized to compensate for thermal expansion of bearings, shafts and housings or to provide a contact angle in the bearing after mounting.

Internal clearance can be measured either by gaging radially or axially.

Radial measurement is accepted as the more significant characteristic for most bearing types because it is more directly related to shaft and housing fits. It also is the method prescribed by the American Bearing Manufacturers Association (ABMA). However, tapered roller bearings and duplex sets of angular contact ball bearings are usually set axially.

The radial internal clearance (RIC) of a radial contact ball bearing can be defined as the average outer ring raceway diameter minus the average inner ring raceway diameter minus twice the ball diameter.

(RIC) can be measured mechanically by moving the outer ring, horizontally as pictured in Figure A-12. The total movement of the outer ring when the balls are properly seated in the raceways determines the (RIC). Several readings should be taken using different circumferential orientations of the rings in order to get a comprehensive average reading.

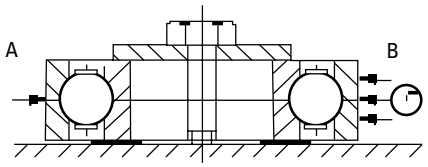


Fig. A-12

The Timken Company radial clearance designations correlate with ABMA symbols as follows:

Bearing Number Prefix	ABMA Symbol	Description
H	2	Snug; slight internal clearance; sometimes used to achieve a minimum of radial or axial play in an assembly, Example: H204K
R	0	Medium; internal clearance generally satisfactory with suggested shaft and housing fits. Example: RMM204K.
P	3	Loose; considerable internal clearance required for applications involving press fits on both inner and outer rings, extra interference fits or temperature differentials. Example: P204K.
J	4	Extra Loose; large amount of internal clearance for applications involving large interference fits or temperature differentials. Example: J204K.
JJ	5	Extra-Extra Loose; extra large amount of internal clearance for applications with large temperature differential and interference fits on both rings.

ENDPLAY

Endplay is an alternate method of measuring internal clearance and is rarely used except for certain special applications. Endplay is determined by mounting the bearing, as shown in Figure A-13, with one of its rings clamped to prevent axial movement. A reversing measuring load is applied to the unclamped ring so that the resultant movement of that ring is parallel to the bearing axis. Endplay is the total movement of the unclamped ring when the load is applied first in one direction and then in the other.

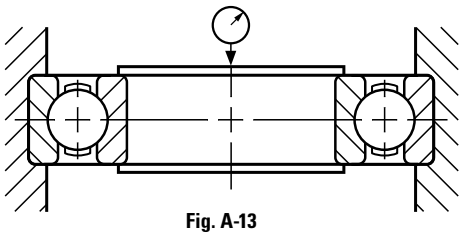


Fig. A-13

When the inner and outer ring raceway curvatures are accurately known, the free endplay can readily be calculated from the values of no load radial clearance by the following formula:

$$E = \sqrt{4dR_D(K_O + K_i - 1) - R_D^2} \text{ or } \cong \sqrt{4dR_D(K_O + K_i - 1)}$$

(Where R_D^2 is generally a very small value and can be omitted for most calculations without introducing undue inaccuracy.)

E = Free endplay where

K_O = outer race contour radius expressed as a decimal fraction of the ball diameter.

K_i = inner race contour radius expressed as a decimal fraction of the ball diameter

R_D = radial clearance (no load)

d = ball diameter

RADIAL BALL BEARINGS

LIMITS FOR RADIAL INTERNAL CLEARANCE OF SINGLE-ROW, RADIAL CONTACT BALL BEARINGS UNDER NO LOAD (APPLIES TO BEARINGS OF ABEC 1, ABEC 3, ABEC 5, ABEC 7, AND ABEC 9 TOLERANCES)

All tolerances in number of micrometers (µm) and ten-thousandths inches (.0001")

Timken® Prefix (ABMA designation)		H (C2) Acceptance Limits		R (C0) Acceptance Limits		P (C3) Acceptance Limits		J (C4) Acceptance Limits		JJ (C5) Acceptance Limit	
Basic Bore Diameter MM											
over	incl.	low	high	low	high	low	high	low	high	low	high
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
		in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
2.5	10	0	7	2	13	8	23	14	29	20	37
		0	3	1	5	3	9	6	11	8	15
10	18	0	9	3	18	11	25	18	33	25	45
		0	3.5	1	7	4	10	7	13	10	18
18	24	0	10	5	20	13	28	20	36	28	48
		0	4	2	8	5	11	8	14	11	19
24	30	1	11	5	20	13	28	23	41	30	53
		0.5	4.5	2	8	5	11	9	16	12	21
30	40	1	11	6	20	15	33	28	46	40	64
		0.5	4.5	2	8	6	13	11	18	16	25
40	50	1	11	6	23	18	36	30	51	45	73
		0.5	4.5	2.5	9	7	14	12	20	18	29
50	65	1	15	8	28	23	43	38	61	55	90
		0.5	6	3.5	11	9	17	15	24	22	35
65	80	1	15	10	30	25	51	46	71	65	105
		0.5	6	4	12	10	20	18	28	26	41
80	100	1	18	12	36	30	58	53	84	75	120
		0.5	7	4.5	14	12	23	21	33	30	47
100	120	2	20	15	41	36	66	61	97	90	140
		1	8	6	16	14	26	24	38	35	55
120	140	2	23	18	48	41	81	71	114	105	160
		1	9	7	19	16	32	28	45	41	63
140	160	2	23	18	53	46	91	81	130	120	180
		1	9	7	21	18	36	32	51	47	71
160	180	2	25	20	61	53	102	91	147	135	200
		1	10	8	24	21	40	36	58	53	79
180	200	2	30	25	71	63	117	107	163	150	230
		1	12	10	28	25	46	42	64	59	91
200	240	3	36	30	81	74	137	127	193	183	267
		1	14	12	32	29	54	50	76	72	105
240	280	3	41	33	97	86	157	147	224	213	310
		1	16	13	38	34	62	58	88	84	122
280	320	5	48	41	114	104	180	170	257	246	353
		2	19	16	45	41	71	67	101	97	139
320	370	5	53	46	127	117	208	198	295	284	409
		2	21	18	50	46	82	78	116	112	161
370	430	8	64	56	147	137	241	231	340	330	475
		3	25	22	58	54	95	91	134	130	187
430	500	10	74	66	170	160	279	269	396	386	551
		4	29	26	67	63	110	106	156	152	217
500	570	10	81	74	193	183	318	307	450	439	630
		4	32	29	76	72	125	121	177	173	248
570	640	13	91	85	216	206	356	345	505	495	706
		5	36	33	85	81	140	136	199	195	278
640	710	20	114	107	239	229	394	384	564	554	780
		8	45	42	94	90	155	151	222	218	307
710	800	20	140	130	269	259	445	434	630	620	879
		8	55	51	106	102	175	171	248	244	346
800	1060	28	211	201	353	345	587	577	833	823	1148
		11	83	79	139	136	231	227	328	324	452

: Standard fits for Timken radial ball bearings. P(C3) for bearing O.D. greater than 52 mm.

MOUNTING DESIGNS - *continued*

CONTACT ANGLE

The contact angle (α) is related to internal clearance as follows:

$$\alpha = \sin^{-1}\left(\frac{E}{2\,(Ko + Ki - 1)\,d}\right)$$

The contact angle (α) may also be accurately determined in a production bearing from its pitch diameter (P.D.) and by measuring the number of revolutions (Nc) of the ball and cage assembly relative to rotation (Ni) of the inner ring under a light thrust load.

$$(Nc) = 0.5Ni\left(1 - \frac{d}{d_m}\cos\alpha\right)$$

$$\cos\alpha = \frac{d_m}{d}\left(1 - \frac{Nc}{0.5Ni}\right)$$

The accuracy of this method of measurement depends greatly upon the care taken in set up. Balanced weight for thrust loading, vertical turning, slow turning, many turns, minimum lubricant of low viscosity and pre-rotation are all essential for instance. The races should not be radially restrained during the contact angle measurement.

RADIAL SPHERICAL ROLLER BEARINGS

Timken bearing RIC allows a tight fit, with sufficient internal clearance after installation for normal operating conditions.

Spherical roller bearings with tapered bore (K) require a slightly greater interference fit on the shaft than would a cylindrical bore bearing. The effect of this greater interference fit is a reduction of RIC. For tapered bore bearings, it is critical to select the RIC that allows for this reduction.

For example, bearing number 22328K C3 (140 mm bore with C3 clearance) is to be mounted on a tapered shaft. By feeler gaging, RIC is found to be 0.178 mm (0.007 in.). The chart indicates that the proper fit will be obtained when RIC is reduced by 0.064 to 0.089 mm (0.0025 in. to 0.0035 in.). Clearance after mounting is computed: 0.178 - 0.076 = 0.102 mm (0.007 in. - 0.003 in. = 0.004 in.). The locknut should be tightened until RIC reaches 0.102 mm (0.004 in.).

Several factors influence RIC reduction. Inner rings pressed into solid steel shafts expand approximately 80 percent of the interference fit. Outer rings pressed into steel or cast iron housings reduce RIC by about 60 percent of the interference fit. For RIC reduction on hollow shafts or non-steel materials, consult your local Timken representative.

Timken bearings are supplied with NORMAL RIC, unless otherwise specified. The desired RIC code must be added to the bearing number, FOLLOWING ALL OTHER SUFFIXES.

Min./max. values for each RIC are shown in the two adjacent columns directly beneath the selected RIC. Each single column represents a boundary between adjacent RICs. For example, the minimum values shown for C5 are also the maximum values for C4; minimum values for C4 are also the maximum values for C3; etc.

SPHERICAL ROLLER BEARING ENDPLAY

In certain applications such as vane pumps, rubber mill rotor shafts or where it is necessary to take up axial expansion within the bearing, knowledge of the bearing endplay relationship to mounted radial internal clearance may be required. The following table showing the ratio of approximate endplay to radial internal clearance in spherical roller bearings can be used to calculate approximate endplay in the bearing.

Example: 22320CJW33C3 bearing has a radial internal clearance after installation of .002. The total endplay would be approximately .0086 in. (± .0043 from center)

Series	E.P. / RIC
39	8.7
30	7.0
22	5.5
31	5.0
40	4.8
32	4.4
23	4.3
41	4.2
33	3.9

MOUNTING DESIGNS - *continued*

RADIAL INTERNAL CLEARANCE LIMITS – RADIAL SPHERICAL ROLLER BEARINGS

All data on this page, except Bore I.D., are in millimeters/inches

Bore (nominal)		Cylindrical Bore						Tapered Bore						Suggested Reduction of RIC Due to Installation		Suggested RIC after Installation[1]
		Normal C0		C4				Normal C0			C4					
		C2		C3		C5		C2		C3		C5				
mm		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Mmin.	Max.	Min.	Max.	Min.	Max.	Min.
over	incl.	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
24	30	**0.015**	**0.025**	**0.040**	**0.055**	**0.075**	**0.095**	**0.020**	**0.030**	**0.040**	**0.055**	**0.075**	**0.095**	**0.015**	**0.020**	**0.015**
		0.0006	0.0010	0.0016	0.0022	0.0030	0.0037	0.0008	0.0012	0.0016	0.0022	0.0030	0.0037	0.0006	0.0008	0.0006
30	40	**0.015**	**0.030**	**0.045**	**0.060**	**0.080**	**1.000**	**0.025**	**0.035**	**0.050**	**0.065**	**0.085**	**0.105**	**0.020**	**0.025**	**0.015**
		0.0006	0.0012	0.0018	0.0024	0.0031	0.0039	0.0010	0.0014	0.0020	0.0026	0.0033	0.0041	0.0008	0.0010	0.0006
40	50	**0.020**	**0.035**	**0.055**	**0.075**	**0.100**	**0.125**	**0.030**	**0.045**	**0.060**	**0.080**	**0.100**	**0.130**	**0.025**	**0.030**	**0.020**
		0.0008	0.0014	0.0022	0.0030	0.0039	0.0049	0.0012	0.0018	0.0024	0.0031	0.0039	0.0051	0.0010	0.0012	0.0008
50	65	**0.020**	**0.040**	**0.065**	**0.090**	**0.120**	**0.150**	**0.040**	**0.055**	**0.075**	**0.095**	**0.120**	**0.160**	**0.030**	**0.038**	**0.025**
		0.0008	0.0016	0.0026	0.0035	0.0047	0.0059	0.0016	0.0022	0.0030	0.0037	0.0047	0.0063	0.0012	0.0015	0.0010
65	80	**0.030**	**0.050**	**0.080**	**0.110**	**0.145**	**0.180**	**0.050**	**0.070**	**0.095**	**0.120**	**0.150**	**0.200**	**0.038**	**0.051**	**0.025**
		0.0012	0.0020	0.0031	0.0043	0.0057	0.0071	0.0020	0.0028	0.0037	0.0047	0.0059	0.0079	0.0015	0.0020	0.0010
80	100	**0.035**	**0.060**	**0.100**	**0.135**	**0.180**	**0.225**	**0.055**	**0.080**	**0.110**	**0.140**	**0.180**	**0.230**	**0.046**	**0.064**	**0.036**
		0.0014	0.0024	0.0039	0.0053	0.0071	0.0089	0.0022	0.0030	0.0043	0.0055	0.0071	0.0091	0.0018	0.0025	0.0014
100	120	**0.040**	**0.075**	**0.120**	**0.160**	**0.210**	**0.260**	**0.065**	**0.100**	**0.135**	**0.170**	**0.220**	**0.280**	**0.051**	**0.071**	**0.051**
		0.0016	0.0030	0.0047	0.0063	0.0083	0.0102	0.0026	0.0039	0.0053	0.0067	0.0087	0.0110	0.0020	0.0028	0.0020
120	140	**0.050**	**0.095**	**0.145**	**0.190**	**0.240**	**0.300**	**0.080**	**0.120**	**0.160**	**0.200**	**0.260**	**0.330**	**0.064**	**0.089**	**0.056**
		0.0020	0.0037	0.0057	0.0075	0.0094	0.0118	0.0031	0.0047	0.0063	0.0079	0.0102	0.0130	0.0025	0.0035	0.0022
140	160	**0.060**	**0.110**	**0.170**	**0.220**	**0.280**	**0.350**	**0.090**	**0.130**	**0.180**	**0.230**	**0.300**	**0.380**	**0.076**	**0.102**	**0.056**
		0.0024	0.0043	0.0067	0.0087	0.0110	0.0138	0.0035	0.0051	0.0071	0.0091	0.0118	0.0150	0.0030	0.0040	0.0022
160	180	**0.065**	**0.120**	**0.180**	**0.240**	**0.310**	**0.390**	**0.100**	**0.140**	**0.200**	**0.260**	**0.340**	**0.430**	**0.076**	**0.114**	**0.061**
		0.0026	0.0047	0.0071	0.0094	0.0122	0.0154	0.0039	0.0055	0.0079	0.0102	0.0134	0.0169	0.0030	0.0045	0.0024
180	200	**0.070**	**0.130**	**0.200**	**0.260**	**0.340**	**0.430**	**0.110**	**0.160**	**0.220**	**0.290**	**0.370**	**0.470**	**0.089**	**0.127**	**0.071**
		0.0028	0.0051	0.0079	0.0102	0.0134	0.0169	0.0043	0.0063	0.0087	0.0114	0.0146	0.0185	0.0035	0.0050	0.0028
200	225	**0.080**	**0.140**	**0.220**	**0.290**	**0.380**	**0.470**	**0.120**	**0.180**	**0.250**	**0.320**	**0.410**	**0.520**	**0.102**	**0.140**	**0.076**
		0.0031	0.0055	0.0087	0.0114	0.0150	0.0185	0.0047	0.0071	0.0098	0.0126	0.0161	0.0205	0.0040	0.0055	0.0030
225	250	**0.090**	**0.150**	**0.240**	**0.320**	**0.420**	**0.520**	**0.140**	**0.200**	**0.270**	**0.350**	**0.450**	**0.570**	**0.114**	**0.152**	**0.089**
		0.0035	0.0059	0.0094	0.0126	0.0165	0.0205	0.0055	0.0079	0.0106	0.0138	0.0177	0.0224	0.0045	0.0060	0.0035
250	280	**0.100**	**0.170**	**0.260**	**0.350**	**0.460**	**0.570**	**0.150**	**0.220**	**0.300**	**0.390**	**0.490**	**0.620**	**0.114**	**0.165**	**0.102**
		0.0039	0.0067	0.0102	0.0138	0.0181	0.0224	0.0059	0.0087	0.0118	0.0154	0.0193	0.0244	0.0045	0.0065	0.0040
280	315	**0.110**	**0.190**	**0.280**	**0.370**	**0.500**	**0.630**	**0.170**	**0.240**	**0.330**	**0.430**	**0.540**	**0.680**	**0.127**	**0.178**	**0.102**
		0.0043	0.0075	0.0110	0.0146	0.0197	0.0248	0.0067	0.0094	0.0130	0.0169	0.0213	0.0268	0.0050	0.0070	0.0040
315	355	**0.120**	**0.200**	**0.310**	**0.410**	**0.550**	**0.690**	**0.190**	**0.270**	**0.360**	**0.470**	**0.590**	**0.740**	**0.140**	**0.190**	**0.114**
		0.0047	0.0079	0.0122	0.0161	0.0217	0.0272	0.0075	0.0106	0.0142	0.0185	0.0232	0.0291	0.0055	0.0075	0.0045
355	400	**0.130**	**0.220**	**0.340**	**0.450**	**0.600**	**0.750**	**0.210**	**0.300**	**0.400**	**0.520**	**0.650**	**0.820**	**0.152**	**0.203**	**0.127**
		0.0051	0.0087	0.0134	0.0177	0.0236	0.0295	0.0083	0.0118	0.0157	0.0205	0.0256	0.0323	0.0060	0.0080	0.0050
400	450	**0.140**	**0.240**	**0.370**	**0.500**	**0.660**	**0.820**	**0.230**	**0.330**	**0.440**	**0.570**	**0.720**	**0.910**	**0.165**	**0.216**	**0.152**
		0.0055	0.0094	0.0146	0.0197	0.0260	0.0323	0.0091	0.0130	0.0173	0.0224	0.0283	0.0358	0.0065	0.0085	0.0060
450	500	**0.140**	**0.260**	**0.410**	**0.550**	**0.720**	**0.900**	**0.260**	**0.370**	**0.490**	**0.630**	**0.790**	**1.000**	**0.178**	**0.229**	**0.165**
		0.0055	0.0102	0.0161	0.0217	0.0283	0.0354	0.0102	0.0146	0.0193	0.0248	0.0311	0.0394	0.0070	0.0090	0.0065
500	560	**0.150**	**0.280**	**0.440**	**0.600**	**0.780**	**1.000**	**0.290**	**0.410**	**0.540**	**0.680**	**0.870**	**1.100**	**0.203**	**0.254**	**0.178**
		0.0059	0.0110	0.0173	0.0236	0.0307	0.0394	0.0114	0.0161	0.0213	0.0268	0.0343	0.0433	0.0080	0.0100	0.0070
560	630	**0.170**	**0.310**	**0.480**	**0.650**	**0.850**	**1.100**	**0.320**	**0.460**	**0.600**	**0.760**	**0.980**	**1.230**	**0.229**	**0.279**	**0.203**
		0.0067	0.0122	0.0189	0.0256	0.0335	0.0433	0.0126	0.0181	0.0236	0.0299	0.0386	0.0484	0.0090	0.0110	0.0080
630	710	**0.190**	**0.350**	**0.530**	**0.700**	**0.920**	**1.190**	**0.350**	**0.510**	**0.670**	**0.850**	**1.090**	**1.360**	**0.254**	**0.305**	**0.203**
		0.0075	0.0138	0.0209	0.0276	0.0362	0.0469	0.0138	0.0201	0.0264	0.0335	0.0429	0.0535	0.0100	0.0120	0.0080
710	800	**0.210**	**0.390**	**0.580**	**0.770**	**1.010**	**1.300**	**0.390**	**0.570**	**0.750**	**0.960**	**1.220**	**1.500**	**0.279**	**0.356**	**0.229**
		0.0083	0.0154	0.0228	0.0303	0.0398	0.0512	0.0154	0.0224	0.0295	0.0378	0.0480	0.0591	0.0110	0.0140	0.0090
800	900	**0.230**	**0.430**	**0.650**	**0.860**	**1.120**	**1.440**	**0.440**	**0.640**	**0.840**	**1.070**	**1.370**	**1.690**	**0.305**	**0.381**	**0.252**
		0.0091	0.0169	0.0256	0.0339	0.0441	0.0567	0.0173	0.0252	0.0331	0.0421	0.0539	0.0665	0.0120	0.0150	0.0100
900	1000	**0.260**	**0.480**	**0.710**	**0.930**	**1.220**	**1.57**	**0.490**	**0.710**	**0.930**	**1.190**	**1.520**	**1.860**	**0.356**	**0.432**	**0.279**
		0.0102	0.0189	0.0280	0.0366	0.0480	0.0618	0.0193	0.0280	0.0366	0.0469	0.0598	0.0732	0.0140	0.0170	0.0110

[1]For bearings with normal initial clearance.

: For bearings with normal initial clearance.

Min./Max. values for each RIC are shown in the two adjacent columns directly beneath the selected RIC. Each single column represents a boundary between adjacent RICs. For example, the minimum values shown for C5 are also the maximum values for C4; minimum values for C4 are also the maximum values for C3, etc.

* Special clearances can be provided (C6, C7, etc.)

MOUNTING DESIGNS - *continued*

CYLINDRICAL ROLLER BEARINGS

Cylindrical roller bearings are available with Radial Internal Clearance designations per either of the following tables: "Timken 'R' Clearance" or "ISO/ABMA 'C' Clearance." Non-standard values are also available by special request. Standard radial internal clearance values are listed in the following tables based on bore size. The clearance required for a given application depends on the desired operating precision, rotational speed of the bearing, and the fitting practice used. Most applications use a normal or C0 clearance. Typically, larger clearance reduces the operating zone of the bearing, increases the maximum roller load and reduces the bearing's expected life.

CYLINDRICAL ROLLER BEARING RADIAL INTERNAL CLEARANCE LIMITS

Bore, mm		R.I.C. (0.0001 inch and µm)									
		C2		C0		C3		C4		C5	
over	incl.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
		in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
-	10	0	25	20	45	35	60	50	75	-	-
		0	10	8	18	14	24	20	30	-	-
10	24	0	25	20	45	35	60	50	75	65	90
		0	10	8	18	14	24	20	30	26	35
24	30	0	25	20	45	35	60	50	75	70	95
		0	10	8	18	14	24	20	30	28	37
30	40	5	30	25	50	45	70	60	85	80	105
		2	12	10	20	18	28	24	33	31	41
40	50	5	35	30	60	50	80	70	100	95	125
		2	14	12	24	20	31	28	39	37	49
50	65	10	40	40	70	60	90	80	110	110	140
		4	16	16	28	24	35	31	43	43	55
65	80	10	45	40	75	65	100	90	125	130	165
		4	18	16	30	26	39	35	49	51	65
80	100	15	50	50	85	75	110	105	140	155	190
		6	20	20	33	30	43	41	55	61	75
100	120	15	55	50	90	85	125	125	165	180	220
		6	22	20	35	33	49	49	65	71	87
120	140	15	60	60	105	100	145	145	190	200	245
		6	24	24	41	39	57	57	75	79	96
140	160	20	70	70	120	115	165	165	215	225	275
		8	28	28	47	45	65	65	85	89	108
160	180	25	75	75	125	120	170	170	220	250	300
		10	30	30	49	47	67	67	87	98	118
180	200	35	90	90	145	140	195	195	250	275	330
		14	35	35	57	55	77	77	98	108	130
200	225	45	105	105	165	160	220	220	280	305	365
		18	41	41	65	63	87	87	110	120	144
225	250	45	110	110	175	170	235	235	300	330	395
		18	43	43	69	67	93	93	118	130	156
250	280	55	125	125	195	190	260	260	330	370	440
		22	49	49	77	75	102	102	130	146	173
280	315	55	130	130	205	200	275	275	350	410	485
		22	51	51	81	79	108	108	138	161	191
315	355	65	145	145	225	225	305	305	385	455	535
		26	57	57	89	89	120	120	152	179	211
355	400	100	190	190	280	280	370	370	460	510	600
		39	75	75	110	110	146	146	181	201	236
400	450	110	210	210	310	310	410	410	510	565	665
		43	83	83	122	122	161	161	201	222	262
450	500	110	220	220	330	330	440	440	550	625	735
		43	87	87	130	130	173	173	217	246	289
500	560	120	240	240	360	360	480	480	600	690	810
		47.2	94.5	94.5	141.7	141.7	189.0	189.0	236.2	271.7	318.9
560	630	140	260	260	380	380	500	500	620	780	900
		55.1	102.4	102.4	149.6	149.6	196.9	196.9	244.1	307.1	354.3
630	710	145	285	285	425	425	565	565	705	865	1005
		57.1	112.2	112.2	167.3	167.3	222.4	222.4	277.6	340.6	395.7
710	800	150	310	310	470	470	630	630	790	975	1135
		59.1	122.0	122.0	185.0	185.0	248.0	248.0	311.0	383.9	446.9
800	900	180	350	350	520	520	690	690	860	1095	1265
		70.9	137.8	137.8	204.7	204.7	271.7	271.7	338.6	431.1	498.0
900	1000	200	390	390	580	580	770	770	960	1215	1405
		78.7	153.5	153.5	228.3	228.3	303.1	303.1	378.0	478.3	553.1

These values indicate the expected range of mounted RIC following suggested push up values. Timken suggests that customers consult with our engineers to evaluate unique applications or requirements for special operating conditions.

MOUNTING DESIGNS - *continued*

RADIAL CYLINDRICAL ROLLER BEARINGS

Min./Max. values for each RIC are shown in the two adjacent columns directly beneath the selected RIC. Each single column represents a boundary between adjacent RICs. For example, the minimum values shown for R5 are also the maximum values for R4; minimum values for R4 are also the maximum values for R3, etc. The desired RIC code (R1, R2, etc.) must be added to the bearing number, FOLLOWING ALL OTHER SUFFIXES.

RADIAL INTERNAL CLEARANCE LIMITS

All data on this chart are in millimeters/inches.

Bore (nominal)		R1		R2		R3		R4		R5	
				Min.	Max.			Min.	Max.		
Over	Incl.	Min.	Max.			Min.	Max.			Min.	Max.
mm in.	mm in.	mm in.	mm in.			mm in	mm in.			mm in.	mm in.
80 3.1496	**100** 3.9370	**0.013** 0.0005	**0.041** 0.0016			**0.081** 0.0032	**0.130** 0.0051			**0.196** 0.0077	**0.272** 0.0107
100 3.9370	**120** 4.7244	**0.013** 0.0005	**0.046** 0.0018			**0.091** 0.0036	**0.152** 0.0060			**0.226** 0.0089	**0.310** 0.0122
120 4.7244	**140** 5.5118	**0.023** 0.0009	**0.056** 0.0022			**0.104** 0.0041	**0.170** 0.0067			**0.256** 0.0101	**0.353** 0.0139
140 5.5118	**160** 6.2992	**0.025** 0.0010	**0.066** 0.0026			**0.124** 0.0049	**0.196** 0.0077			**0.284** 0.0112	**0.384** 0.0151
160 6.2992	**180** 7.0866	**0.028** 0.0011	**0.069** 0.0027			**0.132** 0.0052	**0.208** 0.0082			**0.300** 0.0118	**0.401** 0.0158
180 7.0866	**200** 7.8740	**0.036** 0.0014	**0.081** 0.0032			**0.152** 0.0060	**0.234** 0.0092			**0.330** 0.0130	**0.437** 0.0172
200 7.8740	**220** 8.6614	**0.041** 0.0016	**0.086** 0.0034			**0.157** 0.0062	**0.239** 0.0094			**0.335** 0.0132	**0.4421** 0.0174
220 8.6614	**260** 10.2362	**0.056** 0.0022	**0.102** 0.0040			**0.173** 0.0068	**0.254** 0.0100			**0.351** 0.0138	**0.455** 0.0180
260 10.2362	**300** 11.8110	**0.061** 0.0024	**0.107** 0.0042			**0.178** 0.0070	**0.259** 0.0102			**0.356** 0.0140	**0.462** 0.0182

Bore (nominal)		R1		R2		R3		R4		R5	
				Min.	Max.			Min.	Max.		
Over	Incl.	Min.	Max.			Min.	Max.			Min.	Max.
mm in.	mm in.	mm in.	mm in.			mm in	mm in.			mm in.	mm in.
300 11.8110	**350** 13.7795	**0.081** 0.0032	**0.127** 0.0050			**0.198** 0.0078	**0.279** 0.0110			**0.376** 0.0148	**0.483** 0.0190
350 13.7795	**400** 15.7480	**0.107** 0.0042	**0.165** 0.0065			**0.236** 0.0093	**0.318** 0.0125			**0.414** 0.0163	**0.521** 0.0205
400 15.7480	**450** 17.7165	**0.14** 0.0055	**0.203** 0.0080			**0.279** 0.0110	**0.361** 0.0142			**0.457** 0.0180	**0.564** 0.0222
450 17.7165	**500** 19.6850	**0.152** 0.0060	**0.216** 0.0085			**0.292** 0.0115	**0.381** 0.0150			**0.508** 0.0200	**0.645** 0.0254
500 19.6850	**560** 22.0472	**0.165** 0.0065	**0.229** 0.0090			**0.305** 0.0120	**0.406** 0.0160			**0.533** 0.0210	**0.671** 0.0264
560 22.0472	**630** 24.8031	**0.178** 0.0070	**0.254** 0.0100			**0.356** 0.0140	**0.483** 0.0190			**0.610** 0.0240	**0.747** 0.0294
630 24.8031	**710** 27.9528	**0.190** 0.0075	**0.279** 0.0110			**0.381** 0.0150	**0.508** 0.0200			**0.635** 0.0250	**0.772** 0.0304
710 27.9528	**800** 31.4961	**0.216** 0.0085	**0.330** 0.0130			**0.457** 0.0180	**0.584** 0.2300			**0.711** 0.0280	**0.848** 0.0334

NEEDLE ROLLER BEARINGS

INSPECTION OF DRAWN CUP NEEDLE ROLLER BEARINGS

Although the bearing cup is accurately drawn from strip steel because of its fairly thin section, it may go out of round during heat treatment. When the bearing is pressed into a true round housing or ring gage, of correct size and wall thickness, it becomes round and is sized properly. **For this reason, it is incorrect to inspect an unmounted drawn cup bearing by measuring the outside diameter.** The correct method for inspecting the bearing size is to:

1. Press the bearing into a ring gage of proper size.
2. Plug the bearing bore with the appropriate "go" and "no go" gages or measure it with a tapered arbor (lathe mandrel).

Table 15 lists the "go" gage size for metric bearings which is the minimum needle roller complement bore diameter. The "no go" gage size is larger than the maximum needle roller complement bore diameter by 0.002 mm.

TABLE 15

HK METRIC SERIES BEARINGS

Nominal bore diameter	Dimensions – mm		
	Ring gage	Needle roller complement bore diameter ($F_{ws\ min}$)	
mm	*	Min.	Max.
3	6.484	3.006	3.024
4	7.984	4.010	4.028
5	8.984	5.010	5.028
6	9.984	6.010	6.028
7	10.980	7.013	7.031
8	11.980	8.013	8.031
9	12.980	9.013	9.031
10	13.980	10.013	10.031
12	15.980	12.016	12.034
12	17.980	12.016	12.034
13	18.976	13.016	13.034
14	19.976	14.016	14.034
15	20.976	15.016	15.034
16	21.976	16.016	16.034
17	22.976	17.016	17.034
18	23.976	18.016	18.034
20	25.976	20.020	20.041
22	27.976	22.020	22.041
25	31.972	25.020	25.041
28	34.972	28.020	28.041
30	36.972	30.020	30.041
35	41.972	35.025	35.050
40	46.972	40.025	40.050
45	51.967	45.025	45.050
50	57.967	50.025	50.050
60	67.967	60.030	60.060

* The ring gage sizes are in accordance with ISO N6 lower limit.

Inspection procedures

Table 15-B provides the correct ring and plug gage diameters for inspecting inch drawn cup needle roller bearings. When the letter H appears in the columns headed "Bearing Bore Designation" and "Nominal Shaft Diameter", the gage sizes listed are for the larger cross section bearings which include H in their bearing designation prefix.

Example

Find the ring gage and plug gage dimensions for a BH-68 bearing. The nominal bore diameter (F_w) for this bearing, as shown in the table of dimensions is .3750 inch. Since the letter H appears in the bearing designation, the following information will be found opposite H6 .3750 in Table 15-B.

	INCH
ring gage	.6255
diameter under needle rollers, min.	.3765
diameter under needle rollers, max.	.3774

The "go" plug gage is the same size as the minimum needle roller complement bore diameter and the "no go" plug gage size is .00001 inch larger than the maximum bore diameter. Therefore the correct ring and plug gage dimensions are:

	INCH
ring gage	.6255
plug gage, "go"	.3765
plug gage, "no go"	.3775

These same gage dimensions also apply to JH-68.

MOUNTING DESIGNS - *continued*

TABLE 15-B

INCH SERIES EXTRA-PRECISION BEARINGS

Bearing bore designation	Nominal shaft diameter	Nominal bore diameter	Dimensions – inch		
			Ring gage	Needle roller complement bore diameter	
inch				Min.	Max.
2	1/8	.1250	.2505	.1258	.1267
2 1/2	5/32	.1562	.2817	.1571	.1580
3	3/16	.1875	.3437	.1883	.1892
4	1/4	.2500	.4380	.2515	.2524
5	5/16	.3125	.5005	.3140	.3149
H 5	H 5/16	.3125	.5630	.3140	.3149
6	3/8	.3750	.5630	.3765	.3774
H 6	H 3/8	.3750	.6255	.3765	.3774
7	7/16	.4375	.6255	.4390	.4399
H 7	H 7/16	.4375	.6880	.4390	.4399
8	1/2	.5000	.6880	.5015	.5024
H8	H 1/2	.5000	.7505	.5015	.5024
9	9/16	.5625	.7505	.5640	.5649
H 9	H 9/16	.5625	.8130	.5640	.5649
10	5/8	.6250	.8130	.6265	.6274
H 10	H 5/8	.6250	.8755	.6265	.6274
11	11/16	.6875	.8755	.6890	.6899
H 11	H 11/16	.6875	.9380	.6890	.6899
12	3/4	.7500	.9995	.7505	.7514
H 12	H 3/4	.7500	1.0620	.7505	.7514
13	13/16	.8125	1.0620	.8130	.8139
H 13	H 13/16	.8125	1.1245	.8130	.8139
14	7/8	.8750	1.1245	.8755	.8764
H14	H 7/8	.8750	1.1870	.8755	.8764
15	15/16	.9375	1.1870	.9380	.9389
16	1	1.0000	1.2495	1.0005	1.0014
H 16	H1	1.0000	1.3120	1.0005	1.0014
17	1 1/16	1.0625	1.3120	1.0630	1.0639
18	1 1/8	1.1250	1.3745	1.1255	1.1264
H 18	H 1 1/8	1.1250	1.4995	1.1255	1.1264
19	1 3/16	1.1875	1.4995	1.1880	1.1889
20	1 1/4	1.2500	1.4995	1.2505	1.2514
H 20	H 1 1/4	1.2500	1.6245	1.2505	1.2514
21	1 5/16	1.3125	1.6245	1.3130	1.3140
22	1 3/8	1.3750	1.6245	1.3755	1.3765
H 22	H1 3/8	1.3750	1.7495	1.3755	1.3765
24	1 1/2	1.5000	1.8745	1.5005	1.5016
26	1 5/8	1.6250	1.9995	1.6255	1.6266
28	1 3/4	1.7500	2.1245	1.7505	1.7517
30	1 7/8	1.8750	2.2495	1.8755	1.8767
32	2	2.0000	2.3745	2.0006	2.0018
H 33	H 2 1/16	2.0625	2.5307	2.0635	2.0649
34	2 1/8	2.1250	2.4995	2.1256	2.1270
36	2 1/4	2.2500	2.6245	2.2506	2.2520
42	2 5/8	2.6250	2.9995	2.6260	2.6274
44	2 3/4	2.7500	3.1245	2.7510	2.7524
56	3 1/2	3.5000	3.9995	3.5010	3.5024
88	5 1/2	5.5000	5.9990	5.5010	5.5029

Bearing bore should be checked with “go” and “no go” plug gages. The “go” gage size is the minimum needle roller complement bore diameter. The “no go” gage size is larger than the maximum needle roller complement bore diameter by 0.0001 inch.

Inspection dimensions for the extra-precision bearings are given in the table below. Note that these bearings must be inspected while mounted in the specified ring gage. Bearing bores are checked with “go” and “no go” plug gages. The “go” gage size is the minimum diameter inside the needle rollers. The “no go” gage size is 0.0001 in. larger than the maximum diameter inside the needle rollers.

Procedures for selecting ring and plug gage dimensions are the same as for those involving precision needle bearings, except that the ring gage diameters and diameters inside the needle rollers must be drawn from the table on this page.

GAGING

Nominal shaft diameter inch		Ring gage	Diameter inside needle rollers ($F_{ws\ min}$)	
			Min.	Max.
	1/8	0.2473	0.1256	0.1260
	5/32	0.2785	0.1569	0.1573
	3/16	0.3390	0.1881	0.1885
	1/4	0.4328	0.2506	0.2510
	5/16	0.4953	0.3131	0.3135
H	5/16	0.5578	0.3131	0.3135
	3/8	0.5578	0.3756	0.3760
H	3/8	0.6203	0.3756	0.3760
	7/16	0.6203	0.4381	0.4385
H	7/16	0.6828	0.4381	0.4385
	1/2	0.6828	0.5006	0.5010
H	1/2	0.7453	0.5006	0.5010
	9/16	0.7453	0.5631	0.5635
H	9/16	0.8078	0.5631	0.5635
	5/8	0.8078	0.6256	0.6260
H	5/8	0.8703	0.6256	0.6260
	11/16	0.8703	0.6881	0.6885
H	11/16	0.9328	0.6881	0.6885
	3/4	0.9950	0.7503	0.7507
H	3/4	1.0575	0.7503	0.7507
	13/16	1.0575	0.8128	0.8132
H	13/16	1.1200	0.8128	0.8132
	7/8	1.1200	0.8753	0.8757
H	7/8	1.1825	0.8753	0.8757
	15/16	1.1825	0.9378	0.9382
	1	1.2450	1.0003	1.0007
H	1	1.3075	1.0003	1.0007
	1 1/16	1.3075	1.0628	1.0632
	1 1/8	1.3700	1.1253	1.1257
H	1 1/8	1.4950	1.1253	1.1257
	1 3/16	1.4950	1.1878	1.1882
	1 1/4	1.4950	1.2503	1.2507
H	1 1/4	1.6200	1.2503	1.2507
	1 5/16	1.6200	1.3128	1.3132
	1 3/8	1.6200	1.3753	1.3757
H	1 3/8	1.7450	1.3753	1.3757
	1 1/2	1.8700	1.5003	1.5008
	1 5/8	1.9950	1.6253	1.6258
	1 3/4	2.1200	1.7503	1.7508
	1 7/8	2.2450	1.8753	1.8758
	2	2.3700	2.0003	2.0008
H	2 1/16	2.5262	2.0628	2.0633
	2 1/8	2.4950	2.1253	2.1258
	2 1/4	2.6200	2.2503	2.2508
	2 5/8	2.9950	2.6254	2.6260
	2 3/4	3.1200	2.7504	2.7510
	3 1/2	3.9950	3.5004	3.5010

MOUNTING DESIGNS - *continued*

NEEDLE ROLLER CAGE ASSEMBLIES

Metric series needle roller and cage radial assemblies are supplied with needle roller complements subdivided into groups (gages) shown in Table 16. The groups are at Timken's option if nothing to the contrary is agreed upon at the time of ordering. This is in accordance with Grade G2 specified in ISO 3096 standard. The group limits of the needle rollers are indicated on the package. Labels of identifying colors show the group limits of the needle rollers. The needle roller and cage assemblies of one shipment usually contain needle rollers with group limits of between 0 to -2, and -5 to -7 µm (colors red, blue and white). Information on needle roller and cage assemblies with needle rollers of different group limits will be supplied on request.

TABLE 16

NEEDLE ROLLER GROUP LIMITS (GRADE G2)

Group Tolerance µm		Marking	Identifying color of label or on package
0	-2	P0M2	
-1	-3	M1M3	red
-2	-4	M2M4	
-3	-5	M3M5	blue
-4	-6	M4M6	
-5	-7	M5M7	white (gray)
-6	-8	M6M8	
-7	-9	M7M9	green
-8	-10	M8M10	
-9	-11	M9M11	yellow

In the marking of the gages, P identifies zero (0) or plus (+), M identifies minus (-).

The nominal inch assemblies, WJ and WJC, contain needle rollers manufactured to only one diameter grade. Within any one assembly, the needle rollers have a total diameter tolerance of .0001 inch.

The limit to precision of the radial clearance of mounted needle roller and cage assemblies is the capability of the user to hold close tolerances on the inner and outer raceways.

The tolerance of the overall width of these assemblies is given on the tabular pages of this section.

It may be impractical to finish the shaft to meet desired raceway design requirements. In this case, standard needle roller bearings with inner rings (forming complete bearings) will have to be used. Such bearings meet the quality requirements in accordance with ISO standards.

- For inner and outer ring tolerances the metric series bearings follow the normal tolerance class in ISO Standard 492 covering radial bearings. Bearings to more precise tolerance classes P6 and P5 may be obtained upon request.
- The metric series bearings may be obtained with radial internal clearance in accordance with ISO Standard 5753 also specified for cylindrical roller bearings. Mostly, they follow the normal (C0) radial clearance group although bearings to clearance groups C2, C3, and C4 may be made available on request.
- Inner ring and outer ring chamfer dimensions meet the requirements of ISO Standard 582.

Whenever the shaft can be used as the inner raceway, needle roller bearings without inner rings provide advantages of economy and close control of radial internal clearance in operation. Tolerance class F6 is the normal specification for the metric series needle roller complement bore diameter of an unmounted bearing as shown in the following table. In the case of needle roller bearings of series RNAO, without flanges and without inner rings, the outer rings and needle roller and cage assemblies are not interchangeable.

METRIC SERIES NEEDLE ROLLER COMPLEMENT BORE DIAMETER FOR BEARINGS WITHOUT INNER RINGS

F_w mm		$\Delta F_{ws\ min}$ µm	
>	≤	low	high
3	6	+10	+18
6	10	+13	+22
10	18	+16	+27
18	30	+20	+33
30	50	+25	+41
50	80	+30	+49
80	120	+36	+58
120	180	+43	+68
180	250	+50	+79
250	315	+56	+88
315	400	+62	+98

MOUNTING DESIGNS - *continued*

Alternatively, for inch designs the tolerances for the HJ bearings are given in Tables 17 and 18 and tolerances for the IR inner rings are given in Table 19 and 20.

TABLE 17

OUTSIDE DIAMETER AND WIDTH TOLERANCES, HJ BEARINGS

D Nominal Outside Diameter		Deviations from Nominal of Single Mean Outside Diameter, D_{mp}[1]		Deviations from Nominal of Width, C	
inch	inch	inch		inch	
>	≤	high	low	high	low
0.7500	2.0000	0	-0.0005	0	-0.005
2.0000	3.2500	0	-0.0006	0	-0.005
3.2500	4.7500	0	-0.0008	0	-0.005
4.7500	7.2500	0	-0.001	0	-0.005
7.2500	10.2500	0	-0.0012	0	-0.005
10.2500	12.5000	0	-0.0014	0	-0.005

[1]"Single mean diameter" is defined as the mean diameter in a single radial plane.

TABLE 18

ROLLER COMPLEMENT BORE TOLERANCE, HJ BEARINGS

F_w Nominal Roller Complement Bore Diameter		Deviations from Nominal of the Smallest Single Diameter[1] of the Roller Complement Bore, $F_{ws\ min}$	
inch		inch	
>	≤	low	high
0.5000	0.6250	+0.0008	+0.0017
0.6250	1.1250	+0.0009	+0.0018
1.1250	1.6250	+0.0010	+0.0019
1.6250	1.8750	+0.0010	+0.0020
1.8750	2.7500	+0.0011	+0.0021
2.7500	3.0000	+0.0011	+0.0023
3.0000	4.0000	+0.0012	+0.0024
4.0000	4.5000	+0.0012	+0.0026
4.5000	6.0000	+0.0013	+0.0027
6.0000	6.5000	+0.0013	+0.0029
6.5000	7.7500	+0.0014	+0.0030
7.7500	9.2500	+0.0014	+0.0032

[1] "The smallest single diameter of the roller complement bore" is defined as the diameter of the cylinder which, when used as a bearing inner ring, results in zero radial internal clearance in the bearing on at least one diameter.

TABLE 19

BORE AND WIDTH TOLERANCES, IR INNER RINGS

d Nominal Outside Diameter		Deviations from Nominal of Single Mean Outside Diameter, d_{mp} [1]		of Width, B	
inch	inch	inch		inch	
>	≤	high	low	high	low
0.3125	0.7500	0	-0.0004	+0.010	+0.005
0.7500	2.0000	0	-0.0005	+0.010	+0.005
2.0000	3.2500	0	-0.0006	+0.010	+0.005
3.2500	4.2500	0	-0.0008	+0.015	+0.005
4.2500	4.7500	0	-0.0008	+0.015	+0.010
4.7500	7.0000	0	-0.001	+0.015	+0.010
7.0000	8.0000	0	-0.0012	+0.015	+0.010

[1]"Single mean diameter" is defined as the mean diameter in a single radial plane.

TABLE 20

OUTSIDE DIAMETER TOLERANCE, IR INNER RINGS

F Nominal Outside Diameter		Deviations from Nominal of Single Mean Outside Diameter, F_{mp} [1]	
inch		inch	
>	≤	high	low
0.5000	0.6250	-0.0005	-0.0009
0.6250	1.0000	-0.0007	-0.0012
1.0000	1.1250	-0.0009	-0.0014
1.1250	1.3750	-0.0009	-0.0015
1.3750	1.8750	-0.0010	-0.0016
1.8750	3.0000	-0.0011	-0.0018
3.0000	3.7500	-0.0013	-0.0022
3.7500	4.5000	-0.0015	-0.0024
4.5000	5.5000	-0.0015	-0.0025
5.5000	6.5000	-0.0017	-0.0027
6.5000	8.2500	-0.0019	-0.0031
8.2500	9.2500	-0.0020	-0.0032

[1]"Single mean diameter" is defined as the mean diameter in a single radial plane.

MOUNTING DESIGNS - *continued*

NEEDLE ROLLER BEARINGS

BEARINGS WITHOUT INNER RINGS

When the shaft is used as the inner raceway for needle roller bearings it must have a hardness between 58 and 64 HRC and a wave-free finish in order to realize the full load-carrying capability of the bearing.

1. **Metallurgy** – either case hardening or through hardening grades of good bearing quality steel are satisfactory for raceways. Steels which are modified for free machining, such as those high in sulfur content and particularly those containing lead, are seldom satisfactory for raceways.
   To realize full bearing capacity, the raceway area must be at least surface hard with a reasonable core strength. It is preferred that the case depth be not less than 0.42 mm (0.015 inches). The preferred surface hardness is equivalent to 58 HRC. If the raceway is of lesser hardness, see the modification factors shown on pages A39 and A34.
   The minimum effective case depth of hardened and ground raceways, for use with all types of needle roller bearings, depends on the applied load, the diameter of the rolling elements and the core strength of the steel used. To calculate the approximate case depth the following formula may be used:
   Min case depth = (0.07 to 0.12) • D_w
   D_w is the diameter of the rolling element.
   The high value should apply to a low core strength material and/or heavy loads.

   Note – The effective case is defined as the distance from the surface, after final grind, to the 50 HRC hardness level.

2. **Strength** – the shaft must be of sufficient size to keep the operating deflections within the limits outlined.

3. **Tolerance** – the suggested shaft diameter tolerances for each type of needle roller bearing are indicated in the appropriate section of this catalog.

4. **Variation of mean shaft diameter** – within the length of the bearing raceway should not exceed 0.008 mm (0.0003 inches), or one-half the diameter tolerance, whichever is smaller.

5. **Deviation from circular form** – the radial deviation from true circular form of the raceway should not exceed 0.0025 mm (0.0001 inches) for diameters up to and including 25 mm (1.0 inches). For raceways greater than 25 mm (1.0 inches) the allowable radial deviation should not exceed 0.0025 mm (0.0001 inch) multiplied by a factor of the raceway diameter divided by 25 for mm (1.0 for inches).

6. **High frequency lobing** – the lobing which occurs 10 or more times around the circumference of a shaft and exceeds 0.4 µm (15 microinches) peak-to-valley is defined as chatter. Chatter usually causes undesirable noise and reduces fatigue life.

7. **Surface finish** – In addition to a wave-free finish the raceway surface roughness of $R_a \leq 0.2$ µm (8.0 microinches) must be maintained for the bearing to utilize its full load rating. The raceway area must also be free of nicks, burrs, scratches and dents. Oil holes are permissible in the raceway area but care must be taken to blend the edges gently into the raceway, and if possible, the hole should be located in the unloaded zone of the raceway.
   Care must also be taken to prevent grind reliefs, fillets, etc., from extending into the raceway area. If the rollers overhang a grind relief or step on the shaft, there will be high stress concentration with resultant early damage.

8. **End chamfer** – for the most effective assembly of the shaft into a bearing, the end of the shaft should have a large chamfer or rounding. This should help in preventing damage to the roller complement, scratching of the raceway surface and nicking of the shaft end.

9. **Sealing surface** – in some instances bearings have integral or immediately adjacent seals that operate on the surface ground for the bearing raceway. Here, particular attention should be paid to the pattern of the shaft finish. In no instance should there be a "lead" or spiral effect, as often occurs with through feed centerless grinding. Such a "lead" may pump lubricant past the seal.

BEARINGS WITH INNER RINGS

When it is undesirable or impractical to prepare the shaft to be used as a raceway, inner rings are available as listed in the tabular pages. If the shaft is not used directly as a raceway, the following design specifications must be met:

1. **Strength** – the shaft must be of sufficient size to keep the operating deflections within the limits outlined.

2. **Tolerance** – the suggested shaft diameter tolerances for each type of needle roller bearing are indicated in the appropriate section of the catalog.

3. **Variation of mean shaft raceway diameter and deviation from circular form of the raceway** – should not exceed one-half the shaft diameter tolerance.

4. **Surface finish** – the surface finish should not exceed R_a 1.6 µm (63 microinches).

5. **Locating shoulders or steps** – locating shoulders or steps in the shaft must be held to close concentricity with the bearing seat to prevent imbalance and resultant vibrations.

NEEDLE ROLLER BEARINGS

BEARINGS WITH OUTER RINGS

For bearings with outer rings, the function of the housing is to locate and support the outer ring. The following specifications must be met:

1. **Strength** – housings should be designed so that the radial loads, which will be placed on the bearings, will cause a minimum of deflection or distortion of the housing.
2. **Variation of mean housing diameter** – within the length of the outer ring should not exceed 0.013 mm (0.0005 inches).
3. **Deviation from circular form** – the housing bore should be round within one-half the housing bore tolerance.
4. **Parallelism** – when possible, line bore housings which are common to one shaft to obtain parallelism of the housing bores and the shaft axis.
5. **Surface finish** – The surface finish should not exceed R_a 1.6 µm (63 microinches).
6. **End chamfer** – to permit easy introduction of the bearing into the housing, the end of the housing should have a generous chamfer.

Needle roller bearings can be installed into housings with a transition fit or a clearance fit. The outer ring should be a transition fit in the housing when it rotates relative to the load. The outer ring may be a clearance fit in the housing when it is stationary relative to the load in either case, locate the bearings by shoulders, or other locating devices, to prevent axial movement.

Since the needle roller bearing does not require an interference fit in the housing to round and size it properly, a split housing may be used if desired. Dowels should be used to maintain proper register of the housing sections.

Drawn cup bearings have a thin case-hardened outer ring which is out-of-round from the hardening operation. For proper mounting it must **always** be pressed into the housing. Split housings will not round and size a drawn cup bearing. When split housings must be used, the bearing should first be mounted in a cylindrical sleeve.

The housing should be of sufficient tensile strength and section to round and size the bearing. It must be designed for minimum distortion under load. Steel or cast iron housings are preferred. Housing bores in low tensile strength materials such as aluminum, magnesium, phenolics, etc., should be reduced to provide more interference fit. Thin section cast iron and steel housings may also require reduced bores. Consult your Timken representative for suggestions when working with these lower strength housings.

The housing should be through-bored if possible. When shouldered housing bores are unavoidable, the bearing should be located far enough from the shoulder to avoid the danger of crushing the end of the drawn cup during installation.

When the drawn cup bearing is mounted close to the housing face, care should be taken to mount the bearing at least 0.25 mm (0.010 inches) within the housing face to protect the bearing lip.

BEARINGS WITHOUT OUTER RINGS

In many cases, such as with gear bores, it is desirable to have the housing bore serve as the outer raceway for radial needle roller and cage assemblies or loose needle roller complements. In those instances, as for shafts used as a raceway, the housing bore must have a hardness between 58 and 64 HRC and a roughness $R_a \leq 0.2$ µm (8.0 microinches), so that the full load carrying capacity of the bearing is realized.

1. **Strength** – the housing must be of sufficient cross section to maintain proper roundness and running clearance under maximum load.
2. **Metallurgical** – material selection, hardness and case depth should be consistent with the requirements for inner raceways given in the shaft design.
3. **Variation of mean housing raceway diameter and deviation from circular form of the raceway** – the raceway out-of-roundness and taper should not exceed 0.008 mm (0.0003 inches) or one-half the bore tolerance, whichever is smaller. In addition, the bore diameter must never be smaller at both ends than in the center [sway-back].
4. **Surface finish** – In addition to a wave-free finish, the raceway surface roughness of Ra ≤ 0.2 µm (8.0 microinches) must be maintained for the bearing to utilize its full load rating. The raceway area must also be free of nicks, burrs, scratches and dents.
5. **Grind reliefs** – care must be exercised to ensure that grind reliefs, fillets, etc. do not extend to the raceway. Oil holes in the raceway area are permissible, but the edges must be blended smoothly with the raceway, and if possible, the hole should be located in the unloaded zone of the raceway.

MOUNTING DESIGNS - *continued*

ADDITIONAL DETAILS ABOUT DRAWN CUP NEEDLE BEARINGS

Drawn cup bearings are manufactured to a degree of precision that will satisfy the radial clearance requirements of most applications. The total radial clearance for an installed drawn cup bearing results from the build up of manufacturing tolerances of the housing bore, the inner raceway diameter and the bearing, as well as the minimum radial clearance required for the application.

For metric series drawn cup bearings requiring close control of radial internal clearance the suggested housing bore tolerance is N6 and h5 tolerance for the inner raceway diameter. When such exacting close control of radial internal clearance is not required, the user may select N7 housing bore and h6 inner raceway diameter tolerances.

For metric series drawn cup bearings used in housings made from materials of low rigidity or steel housings of small section the suggested housing bore tolerance is R6 (R7). To maintain normal radial internal clearance the inner raceway diameter tolerance should be h5 (h6).

For metric series drawn cup bearing applications where the outer ring rotates with respect to the load, it is suggested that both the housing bore and the inner raceway diameter be reduced using R6 (R7) and f5 (f6) tolerance practice respectively.

Metric series drawn cup bearing applications involving oscillating motion may require reduced radial internal clearances. This reduction may be accomplished by increasing the inner raceway diameter using j6 tolerance.

When it becomes impractical to meet the shaft raceway design requirements (hardness, case depth, surface finish etc.) outlined in this section, standard inner rings may be used with metric series drawn cup bearings. It is suggested that when metric series inner rings are used with metric series drawn cup bearings, they should be mounted with a loose transition fit on the shaft using g6 (g5) shaft diameter tolerance. The inner ring should be endclamped against a shoulder. If a tight transition fit must be used, [shaft diameter tolerance h6 (h5)], to keep the inner ring from rotating relative to the shaft, the inner ring outside diameter, as mounted, must not exceed the raceway diameter required by the drawn cup bearing for the particular application. In case the outside diameter of the inner ring, when mounted on the shaft, exceeds the required raceway diameter for the matching drawn cup bearing, it should be ground to proper diameter while mounted on the shaft.

Inch drawn cup needle roller bearings utilize the standard tolerance scheme outlined in the following figure.

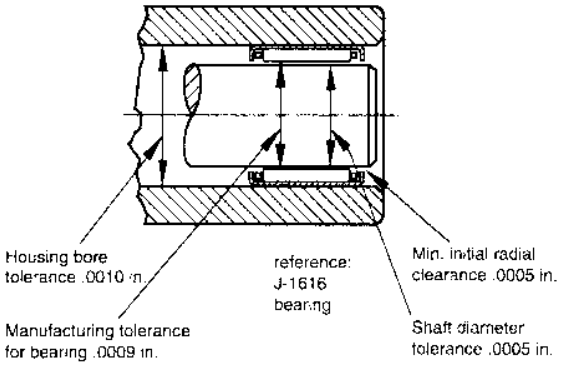


Fig. A-14

MOUNTING DESIGNS - *continued*

For housing materials of low rigidity or steel housings of small section, it is suggested that for initial trial the housing bore diameters given in the tabular pages be reduced by the amounts shown in Table 21. To maintain normal radial internal clearance, the inner raceway diameter tolerance given in the tabular pages should be used.

TABLE 21

LOW RIGIDITY HOUSING BORE

Nom. Housing Bore Inch		Subtract Inch
over	incl.	
0	.38	.0004
.38	1.00	.0006
1.00	2.00	.0010
2.00	3.00	.0012
3.00	6.00	.0014

For applications where the outer ring rotates with respect to the load, it is suggested that both the housing bore and inner raceway diameter be reduced. Bearings of nominal inch dimensions should have the housing bore and inner raceway diameters reduced by .0005".

Applications involving oscillating motion often require reduced radial clearances. This reduction is accomplished by increasing the shaft raceway diameters as shown in Table 22.

TABLE 22

NOMINAL INCH BEARING OSCILLATING SHAFT SIZE

Shaft Size	Add
inch	inch
.094 to .188	.0003
.25 to 1.875	.0005
2 to 5.5	.0006

Where it becomes impractical to meet the shaft raceway design requirements (hardness, case depth, surface finish, etc.) standard inner rings for inch drawn cup bearings are available.

Inner rings for inch drawn cup bearings are designed to be a loose transition fit on the shaft and should be clamped against a shoulder. If a tight transition fit must be used to keep the inner ring from rotating relative to the shaft, the inner ring O.D., as mounted, must not exceed the raceway diameters required by the drawn cup bearing for the particular application. See the previous discussion on internal clearances and fits for further details on inner raceway diameter choice.

EXTRA-PRECISION INCH DRAWN CUP NEEDLE ROLLER BEARINGS

MOUNTING						
Basic Bore Designation	Nominal Bore Inch	Nominal O.D.	Shaft Raceway Diameter		Housing Bore	
			Max.	Min.	Min.	Max.
GB-2	.1250	.2500	0.1251	0.1248	0.2470	0.2473
GB-2 1/2	.1562	.2812	0.1564	0.1561	0.2782	0.2785
GB-3	.1875	.3438	0.1876	0.1873	0.3387	0.3390
GB-4	.2500	.4375	0.2501	0.2498	0.4325	0.4328
GB-5	.3125	.5000	0.3126	0.3123	0.4950	0.4953
GBH-5	.3125	.5625	0.3126	0.3123	0.5575	0.5578
GB-6	.3750	.5625	0.3751	0.3748	0.5575	0.5578
GBH-6	.3750	.6250	0.3751	0.3748	0.6200	0.6203
GB-7	.4375	.6250	0.4376	0.4373	0.6200	0.6203
GBH-7	.4375	.6875	0.4376	0.4373	0.6825	0.6828
GB-8	.5000	.6875	0.5001	0.4998	0.6825	0.6828
GBH-8	.5000	.7500	0.5001	0.4998	0.7450	0.7453
GB-9	.5625	.7500	0.5626	0.5623	0.7450	0.7453
GBH-9	.5625	.8125	0.5626	0.5623	0.8075	0.8078
GB-10	.6250	.8125	0.6251	0.6248	0.8075	0.8078
GBH-10	.6250	.8750	0.6251	0.6248	0.8700	0.8703
GB-11	.6875	.8750	0.6876	0.6873	0.8700	0.8703
GBH-11	.6875	.9375	0.6876	0.6873	0.9325	0.9328
GB-12	.7500	1.0000	0.7501	0.7498	0.9950	0.9953
GBH-12	.7500	1.0625	0.7501	0.7498	1.0575	1.0578
GB-13	.8125	1.0625	0.8126	0.8123	1.0575	1.0578
GBH-13	.8125	1.1250	0.8126	0.8123	1.1200	1.1203
GB-14	.8750	1.1250	0.8751	0.8748	1.1200	1.1203
GBH-14	.8750	1.1875	0.8751	0.8748	1.1825	1.1829
GB-15	.9375	1.1875	0.9376	0.9373	1.1825	1.1829
GB-16	1.0000	1.2500	1.0001	0.9998	1.2450	1.2454
GBH-16	1.0000	1.3125	1.0001	0.9998	1.3075	1.3079
GB-17	1.0625	1.3125	1.0626	1.0623	1.3075	1.3079
GB-18	1.1250	1.3750	1.1251	1.1248	1.3700	1.3704
GBH-18	1.1250	1.5000	1.1251	1.1248	1.4950	1.4955
GB-19	1.1875	1.5000	1.1876	1.1873	1.4950	1.4955
GB-20	1.2500	1.5000	1.2501	1.2498	1.4950	1.4955
GBH-20	1.2500	1.6250	1.2501	1.2498	1.6200	1.6205
GB-21	1.3125	1.6250	1.3126	1.3123	1.6200	1.6205
GB-22	1.3750	1.6250	1.3750	1.3747	1.6200	1.6205
GBH-22	1.3750	1.7500	1.3750	1.3747	1.7450	1.7455
GB-24	1.5000	1.8750	1.5000	1.4997	1.8700	1.8705
GB-26	1.6250	2.0000	1.6250	1.6247	1.9950	1.9955
GB-28	1.7500	2.1250	1.7500	1.7497	2.1200	2.1205
GB-30	1.8750	2.2500	1.8750	1.8747	2.2450	2.2455
GB-32	2.0000	2.3750	2.0000	1.9997	2.3700	2.3705
GBH-33	2.0625	2.5312	2.0624	2.0621	2.5262	2.5267
GB-34	2.1250	2.5000	2.1249	2.1246	2.4950	2.4955
GB-36	2.2500	2.6250	2.2499	2.2496	2.6200	2.6205
GB-42	2.6250	3.0000	2.6248	2.6245	2.9950	2.9956
GB-44	2.7500	3.1250	2.7498	2.7495	3.1200	3.1206
GB-56	3.5000	4.0000	3.4998	3.4995	3.9950	3.9956

* Check for availability – not every size may be in production.

MOUNTING DESIGNS - *continued*

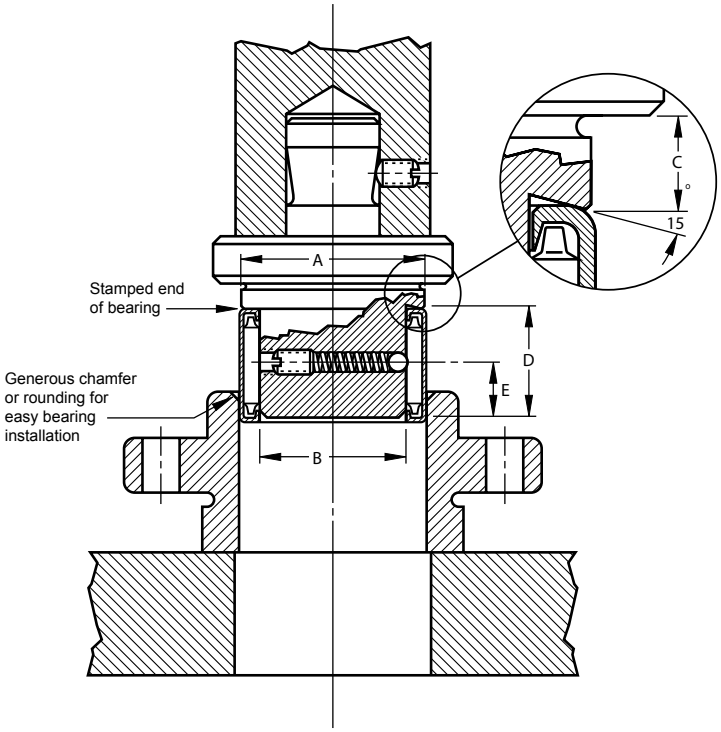
INSTALLATION OF DRAWN CUP BEARINGS

General installation requirements

- A drawn cup bearing must be pressed into its housing.
- An installation tool, similar to the ones shown, must be used in conjunction with a standard press.
- The bearing must not be hammered into its housing, even in conjunction with the proper assembly mandrel.
- The bearing must not be pressed tightly against a shoulder in the housing.
- If it is necessary to use a shouldered housing, the depth of the housing bore must be sufficient to ensure the housing shoulder fillet, as well as the shoulder face, clears the bearing.
- The installation tool must be co-axial with the housing bore.

INSTALLATION OF OPEN END BEARINGS

It is advisable to utilize a positive stop on the press tool to locate the bearing properly in the housing. The assembly tool should have a leader or a pilot, as shown, to aid in starting the bearing true in the housing. The ball detent shown on the drawing is used to assist in aligning the rollers of a full complement bearing during installation and to hold the bearing on the installation tool. A caged type drawn cup bearing does not require a ball detent to align its rollers. The ball detent may still be used to hold the bearing on the installation tool or an "O" ring may be used. The bearing should be installed with the stamped end (the end with identification markings) against the angled shoulder of the pressing tool.



INCH BEARINGS

A – 1/64 in. less than housing bore
B – .003 in. less than shaft diameter
C – distance bearing will be inset into housing, minimum of .008 in.
D – pilot length should be length of bearing less 1/32 in.
E – approximately ½ D

METRIC BEARINGS

A – 0.4 mm less than housing bore
B – 0.08 mm less than shaft diameter
C – distance bearing will be inset into housing, minimum of 0.2 mm
D – pilot length should be length of bearing less 0.8 mm
E – approximately ½ D

A

MOUNTING DESIGNS - *continued*

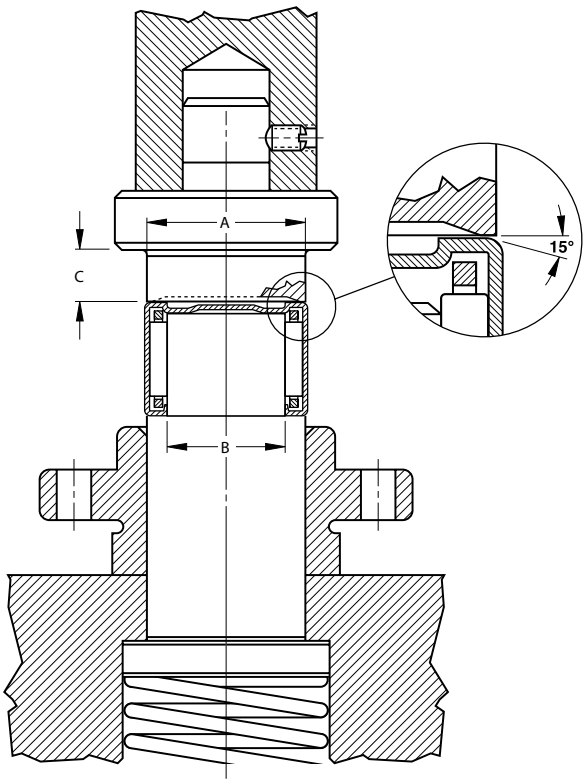
DRAWN CUP NEEDLE ROLLER BEARINGS – INCH

Installation of closed end bearings

The installation tool combines all the features of the tool used to install open end bearings, but the pilot is spring-loaded and is part of the press bed.

The angled shoulder of the pressing tool should bear against the closed end with the bearing held on the pilot to aid in starting the bearing true in the housing.

A – 1/64 in. less than housing bore
B – .003 in. less than shaft diameter
C – distance bearing will be inset into housing, minimum of .008 in.

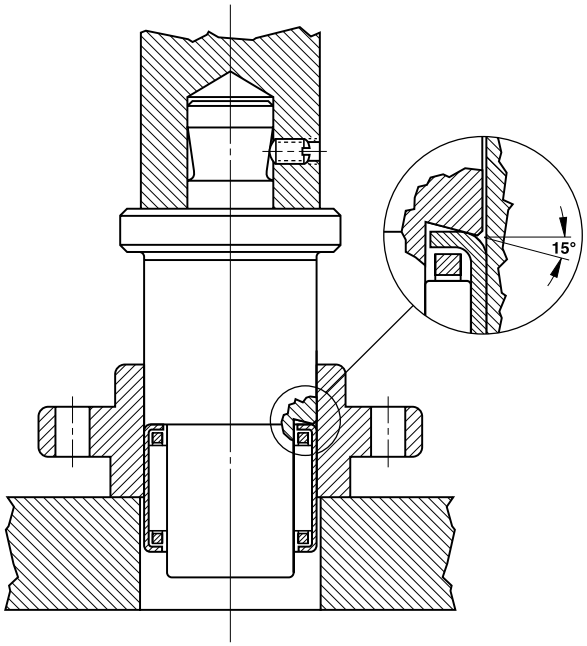


Extraction of drawn cup bearings

The need to extract a drawn cup bearing does not arise often. Standard extractor tools may be purchased from a reputable manufacturer. Customers may produce the special extraction tools at their own facilities. After extraction, the drawn cup bearing should not be reused.

Extraction from a straight housing

When it is necessary to extract a drawn cup bearing from a straight housing, a similar tool to the installation tool, but without the stop, may be used. To avoid damage to the bearing, pressure should be applied against the stamped end of the bearing, just as it is done at installation.

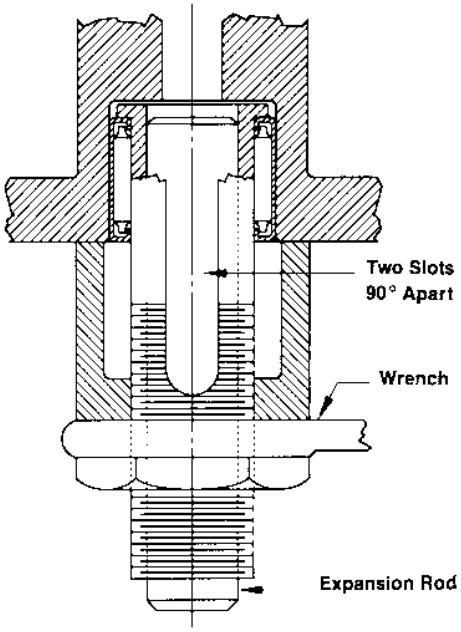


MOUNTING DESIGNS - *continued*

DRAWN CUP NEEDLE ROLLER BEARINGS

Extraction from a shouldered or dead-end housing (with space between the bearing and the housing shoulder)

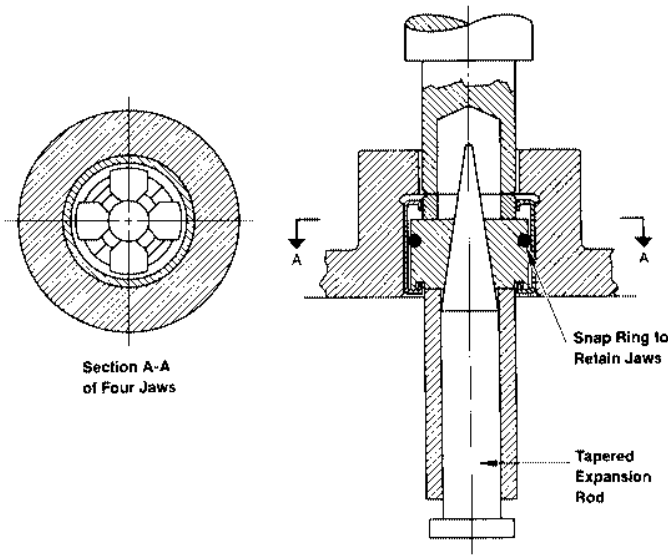
Bearings may be extracted from shouldered or dead-end housings with a common bearing puller tool as shown. This type of tool is slotted in two places at right angles to form four prongs. The four puller prongs are pressed together and inserted into the space between the end of the bearing and the shoulder. The prongs are forced outward by inserting the expansion rod, and then the bearing is extracted. Do not reuse the bearing after extraction.

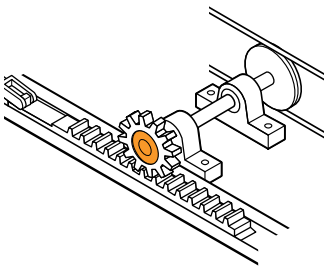


Extraction from a shouldered housing (with bearing pressed up close to the shoulder)

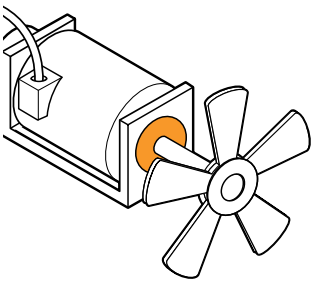
The tool to be used, as shown, is of a similar type described for a shouldered or dead-end housing, but the rollers must first be removed from the bearing.

The four segment puller jaws are collapsed and slipped into the empty cup. The jaws are then forced outward into the cup bore by means of the tapered expansion rod. The jaws should bear on the lip as near as possible to the cup bore. The cup is then pressed out from the top.

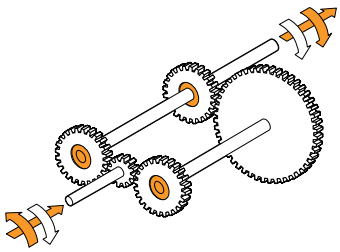




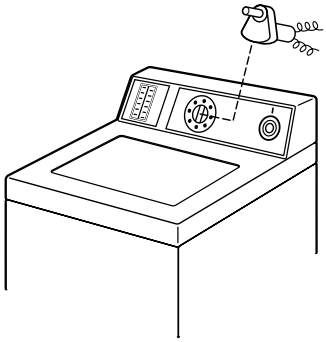
Rack Indexing Drive



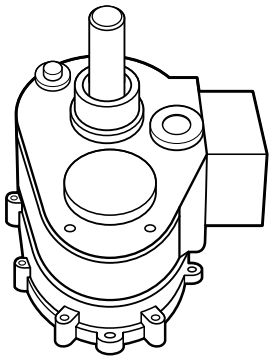
Motor Backstops



2-Speed Gearbox
with Reversing Input



Timing Motor
Freewheels



Washing Machine
Transmission

DRAWN CUP ROLLER CLUTCHES

Housing design

Drawn cup clutches and clutch and bearing assemblies are mounted with a simple press fit in their housings. Through bored and chamfered housings are preferred. Provisions for axial location, such as shoulders or snap rings, are not required. The case hardened cups must be properly supported. Steel housings are preferred and must be used for applications involving high torque loads to prevent radial expansion of the clutch cups. The suggested minimum housing outside diameters in the tables of dimensions are for steel.

The housing bore should be round within one-half of the diameter tolerance. The taper within the length of the outer ring should not exceed 0.013 mm or 0.0005 inch.

The surface finish of the housing bore should not exceed 63 microinches, a.a. (arithmetic average) or 1.6 µm (on the Ra scale).

Low strength housings (non-steel, sintered metals and some plastics) may be entirely satisfactory in lightly loaded applications. When using non-steel housings, thoroughly test designs.

Adhesive compounds can be used to prevent creeping rotation of the clutch in plastic housings with low friction properties. Adhesives will not provide proper support in oversized metallic housings. When using adhesives, care must be taken to keep the adhesive out of the clutches and bearings.

Shaft design

The clutch or bearing assembly operates directly on the shaft whose specifications of dimensions, hardness and surface finish are well within standard manufacturing limits.

Either case hardening or through hardening grades of good bearing quality steel are satisfactory for raceways. Steels which are modified for free machining, such as those high in sulfur content and particularly those containing lead, are seldom satisfactory for raceways.

For long fatigue life, the shaft raceway, must have a hardness equivalent to 58 HRC (ref, ASTM E-18), and ground to the suggested diameter shown in the tables of dimensions. It may be through hardened, or it may be case hardened, with an effective case depth of 0. mm (0.015 inch) (Effective case depth is defined as the distance from the surface inward to the equivalent of 50 HRC hardness level after grinding.)

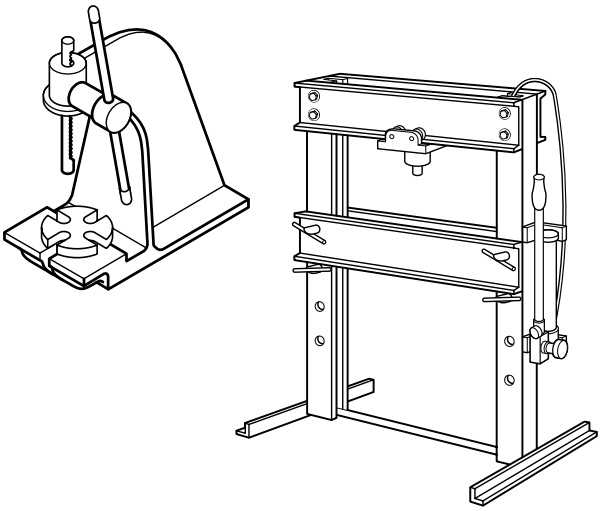
Taper within the length of the raceway should not exceed 0.008 mm (0.0003 inch), or one-half the diameter tolerance, whichever is smaller. The radial deviation from true circular form of the raceway should not exceed 0.0025 mm (.0001 inch) for diameters up to and including 25.4 mm (1 inch). For raceways greater than 25 mm or 1.0 inch the allowable radial deviation may be greater than 0.0025 mm (.0001 inch) by a factor of raceway diameter (in inches) divided by 1.0 or a factor of raceway diameter (in mm) divided by 25.4. Surface finish on the raceway should not exceed 16 microinches a.a. (arithmetic average) or 0.4 µm (on the Ra scale). Deviations will reduce the load capacity and fatigue life of the shaft.

MOUNTING DESIGNS - *continued*

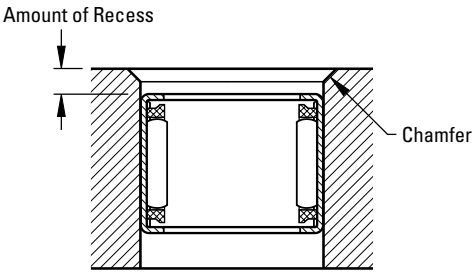
Installation

Simplicity of installation promotes additional cost savings. The drawn cup roller clutch or the clutch and bearing assembly must be pressed into its housing. The unit is pressed into the bore of a gear hub or pulley hub or housing of the proper size and no shoulders, splines, keys, screws or snap rings are required.

Installation procedures are summarized in the following sketches:

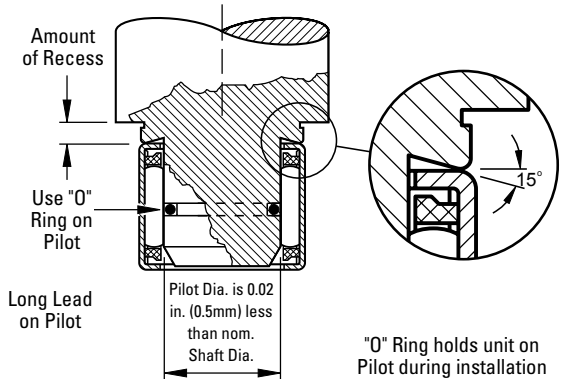


Use an arbor press or hydraulic ram press which will exert steady pressure. Never use a hammer or other tool requiring pounding to drive the clutch into its housing.

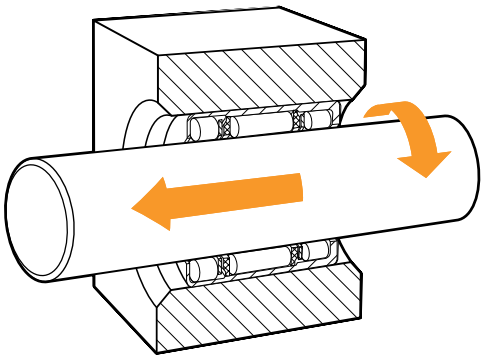


Make sure that the housing bore is chamfered to permit easy introduction of the clutch and bearing or the clutch unit. Press unit slightly beyond the chamfer in the housing bore to assure full seating. Through bored housings are always preferred. If the housing has a shoulder, never seat the clutch against the shoulder.

IMPORTANT: The mounted clutch or clutch and bearing assembly engages when the housing is rotated relative to the shaft in the direction of the arrow and LOCK marking (←LOCK) stamped on the cup. Make sure that the unit is oriented properly before pressing it into its housing.



Use an installation tool as shown in the diagram above. If clutch is straddled by needle roller bearings, press units into position in proper sequence and preferably leave a small clearance between units.



When assembling the shaft, it should be rotated during insertion. The end of the shaft should have a large chamfer or rounding.

RADIAL NEEDLE ROLLER AND CAGE ASSEMBLIES – METRIC

Radial needle roller and cage radial assemblies use the housing bore as the outer raceway and the shaft as the inner raceway. In order to realize full bearing load rating, the housing bore and the shaft raceways must have the correct geometric and metallurgical characteristics. The housing should be of sufficient cross section to maintain adequate roundness and running clearance under load. The only limit to precision of the radial clearance of a mounted assembly is the capability of the user to hold close tolerances on the inner and outer raceways. The suggested shaft tolerances listed in Table 23 are based on housing bore tolerance G6 and apply to metric series needle roller and cage radial assemblies with needle rollers of group limits between P0M2 and M5M7. Inch cage and roller assemblies list shaft tolerances in the bearing data tables based on h5 tolerances and housings to G6 tolerances.

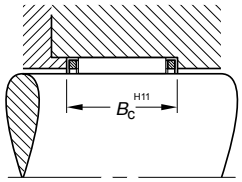
TABLE 23

SUGGESTED SHAFT TOLERANCES FOR METRIC BEARINGS USING HOUSING BORES MACHINED TO G6 AS OUTER RACEWAYS

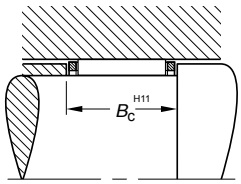
Nominal shaft diameter in mm	≤ 80	> 80
Radial clearance	Shaft tolerance	
Smaller than normal	j5	h5
Normal	h5	g5
Larger than normal	g6	f6

Needle roller and cage radial assembly must be axially guided by shoulders or other suitable means. The end guiding surfaces should be hardened to minimize wear and must provide sufficient axial clearance to prevent end locking of the assembly. Metric length tolerance H11 is suggested. Inch bearings are designed for minimum 0.008 inch axial clearance.

If end guidance is provided by a housing shoulder at one end and by a shaft shoulder at the other end the shaft must be axially positioned to prevent end locking of needle roller and cage assembly. The housing and shaft shoulder heights should be 70 to 90 percent of the needle roller diameter to provide proper axial guidance.



Guidance in the housing



Guidance on the shaft

Needle roller and cage radial assemblies which are mounted side by side must have needle rollers of the same group limits to ensure uniform load distribution.

Connecting rod guidance arrangements

End guidance of a connecting rod can be provided either at the crank pin or at the wrist pin end. Connecting rod guidance is achieved at the crank pin end using a small clearance between the crank webs. Guidance at the wrist pin end is controlled by a small clearance between the piston bosses.

Crank pin end guidance

With crank pin end guidance, care must be taken to ensure that an adequate amount of lubricant is supplied to the crank pin bearing and the surfaces which guide the connecting rod. For this purpose, grooves in the connecting rod end faces or slots in the connecting rod bore aligned with the incoming lubrication path should be provided. Occasionally, brass or hardened steel washers may be used for end guidance of the connecting rod.

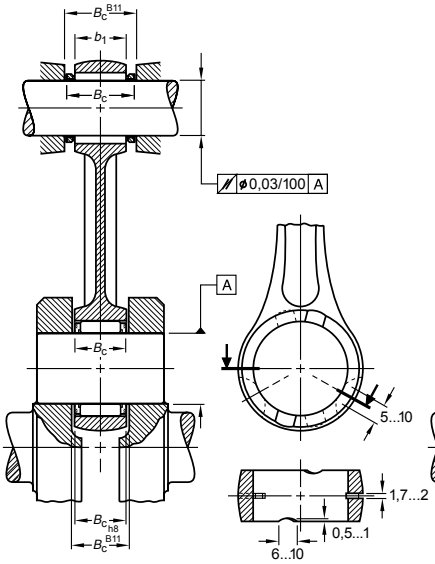
At the wrist pin end, the needle roller and cage radial assembly is located axially between the piston bosses. It may be both economical and effective to machine the connecting rod at the wrist pin end and at the crank pin end to the same width. It is suggested that at the wrist pin end, the needle roller length does not overhang the connecting rod width. Otherwise the load rating of the needle roller and cage assembly will be reduced.

Wrist pin end guidance

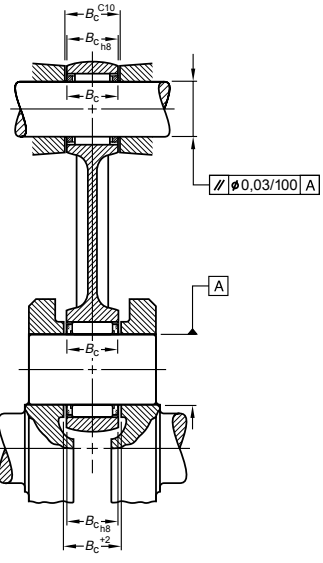
Wrist pin end will get the most effective axial guidance between the piston bosses. Grooves in the bottom of the piston bosses and a chamfer of small angle on each side of the upper portion of the connecting rod small end, can improve the oil flow to the needle roller and cage radial assembly and its guiding surfaces.

The length of the needle roller and cage radial assembly and the connecting rod width at the crank pin end should be identical to ensure best possible radial piloting of cage in the bore of the connecting rod. The crank webs are recessed to allow proper axial alignment of the connecting rod. As a rule it is not necessary to have additional supply of lubricant. Only in engines with sparse lubrication should consideration be given to provide lubricating slots in the connecting rod bores as with crank pin end guidance.

Crank Pin End Guidance



Wrist Pin End Guidance



MOUNTING DESIGNS - *continued*

NEEDLE ROLLER BEARINGS

Heavy-duty needle roller bearings

It is suggested that needle roller bearings are mounted in their housings with a clearance fit if the load is stationary relative to the housing or with a tight transition fit if the load rotates relative to the housing. Table 24 lists the suggested tolerances for the housing bore and the shaft raceway for metric series bearings without inner rings. Table 25 lists the suggested shaft tolerances for the above two mounting conditions when the metric series bearings are used with inner rings. The suggested housing bore tolerances for metric series bearings with inner rings are the same as the housing bore tolerance listed in Table 24 for metric series bearings without inner rings.

The tables of dimensions for inch bearings list the suggested ISO H7 tolerances for the housing bore and the suggested ISO h6 tolerances for the shaft raceway when the outer ring is to be mounted with a clearance fit. They also list the suggested ISO N7 tolerances for the housing bore and the suggested ISO f6 tolerances for the shaft raceway when the outer ring is to be mounted with a tight transition fit.

Other mounting dimensions may be required for special operating conditions such as:

1. Extremely heavy radial loads
2. Shock loads
3. Temperature gradient across bearing
4. Housing material with heat expansion coefficient different than that of the bearing

If these conditions are expected, please consult your Timken representative.

TABLE 24

MOUNTING TOLERANCES FOR METRIC SERIES BEARINGS WITHOUT INNER RING

Rotation conditions	Nominal housing bore diameter D	ISO tolerance zone for housing		Nominal shaft diameter F	ISO tolerance zone for shaft	
	mm	caged	full	mm	caged	full
Load stationary relative to housing	all diameters	H7	J6	all diameters	h6	h5
General work with larger clearance	all diameters	K7	—	all diameters	g6	—
Load rotates relative to housing	all diameters	N7	M6	all diameters	f6	g5

NOTE: Care should be taken that the selected bearing internal clearance is appropriate for the operating conditions.

TABLE 25

SHAFT TOLERANCES FOR METRIC SERIES BEARINGS WITH INNER RINGS (USE HOUSING TOLERANCE SHOWN IN TABLE 24)

Rotation Conditions	Nominal Shaft Diameter d, mm		ISO Tolerance Zone for Shaft
load rotates relative to housing	all diameters		g6
load stationary relative to housing	>	≤	
		40	k6
	40	100	m6
	100	140	m6
	140		n6

NOTE: Care should be taken that the selected bearing internal clearance is appropriate for the operating conditions.

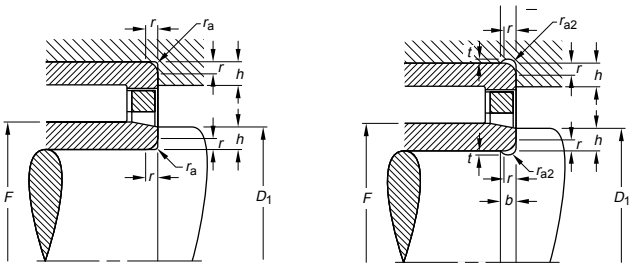


TABLE 26

FILLETS, UNDERCUTS, AND SHOULDER HEIGHTS FOR METRIC SERIES BEARINGS

r_s Min. mm	r_{as} Max.	t	r_{a2s} Min.	b	h Min.
0.15	0.15				0.6
0.3	0.3				1
0.6	0.6				2
1	1	0.2	1.3	2	2.5
1.1	1	0.3	2	3	3.25
1.5	1.5	0.4	2	3.2	4
2	2	0.5	2.5	4	5
2.1	2.1	0.5	3	4.7	5.5
3	2.5	0.5	3.5	5	3 6

Regardless of the fit of the bearing outer ring in the housing, the outer ring should be axially located by housing shoulders or other positive means. The bearing rings should closely fit against the shaft and housing shoulders and must not contact the fillet radius. In fact, the maximum shaft or housing fillet $r_{as\ max}$ should be no greater than the minimum bearing chamfer $r_{s\ min}$ as shown in Table 26.

In order to permit mounting and dismounting of the shaft, the maximum diameter D_1 in Table 27 must not be exceeded. F_w is shown in the bearing tables.

For inch bearings, the unmarked end of the outer ring should be assembled against the housing shoulder to assure clearing the maximum housing fillet. Similarly, the unmarked end of the inner ring should be assembled against the shaft shoulder to assure clearing the maximum shaft fillet.

MOUNTING DESIGNS - *continued*

TABLE 27

SHOULDER DIAMETER D_1 MAX FOR METRIC SERIES BEARINGS

Dimensions in mm

Needle roller complement bore diameter F_w						
	>		20	55	100	250
	≤	20	55	100	250	
Diameter	D_{1max}	F_w -0.3	F_w -0.5	F_w -0.7	F_w -1	F_w -1.5

Needle roller bearings without flanges of series RNAO and NAO must have the needle roller and cage radial assembly properly end guided by shoulders or other suitable means such as the spring steel washers (SNSH). These end guiding surfaces should be hardened and precision turned or ground to minimize wear and should properly fit against the outer rings and the inner rings to provide the desired end clearance for the needle roller and cage radial assembly.

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

On NTA inch type needle roller and cage thrust assemblies the cage bore has a larger contact area and a closer tolerance than the outside diameter. Therefore, bore piloting is preferred for these assemblies. To reduce wear, it is suggested that the piloting surface for the cage be hardened to an equivalent of at least 55 HRC. Where design requirements prevent bore piloting, the NTA needle roller and cage thrust assemblies may be piloted on the outside diameters. It should be noted that the "diameter to clear washer O.D. " given in the tabular data is not suitable for outside diameter piloting. For such cases, suitable O.D. piloting dimensions should be determined in consultation with your Timken representative.

On FNT and AXK Series needle roller and cage thrust assemblies, the cage bore has a closer tolerance than the outside diameter, therefore bore piloting is preferred for these assemblies. To reduce wear, it is suggested that the piloting surface for the cage be hardened to an equivalent of at least 55 HRC. Where design requirements prevent bore piloting, the FNT or AXK Series needle roller and cage thrust assemblies may be piloted on the outside diameters. For such cases, suitable O.D. piloting dimensions should be determined. Mounting tolerances are given in the table to the right.

Ideally, a thrust washer should be stationary with respect to, and piloted by, its supporting or backing member, whether or not this is an integral part of the shaft or housing. There should be no rubbing action between the thrust washer and any other machine member. The economics of design, however, often preclude these ideal conditions and thrust washers must be employed in another manner. In such cases, design details should be determined in consultation with your Timken representative.

The mounting tolerances for series AS, LS, WS and GS thrust washers for use with needle roller and cage thrust assemblies are given in the table to the right.

As for the FNT and AXK Series thrust assemblies, to reduce wear, the piloting surface for the thrust washers should also be hardened to an equivalent of at least 55 HRC.

Out of Square Surface

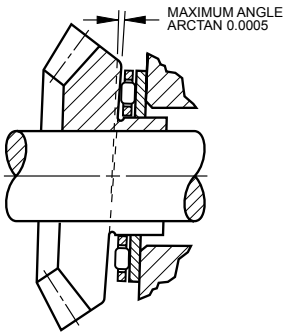


Fig. A-15

Dished or Coned Surface

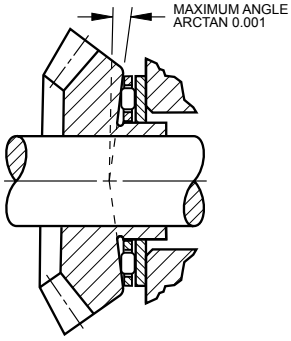


Fig. A-16

MOUNTING TOLERANCES FOR SHAFTS AND HOUSINGS FOR METRIC SERIES COMPONENTS

Bearing components	shaft tolerance	housing tolerance (shaft piloting)	piloting member (housing piloting)
Cylindrical roller & needle roller cage thrust assembly	h8	H10	shaft
Thin thrust washer AS	h10	H11	shaft
Heavy thrust washer LS	h10	H11	shaft
Shaft piloted thrust washer WS.811	h6 (j6)	clearance	shaft
Housing piloted thrust washer GS.811	Clearance	H7 (K7)	housing

In some applications, it is desirable to use the backup surfaces as raceways for the needle rollers of the needle roller and cage thrust assemblies. In such designs, these surfaces must be hardened to at least 58 HRC. If this hardness cannot be achieved and thrust washers cannot be used, the load ratings must be reduced, as explained in the Fatigue Life section.

Thrust raceway surfaces must be ground to a surface finish of 0.2 µm (0.8 µm) R_a. When this requirement cannot be met, thrust washers must be used.

The raceways against which the needle rollers operate or the surface against which the thrust washers bear must be square with the axis of the shaft. Equally important, the raceway or surface backing the thrust washer, must not be dished or coned. The permissible limits of out-of-squareness and dishing or coning are shown in Figures A-15 and A-16.

Metric raceway contact dimensions E_a and E_b are given in the tabular pages. For the thin series AS thrust washers, full backup between the dimensions E_a and E_b should be provided.

MOUNTING DESIGNS - *continued*

CONSTRUCTION

Basic designs

Cylindrical roller thrust bearings dimension series 811 and 812 comprise a cylindrical roller and cage thrust assembly (K), a shaft washer (WS) and a housing washer (GS). Providing the backup surfaces can be hardened and ground they can be used as raceways for the cylindrical rollers of the cylindrical roller and cage thrust assembly, resulting in a compact bearing arrangement.

Cage designs

Metric series cylindrical roller thrust bearings use molded cages of glass fiber reinforced nylon 6/6 (suffix TVP) or machined cages of light metal (suffix LPB). The cages are designed to be piloted on the shaft. The reinforced nylon cages can be used at temperatures up to 120° C continuously for extended periods. When lubricating these bearings with oil it should be ensured that the oil does not contain additives detrimental to the cage over extended life at operating temperatures higher than 100° C. Also, care should be exercised that oil change intervals are observed as old oil may reduce cage life at such temperatures.

BEARING THRUST WASHERS

Shaft washers and housing washers

Shaft washers of types WS.811 and WS.812 as well as housing washers of types GS.811 and GS.812 are components of the metric series cylindrical roller thrust bearings of series 811 and 812. They are made of bearing quality steel, with hardened and precision ground and lapped flat raceway surfaces. The tolerances of the thrust bearing bore and outside diameter shown in Table 7 and Table 8 (on page A47) apply to shaft and housing piloted metric series washers.

Heavy thrust washers (LS), thin thrust washers (AS)

These thrust washers, more frequently used with needle roller and cage thrust assemblies of metric series FNT or AXK, are also suitable for use with the cylindrical roller and cage thrust assemblies K.811. The heavy thrust washer of series LS are made of bearing quality steel, hardened and precision ground on the flat raceway surfaces. The bore and outside diameters of the heavy thrust washers are not ground. Therefore, when used with K.811 type assemblies they are only suggested where accurate centering is not required. The thin thrust washers of series AS may be used in applications where the loads are light. Both types of these washers are listed in the tabular part of the metric series needle roller and cage thrust assemblies section.

MOUNTING DESIGNS - *continued*

DIMENSIONAL ACCURACY

The tolerances for the metric series cylindrical roller thrust bearing bore and outside diameter shown in Tables 7 and 8 (on page A47) apply to shaft piloted washers of series WS.811 and WS.812 as well as housing piloted washers of series GS.811 and GS.812.

The tolerances for the bore and outside diameter of series AS thrust washers are shown in Table 13. The tolerances for the bore and outside diameter of series LS thrust washers are given in Table 14. Bore inspection procedures for thin thrust washers (AS) and heavy thrust washers (LS) are given on page A50.

MOUNTING TOLERANCES

Shaft and housing tolerances for mounting metric series cylindrical roller and cage thrust assemblies are given on page A96. If the cylindrical rollers of the cylindrical roller and cage thrust assemblies are to run directly on the adjacent support surfaces, these must be hardened to at least 58 HRC. Raceway contact dimensions E_a and E_b must be observed.

The backup surfaces for the shaft washers WS.811 and WS.812 as well as the housing washers GS.811 and GS.812 of cylindrical roller thrust bearings must be square with the axis of the shaft. Equally important, the raceway or the surface backing the thrust washer must not be dished or coned. The permissible limits of the squareness and dishing or coning are shown in Figures A-15 and A-16. When using the thin (AS) thrust washers the cylindrical rollers of the thrust cage assembly must be supported over their entire length.

Bearing thrust washers should make close contact with the shaft or housing shoulder and must not touch the fillet radius. Therefore, the maximum fillet radius $r_{as\ max}$ must be no greater than the minimum chamfer $r_{s\ min}$ of the shaft washer (WS) and the housing washer (GS).

THRUST BEARINGS

Tapered Roller thrust bearings are generally mounted with a fit range on the inside diameter of 127 µm (0.0050 in.) loose to 400 µm (0.0150 in.) loose. Sufficient clearance should be provided on the outside diameter to permit free centering of the bearing without interference.

When Type TTHD or TTHDFL thrust bearings are subjected to continuous rotation, the rotating race should be applied with a minimum interference fit of 25 µm (0.0010 in.). Sufficient clearance should be provided on the outside diameter of the stationary race to permit free centering of the bearing without interference.

MOUNTING DESIGNS - *continued*

TAPERED ROLLER BEARING MOUNTING PROCEDURE

Bearing performances can be adversely affected by improper mounting procedure or lack of care during the assembly phase.

Environment

Cleanliness during the bearing mounting operation is essential for a rolling bearing to operate for maximum service life. Bearings in their shipping containers or wrapping have been coated for rust protection. While this coating is not sufficient to properly lubricate the bearing, it is compatible with most lubricants and therefore does not have to be removed when mounting the bearing in the majority of applications. Burrs, foreign matter and damaged bearing seats cause misalignment. Care should be taken to avoid shearing or damaging bearing seats during assembly which may introduce misalignment or result in a change of bearing setting during operation.

Fitting

Adequate tools must be provided to properly fit the inner and outer races on shafts or in housings to avoid damage. Direct shock on the races must be avoided. Often, bearing races have to be heated or cooled to ease assembly. Do not heat standard bearings above 150° C (300° F) or freeze outer races below -55° C (-65° F). For precision bearings, do not heat above 65° C (150° F) or freeze below -30° C (-20° F). Note: For more information on this subject, please contact your Timken representative.

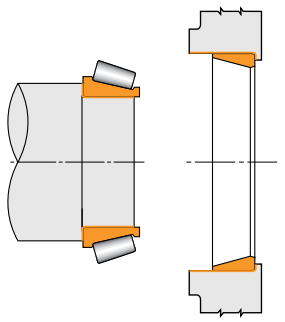


Fig. A-17
Shaft and housing shoulders.

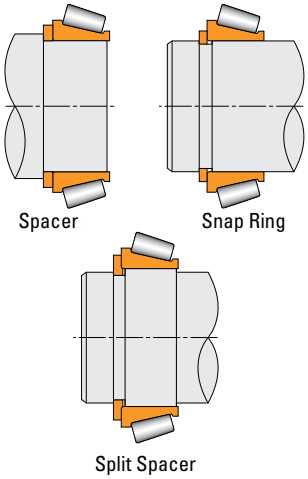


Fig. A-18
Separate member used to provide adequate shaft shoulder diameter.

MOUNTING DESIGNS

The primary function of either the cone or cup backing shoulders is to positively establish the axial location and alignment of the bearing and its adjacent parts under all loading and operating conditions.

For a tapered roller bearing to operate for maximum service life, it is essential that a shoulder, square with the bearing axis and of sufficient diameter, is provided for each race. It must be of sufficient section and design to resist axial movement due to loading or distortion and must be wear-resistant at the interface with the bearing.

The conventional and most widely accepted method used to provide bearing backing is to machine a shoulder on a shaft or in the housing (Fig. A-17).

In some applications a spacer is used between a cone and shaft shoulder or a snap ring. As a further alternative, a split spacer can be used (Fig. A-18).

A spacer or snap ring can also be used for cup backing (Fig. A-19). If a snap ring is used for bearing backing it is suggested that an interference cup fit be used.

The cup used for bearing setting in a direct mounting (roller small ends pointing outwards) is usually set in position by a cup follower or by mounting in a carrier (Fig. A-20).

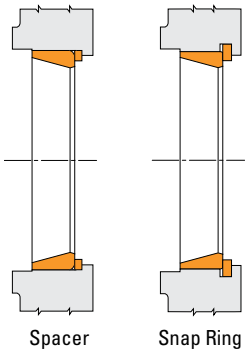


Fig. A-19
Separate member used to provide adequate housing backing diameter.

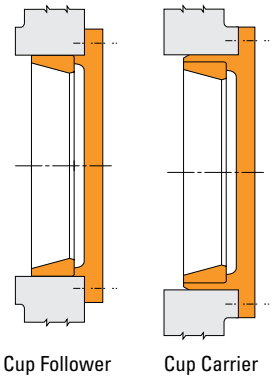


Fig. A-20
Bearing setting devices - direct mounting.

MOUNTING DESIGNS - *continued*

With an indirect mounting (roller small ends pointing inwards), bearing setting can be achieved by a wide variety of devices (Fig. A-21).

In applications requiring precision class bearings, a special precision nut can be used. This has a soft metal shoe that is clamped against the threads with a locking screw. Other solutions can use split nut and/or ground spacers where setting cannot be altered (Fig. A-22).

Snap rings

In instances where snap rings are used to locate bearing components, it is important that they are of sufficient section to provide positive location. Care must be taken during installation or removal of the snap ring to prevent damage to the bearing cage.

Removal

Suitable means must be provided on adjacent bearing parts for easy bearing removal. Knockout slots, puller grooves and axial holes can be designed into the backing surfaces to ease removal of the cup or cone for servicing (Fig. A-23). In specific cases, hydraulic devices can also be used.

Backing diameters

Backing diameters, fillet clearances and cage clearances are listed for each individual part number in the bearing tables. Backing shoulder diameters shown should be considered as minimum values for shafts and maximum values for housings.

NOTE: Do not use a backing diameter that provides less backing surface than suggested.

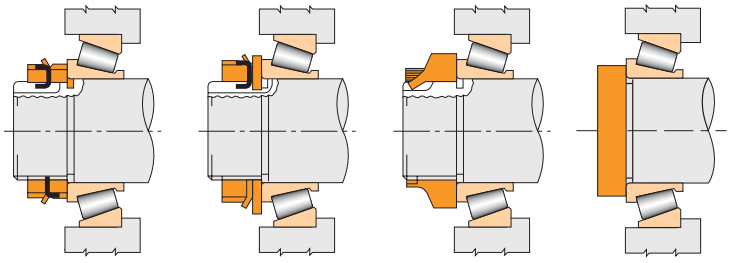


Fig. A-21
Bearing setting devices - indirect mounting.

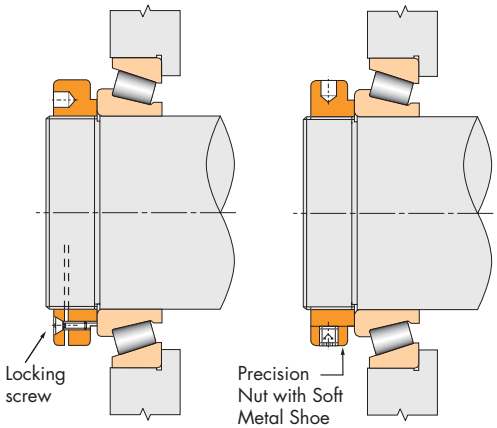


Fig. A-22
Setting devices using split nut and precision nut with soft metal shoe.

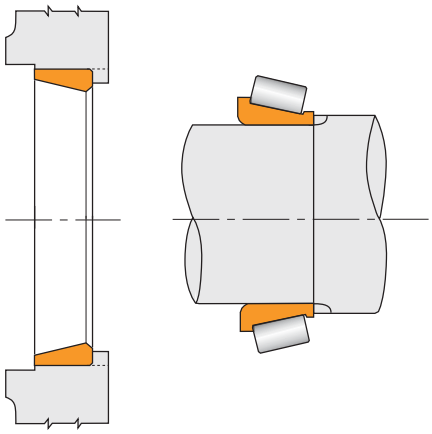


Fig. A-23
Removal slots or puller grooves to ease removal.

MOUNTING DESIGNS - *continued*

SEATING

Geometry

Two major causes of misalignment occur when the seats of cones and/or cups are machined out of square with the bearing axis or when the seats are parallel but out of alignment.

Surface finishes – standard bearings

For industrial applications, please refer to the following guidelines:

GROUND SHAFTS

All roller bearing shaft seats should be ground to a surface finish of 1.6 µm (65 µin) R_a maximum wherever possible. Ball bearing seats should be 0.8 µm (32 µin) for shafts under 2 inches and 1.6 µm (65 µin) for all other sizes.

TURNED SHAFTS

When shaft seats are turned, a tighter heavy-duty fit should be used. In this case the shaft diameter should be turned to a finish of 3.2 µm (125 µin) R_a maximum.

HOUSING BORES

Housing bores should be finished to 3.2 µm (125 µin) R_a maximum.

Surface finishes - precision bearings

Precision class bearings should be mounted on shafts and in housings that are finished to at least the same precision limits as the bearing bore or outside diameter.

Furthermore, high quality surface finishes together with close machining tolerances of bearing seats must also be provided. The following tabulations give some guidelines for all these criteria:

TAPERED ROLLER BEARINGS
SURFACE FINISH – R_a (µm - µin)
BEARING CLASS

ALL SIZES	C 3	B 0	A 00	AA 000
Shaft	0.8 32	0.6 24	0.4 15	0.2 7
Housing	1.6 65	0.8 32	0.6 24	0.4 15

Correct fitting practice and precise bearing setting both affect bearing life, rigidity and, in the case of precision bearings, accuracy.

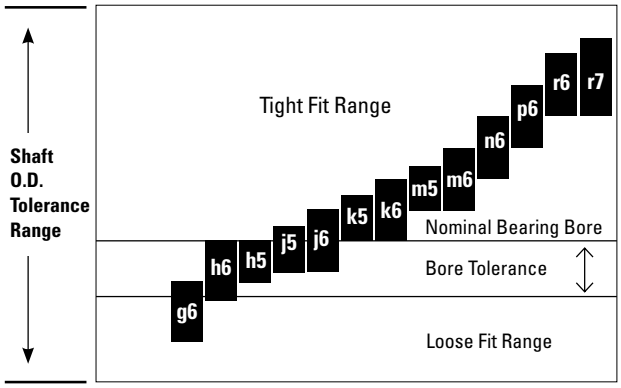
Improper fits will lead to problems such as poor machine performance including creeping of the cone on the spindle or the cup in the housing and lack of spindle stiffness.

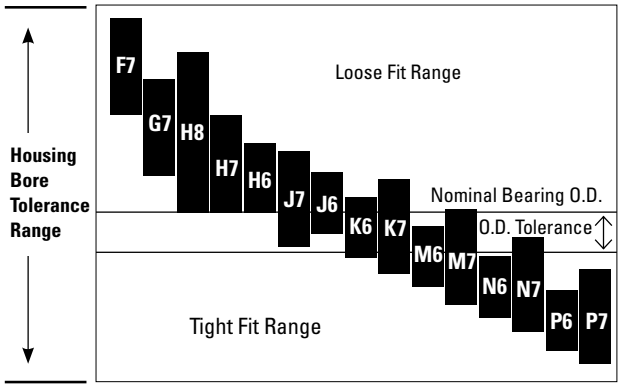
The choice of fitting practices will mainly depend upon the following parameters:

- Precision class of the bearing.
- Rotating or stationary race.
- Type of layout (single/double-row bearings).
- Type and direction of load (continuous/alternate rotating).
- Particular running conditions like shocks, vibrations, overloading or high speed.
- Capability for machining the seats (grinding, turning or boring).
- Shaft and housing section and material.
- Mounting and setting conditions.
- Preadjusted tapered roller bearings must be mounted with the suggested fit.

SHAFT AND HOUSING FITS

Below is a graphical representation of shaft and housing fit selection for these bearings conforming to ANSI/ABMA Standard 7. The bars designated by g6, h6 etc., represent shaft/housing diameter and tolerance ranges to achieve various loose and interference fits required for various load and ring rotation conditions.





A

FITTING PRACTICES

TAPERED ROLLER BEARINGS

The design of a Timken tapered roller bearing allows the setting of bearing internal clearance during installation to optimize bearing operation.

General industrial application fitting practice standards for cones and cups are shown in the following tables. These tables apply to solid or heavy-sectioned steel shafts, heavy-sectioned ferrous housings and normal operating conditions. To use the tables, it is necessary to determine if the member is rotating or stationary, the magnitude, direction, and type of loading and the shaft finish.

Certain table fits may not be adequate for light shaft and housing sections, shafts other than steel, nonferrous housings, critical operation conditions such as high speed, unusual thermal or loading conditions or a combination thereof. Also assembly procedures and the means and ease of obtaining the bearing setting may require special fits. In these cases, experience should be used as a guideline or your Timken representative should be consulted for review and suggestions.

Rotating cones generally should be applied with an interference fit. In special cases loose fits may be considered if it has been determined by test or experience they will perform satisfactorily. The term "rotating cone" describes a condition in which the cone rotates relative to the load. This may occur with a rotating cone under a stationary load or a stationary cone with a rotating load. Loose fits will permit the cones to creep and wear the shaft and the backing shoulder. This will result in excessive bearing looseness and possible bearing and shaft damage.

Stationary cone fitting practice depends on the application. Under conditions of high speed, heavy loads or shock, interference fits using heavy-duty fitting practice should be used. With cones mounted on unground shafts subjected to moderate loads (no shock) and moderate speeds, a metal-to-metal or near zero average fit is used. In sheave and wheel applications using unground shafts, or in cases using ground shafts with moderate loads (no shock), a minimum fit near zero to a maximum looseness which varies with the cone bore size is suggested. In stationary cone applications requiring hardened and ground spindles, a slightly looser fit may be satisfactory. Special fits may also be necessary on installations such as multiple sheave crane blocks.

Rotating cup applications where the cup rotates relative to the load should always use an interference fit.

Stationary, nonadjustable and fixed single-row cup applications should be applied with a tight fit wherever practical. Generally, adjustable fits may be used where the bearing setup is obtained by sliding the cup axially in the housing bore. However, in certain heavy-duty, high-load applications, tight fits are necessary to prevent pounding and plastic deformation of the housing. Tightly fitted cups mounted in carriers can be used. Tight fits should always be used when the load rotates relative to the cup.

To permit through-boring when the outside diameters of single-row bearings mounted at each end of a shaft are equal and one is adjustable and the other fixed, it is suggested that the same adjustable fit be used at both ends. However, tight fits should be used if cups are backed against snap rings, to prevent excessive dishing of snap rings, groove wear and possible loss of ring retention. Only cups with a maximum housing fillet radius requirement of 1.3 mm (0.05 in.) or less should be considered for a snap ring backing.

Two-row stationary double cups are generally mounted with loose fits to permit assembly and disassembly. The loose fit also permits float when a floating bearing is mounted in conjunction with an axially fixed bearing on the other end of the shaft.

The fitting practice tables that follow have been prepared for both metric and inch dimensions.

For the inch system bearings, classes 4 and 2 (standard) and classes 3, 0, and 00 (precision) have been included.

The metric system bearings that have been included are: Classes K and N (metric system standard bearings) and classes C, B, and A (metric system precision bearings).

Precision class bearings should be mounted on shafts and in housings which are similarly finished to at least the same precision limits as the bearing bore and O.D. High quality surface finishes should also be provided.

Two-row and four-row bearings, which are provided with spacers and shipped as matched assemblies, have been preset to a specific bench endplay. The specific endplay setting is determined from a study of the bearing mounting and expected environment. It is dependent on the fitting practice and the required mounted bearing settings.

FITTING PRACTICES - *continued*

For rolling mill neck fitting practice, consult your Timken representative. For all other equipment associated with the rolling mill industry, the fitting practice suggestions in the tables that follow should be used.

In addition to all other axial tolerances and the overall bearing width tolerance, the width increase due to tight fits of the cone or cup, or both, must be considered when axial tolerance summation calculations are made. By knowing the fit range, the minimum and maximum bearing width increase can be determined to establish the initial design dimensions. For instance, all tolerances plus the bearing width increase range due to tight fits must be known in order to calculate the shim gap range that would occur on a cup adjusted, direct mounting design.

In a factory preset bearing or a SET-RIGHT™ mounting, where the bearing overall width is fixed and clamped, tight fits will cause cup expansion or cone contraction which will reduce the internal clearance (endplay) within the bearing.

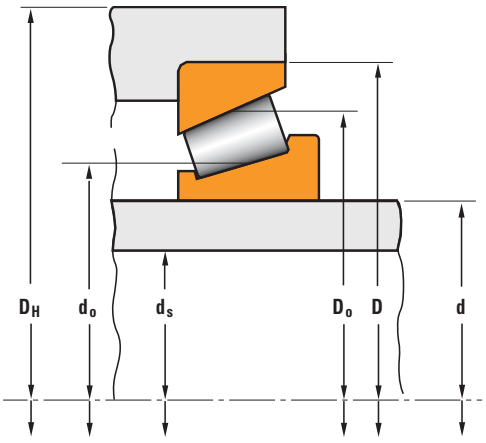
Endplay Removed for Single Cone

$$= 0.5 \left(\frac{K}{0.39}\right)\left(\frac{d}{d_o}\right) \delta_S$$

The following equations under Normal Sections and Thin Wall Sections can be used to calculate endplay removed in a similar manner.

where:

- K = Tapered Roller Bearing Radial-to-Axial Dynamic Load Rating Factor
- d = Bearing Bore Diameter
- d_o = Mean Inner Race Diameter
- D_o = Mean Outer Race Diameter
- d_S = Shaft Inside Diameter
- D = Bearing Outside Diameter
- D_H = Housing Outside Diameter
- δ_S = Interference Fit of Inner Race on Shaft
- δ_H = Interference Fit of Outer Race in Housing



BEARING DIAMETER

EFFECT OF TIGHT FITS ON BEARING WIDTH

Normal Sections

The interference fit of either the cone or the cup increases the overall bearing width. For solid steel shafts and heavy sectioned steel housings, the increased bearing width for a single-row bearing is as follows. (Refer to diagram to the left.)

Bearing Width Increase for Single Cone

$$= 0.5 \left(\frac{K}{0.39}\right)\left(\frac{d}{d_o}\right) \delta_S$$

Bearing Width Increase for Single Cup

$$= 0.5 \left(\frac{K}{0.39}\right)\left(\frac{D_o}{D}\right) \delta_H$$

If the shaft or housing material is other than steel, consult your Timken representative.

Thin Wall Sections

Interference fits on thin-walled steel shafts and light-sectioned steel housings have a tendency to collapse the cone seat and stretch the cup seat, causing less change in bearing width than when used with solid shafts and heavy housings. The bearing width change due to tight fits on thin bearing seat sections is as follows. (Refer to diagram to the left.)

Bearing Width Increase for Single Cone

$$= 0.5 \left(\frac{K}{0.39}\right) \left\{ \frac{\left(\frac{d}{d_o}\right)\left[1 - \left(\frac{d_S}{d}\right)^2\right]}{1 - \left(\frac{d_S}{d_o}\right)^2} \right\} \delta_S$$

Bearing Width Increase for Single Cup

$$= 0.5 \left(\frac{K}{0.39}\right) \left\{ \frac{\left(\frac{D_o}{D}\right)\left[1 - \left(\frac{D}{D_H}\right)^2\right]}{1 - \left(\frac{D_o}{D_H}\right)^2} \right\} \delta_H$$

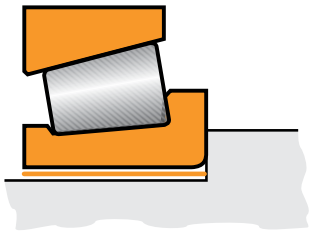
These equations apply only to steel shafts and housings.

FITTING GUIDELINES FOR METRIC BEARINGS (ISO AND J PREFIX)
INDUSTRIAL EQUIPMENT BEARING CLASSES K AND N

SHAFT O.D. (µm)

Deviation from nominal (maximum) bearing bore and resultant fit (µm)

T= Tight
L = Loose



BEARING BORE			ROTATING SHAFT			ROTATING OR STATIONARY SHAFT		
			Ground			Unground or Ground		
Range mm		Tolerance µm	Constant loads with moderate shock			Heavy Loads or High Speed or Shock		
over	incl.		Symbol	Shaft O.D. Deviation	Resultant Fit	Symbol	Shaft O.D. Deviation	Resultant Fit
10	18	-12 0	m6	+18 +7	30T 7T	n6	+23 +12	35T 12T
18	30	-12 0	m6	+21 +8	33T 8T	n6	+28 +15	40T 15T
30	50	-12 0	m6	+25 +9	37T 9T	n6	+33 +17	45T 17T
50	80	-15 0	m6	+30 +11	45T 11T	n6	+39 +20	54T 20T
80	120	-20 0	m6	+35 +13	55T 13T	n6	+45 +23	65T 23T
120	180	-25 0	m6	+40 +15	65T 15T	p6	+68 +43	93T 43T
180	200	-30 0	m6	+46 +17	76T 17T	r6	+106 +77	136T 77T
200	225						+109 +80	139T 80T
225	250						+113 +84	143T 84T
250	280	-35 0	m6	+52 +20	87T 20T	r6	+126 +94	161T 94T
280	315						+130 +98	165T 98T
315	355	-40 0	n6	+73 +37	113T 37T	r6	+144 +108	184T 108T
355	400						+150 +114	190T 114T
400	450	-45 0	n6	+80 +40	125T 40T	r6	+166 +126	211T 126T
450	500						+172 +132	217T 132T
500	560	-50 0	n6	+88 +44	138T 44T	r6	+194 +150	244T 150T
560	630						+199 +155	249T 155T
630	710	-80 0	n7	+130 +50	210T 50T	r7	+255 +175	335T 175T
710	800						+265 +185	345T 185T
800	900	-100 0	n7	+146 +56	246T 56T	r7	+300 +210	400T 210T
900	1000						+310 +220	410T 220T

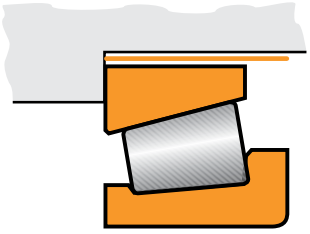
STATIONARY SHAFT												
Unground Moderate Loads, No Shock			Ground Moderate Loads, No Shock			Unground Sheaves, Wheels, Idlers			Hardened and Ground Wheel Spindles		
Symbol	Shaft O.D. Deviation	Resultant Fit	Symbol	Shaft O.D. Deviation	Resultant Fit	Symbol	Shaft O.D. Deviation	Resultant Fit	Symbol	Shaft O.D. Deviation	Resultant Fit
h6	0 -11	12T 11L	g6	-6 -17	6T 17L	g6	-6 -17	6T 17L	f6	-16 -27	4L 27L
h6	0 -13	12T 13L	g6	-7 -20	5T 20L	g6	-7 -20	5T 20L	f6	-20 -33	8L 33L
h6	0 -16	12T 16L	g6	-9 -25	3T 25L	g6	-9 -25	3T 25L	f6	-25 -41	13L 41L
h6	0 -19	15T 19L	g6	-10 -29	5T 29L	g6	-10 -29	5T 29L	f6	-30 -49	15L 49L
h6	0 -22	20T 22L	g6	-12 -34	8T 34L	g6	-12 -34	8T 34L	f6	-36 -58	16L 58L
h6	0 -25	25T 25L	g6	-14 -39	11T 39L	g6	-14 -39	11T 39L	f6	-43 -68	18L 68L
h6	0 -29	30T 29L	g6	-15 -44	15T 44L	g6	-15 -44	15T 44L	f6	-50 -79	20L 79L
h6	0 -32	35T 32L	g6	-17 -49	18T 49L	g6	-17 -49	18T 49L	f6	-56 -88	21L 88L
h6	0 -36	40T 36L	g6	-18 -54	22T 54L	g6	-18 -54	22T 54L	_	_ _	_ _
h6	0 -40	45T 40L	g6	-20 -60	25T 60L	g6	-20 -60	25T 60L	_	_ _	_ _
h6	0 -44	50T 44L	g6	-22 -66	28T 66L	g6	-22 -66	28T 66L	_	_ _	_ _
h7	0 -80	80T 80L	g7	-24 -104	56T 104L	g7	-24 -104	56T 104L	_	_ _	_ _
h7	0 -90	100T 90L	g7	-26 -116	74T 116L	g7	-26 -116	74T 116L	_	_ _	_ _

FITTING GUIDELINES FOR METRIC BEARINGS (ISO AND J PREFIX) INDUSTRIAL EQUIPMENT BEARING CLASSES K AND N

HOUSING BORE(µm)

Deviation from nominal (maximum) bearing bore and resultant fit (µm)

T= Tight
L = Loose



BEARING O.D.			STATIONARY HOUSING		
Range mm		Tolerance µm	Floating or Clamped Race		
over	incl.		Symbol	Housing Bore Deviation	Resultant fit
18	30	0 -12	G7	+7 +28	7L 40L
30	50	0 -14	G7	+9 +34	9L 48L
50	65	0 -16	G7	+10 +40	10L 56L
65	80				
80	100	0 -18	G7	+12 +47	12L 65L
100	120				
120	140	0 -20	G7	+14 +54	14L 74L
140	150				
150	160	0 -25	G7	+14 +54	14L 79L
160	180				
180	200	0 -30	G7	+15 +61	15L 91L
200	225				
225	250				
250	280	0 -35	G7	+17 +69	17L 104L
280	315				
315	355	0 -40	F7	+62 +119	62L 159L
355	400				
400	450	0 -45	F7	+68 +131	68L 176L
450	500				
500	560	0 -50	F7	+76 +146	76L 196L
560	630				
630	710	0 -80	F7	+80 +160	80L 240L
710	800				
800	900	0 -100	F7	+86 +176	86L 276L
900	1000				

STATIONARY HOUSING						ROTATING HOUSING		
Adjustable Race			Non-adjustable Race or in Carrier			Non-adjustable Race or in Carrier or Sheave - Clamped Race		
Symbol	Housing Bore Deviation	Resultant Fit	Symbol	Housing Bore Deviation	Resultant Fit	Symbol	Housing Bore Deviation	Resultant Fit
J7	-9 +12	9T 24L	P7	-35 -14	35T 2T	R7	-41 -20	41T 8T
J7	-11 +14	11T 28L	P7	-42 -17	42T 3T	R7	-50 -25	50T 11T
J7	-12 +18	12T 34L	P7	-51 -21	51T 5T	R7	-60 -30	60T 14T
							-62 -32	62T 16T
J7	-13 +22	13T 40L	P7	-59 -24	59T 6T	R7	-73 -38	73T 20T
							-76 -41	76T 23T
J7	-14 +26	14T 46L	P7	-68 -28	68T 8T	R7	-88 -48	88T 28T
							-90 -50	90T 30T
J7	-14 +26	14T 51L	P7	-68 -28	68T 3T	R7	-90 -50	90T 25T
							-93 -53	93T 28T
J7	-16 +30	16T 60L	P7	-79 -33	79T 3T	R7	-106 -60	106T 30T
							-109 -63	109T 33T
							-113 -67	113T 37T
J7	-16 +36	16T 71L	P7	-88 -36	88T 1T	R7	-126 -74	126T 39T
							-130 -78	130T 43T
J7	-18 +39	18T 79L	P7	-98 -41	98T 1T	R7	-144 -87	144T 47T
							-150 -93	150T 53T
J7	-20 +43	20T 88L	P7	-108 -45	108T 0	R7	-166 -103	166T 58T
							-172 -109	172T 64T
JS7	-35 +35	35T 85L	P7	-148 -78	148T 28T	R7	-220 -150	220T 100T
							-225 -155	225T 105T
JS7	-40 +40	40T 120L	P7	-168 -88	168T 8T	R7	-255 -175	255T 95T
							-245 -185	265T 105T
JS7	-45 +45	45T 145L	P7	-190 -100	190T 0	R7	-300 -210	300T 110T
							-310 -220	310T 120T

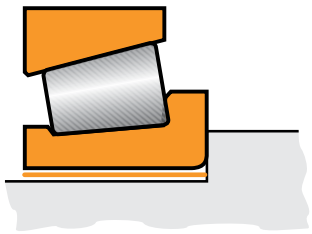
FITTING PRACTICES - *continued*

FITTING GUIDELINES FOR INCH BEARINGS
INDUSTRIAL EQUIPMENT BEARING CLASSES 4 AND 2

SHAFT O.D. (µm - INCHES)

Deviation from nominal (minimum) bearing bore and resultant fit (µm - 0.0001 inch)

T= Tight
L = Loose



BEARING BORE			ROTATING SHAFT	
Range mm (inches)		Tolerance µm (0.0001 in.)	Ground Constant loads with moderate shock	
over	incl.		Shaft O.D. Deviation	Resultant Fit
0	**76.2**	**0**	**+38**	**38T**
		+13	**+25**	**12T**
0	3.0000	0	+15	15T
		+5	+10	5T
76.2	**88.9**			
3.0000	3.5000			
88.9	**114.3**			
3.5000	4.5000			
114.3	**139.7**			
4.5000	5.5000			
139.7	**165.1**			
5.5000	6.5000			
165.1	**190.5**	**0**	**+64**	**64T**
		+25	**+38**	**13T**
6.5000	7.5000	0	+25	25T
		+10	+15	5T
190.5	**215.9**			
7.5000	8.5000			
215.9	**241.3**			
8.5000	9.5000			
241.3	**266.7**			
9.5000	10.5000			
266.7	**292.1**			
10.5000	11.5000			
292.1	**304.8**			
11.5000	12.0000			
304.8	**317.5**			
12.0000	12.5000	**0**	**+127**	**127T**
		+51	**+76**	**25T**
317.5	**342.9**	0	+50	50T
		+20	+30	10T
12.5000	13.5000			

* Suggested heavy-duty fitting practices shown above are applicable for case carburized bearings. Consult your Timken representative for the suggested heavy-duty fitting practices that are specified for through hardened bearings.

ROTATING OR STATIONARY SHAFT		STATIONARY SHAFT							
Unground or Ground Heavy Loads, High Speed or Shock*		Unground Moderate Loads, No Shock		Ground Moderate Loads, No Shock		Unground Sheaves, Wheels, Idlers		Hardened and Ground Wheel Spindles	
Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit
+64	**64T**	**+13**	**13T**	**0**	**0**	**0**	**0**	**-5**	**5L**
+38	**25T**	**0**	**13L**	**-13**	**26L**	**-13**	**26L**	**-18**	**31L**
+25	25T	+5	5T	0	0	0	0	-2	2L
+15	10T	0	5L	-5	10L	-5	10L	-7	12L
+76	**76T**								
+51	**25T**								
+30	30T								
+20	10T								
+76	**76T**								
+51	**25T**								
+30	30T								
+20	10T								
+89	**89T**								
+64	**38T**								
+35	35T								
+25	15T								
+102	**102T**								
+76	**51T**								
+40	40T								
+30	20T								
+114	**114T**	**+25**	**25T**	**0**	**0**	**0**	**0**	**-5**	**5L**
+89	**64T**	**0**	**25L**	**-25**	**50L**	**-25**	**50L**	**-30**	**55L**
+45	45T	+10	10T	0	0	0	0	-2	2L
+35	25T	0	10L	-10	20L	-10	20L	-12	22L
+127	**127T**								
+102	**76T**								
+50	50T								
+40	30T								
+140	**140T**								
+114	**89T**								
+55	55T								
+45	35T								
+152	**152T**								
+127	**102T**								
+60	60T								
+50	40T								
+165	**165T**								
+140	**114T**								
+65	65T								
+55	45T								
+178	**178T**								
+152	**127T**								
+70	70T								
+60	50T								
+203	**203T**								
+152	**101T**								
+80	80T	**+51**	**51T**	**0**	**0**	**0**	**0**	–	–
+60	40T	**0**	**51L**	**-51**	**102L**	**-51**	**102L**		
+216	**216T**	+20	20T	0	0	0	0	–	–
+165	**114T**	0	20L	-20	40L	-20	40L		
+85	85T								
+65	45T								

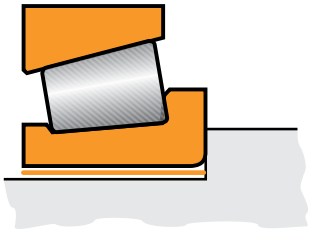
FITTING PRACTICES - *continued*

FITTING GUIDELINES FOR INCH BEARINGS
INDUSTRIAL EQUIPMENT BEARING CLASSES 4 AND 2

SHAFT O.D. (µm - INCHES)

Deviation from nominal (minimum) bearing bore and resultant fit (µm - 0.0001 inch)

T= Tight
L = Loose



BEARING BORE			ROTATING SHAFT	
Range mm (inches)		Tolerance µm (0.0001 in.)	Ground Constant loads with moderate shock	
over	incl.		Shaft O.D. Deviation	Resultant Fit
342.9 13.5000	**368.3** 14.5000			
368.3 14.5000	**393.7** 15.5000			
393.7 15.5000	**419.1** 16.5000			
419.1 16.5000	**444.5** 17.5000			
444.5 17.5000	**469.9** 18.5000			
469.9 18.5000	**495.3** 19.5000	**0** **+51** 0 +20	**+127** **+76** +50 +30	**127T** **25T** 50T 10T
495.3 19.5000	**520.7** 20.5000			
520.7 20.5000	**546.1** 21.5000			
546.1 21.5000	**571.5** 22.5000			
571.5 22.5000	**596.9** 23.5000			
596.9 23.5000	**609.6** 24.0000			
609.6 24.0000	**914.4** 36.0000	**0** **+76** 0 +30	**+190** **+114** +75 +45	**190T** **38T** 75T 15T
914.4 36.0000	**1219.2** 48.0000	**0** **+102** 0 +40	**+252** **+150** +100 +60	**252T** **48T** 100T 20T
1219.2 48.0000	– –	**0** **+127** 0 +50	**+305** **+178** +120 +70	**305T** **51T** 120T 20T

* Suggested heavy-duty fitting practices shown above are applicable for case carburized bearings. Consult your Timken representative for the suggested heavy-duty fitting practices that are specified for through hardened bearings.

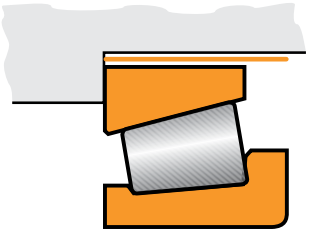
ROTATION OR STATIONARY SHAFT		STATIONARY SHAFT							
Unground or Ground Heavy Loads, High Speed or Shock*		Unground Moderate Loads, No Shock		Ground Moderate Loads, No Shock		Unground Sheaves, Wheels, Idlers		Hardened and Ground Wheel Spindles	
Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit
+229	**229T**								
+178	**127T**								
+90	90T								
+70	50T								
+241	**241T**								
+190	**139T**								
+95	95T								
+75	55T								
+254	**254T**								
+203	**152T**								
+100	100T								
+80	60T								
+267	**267T**								
+216	**165T**								
+105	105T								
+85	65T								
+279	**279T**								
+229	**178T**								
+110	110T								
+90	70T								
+292	**292T**	**+51**	**51T**	**0**	**0**	**0**	**0**	–	–
+241	**190T**	**0**	**51L**	**-51**	**102L**	**-51**	**102L**		
+115	115T	+20	20T	0	0	0	0	–	–
+95	75T	0	20L	-20	40L	-20	40L		
+305	**305T**								
+254	**203T**								
+120	120T								
+100	80T								
+318	**318T**								
+267	**216T**								
+125	125T								
+105	85T								
+330	**330T**								
+279	**228T**								
+130	130T								
+110	90T								
+343	**343T**								
+292	**241T**								
+135	135T								
+115	95T								
+356	**356T**								
+305	**254T**								
+140	140T								
+120	100T								
+457	**457T**	**+76**	**76T**	**0**	**0**	**0**	**0**	–	–
+331	**305T**	**0**	**76L**	**-76**	**152L**	**-76**	**152L**		
+180	180T	+30	30T	0	0	0	0	–	–
+150	120T	0	30L	-30	60L	-30	60L		
+625	**625T**	**+102**	**102T**	**0**	**0**	**0**	**0**		
+534	**432T**	**0**	**102L**	**-102**	**204L**	**-102**	**204L**	–	–
+250	250T	+40	40T	0	0	0	0	–	–
+210	170T	0	40L	-40	80L	-40	80L		
+813	**813T**	**+127**	**127T**	**0**	**0**	**0**	**0**		
+686	**559T**	**0**	**127L**	**-127**	**254L**	**-127**	**254L**	–	–
+320	320T	+50	50T	0	0	0	0	–	–
+270	220T	0	50L	-50	100L	-50	100L		

FITTING GUIDELINES FOR INCH BEARINGS
INDUSTRIAL EQUIPMENT BEARING CLASSES 4 AND 2

HOUSING BORE (µm)

Deviation from nominal (minimum) bearing bore and resultant fit (µm)

T= Tight
L = Loose



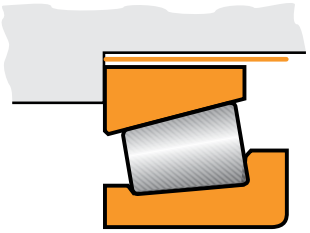
BEARING O.D.			STATIONARY HOUSING	
Range mm		Tolerance µm	Floating or Clamped Race	
over	incl.		Housing Bore Deviation	Resultant Fit
0	76.2	+25 0	+51 +76	26L 76L
76.2	127	+25 0	+51 +76	26L 76L
127	304.8	+25 0	+51 +76	26L 76L
304.8	609.6	+51 0	+102 +152	51L 152L
609.6	914.4	+76 0	+152 +229	76L 229L
914.4	1219.2	+102 0	+204 +305	102L 305L
1219.2	–	+127 0	+254 +381	127L 381L

* Unclamped race design is applicable only to sheaves with negligible fleet angle.

HOUSING BORE (INCHES)

Deviation from nominal (minimum) bearing bore and resultant fit (0.0001 inch)

T= Tight
L = Loose



BEARING O.D.			STATIONARY HOUSING	
Range inches		Tolerance 0.0001 in.	Floating or Clamped Race	
over	incl.		Housing Bore Deviation	Resultant Fit
0	3.0000	+10 0	+20 +30	10L 30L
3.0000	5.0000	+10 0	+20 +30	10L 30L
5.0000	12.0000	+10 0	+20 +30	10L 30L
12.0000	24.0000	+20 0	+40 +60	20L 60L
24.0000	36.0000	+30 0	+60 +90	30L 90L
36.0000	48.0000	+40 0	+80 +120	40L 120L
48.0000	–	+50 0	+100 +150	50L 150L

* Unclamped race design is applicable only to sheaves with negligible fleet angle.

STATIONARY HOUSING		STATIONARY OR ROTATION HOUSING		ROTATING HOUSING	
Adjustable Race		Non-adjustable Race or In Carrier or Sheave - Clamped Race		Sheave-unclamped Race*	
Housing bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit
0	25T	-38	63T	-76	101T
+25	25L	-13	13T	-51	51T
0	25T	-51	76T	-76	101T
+25	25L	-25	25T	-51	51T
0	25T	-51	76T	-76	101T
+51	51L	-25	25T	-51	51T
+26	25T	-76	127T	-102	153T
+76	76L	-25	25T	-51	51T
+51	25T	-102	178T	–	–
+127	127L	-25	25T	–	–
+76	25T	-127	229T	–	–
+178	178L	-25	25T	–	–
+102	25T	-152	279T	–	–
+229	229L	-25	25T	–	–

STATIONARY HOUSING		STATIONARY OR ROTATION HOUSING		ROTATING HOUSING	
Adjustable Race		Non-adjustable Race or In Carrier or Sheave - Clamped Race		Sheave-unclamped Race*	
Housing bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit
0	10T	-15	25T	-30	40T
+10	10L	-5	5T	-20	20T
0	10T	-20	30T	-30	40T
+10	10L	-10	10T	-20	20T
0	10T	-20	30T	-30	40T
+20	20L	-10	10T	-20	20T
+10	10T	-30	50T	-40	60T
+30	30L	-10	10T	-20	20T
+20	10T	-40	70T	–	–
+50	50L	-10	10T	–	–
+30	10T	-50	90T	–	–
+70	70L	-10	10T	–	–
+40	10T	-60	110T	–	–
+90	90L	-10	10T	–	–

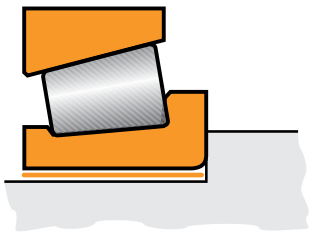
FITTING PRACTICES - *continued*

FITTING GUIDELINES FOR PRECISION BEARINGS

SHAFT O.D. METRIC BEARINGS (ISO & J Prefix)

Deviation from nominal (maximum) bearing bore and resultant fit (µm)

T= Tight
L = Loose



BEARING BORE		CLASS C			
Range		Bearing Bore Tolerance µm	Symbol	Shaft O.D. Deviation	Resultant Fit
over	incl.				
10	18	-7 0	k5	+9 +1	16T 1T
18	30	-8 0	k5	+11 +2	19T 2T
30	50	-10 0	k5	+13 +2	23T 2T
50	80	-12 0	k5	+15 +2	27T 2T
80	120	-15 0	k5	+18 +3	33T 3T
120	180	-18 0	k5	+21 +3	39T 3T
180	250	-22 0	k5	+24 +4	46T 4T
250	315	-22 0	k5	+27 +4	49T 4T

SHAFT O.D. INCH BEARINGS

Deviation from nominal (minimum) bearing bore and resultant fit (µm - 0.0001 inch)

T= Tight
L = Loose

BEARING BORE		CLASS 3 AND 0[1]			CLASS 00 AND 000		
Range mm (inches)		Bearing Bore Tolerance	Shaft O.D. Deviation	Resultant Fit	Bearing Bore Tolerance	Shaft O.D. Deviation	Resultant Fit
over	incl.	µm (0.0001 in.)					
–	**304.8**	**0** **+13**	**+30** **+18**	**30T** **5T**	**0** **+8**	**+20** **+13**	**20T** **5T**
–	12	0 +5	+12 +7	12T 2T	0 +3	+8 +5	8T 2T
304.8	**609.6**	**0** **+25**	**+64** **+38**	**64T** **13T**	–	–	–
12	24	0 +10	+25 +15	25T 5T	–	–	–
609.6	**914.4**	**0** **+38**	**+102** **+64**	**102T** **26T**	–	–	–
24	36	0 +15	+40 +25	40T 10T	–	–	–

[1]Class 0 made only to 304.8 mm (12 inch) O.D.

FITTING PRACTICES - *continued*

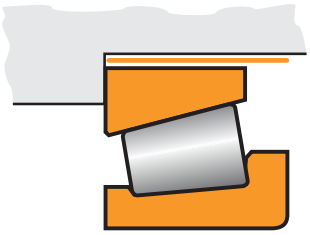
CLASS B				BEARING BORE		CLASS A AND AA			
Bearing Bore Tolerance	Symbol	Shaft O.D. Deviation	Resultant Fit	Range mm over	Range mm incl.	Bearing Bore Tolerance	Symbol	Shaft O.D. Deviation	Resultant Fit
-5 0	k5	+9 +1	14T 1T	10	18	-5 0	k4	+6 +1	11T 1T
-6 0	k5	+11 +2	17T 2T	18	30	-6 0	k4	+8 +2	14T 2T
-8 0	k5	+13 +2	21T 2T	30	315	-8 0		+13 +5	21T 5T
-9 0	k5	+15 +2	24T 2T						
-10 0	k5	+18 +3	28T 3T						
-13 0	k5	+21 +3	34T 3T						
-15 0	k5	+24 +4	39T 4T						
-15 0	k5	+27 +4	42T 4T						

FITTING GUIDELINES FOR PRECISION BEARINGS

HOUSING BORE METRIC BEARINGS

Deviation from nominal (maximum) bearing O.D. and resultant fit (µm)

T= Tight
L = Loose



BEARING O.D.			CLASS C								
Range mm		Tolerance µm	Non-adjustable or In Carrier			Floating			Adjustable		
over	incl.		Symbol	Housing Bore Deviation	Resultant Fit	Symbol	Housing Bore Deviation	Resultant Fit	Symbol	Housing Bore Deviation	Resultant Fit
18	**30**	**0** -8	**N5**	**-21** -12	**21T** 4T	**G5**	**+7** +16	**7L** 24L	**K5**	**-8** +1	**8T** 9L
30	**50**	**0** -9	**N5**	**-24** -13	**24T** 4T	**G5**	**+9** +20	**9L** 29L	**K5**	**-9** +2	**9T** 11L
50	**80**	**0** -11	**N5**	**-28** -15	**28T** 4T	**G5**	**+10** +23	**10L** 34L	**K5**	**-10** +3	**10T** 14L
80	**120**	**0** -13	**N5**	**-33** -18	**33T** 5T	**G5**	**+12** +27	**12L** 40L	**K5**	**-13** +2	**13T** 15L
120	**150**	**0** -15	**N5**	**-39** -21	**39T** 6T	**G5**	**+14** +32	**14L** 47L	**K5**	**-15** +3	**15T** 18L
150	**180**	**0** -18	**N5**	**-39** -21	**39T** 3T	**G5**	**+14** +32	**14L** 50L	**K5**	**-15** +3	**15T** 21L
180	**250**	**0** -20	**N5**	**-45** -25	**45T** 5T	**G5**	**+15** +35	**15L** 55L	**K5**	**-18** +2	**18T** 27L
250	**315**	**0** -25	**N5**	**-50** -27	**50T** 2T	**G5**	**+17** +40	**17L** 65L	**K5**	**-20** +3	**20T** 28L

HOUSING BORE INCH BEARINGS

Deviation from nominal (minimum) bearing O.D. and resultant fit (µm - 0.0001 inch)

T= Tight
L = Loose

BEARING O.D.			CLASS 3 AND 0[1]					
Range mm (inches)		Tolerance µm (0.0001 in.)	Non-adjustable or In Carrier		Floating		Adjustable	
over	incl.		Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit
–	**152.4**	**+13** **0** +5 0	**-13** **0** -5 0	**26T** **0** 10T 0	**+25** **+38** +10 +15	**12L** **38L** 5L 15L	**0** **+13** 0 +5	**13T** **13L** 5T 5L
152.4	**304.8**	**+13** **0** +5 0	**-25** **0** -10 0	**38T** **0** 15T 0	**+25** **+38** +10 +15	**12L** **38L** 5L 15L	**0** **+25** 0 +10	**13T** **25L** 5T 10L
304.8	**609.6**	**+25** **0** +10 0	**-25** **0** -10 0	**50T** **0** 20T 0	**+38** **+64** +15 +25	**13L** **64L** 5L 25L	**0** **+25** 0 +10	**25T** **25L** 10T 10L
609.6	**914.4**	**+38** **0** +15 0	**-38** **0** -15 0	**76T** **0** 30T 0	**+51** **+89** +20 +35	**13L** **89L** 5L 35L	**0** **+38** 0 +15	**38T** **38L** 15T 15L

[1]Class O made only to 304.8 mm (12 inch) O.D.

BEARING O.D.			CLASS B								
Range mm (inches)		Tolerance µm	Non-adjustable or In Carrier			Floating			Adjustable		
over	incl.		Symbol	Housing Bore Deviation	Resultant Fit	Symbol	Housing Bore Deviation	Resultant Fit	Symbol	Housing Bore Deviation	Resultant Fit
18	**30**	**0** -6	**M5**	**-14** -5	**14T** 1L	**G5**	**+7** +16	**7L** 22L	**K5**	**-8** +1	**8T** 7L
30	**50**	**0** -7	**M5**	**-16** -5	**16T** 2L	**G5**	**+9** +20	**9L** 27L	**K5**	**-9** +2	**9T** 9L
50	**80**	**0** -9	**M5**	**-19** -6	**19T** 3L	**G5**	**+10** +23	**10L** 32L	**K5**	**-10** +3	**10T** 12L
80	**120**	**0** -10	**M5**	**-23** -8	**23T** 2L	**G5**	**+12** +27	**12L** 37L	**K5**	**-13** +2	**13T** 12L
120	**150**	**0** -11	**M5**	**-27** -9	**27T** 2L	**G5**	**+14** +32	**14L** 43L	**K5**	**-15** +3	**15T** 12L
150	**180**	**0** -13	**M5**	**-27** -9	**27T** 4L	**G5**	**+14** +32	**14L** 45L	**K5**	**-15** +3	**15T** 16L
180	**250**	**0** -15	**M5**	**-31** -11	**31T** 4L	**G5**	**+15** +35	**15L** 50L	**K5**	**-18** +2	**18T** 17L
250	**315**	**0** -18	**M5**	**-36** -13	**36T** 5L	**G5**	**+17** +40	**17L** 58L	**K5**	**-20** +3	**20T** 21L

BEARING O.D.			CLASS A AND AA					
Range mm		Tolerance µm (0.0001 in.)	Non-adjustable or In Carrier		Floating		Adjustable	
over	incl.		Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit
0	**315**	**-0** -8	**-16** -8	**16T** 0	**+8** +16	**8L** 24L	**-8** -0	**8T** 8L

BEARING O.D.			CLASS 00 AND 000					
Range mm (inches)		Tolerance µm (0.0001 in.)	Non-adjustable or In Carrier		Floating		Adjustable	
over	incl.		Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit
0	**304.8**	**+8** **0**	**-8** **0**	**16T** **0**	**+15** **+23**	**7L** **23L**	**0** **+8**	**8T** **8L**
0	12	+3 0	-3 0	6T 0	+6 +9	3L 9L	0 +3	3T 3L

FITTING GUIDELINES FOR INCH BEARINGS AUTOMOTIVE EQUIPMENT BEARING CLASSES 4 AND 2

SHAFT O.D. (µm - INCHES)

Deviation from nominal (minimum) bearing bore and resultant fit (µm - 0.0001 inch)

T= Tight
L = Loose

CONE BORE			STATIONARY CONE Front Wheels Rear Wheels (Full Floating Axles) Trailer Wheels Non-adjustable	
over	incl.	Tolerance	Deviation	Resultant Fit
mm	mm	µm	µm	µm
0	76.200	0 +13	-5 -18	5L 31L
76.200	304.800	0 +25	-13 -38	13L 63L
in.	in.	in.	in.	in.
0	3.0000	0 +.0005	-.0002 -.0007	.0002L .0012L
3.0000	12.0000	0 +.0010	-.0005 -.0015	.0005L .0025L

Heavy-duty min. fit of .0005 inch per inch of cone bore

FITTING GUIDELINES FOR METRIC BEARINGS AUTOMOTIVE EQUIPMENT BEARING CLASSES K AND N

SHAFT O.D. (µm - INCHES)

Deviation from nominal (maximum) bearing bore and resultant fit (µm - 0.0001 inch)

T= Tight
L = Loose

CONE BORE			STATIONARY CONE Front Wheels Rear Wheels (Full Floating Axles) Trailer Wheels Non-adjustable		
over	incl.	Tolerance	Deviation		Resultant Fit
mm	mm	µm	µm		µm
18	30	-12 0	f6	-20 -33	8L 33L
30	50	-12 0	f6	-25 -41	13L 41L
50	80	-15 0	f6	-30 -49	15L 49L
80	120	-20 0	f6	-36 -58	16L 58L
120	180	-25 0	f6	-43 -68	18L 68L
in.	in.	in.	in.		in.
.7087	1.1811	-.0005 0	f6	-.0008 -.0013	.0003L .0013L
1.1811	1.9865	-.0005 0	f6	-.0010 -.0016	.0005L .0016L
1.9685	3.1496	-.0006 0	f6	-.0012 -.0019	.0006L .0019L
3.1496	4.7244	-.0008 0	f6	-.0014 -.0023	.0006L .0023L
4.7244	7.0866	-.0010 0	f6	-.0016 -.0026	.0006L .0026L

ROTATING CONE

Rear Wheels (Semi-floating Axles)		Rear Wheels (UNIT-BEARING) (Semi-floating Axles)		Pinion						Differential		Transaxles Transmissions Transfer Cases Cross Shafts	
Non-adjustable		Non-adjustable		Clamped		Collapsible Spacer		Non-adjustable		Non-adjustable		Non-adjustable	
Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit
µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm
+51 +38	51T 25T	+56 +38	56T 25T	+38 +25	38T 13T	+30 +18	30T 5T	+51 +38	51T 25T	+102 +64	102T 51T	+38 +25	38T 12T
+76 +51	76T 26T			+63 +38	63T 13T			+76 +51	76T 26T	+102 +76	102T 51T	+64 +38	64T 13T
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
+.0020 +.0015	.0020T .0010T	+.0022 +.0015	.0022 T .0010 T	+.0015 +.0010	.0015T .0005T	+.0012 +.0007	.0012T .0002T	+.0020 +.0015	.0020T .0010T	+.0040 +.0025	+.0040T .0020T	+.0015 +.0010	.0015T .0005T
+.0030 +.0020	.0030T .0010T			.0025 .0015	.0025T .0005T			+.0030 +.0020	.0030T .0010T	+.0040 +.0025	.0040T .0020T	+.0025 +.0015	.0025T .0005T

ROTATING CONE

Rear Wheels (Semi-floating Axles)		Rear Wheels (UNIT-BEARING) (Semi-floating Axles)		Pinion						Differential		Transaxles Transmissions Transfer Cases Cross Shafts	
Non-adjustable		Non-adjustable		Clamped		Collapsible Spacer		Non-adjustable		Non-adjustable		Non-adjustable	
Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit	Shaft O.D. Deviation	Resultant Fit
µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm
p6 +35 +22	47T 22T	p6 +35 +22	47T 22T	k6 +15 +2	27T 2T	k6 +15 +2	27T 2T	p6 +35	47T +22	+56 22T	68T +35	m6 +21 35T +8	33T 8T
p6 +42 +26	54T 26T	p6 +42 +26	54T 26T	k6 +18 +2	30T 2T	k6 +18 +2	30T 2T	p6 +42 +26	54T 26T	+68 +43	80T 43T	m6 +25 +9 9T	37T
p6 +51 +32	66T 32T			k6 +21 +2	36T 2T	k6 +21 +2	36T 2T	p6 +51 +32	66T 32T	+89 +59	104T 59T	m6 +30 +11 11T	45T
n6 +45 +23	65T 23T			j6 +13 –9	33T 9L			n6 +45 +23	65T 23T	+114 +79	134T 79T	m6 +35 +13	55T 13T
n6 +52 +27	77T 29T			j6 +14 –11	39T 11L			n6 +52 +27	77T 29T	+140 +100	165T 100T	m6 +40 +15	66T 15T
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
p6 +.0013 +.0008	.0018T .0008T	p6 +.0013 +.0008	.0018T .0008T	k6 +.0006 +.0001	.0011T .0001T	k6 +.0006 +.0001	.0011T .0001T	p6 +.0013 +.0008	.0018T .0008T	+.0022 +.0014	.0027T .0014T	m6 +.0008 +.0003	.0013T .0003 T
p6 +.0016 +.0010	.0021T .0010T	p6 +.0016 +.0010	.0021T .0010T	k6 +.0007 +.0001	.0012T .0001T	k6 +.0007 +.0001	.0012T .0001T	p6 +.0016 +.0010	.0021T .0010T	+.0028 +.0018	.0033T .0018T	m6 +.0010 +.0004	.0015T .0004T
p6 +.0021 +.0014	.0027T .0014T			k6 +.0008 –.0001	.0014T .0001L	k6 +.0008 +.0001	.0014T .0001L	p6 +.0021 +.0014	.0027T .0014T	+.0034 +.0022	.0040T .0022T	m6 +.0012 +.0005	.0018T .0005T
n6 +.0019 +.0010	.0027T .0010T			j6 +.0005 –.0004	.0013T .0004L			n6 +.0019 +.0010	.0027T .0010T	+.0044 +.0030	.0052T .0030T	m6 +.0014 +.0005	.0022T .0005T
n6 +.0022 +.0012	.0032T .0012T			j6 +.0006 –.0004	.0016T .0004L			n6 +.0022 +.0012	.0032T .0012T	+.0056 +.0040	.0066T .0040T	m6 +.0016 +.0006	.0026T .0006T

A

FITTING PRACTICES - *continued*

FITTING GUIDELINES FOR INCH BEARINGS
AUTOMOTIVE EQUIPMENT BEARING CLASSES 4 AND 2

Deviation from nominal (minimum) bearing bore and resultant fit (µm - 0.001 inch)

HOUSING BORE (µm - INCHES)

	CUP O.D.			ROTATING CUP		STATIONARY CUP							
				Front Wheels Non-adjustable	Rear Wheels (Full Floating Trailer Wheels) Non-adjustable	Rear Wheels Adjustable (TS)	(Semi-Floating Axles) Clamped (TSU)	Differential (Split Seat) Adjustable		Trans-missions Adjustable	Transfer Cases Cross Shafts Adjustable	Pinion (Solid Seat) Transmission Non-Adjustable	Differential Transaxles Transfer Cases Non-Adjustable
	over	incl.	Tolerance	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit	Housing Bore Deviation	Resultant Fit
	mm	mm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm
Inch System Bearings Classes 4 and 2	0	76.200	+25 0	-51 -13	76T 13T	+38 +76	13L 76L	+25 +51	0 51L	0 +25	25T 25L	-38 -13	63T 13T
	76.200	127.00	+25 0	-77 -25	102T 25T	+38 +76	13L 76L	+25 +51	0 51L	0 +25	25T 25L	-51 -25	76T 25T
	127.00	304.800	+25 0	-77 -25	102T 25T			0 +51	25T 51L	0 +51	25T 51L	-77 -25	102T 25T
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
	0	3.0000	+.0010 0	-.0020 -.0005	.0030T .0005T	+.0015 +.0030	.0005L .0030L	+.0010 +.0020	0 .0020L	0 +.0010	.0010T .0010L	-.0015 -.0005	.0025T .0005T
	3.0000	5.0000	+.0010 0	-.0030 -.0010	.0040T .0010T	+.0015 +.0030	.0005L .0030L	+.0010 +.0020	0 .0020L	0 +.0010	.0010T .0010L	-.0020 -.0010	.0030T .0010T
	5.0000	12.0000	+.0010 0	-.0030 -.0010	.0040T .0010T			0 +.0020	.0010T .0020L	0 +.0020	.0010T .0020L	-.0030 -.0010	.0040T .0010T

Aluminum housings min. fit of .001 inch per inch of cup O.D.
Magnesium housings min. fit of .0015 inch per inch of cup O.D.

FITTING PRACTICES - *continued*

FITTING GUIDELINES FOR METRIC BEARINGS
AUTOMOTIVE EQUIPMENT BEARING CLASSES K AND N

Deviation from nominal (minimum) bearing bore and resultant fit (µm - inches)

HOUSING BORE (µm - INCHES)

CUP O.D.			ROTATING CUP Front Wheels Rear Wheels (Full Floating Axles) Non-adjustable			STATIONARY CUP Rear Wheels (Semi-floating Axles) Adjustable (TS) Clamped (TSU)			Differential (Split Seat) Adjustable			Transmissions Transfer Cases Cross Shafts Adjustable			Pinion Differential (Solid Seat) Transaxles Transmission Transfer Cases Non-Adjustable		
over	incl.	Tolerance	Housing Bore Deviation		Resultant Fit	Housing Bore Deviation		Resultant Fit	Housing Bore Deviation		Resultant Fit	Housing Bore Deviation		Resultant Fit	Housing Bore Deviation		Resultant Fit
µm	µm	µm	µm		µm	µm		µm	µm		µm	µm		µm	µm		µm
30	50	0	R7	-50	50T	G7	+9	9L	H7	0	0	K6	-13	13T	R7	-50	50T
		-14		-25	11T		+34	48L		+25	39L		+3	17L		-25	11T
50	65	0	R7	-60	60T										R7	-60	60T
		-16		-30	14T	G7	+10	10L	H7	0	0	K6	-15	15T		-30	14T
65	80	0	R7	-62	62T		+40	56L		+30	46L		+4	20L	R7	-62	62T
		-16		-32	16T											-32	16T
80	100	0	R7	-73	73T										R7	-73	73T
		-18		-38	20T	G7	+12	12L	H7	0	0	K6	-18	18T		-38	20T
100	120	0	R7	-76	76T		+47	65L		+35	53L		+4	22L	R7	-76	76T
		-18		-41	23T											-41	23T
120	140	0	R7	-88	88T										R7	-88	88T
		-20		-48	28T	G7	+14	14L	J7	-14	14T	K6	-21	21T		-48	28T
140	150	0	R7	-90	90T		+54	74L		+26	46L		+4	24L	R7	-90	90T
		-20		-50	30T											-50	30T
150	160	0	R7	-90	90T										R7	-90	90T
		-25		-50	25T	G7	+14	14L	J7	-14	14T	K6	-21	21T		-50	25T
160	180	0	R7	-93	93T		+54	79L		+26	51L		+4	29L	R7	-93	93T
		-25		-53	28T											-53	28T
180	200	0	R7	-106	106T										R7	-106	106T
		-30		-60	30T											-60	30T
200	225	0	R7	-109	109T				J7	-16	16T	J7	-16	16T	R7	-109	109T
		-30		-63	33T					+30	60L		+30	60L		-63	33T
225	250	0	R7	-113	113T										R7	-113	113T
		-30		-67	37T											-67	37T
250	280	0	R7	-126	126T										R7	-126	126T
		-35		-74	39T				J7	-16	16T	J7	-16	16T		-74	39T
280	315	0	R7	-130	130T					+36	71L		+36	71L	R7	-130	130T
		-35		-78	43T											-78	43T
in.	in.	in.	in.		in.	in.		in.	in.		in.	in.		in.	in.		in.
1.1811	1.9685	0	R7	-.0020	.0020T	G7	+.0004	.0004L	H7	0	0	K6	-.0005	.0005T	R7	-.0020	.0020T
		-.0006		-.0010	.0004T		+.0014	.0020L		+.0010	.0016L		+.0001	.0007L		-.0010	.0004T
1.9685	2.5591	0	R7	-.0023	.0023T										R7	-.0023	.0023T
		-.0006		-.0011	.0005T	G7	+.0004	.0004L	H7	0	0	K6	-.0006	.0006T		-.0011	.0005T
2.5591	3.1496	0	R7	-.0023	.0023T		+.0016	.0022L		+.0012	.0018L		+.0001	.0007L	R7	-.0023	.0023T
		-.0006		-.0011	.0005T											-.0011	.0005T
3.1496	3.9370	0	R7	-.0029	.0029T										R7	-.0029	.0029T
		-.0007		-.0015	.0008T	G7	+.0005	.0005L	H7	0	0	K6	-.0007	.0007T		-.0015	.0008T
3.9370	4.7244	0	R7	-.0029	.0029T		+.0019	.0026L		+.0014	.0021L		+.0002	.0009L	R7	-.0029	.0029T
		-.0007		-.0015	.0008T											-.0015	.0008T
4.7244	5.5118	0	R7	-.0035	.0035T										R7	-.0035	.0035T
		-.0008		-.0019	.0011T	G7	+.0006	.0006L	J7	-.0006	.0006T	K6	-.0008	.0008T		-.0019	.0011T
5.5118	5.9055	0	R7	-.0035	.0035T		+.0022	.0030L		+.0010	.0018L		+.0002	.0010L	R7	-.0035	.0035T
		-.0008		–.0019	.0011T											-.0019	.0011T
5.9055	6.2992	0	R7	-.0035	.0035T										R7	-.0035	.0035T
		-.0010		-.0019	.0009T	G7	+.0006	.0006L	J7	-.0006	.0006T	K6	-.0008	.0008T		-.0019	.0009T
6.2992	7.0866	0	R7	-.0035	.0035T		+.0022	.0032L		+.0010	.0020L		+.0002	.0012L	R7	-.0035	.0035T
		-.0010		-.0019	.0009T											-.0019	.0009T
7.0866	7.8740	0	R7	-.0042	.0042T										R7	-.0042	.0042T
		-.0012		-.0024	.0012T											-.0024	.0012T
7.8740	8.8583	0	R7	-.0042	.0042T				J7	-.0007	.0007T	J7	-.0007	.0007T	R7	-.0042	.0042T
		-.0012		-.0024	.0012T					+.0011	.0023L		+.0011	.0023L		-.0024	.0012T
8.8583	9.8425	0	R7	-.0042	.0042T										R7	-.0042	.0042T
		-.0012		-.0024	.0012T											-.0024	.0012T
9.8425	11.0236	0	R7	-.0047	.0047T										R7	-.0047	.0047T
		-.0014		-.0027	.0013T				J7	-.0007	.0007T	J7	-.0007	.0007T		-.0027	.0013T
11.0236	12.4016	0	R7	-.0047	.0047T					+.0013	.0027L		+.0013	.0027L	R7	-.0047	.0047T
		-.0014		-.0027	.0013T											-.0027	.0013T

Aluminum housings min. fit of .001 inch per inch of cup O.D.
Magnesium housings min. fit of .0015 inch per inch of cup O.D.

A

FITTING PRACTICES - *continued*

Non-ferrous housings

Care should be taken when pressing cups into aluminum or magnesium housings to avoid metal pick up. This may result in unsatisfactory fits, backing, and alignment from debris trapped between the cup and backing shoulder. Preferably, the cup should be frozen or the housing heated, or both, during assembly. Also, a special lubricant may be used to ease assembly. In some cases, cups are mounted in steel inserts which are attached to the aluminum or magnesium housings. Table fits may then be used. Where the cup is fitted directly into an aluminum housing, it is suggested that a minimum tight fit of 1.0 µm per mm (0.0010 in. per in.) of cup outside diameter be used. For a magnesium housing, a minimum tight fit of 1.5 µm per mm (0.0015 in. per in.) of cup outside diameter is suggested.

Hollow shafts

In case of a thin section hollow shaft, the fits mentioned in the tables for industrial applications should be increased to avoid possible cone creeping under some load conditions.

Heavy-duty fitting practice

Where heavy-duty loads, shock loads or high speeds are involved, the heavy-duty fitting practice should be used, regardless of whether the cone seats are ground or unground. Where it is impractical to grind the shaft O.D. for the cone seats, the tighter heavy-duty fitting practice should be followed. In this case the turned shaft O.D. should not exceed a maximum surface finish of 3.2 µm (125 µin) arithmetic average.

The average interference cone fit for inch bearings above 76.2 mm (3 in.) bore should be 0.5 µm per mm (0.0005 in. per in.) of bearing bore. See inch fitting practice tables for cones with smaller bores. The minimum fit should not be less than 25 µm (0.0010 in.) tight. If the shaft diameter is held to the same tolerance as the bearing bore, use the average interference fit. For example, average interference fit between a 609.6 mm (24 in.) bore cone and shaft will be 305 µm (0.0120 in.). The fit range will be 305 µm (0.0120 in.) tight plus or minus the bearing bore tolerance. See metric fitting practice tables for heavy-duty metric cone fitting practice.

Double-row assemblies with double cups

Non-rotating double outer races of types TDO and TNA bearings are generally mounted with loose fits to permit assembly and disassembly (Fig. A-24). The loose fit also permits axial floating when the bearing is mounted in conjunction with an axially fixed (locating) bearing on the other end of the shaft. Double outer races types CD and DC can be pinned to prevent rotation in the housing. Fitting values can be taken from general industrial guidelines.

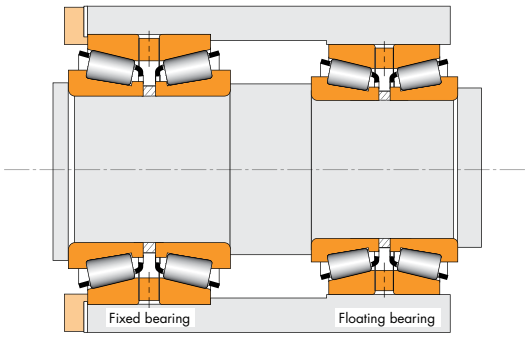


Fig. A-24
Double-row bearing arrangement assembled with loose fit.

Bearing assemblies
SR, TNA, TNASW, TNASWE types

The tolerance and fits for bearing types SR, TNA, TNASW, and TNASWE are tabulated along with the other dimensions in the bearing tables.

CAUTION: Failure to use the specified fits may result in improper bearing setting. Reduced bearing performance or malfunction may occur. This may cause damage to machinery in which the bearing is a component. If interference fits are either greater or less than those specified, the mounted bearing setting will be other than intended.

FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS

RADIAL BALL AND CYLINDRICAL ROLLER BEARINGS

These charts are guidelines for specifying shaft and housing fits related to particular operating conditions.

SHAFT

Ball Bearings (For all nominal diameters)			Operating Conditions	Examples	Cylindrical Roller Bearings (Except 5200 Series)						
Loads		Shaft			Loads		Shaft Diameter mm		Shaft Tolerance Symbol[1]	Shaft Diameter inch	
Lower Load Limit	Upper Load Limit	Tolerance Symbol			Lower Load Limit	Upper Load Limit					
Inner Ring Stationary											
0	C_e [7]	g6	Inner ring to be easily displaced on shaft	Wheels Non-rotating shafts	0	C[6]	All	g6	All		
0	C_e	h6	Inner ring does not need to be easily displaced	Tension pulleys	0	C	All	h6	All		
Inner Ring Rotating or Indeterminate							over	incl.		over	incl.
0	0.07 C_e	j6[2]	Light loads	Electrical apparatus Machine tools Pumps Ventilators Industrial trucks	0	0.08C	**0** **40** **140** **320** **500**	**40** **140** **320** **500** –	j6[8] k6[4] m6[5] n6 p6	0 1.57 5.51 12.60 19.68	1.57 5.51 12.60 19.68 –
0.07 C_e	0.15 C_e	k5	Normal loads	Electrical motors Turbines Pumps Combustion engines Gear transmissions etc.	0.08C	0.18C	**0** **40** **100** **140** **320** **500**	**40** **100** **140** **320** **500** –	k5 m5 m6 n6 p6 r6	0 1.57 3.94 5.51 12.60 19.68	1.57 3.94 5.51 12.60 19.68 –
0.15 C_e	C_e	m5	Heavy loads Shock loads	Rail vehicles Traction motors	0.18C	C	**0** **40** **65** **140** **320** **500**	**40** **65** **140** **320** **500** –	m5[3] m6[3] n6[3] p6[3] r6[3] r7[3]	0 1.57 2.56 5.51 12.60 19.68	1.57 2.56 5.51 12.60 19.68 –
Thrust Loads											
0	C_e	j6[3]	Pure thrust loads	All	Not suggested, consult your Timken representative.						

[1] For solid shaft. See pages A61 for numerical values.
[2] Use j5 for accurate applications.
[3] Bearings with greater than nominal clearance must be used.
[4] Use k5 for accurate applications.
[5] Use m5 for accurate applications.
[6] C = Dynamic Load Rating.
[7] C_e = Extended Dynamic Load Rating (Ball Bearings).
[8] Use j5 for accurate applications.

HOUSING

Operating Conditions		Examples	Housing Tolerance Symbol[1]	Outer Ring Displaceable Axially
Outer Ring Rotating				
Heavy loads with thin-wall housing		Crane support wheels Wheel hubs (roller bearings) Crank bearings	P6	No
Normal to heavy loads		Wheel hubs (ball bearings) Crank bearings	N6	No
Light loads		Conveyor rollers Rope sheaves Tension pulleys	M6	No
Indeterminate Load Direction				
Heavy shock loads		Electric traction motors	M7	No
Normal to heavy loads, axial displacement of outer ring not required.		Electric motors Pumps Crankshaft main bearings	K6	No, normally
Light to normal loads, axial displacement of outer ring desired.		Electric motors Pumps Crankshaft main bearings	J6	Yes, normally
Outer Ring Stationary				
Shock loads, temporary complete unloading		Heavy rail vehicles	J6	Yes, normally
All loads	One-piece housing	General applications Heavy rail vehicles	H6	Easily
	Radially split housing	Transmission drives	H7	Easily
Heat supplied through shaft		Drier cylinders	G7	Easily

* Below this line, housing can either be one piece or split; above this line, a split housing is not suggested.

[1] Cast iron steel housing. See pages A61 to A72 for numerical values.
Where wider tolerances are permissible, P7, N7, M7, K7, J7 and H7 values may be used in place of P6, N6, M6, K6, J6, and H6 values respectively.

FITTING PRACTICES - *continued*

RADIAL BALL BEARINGS
ABEC 1 AND ABEC 3 BALL BEARINGS
Shaft and housing fits

The tables on the following pages show information supplemental to and coherent with that found on pages A125 through A139 as applied to ball bearings. Actual shaft and housing diameters are listed for ABEC 1, ABEC 3 and angular contact 7000WN Series. These suggestions can be used for most applications having light to normal loads. Shaft and housing fits for wide inner ring ball bearings are found on page A133.

ABEC 7 BALL BEARINGS
Shaft fits

As a general rule, it is suggested that the shaft size and tolerance for seating ABEC 7 super precision bearings be the same as the bearing bore thus producing an average line-to-line fit. For larger shaft sizes, the average fit increases to a slight interference.

EXAMPLE

Bore Size, Inches	Shaft Diameter, Inches	Resultant Mounting Fits, Inches	Average Fit
Max. 2.1654	Min. 2.1652	.0002 tight	line-to-line
Min. 2.1652	Max. 2.1654	.0002 loose	

HOUSING FITS

Under normal conditions of rotating shaft, the outer ring is stationary and should be mounted with a hand push or light tapping fit. Should the housing be the rotating member, the same fundamental considerations apply in mounting the outer race as in the case of an inner ring mounted on a rotating shaft.

As a general rule, the minimum housing bore dimensions for super precision bearings may be established as the same as the maximum bearing outside diameter. If the bearing O.D. tolerance is .0003 inch, the maximum housing bore should be established as .0003 inch larger than the minimum housing bore dimension.

EXAMPLE

Outside Diameter, Inches	Housing Bore, Inches	Resultant Mounting Fits, Inches	Average Fit Inches
Max. 3.5433	Min. 3.5433	.0000 tight	.0003 loose
Min. 3.5430	Max. 3.5436	.0006 loose	

On high-speed applications, it is extremely important that the floating bearing or pair can move axially to compensate for thermal changes. It cannot float laterally if restricted by a tight housing bore or by the radial expansion of the bearing itself. Cases involving unusual conditions should be submitted to your Timken representative for suggestions.

It is equally important that all shaft and housing shoulders be absolutely square and that the faces of the spacers be square and parallel.

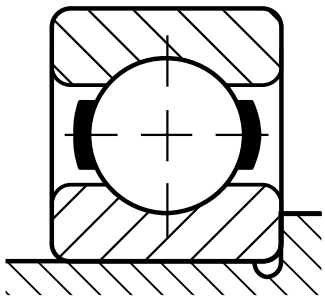
Selective assembly

Under certain conditions it may be desirable to control fits more accurately without the added expense of using closer-tolerance bearings and mating parts. This can be accomplished by selective assembly of bearings, shafts and housings after they have been sized and grouped according to bores and outside diameters. Generally, however, it is more satisfactory for production and servicing to use closer shaft and housing tolerances with bearings having a higher degree of precision.

Bearings with coded bores and O.D.s are available on special order to facilitate this selective assembly process.

Shafts and housing fillets

The suggested shaft and housing fillet radii listed in the dimension tables of the product catalogs should be used to assure proper seating of the bearings against shaft and housing shoulders. The manufacturing tolerances on bearing corner radii are such that the corners will clear the cataloged fillet radii when the bearings are tightly seated against shoulders. Shaft and housing radii and shoulders should be free from nicks and burrs. Whenever possible, undercutting of bearing seats and adjacent shoulders per figure below is advisable to help avoid tapered bearing seats and assure clearing corners.



FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS RADIAL BALL BEARING

Shaft fits, ABEC 1, ABEC 3

Note: These tables are to be used for applications where only one ring (either inner or outer) has an interference fit with its shaft and housing. The guidelines for operating conditions covering these tables are found on page A123. In cases where interference fits are used for both rings, bearings with a special internal clearance may be required. Shaft diameter dimensions are for solid steel shafts. Consult your Timken representative when using hollow shafts.

SHAFT FITS, ABEC 1, ABEC 3

					These diameters result in shaft to bearing bore fit which closely conforms to k5 listed on pages A66 and A72								These diameters result in shaft to bearing bore fit which closely conforms to g6 listed on pages A66 and A72							
Basic Bearing Number	Bore Tolerance				Shaft Rotating, Load Stationary or Shaft Stationary, Load Rotating (Typical Inner Ring Rotation)								Shaft Stationary, Load Stationary or Shaft Rotating, Load Rotating (Typical Outer Ring Rotation)							
					Shaft Diameter				Mean Fit Tight				Shaft diameter				Mean Fit Loose			
	Max.		Min.		Max.		Min.		ABEC 1		ABEC 3		Max.		Min.		ABEC 1		ABEC 3	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
Extra-Small 30, S, F-Flanged Series																				
33K3, F33K3	**3.175**	0.1250	**3.167**	0.1247	**3.180**	0.1252	**3.175**	0.1250	**0.006**	0.00025	**0.005**	0.00020	**3.170**	0.1248	**3.162**	0.1245	**0.005**	0.00020	**0.006**	0.00025
33K4	**3.175**	0.1250	**3.167**	0.1247	**3.180**	0.1252	**3.175**	0.1250	**0.006**	0.00025	**0.005**	0.00020	**3.170**	0.1248	**3.162**	0.1245	**0.005**	0.00020	**0.006**	0.00025
33K5	**4.762**	0.1875	**3.754**	0.1872	**4.768**	0.1877	**4.762**	0.1875	**0.006**	0.00025	**0.005**	0.00020	**4.752**	0.1873	**4.750**	0.1870	**0.005**	0.00020	**0.006**	0.00025
34K	**4.000**	0.1575	**3.992**	0.1572	**4.006**	0.1577	**4.001**	0.1575	**0.006**	0.00025	**0.005**	0.00020	**3.995**	0.1573	**3.988**	0.1570	**0.005**	0.00020	**0.006**	0.00025
35K	**5.000**	0.1969	**4.992**	0.1966	**5.006**	0.1971	**5.001**	0.1969	**0.006**	0.00025	**0.005**	0.00020	**4.996**	0.1967	**4.989**	0.1964	**0.005**	0.00020	**0.006**	0.00025
36K	**6.000**	0.2362	**5.992**	0.2359	**6.005**	0.2364	**5.999**	0.2362	**0.006**	0.00025	**0.005**	0.00020	**5.994**	0.2360	**5.987**	0.2357	**0.005**	0.00020	**0.006**	0.00025
37K	**7.000**	0.2756	**6.992**	0.2753	**7.005**	0.2758	**6.998**	0.2755	**0.005**	0.00020	**0.004**	0.00015	**6.995**	0.2754	**6.985**	0.2750	**0.006**	0.00025	**0.008**	0.00030
38K,38KV	**8.000**	0.3150	**7.992**	0.3147	**8.006**	0.3152	**7.998**	0.3149	**0.005**	0.00020	**0.004**	0.00015	**7.996**	0.3148	**7.986**	0.3144	**0.006**	0.00025	**0.008**	0.00030
39K	**9.000**	0.3543	**8.992**	0.3540	**9.004**	0.3545	**8.997**	0.3542	**0.005**	0.00020	**0.004**	0.00015	**8.994**	0.3541	**8.984**	0.3537	**0.006**	0.00025	**0.008**	0.00030
S1K,S1K7,FS1K7	**6.350**	0.2500	**6.342**	0.2497	**6.355**	0.2502	**6.347**	0.2499	**0.005**	0.00020	**0.004**	0.00015	**6.345**	0.2498	**6.335**	0.2494	**0.006**	0.00025	**0.008**	0.00030
S3K,FS3K	**9.525**	0.3750	**9.517**	0.3747	**9.530**	0.3752	**9.522**	0.3749	**0.005**	0.00020	**0.004**	0.00015	**9.520**	0.3748	**9.510**	0.3744	**0.006**	0.00025	**0.008**	0.00030
S5K	**12.700**	0.5000	**12.692**	0.4997	**12.705**	0.5002	**12.697**	0.4999	**0.005**	0.00020	**0.004**	0.00015	**12.695**	0.4998	**12.682**	0.4993	**0.008**	0.00030	**0.009**	0.00035
S7K	**15.875**	0.6250	**15.867**	0.6247	**15.880**	0.6252	**15.872**	0.6249	**0.005**	0.00020	**0.004**	0.00015	**15.870**	0.6248	**15.857**	0.6243	**0.008**	0.00030	**0.009**	0.00035
S8K	**19.050**	0.7500	**19.040**	0.7496	**19.060**	0.7504	**19.053**	0.7501	**0.011**	0.00045	**0.009**	0.00035	**19.042**	0.7497	**19.030**	0.7492	**0.009**	0.00035	**0.011**	0.00045
S9K	**22.225**	0.8750	**22.215**	0.8746	**22.235**	0.8754	**22.228**	0.8751	**0.011**	0.00045	**0.009**	0.00035	**22.217**	0.8747	**22.205**	0.8742	**0.009**	0.00035	**0.011**	0.00045
S10K	**25.400**	1.0000	**25.390**	0.9996	**25.410**	1.0004	**25.403**	1.0001	**0.011**	0.00045	**0.009**	0.00035	**25.392**	0.9997	**25.380**	0.9992	**0.009**	0.00035	**0.011**	0.00045
S11K	**28.575**	1.1250	**28.565**	1.1246	**28.585**	1.1254	**28.578**	1.1251	**0.011**	0.00045	**0.009**	0.00035	**28.567**	1.1247	**28.555**	1.1242	**0.009**	0.00035	**0.011**	0.00045
S12K	**31.750**	1.2500	**31.737**	1.2495	**31.763**	1.2505	**31.753**	1.2501	**0.014**	0.00055	**0.011**	0.00045	**31.740**	1.2496	**31.725**	1.2490	**0.011**	0.00045	**0.014**	0.00055
F2DD-2	**3.183**	0.1253	**3.175**	0.1250	**3.175**	0.1250	**3.167**	0.1247	**0.008**(1)	0.00030	**0.006**(1)	0.00025	**3.175**	0.1250	**3.167**	0.1247	**0.008**	0.00030	**0.006**	0.00025
F2	**4.770**	0.1878	**4.762**	0.1875	**4.762**	0.1875	**4.755**	0.1872	**0.008**(1)	0.00030	**0.006**(1)	0.00025	**4.762**	0.1875	**4.755**	0.1872	**0.008**	0.00030	**0.006**	0.00025
F3	**4.770**	0.1878	**4.762**	0.1875	**4.762**	0.1875	**4.755**	0.1872	**0.008**(1)	0.00030	**0.006**(1)	0.00025	**4.762**	0.1875	**4.755**	0.1872	**0.008**	0.00030	**0.006**	0.00025
F4	**6.358**	0.2503	**6.350**	0.2500	**6.350**	0.2500	**6.342**	0.2497	**0.008**(1)	0.00030	**0.006**(1)	0.00025	**6.350**	0.2500	**6.342**	0.2497	**0.008**	0.00030	**0.006**	0.00025
F5	**7.946**	0.3128	**7.938**	0.3125	**7.938**	0.3125	**7.930**	0.3122	**0.008**(1)	0.00030	**0.006**(1)	0.00025	**7.938**	0.3125	**7.930**	0.3122	**0.008**	0.00030	**0.006**	0.00025

(1) Mean fit loose. These sizes have plus bore tolerances.

FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS RADIAL BALL BEARING

Shaft fits, ABEC 1, ABEC 3

Note: These tables are to be used for applications where only one ring (either inner or outer) has an interference fit with its shaft and housing. The guidelines for operating conditions covering these tables are found on page A123. In cases where interference fits are used for both rings, bearings with a special internal clearance may be required. Shaft diameter dimensions are for solid steel shafts. Consult your Timken representative when using hollow shafts.

SHAFT FITS, ABEC 1, ABEC 3

					These diameters result in shaft to bearing bore fit which closely conforms to k5 listed on pages A66 and A72								These diameters result in shaft to bearing bore fit which closely conforms to g6 listed on pages A66 and A72							
Basic Bearing Number	Bore Tolerance				Shaft Rotating, Load Stationary or Shaft Stationary, Load Rotating								Shaft Stationary, Load Stationary or Shaft Rotating, Load Rotating							
					Shaft Diameter				Mean Fit Tight				Shaft Diameter				Mean Fit Loose			
	Max.		Min.		Max.		Min.		ABEC 1		ABEC 3		Max.		Min.		ABEC 1		ABEC 3	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
9100, 9300, 200, 300, 400, 5200, 5300 SERIES																				
00	**10**	0.3937	**9.992**	0.3934	**10.005**	0.3939	**9.997**	0.3936	**0.005**	0.0002	**0.004**	0.00015	**9.995**	0.3935	**9.985**	0.3931	**0.006**	0.00025	**0.008**	0.00030
01	**12**	0.4724	**11.992**	0.4721	**12.004**	0.4726	**11.996**	0.4723	**0.005**	0.0002	**0.004**	0.00015	**11.994**	0.4722	**11.981**	0.4717	**0.008**	0.00030	**0.009**	0.00035
02	**15**	0.5906	**14.992**	0.5903	**15.006**	0.5908	**14.999**	0.5905	**0.005**	0.0002	**0.004**	0.00015	**14.996**	0.5904	**14.983**	0.5899	**0.008**	0.00030	**0.009**	0.00035
03	**17**	0.6693	**16.992**	0.6690	**17.005**	0.6695	**16.998**	0.6692	**0.005**	0.0002	**0.004**	0.00015	**16.995**	0.6691	**16.982**	0.6686	**0.008**	0.00030	**0.009**	0.00035
04	**20**	0.7874	**19.990**	0.7870	**20.010**	0.7879	**20.002**	0.7875	**0.013**	0.0005	**0.009**	0.00035	**19.992**	0.7871	**19.980**	0.7866	**0.009**	0.00035	**0.011**	0.00045
05	**25**	0.9843	**24.990**	0.9839	**25.014**	0.9848	**25.004**	0.9844	**0.013**	0.0005	**0.009**	0.00035	**24.994**	0.9840	**24.981**	0.9835	**0.009**	0.00035	**0.011**	0.00045
06	**30**	1.1811	**29.990**	1.1807	**30.010**	1.1816	**30.002**	1.1812	**0.013**	0.0005	**0.009**	0.00035	**29.992**	1.1808	**29.980**	1.1803	**0.009**	0.00035	**0.011**	0.00045
07	**35**	1.3780	**34.987**	1.3775	**35.014**	1.3785	**35.004**	1.3781	**0.014**	0.0006	**0.011**	0.00045	**34.991**	1.3776	**34.976**	1.3770	**0.011**	0.00045	**0.014**	0.00055
08	**40**	1.5748	**39.987**	1.5743	**40.013**	1.5753	**40.002**	1.5749	**0.014**	0.0006	**0.011**	0.00045	**39.990**	1.5744	**39.975**	1.5738	**0.011**	0.00045	**0.014**	0.00055
09	**45**	1.7717	**44.987**	1.7712	**45.014**	1.7722	**45.004**	1.7718	**0.014**	0.0006	**0.011**	0.00045	**44.991**	1.7713	**44.976**	1.7707	**0.011**	0.00045	**0.014**	0.00055
10	**50**	1.9685	**49.987**	1.9680	**50.013**	1.9690	**50.002**	1.9686	**0.014**	0.0006	**0.011**	0.00045	**49.990**	1.9681	**49.974**	1.9675	**0.011**	0.00045	**0.014**	0.00055
11	**55**	2.1654	**54.985**	2.1648	**55.016**	2.1660	**55.004**	2.1655	**0.017**	0.0007	**0.014**	0.00055	**54.991**	2.1650	**54.973**	2.1643	**0.011**	0.00045	**0.014**	0.00055
12	**60**	2.3622	**59.985**	2.3616	**60.015**	2.3628	**60.002**	2.3623	**0.017**	0.0007	**0.014**	0.00055	**59.990**	2.3618	**59.972**	2.3611	**0.011**	0.00045	**0.014**	0.00055
13	**65**	2.5591	**64.985**	2.5585	**65.016**	2.5597	**65.004**	2.5592	**0.017**	0.0007	**0.014**	0.00055	**64.991**	2.5587	**64.973**	2.5580	**0.011**	0.00045	**0.014**	0.00055
14	**70**	2.7559	**69.985**	2.7553	**70.015**	2.7565	**70.002**	2.7560	**0.017**	0.0007	**0.014**	0.00055	**69.990**	2.7555	**69.972**	2.7548	**0.011**	0.00045	**0.014**	0.00055
15	**75**	2.9528	**74.985**	2.9552	**75.016**	2.9534	**75.004**	2.9529	**0.017**	0.0007	**0.014**	0.00055	**74.991**	2.9524	**74.973**	2.9517	**0.011**	0.00045	**0.014**	0.00055
16	**80**	3.1496	**79.985**	3.1490	**80.015**	3.1502	**80.002**	3.1497	**0.017**	0.0007	**0.014**	0.00055	**79.990**	3.1492	**79.972**	3.1485	**0.011**	0.00045	**0.014**	0.00055
17	**85**	3.3465	**84.980**	3.3457	**85.019**	3.3472	**85.004**	3.3466	**0.020**	0.0008	**0.017**	0.00065	**84.988**	3.3460	**84.968**	3.3452	**0.013**	0.00050	**0.017**	0.00065
18	**90**	3.5433	**89.980**	3.5425	**90.018**	3.5440	**90.002**	3.5434	**0.020**	0.0008	**0.017**	0.00065	**89.987**	3.5428	**89.967**	3.5420	**0.013**	0.00050	**0.017**	0.00065
19	**95**	3.7402	**94.980**	3.7394	**95.019**	3.7409	**95.004**	3.7403	**0.020**	0.0008	**0.017**	0.00065	**94.988**	3.7397	**94.968**	3.7389	**0.013**	0.00050	**0.017**	0.00065
20	**100**	3.9370	**99.980**	3.9362	**100.018**	3.9377	**100.002**	3.9371	**0.020**	0.0008	**0.017**	0.00065	**99.987**	3.9365	**99.967**	3.9357	**0.013**	0.00050	**0.017**	0.00065
21	**105**	4.1339	**104.980**	4.1331	**105.019**	4.1346	**105.004**	4.1340	**0.020**	0.0008	**0.017**	0.00065	**104.988**	4.1334	**104.968**	4.1326	**0.013**	0.00050	**0.017**	0.00065
22	**110**	4.3307	**109.980**	4.3299	**110.018**	4.3314	**110.002**	4.3308	**0.020**	0.0008	**0.017**	0.00065	**109.987**	4.3302	**109.967**	4.3294	**0.013**	0.00050	**0.017**	0.00065
EXTRA-LARGE SERIES																				
124, 224, 324	**120**	4.7244	**119.980**	4.7236	**120.018**	4.7251	**120.002**	4.7245	**0.020**	0.0008	**0.017**	0.00065	**119.987**	4.7239	**119.967**	4.7231	**0.013**	0.00050	**0.017**	0.00065
126, 226, 326	**130**	5.1181	**129.975**	5.1171	**130.020**	5.1189	**130.002**	5.1182	**0.024**	0.0010	**0.019**	0.00075	**129.984**	5.1175	**129.962**	5.1166	**0.014**	0.00055	**0.019**	0.00075
128, 228, 328	**140**	5.5118	**139.975**	5.5108	**140.020**	5.5126	**140.002**	5.5119	**0.024**	0.0010	**0.019**	0.00075	**139.984**	5.5112	**139.962**	5.5103	**0.014**	0.00055	**0.019**	0.00075
9130, 130, 230, 330	**150**	5.9055	**149.975**	5.9045	**150.020**	5.9063	**150.002**	5.9056	**0.024**	0.0010	**0.019**	0.00075	**149.984**	5.9049	**149.962**	5.9040	**0.014**	0.00055	**0.019**	0.00075
9132, 132, 232	**160**	6.2992	**159.975**	6.2982	**160.020**	6.3000	**160.002**	6.2993	**0.024**	0.0010	**0.019**	0.00075	**159.984**	6.2986	**159.962**	6.2977	**0.014**	0.00055	**0.019**	0.00075
9134, 134, 234	**170**	6.6929	**169.975**	6.6919	**170.020**	6.6937	**170.002**	6.6930	**0.024**	0.0010	**0.019**	0.00075	**169.984**	6.6923	**169.962**	6.6914	**0.014**	0.00055	**0.019**	0.00075
9136, 136, 236, 336	**180**	7.0866	**179.975**	7.0856	**180.020**	7.0874	**180.002**	7.0867	**0.024**	0.0010	**0.019**	0.00075	**179.984**	7.0860	**179.962**	7.0851	**0.014**	0.00055	**0.019**	0.00075
9138, 138, 238, 338	**190**	7.4803	**189.970**	7.4791	**190.025**	7.4813	**190.005**	7.4805	**0.030**	0.0012	**0.024**	0.00095	**189.984**	7.4797	**189.956**	7.4786	**0.014**	0.00055	**0.020**	0.00080
9140,240, 340	**200**	7.8740	**199.969**	7.8728	**200.025**	7.8750	**200.005**	7.8742	**0.030**	0.0012	–	–	**199.984**	7.8734	**199.954**	7.8722	**0.015**	0.00060	–	–
9142,242, 342	**210**	8.2677	**212.509**	8.2665	**209.771**	8.2587	**210.002**	8.2678	**0.030**	0.0012	–	–	**209.987**	8.2672	**209.951**	8.2658	**0.015**	0.00060	–	–
9144,244, 344	**220**	8.6614	**219.969**	8.6602	**220.025**	8.6624	**220.005**	8.6616	**0.030**	0.0012	–	–	**219.984**	8.6608	**219.954**	8.6596	**0.015**	0.00060	–	–
9146, 246	**230**	9.0551	**229.969**	9.0539	**230.025**	9.0561	**230.005**	9.0553	**0.030**	0.0012	–	–	**230.022**	9.0545	**229.951**	9.0533	**0.015**	0.00060	–	–
248, 348	**240**	9.4488	**239.969**	9.4476	**240.025**	9.4498	**240.005**	9.4490	**0.030**	0.0012	–	–	**239.984**	9.4482	**239.954**	9.4470	**0.015**	0.00060	–	–
250	**250**	9.8425	**249.964**	9.8411	**250.020**	9.8434	**250.005**	9.8426	**0.030**	0.0012	–	–	**250.022**	9.8418	**249.972**	9.8406	**0.015**	0.00060	–	–
9152,252, 352	**260**	10.2362	**259.964**	10.2348	**260.027**	10.2373	**260.005**	10.2364	**0.036**	0.0014	–	–	**259.982**	10.2355	**259.951**	10.2343	**0.015**	0.00060	–	–
9156,256, 356	**280**	11.0236	**279.964**	11.0222	**280.027**	11.0247	**280.005**	11.0238	**0.036**	0.0014	–	–	**279.982**	11.0229	**279.951**	11.0217	**0.015**	0.00060	–	–
9160,260	**300**	11.8110	**299.964**	11.8096	**300.027**	11.8121	**300.005**	11.8112	**0.036**	0.0014	–	–	**299.982**	11.8103	**299.951**	11.8091	**0.015**	0.00060	–	–
9164,264	**320**	12.5984	**319.964**	12.5970	**320.030**	12.5996	**320.005**	12.5986	**0.038**	0.0015	–	–	**319.982**	12.5977	**319.946**	12.5963	**0.015**	0.00060	–	–
9180	**400**	15.7480	**399.969**	15.7464	**400.030**	15.7492	**400.005**	15.7482	**0.038**	0.0015	–	–	**399.982**	15.7473	**399.946**	15.7459	**0.015**	0.00060	–	–

FITTING PRACTICES - *continued*

SHAFT FITS, 7000WN

Note: These tables are to be used for applications where only one ring (either inner or outer) has an interference fit with its shaft and housing. The guidelines for operating conditions covering these tables are found on page A123. In cases where interference fits are used for both rings, bearings with a special internal clearance may be required. Shaft diameter dimensions are for solid steel shafts. Consult your Timken representative when using hollow shafts.

SHAFT FITS, 7000WN SINGLE ROW ANGULAR CONTACT BEARINGS

					These diameters result in shaft to bearing bore fit which closely conforms to j5 listed on pages A67 and A72.					
Bearing Bore Number	Bearing Bore Diameter				Shaft Rotating, Load Stationary Shaft Diameter				Mean Tight Fit	
	Max.		Min.		Min.		Max.			
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
00	**10**	0.3937	**9.992**	0.3934	**9.997**	0.3936	**10.005**	0.3939	**0.005**	0.0002
01	**12**	0.4724	**11.991**	0.4721	**11.996**	0.4723	**12.004**	0.4726	**0.005**	0.0002
02	**15**	0.5906	**14.994**	0.5903	**14.999**	0.5905	**15.006**	0.5908	**0.005**	0.0002
03	**17**	0.6693	**16.993**	0.6690	**16.998**	0.6692	**17.005**	0.6695	**0.005**	0.0002
04	**20**	0.7874	**19.992**	0.7871	**19.997**	0.7873	**20.005**	0.7876	**0.005**	0.0002
05	**25**	0.9843	**24.994**	0.9840	**24.999**	0.9842	**25.006**	0.9845	**0.005**	0.0002
06	**30**	1.1811	**29.992**	1.1808	**29.997**	1.1810	**30.005**	1.1813	**0.005**	0.0002
07	**35**	1.3780	**34.994**	1.3777	**34.999**	1.3779	**35.009**	1.3783	**0.006**	0.00025
08	**40**	1.5748	**39.992**	1.5745	**39.997**	1.5747	**40.008**	1.5751	**0.006**	0.00025
09	**45**	1.7717	**44.994**	1.7714	**44.999**	1.7716	**45.009**	1.7720	**0.006**	0.00025
10	**50**	1.9685	**49.992**	1.9682	**49.997**	1.9684	**50.008**	1.9688	**0.006**	0.00025
11	**55**	2.1654	**54.991**	2.1650	**54.999**	2.1653	**55.011**	2.1658	**0.009**	0.00035
12	**60**	2.3622	**59.990**	2.3618	**59.997**	2.3621	**60.010**	2.3626	**0.009**	0.00035
13	**65**	2.5591	**64.991**	2.5587	**64.999**	2.5590	**65.011**	2.5595	**0.009**	0.00035
14	**70**	2.7559	**69.990**	2.7555	**69.997**	2.7558	**70.010**	2.7563	**0.009**	0.00035
15	**75**	2.9528	**74.991**	2.9524	**74.999**	2.9527	**75.011**	2.9532	**0.009**	0.00035
16	**80**	3.1496	**79.990**	3.1492	**79.997**	3.1495	**80.010**	3.1500	**0.009**	0.00035
17	**85**	3.3465	**84.988**	3.3460	**84.999**	3.3464	**85.014**	3.3470	**0.011**	0.00045
18	**90**	3.5433	**89.987**	3.5428	**89.997**	3.5432	**90.013**	3.5438	**0.011**	0.00045
19	**95**	3.7402	**94.988**	3.7397	**94.999**	3.7401	**95.014**	3.7407	**0.011**	0.00045
20	**100**	3.9370	**99.987**	3.9365	**99.997**	3.9369	**100.013**	3.9375	**0.011**	0.00045
21	**105**	4.1339	**104.988**	4.1334	**104.999**	4.1338	**105.014**	4.1344	**0.011**	0.00045
22	**110**	4.3307	**109.987**	4.3302	**109.997**	4.3306	**110.012**	4.3312	**0.011**	0.00045
24	**120**	4.7244	**119.987**	4.7239	**119.997**	4.7243	**120.012**	4.7249	**0.011**	0.00045
26	**130**	5.1181	**129.982**	5.1174	**129.997**	5.1180	**130.015**	5.1187	**0.015**	0.0006
28	**140**	5.5118	**139.982**	5.5111	**139.997**	5.5117	**140.015**	5.5124	**0.015**	0.0006
30	**150**	5.9055	**149.982**	5.9048	**149.997**	5.9054	**150.015**	5.9061	**0.015**	0.0006

FITTING PRACTICES - *continued*

HOUSING FITS RADIAL BALL BEARING

Housing fits, ABEC 1, ABEC 3

Note: These tables are to be used for applications where only one ring (either inner or outer) has an interference fit with its shaft and housing. The guidelines for operating conditions covering these tables are found on page A123. In cases where interference fits are used for both rings, bearings with a special internal clearance may be required. Housing bore diameter dimensions are for steel materials. Consult your Timken representative when using other housing materials.

HOUSING FITS, ABEC 1, ABEC 3

					These diameters result in a bearing O.D. to housing bore fit which closely conforms to H6 listed on pages A66 and A72								These diameters result in a bearing O.D. to housing bore fit which closely conforms to M7 listed on pages A66 and A72							
Basic Bearing Number					Housing Stationary, Load Stationary or Housing Rotating, Load Rotating								Housing Rotating, Load Stationary or Housing Stationary, Load Rotating							
					Housing Bore				Mean Fit Loose				Housing Bore				Mean Fit Tight			
Extra Small	Extra Light	Light	Medium	Heavy	Min.		Max		ABEC 1		ABEC 3		Min.		Max.		ABEC 1		ABEC 3	
					mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
30, S, F SERIES	9100, 9300 SERIES	200, 5200,7200 SERIES	300, 5300,7300 SERIES	400[2] 7400 SERIES																
33K3, F33K3	–	–	–	–	**9.525**	0.3750	**9.535**	0.3754	**0.010**	0.00040	**0.009**	0.00035	**9.507**	0.3743	**9.525**	0.3750	**0.004**	0.00015	**0.005**	0.00020
33K4	–	–	–	–	**12.700**	0.5000	**12.710**	0.5004	**0.010**	0.00040	**0.009**	0.00035	**12.682**	0.4993	**12.700**	0.5000	**0.004**	0.00015	**0.005**	0.00020
33K5, F33K5	–	–	–	–	**12.700**	0.5000	**12.710**	0.5004	**0.010**	0.00040	**0.009**	0.00035	**12.682**	0.4993	**12.700**	0.5000	**0.004**	0.00015	**0.005**	0.00020
34K	–	–	–	–	**15.999**	0.6299	**16.010**	0.6303	**0.010**	0.00040	**0.009**	0.00035	**15.982**	0.6292	**15.999**	0.6299	**0.004**	0.00015	**0.005**	0.00020
35K	–	–	–	–	**18.999**	0.7480	**19.012**	0.7485	**0.011**	0.00045	**0.010**	0.00040	**18.979**	0.7472	**18.999**	0.7480	**0.005**	0.00020	**0.006**	0.00025
36K	–	–	–	–	**18.999**	0.7480	**19.012**	0.7485	**0.011**	0.00045	**0.010**	0.00040	**18.979**	0.7472	**18.999**	0.7480	**0.005**	0.00020	**0.006**	0.00025
37K	–	–	–	–	**21.999**	0.8661	**22.012**	0.8666	**0.011**	0.00045	**0.010**	0.00040	**21.979**	0.8653	**29.999**	0.8661	**0.005**	0.00020	**0.006**	0.00025
38K	–	–	–	–	**21.999**	0.8661	**22.012**	0.8666	**0.011**	0.00045	**0.010**	0.00040	**21.979**	0.8653	**21.999**	0.8661	**0.005**	0.00020	**0.006**	0.00025
38KV	–	–	–	–	**24.000**	0.9449	**24.013**	0.9454	**0.011**	0.00045	**0.010**	0.00040	**23.980**	0.9441	**24.000**	0.9449	**0.005**	0.00020	**0.006**	0.00025
39K	9100	–	–	–	**25.999**	1.0236	**26.012**	1.0241	**0.011**	0.00045	**0.010**	0.00040	**25.979**	1.0228	**25.999**	1.0236	**0.005**	0.00020	**0.006**	0.00025
S1K7, FS1K7	–	–	–	–	**15.875**	0.6250	**15.885**	0.6254	**0.010**	0.00040	**0.009**	0.00035	**15.857**	0.6243	**15.875**	0.6250	**0.004**	0.00015	**0.005**	0.00020
S1K	–	–	–	–	**19.050**	0.7500	**19.063**	0.7505	**0.011**	0.00045	**0.010**	0.00040	**19.030**	0.7492	**19.050**	0.7500	**0.005**	0.00020	**0.006**	0.00025
S3K, FS3K	–	–	–	–	**22.225**	0.8750	**22.238**	0.8755	**0.011**	0.00045	**0.010**	0.00040	**22.205**	0.8742	**22.225**	0.8750	**0.005**	0.00020	**0.006**	0.00025
S5K	–	–	–	–	**28.575**	1.1250	**28.588**	1.1255	**0.011**	0.00045	**0.010**	0.00040	**28.555**	1.1242	**28.575**	1.1250	**0.005**	0.00020	**0.006**	0.00025
S7K	–	–	–	–	**34.925**	1.3750	**34.940**	1.3756	**0.014**	0.00055	**0.011**	0.00045	**34.900**	1.3740	**34.925**	1.3750	**0.006**	0.00025	**0.009**	0.00035
S8K	–	–	–	–	**41.275**	1.6250	**41.290**	1.6256	**0.014**	0.00055	**0.011**	0.00045	**41.250**	1.6240	**41.275**	1.6250	**0.006**	0.00025	**0.009**	0.00035
S9K	–	–	–	–	**47.625**	1.8750	**47.640**	1.8756	**0.014**	0.00055	**0.011**	0.00045	**47.600**	1.8740	**47.625**	1.8750	**0.006**	0.00025	**0.009**	0.00035
S10K	–	–	–	–	**50.800**	2.0000	**50.818**	2.0007	**0.015**	0.00060	**0.014**	0.00055	**50.770**	1.9988	**50.800**	2.0000	**0.009**	0.00035	**0.010**	0.00040
S11K	–	–	–	–	**53.975**	2.1250	**53.993**	2.1257	**0.015**	0.00060	**0.014**	0.00055	**53.945**	2.1238	**53.975**	2.1250	**0.009**	0.00035	**0.010**	0.00040
S12K	–	–	–	–	**57.150**	2.2500	**57.168**	2.2507	**0.015**	0.00060	**0.014**	0.00055	**57.120**	2.2488	**57.150**	2.2500	**0.009**	0.00035	**0.010**	0.00040
F2002	–	–	–	–	**9.525**	0.3750	**9.533**	0.3753	**0.000**	0.00000	**0.000**	0.00000	**9.522**	0.3749	**9.533**	0.3753	**0.000**	0.00000	**0.000**	0.00000
F2	–	–	–	–	**11.112**	0.4375	**11.120**	0.4378	**0.000**	0.00000	**0.000**	0.00000	**11.110**	0.4374	**11.120**	0.4378	**0.000**	0.00000	**0.000**	0.00000
F3	–	–	–	–	**14.285**	0.5624	**14.295**	0.5628	**0.000**	0.00000	**0.000**	0.00000	**14.285**	0.5624	**14.295**	0.5628	**0.000**	0.00000	**0.000**	0.00000
F4	–	–	–	–	**15.872**	0.6249	**15.883**	0.6253	**0.000**	0.00000	**0.000**	0.00000	**15.872**	0.6249	**15.883**	0.6253	**0.000**	0.00000	**0.000**	0.00000
F5	–	–	–	–	**17.460**	0.6874	**17.470**	0.6878	**0.000**	0.00000	**0.000**	0.00000	**17.460**	0.6874	**17.476**	0.6878	**0.000**	0.00000	**0.000**	0.00000
–	9101, 9302	–	–	–	**28.001**	1.1024	**28.014**	1.1029	**0.011**	0.00045	**0.000**	0.00040	**27.981**	1.1016	**28.001**	1.1024	**0.005**	0.00020	**0.006**	0.00025
–	9303	200	–	–	**30.000**	1.1811	**30.013**	1.1816	**0.011**	0.00045	**0.010**	0.00040	**29.980**	1.1803	**39.000**	1.1811	**0.005**	0.00020	**0.006**	0.00025
–	9102	201	–	–	**31.999**	1.2598	**32.014**	1.2604	**0.014**	0.00055	**0.011**	0.00045	**31.974**	1.2588	**31.999**	1.2598	**0.006**	0.00025	**0.009**	0.00035
–	9103	202	300	–	**35.001**	1.3780	**35.016**	1.3786	**0.014**	0.00055	**0.011**	0.00045	**34.976**	1.3770	**35.001**	1.3780	**0.006**	0.00025	**0.009**	0.00035
–	9304	–	301	–	**37.000**	1.4567	**37.015**	1.4573	**0.014**	0.00055	**0.011**	0.00045	**36.975**	1.4557	**37.000**	1.4567	**0.006**	0.00025	**0.009**	0.00035
–	–	203	–	–	**40.000**	1.5748	**40.015**	1.5754	**0.014**	0.00055	**0.011**	0.00045	**39.975**	1.5738	**40.000**	1.5748	**0.006**	0.00025	**0.009**	0.00035
–	9104, 9305	–	302	–	**41.999**	1.6535	**42.014**	1.6541	**0.014**	0.00055	**0.011**	0.00045	**41.974**	1.6525	**41.999**	1.6535	**0.006**	0.00025	**0.009**	0.00035
–	9105, 9306	204	303	–	**47.000**	1.8504	**47.015**	1.8510	**0.014**	0.00055	**0.011**	0.00045	**46.975**	1.8494	**47.000**	1.8504	**0.006**	0.00025	**0.009**	0.00035
–	–	205	304	–	**51.999**	2.0472	**52.017**	2.0479	**0.015**	0.00060	**0.014**	0.00055	**51.968**	2.0460	**51.999**	2.0472	**0.009**	0.00035	**0.010**	0.00040
–	9106, 9307	–	–	–	**55.001**	2.1654	**55.019**	2.1661	**0.015**	0.00060	**0.014**	0.00055	**54.971**	2.1642	**55.001**	2.1654	**0.009**	0.00035	**0.010**	0.00040
–	9107, 9308	206	305	403	**61.999**	2.4409	**62.017**	2.4416	**0.015**	0.00060	**0.014**	0.00055	**61.968**	2.4397	**61.999**	2.4409	**0.009**	0.00030	**0.010**	0.00040
–	9108	–	–	–	**68.001**	2.6772	**68.019**	2.6779	**0.015**	0.00060	**0.014**	0.00055	**67.970**	2.6760	**68.001**	2.6772	**0.009**	0.00030	**0.010**	0.00040
–	9310	207	306	404	**71.999**	2.8346	**72.017**	2.8353	**0.015**	0.00060	**0.014**	0.00055	**71.968**	2.8334	**71.999**	2.8346	**0.009**	0.00030	**0.010**	0.00040
–	9109	–	–	–	**75.001**	2.9528	**75.019**	2.9535	**0.015**	0.00060	**0.014**	0.00055	**74.971**	2.9516	**75.001**	2.9528	**0.009**	0.00030	**0.010**	0.00040
–	9110	208	307	405	**80.000**	3.1496	**80.018**	3.1503	**0.015**	0.00060	**0.014**	0.00055	**79.969**	3.1484	**80.000**	3.1496	**0.009**	0.00030	**0.010**	0.00040
–	9312	209	–	–	**85.001**	3.3465	**85.024**	3.3474	**0.019**	0.00080	**0.017**	0.00065	**84.966**	3.3451	**85.001**	3.3465	**0.010**	0.00040	**0.013**	0.00050
–	9111	210	308	406	**90.000**	3.5433	**90.023**	3.5442	**0.019**	0.00080	**0.017**	0.00065	**89.964**	3.5419	**90.000**	3.5433	**0.010**	0.00040	**0.013**	0.00050
–	9112	–	–	–	**95.001**	3.7402	**120.424**	3.7411	**0.019**	0.00080	**0.017**	0.00065	**94.965**	3.7388	**95.001**	3.7402	**0.010**	0.00040	**0.013**	0.00050
–	9113	211	309	407	**100.000**	3.9370	**100.023**	3.9379	**0.019**	0.00080	**0.017**	0.00065	**99.964**	3.9356	**100.000**	3.9370	**0.010**	0.00040	**0.013**	0.00050
–	9114	212	310	408	**110.000**	4.3307	**110.023**	4.3316	**0.019**	0.00080	**0.017**	0.00065	**109.964**	4.3293	**110.000**	4.3307	**0.010**	0.00040	**0.013**	0.00050

[2]400 Series are "specials," consult your Timken representative.

FITTING PRACTICES - *continued*

HOUSING FITS, ABEC 1, ABEC 3

Note: These tables are to be used for applications where only one ring (either inner or outer) has an interference fit with its shaft and housing. The guidelines for operating conditions covering these tables are found on page A123. In cases where interference fits are used for both rings, bearings with a special internal clearance may be required. Housing bore diameter dimensions are for steel materials. Consult your Timken representative when using other housing materials.

HOUSING FITS, ABEC 1, ABEC 3

					These diameters result in a bearing O.D. to housing bore fit which closely conforms to H6 beginning on A61								These diameters result in a bearing O.D. to housing bore fit which closely conforms to M7 listed on page A63							
Basic Bearing Number					Housing Stationary, Load Stationary or Housing Rotating, Load Rotating								Housing Rotating, Load Stationary or Housing Stationary, Load Rotating							
					Housing Bore				Mean Fit Loose				Housing Bore				Mean Fit Tight			
Extra Small	Extra Light	Light	Medium	Heavy	Min.		Max		ABEC 1		ABEC 3		Min.		Max.		ABEC 1		ABEC 3	
					mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.
30,S,F SERIES	9100, 9300 SERIES	200,5200, 7200 SERIES	300,5300, 7300 SERIES	400,5400, 7400 SERIES																
—	9115	—	—	—	**115.001**	4.5276	**115.024**	4.5285	**0.019**	0.0008	**0.017**	0.00065	**114.965**	4.5262	**115.001**	4.5276	**0.010**	0.0004	**0.013**	0.00050
—	—	213	311	409	**120.000**	4.7244	**120.023**	4.7253	**0.019**	0.0008	**0.017**	0.00065	**119.964**	4.7230	**120.000**	4.7244	**0.010**	0.0004	**0.013**	0.00050
—	—	214	—	—	**125.001**	4.9213	**125.026**	4.9223	**0.023**	0.0009	**0.019**	0.00075	**124.960**	4.9197	**125.001**	4.9213	**0.010**	0.0004	**0.014**	0.00055
—	9117	215	312	410	**130.000**	5.1181	**130.025**	5.1191	**0.023**	0.0009	**0.019**	0.00075	**129.959**	5.1165	**130.000**	5.1181	**0.010**	0.0004	**0.014**	0.00055
—	9118	216	313	411	**140.000**	5.5118	**140.025**	5.5128	**0.023**	0.0009	**0.019**	0.00075	**139.959**	5.5102	**140.000**	5.5118	**0.010**	0.0004	**0.014**	0.00055
—	9120	217	314	412	**150.000**	5.9055	**150.025**	5.9065	**0.023**	0.0009	**0.019**	0.00075	**149.959**	5.9039	**150.000**	5.9055	**0.010**	0.0004	**0.014**	0.00055
—	120–2	218	315	—	**160.000**	6.2992	**160.025**	6.3002	**0.025**	0.0010	**0.020**	0.00080	**159.959**	6.2976	**160.000**	6.2992	**0.008**	0.0003	**0.013**	0.00050
—	9121	—	—	413	**160.000**	6.2992	**160.025**	6.3002	**0.025**	0.0010	**0.020**	0.00080	**159.959**	6.2976	**160.000**	6.2992	**0.008**	0.0003	**0.013**	0.00050
—	9122	129	316	—	**170.000**	6.6929	**170.025**	6.6939	**0.025**	0.0010	**0.020**	0.00080	**169.959**	6.6913	**170.000**	6.6929	**0.008**	0.0003	**0.013**	0.00050
—	122	—	—	—	**175.000**	6.8898	**175.026**	6.8908	**0.025**	0.0010	**0.020**	0.00080	**174.960**	6.8882	**175.001**	6.8898	**0.008**	0.0003	**0.013**	0.00050
—	9124	220	317	414	**180.000**	7.0866	**180.025**	7.0876	**0.025**	0.0010	**0.020**	0.00080	**179.959**	7.0850	**180.000**	7.0866	**0.008**	0.0003	**0.013**	0.00050
—	124	221	318	415	**190.000**	7.4803	**190.028**	7.4815	**0.029**	0.0012	**0.023**	0.00090	**189.954**	7.4785	**190.000**	7.4803	**0.008**	0.0003	**0.014**	0.00055
—	9126	222	319	416	**200.000**	7.8740	**200.028**	7.8752	**0.029**	0.0012	**0.023**	0.00090	**199.954**	7.8722	**200.000**	7.8740	**0.008**	0.0003	**0.014**	0.00055
—	126	—	—	—	**205.001**	8.0709	**205.029**	8.0721	**0.029**	0.0012	**0.023**	0.00090	**204.955**	8.0691	**205.001**	8.0709	**0.008**	0.0003	**0.014**	0.00055
—	9128	—	—	—	**210.000**	8.2677	**210.028**	8.2689	**0.029**	0.0012	**0.023**	0.00090	**209.954**	8.2659	**210.000**	8.2677	**0.008**	0.0003	**0.014**	0.00055
—	—	224	320	—	**215.001**	8.4646	**215.029**	8.4658	**0.029**	0.0012	**0.023**	0.00090	**214.955**	8.4628	**215.001**	8.4646	**0.008**	0.0003	**0.014**	0.00055
—	128	—	—	—	**220.000**	8.6614	**220.028**	8.6626	**0.029**	0.0012	**0.023**	0.00090	**219.954**	8.6596	**220.000**	8.6614	**0.008**	0.0003	**0.014**	0.00055
—	9130	—	321	418	**225.001**	8.8583	**225.029**	8.8595	**0.029**	0.0012	**0.023**	0.00090	**224.955**	8.8565	**225.001**	8.8583	**0.008**	0.0003	**0.014**	0.00055
—	—	226	—	—	**230.000**	9.0551	**230.027**	9.0563	**0.029**	0.0012	**0.023**	0.00090	**229.954**	9.0533	**230.000**	9.0551	**0.008**	0.0003	**0.014**	0.00055
—	130	—	—	—	**235.001**	9.2520	**235.029**	9.2532	**0.029**	0.0012	**0.023**	0.00090	**234.955**	9.2502	**235.001**	9.2520	**0.008**	0.0003	**0.014**	0.00055
—	9132	—	322	—	**240.000**	9.4488	**240.027**	9.4506	**0.029**	0.0012	**0.023**	0.00090	**239.954**	9.4470	**240.000**	9.4488	**0.008**	0.0003	**0.014**	0.00055
—	132	228	—	—	**250.000**	9.8425	**250.027**	9.8437	**0.029**	0.0012	**0.023**	0.00090	**249.954**	9.8407	**250.000**	9.8425	**0.008**	0.0003	**0.014**	0.00055
—	9134	—	324	—	**259.999**	10.2362	**260.032**	10.2374	**0.033**	0.0013	**0.027**	0.00105	**259.942**	10.2342	**259.999**	10.2362	**0.008**	0.0003	**0.015**	0.00060
—	134	—	—	420	**265.001**	10.4331	**265.034**	10.4343	**0.033**	0.0013	**0.027**	0.00105	**264.950**	10.4311	**265.001**	10.4331	**0.008**	0.0003	**0.015**	0.00060
—	—	230	—	—	**269.999**	10.6299	**270.032**	10.6311	**0.033**	0.0013	**0.027**	0.00105	**269.949**	10.6279	**269.999**	10.6299	**0.008**	0.0003	**0.015**	0.00060
—	136,9136	—	326	—	**279.999**	11.0236	**280.032**	11.0248	**0.033**	0.0013	**0.027**	0.00105	**279.949**	11.0216	**279.999**	11.0236	**0.008**	0.0003	**0.015**	0.00060
—	9138	232	—	—	**289.999**	11.4173	**290.039**	11.4185	**0.033**	0.0013	**0.027**	0.00105	**289.949**	11.4153	**289.999**	11.4173	**0.008**	0.0003	**0.015**	0.00060
—	138	—	328	—	**299.999**	11.8110	**300.032**	11.8122	**0.033**	0.0013	**0.027**	0.00105	**299.949**	11.8090	**299.999**	11.8110	**0.008**	0.0003	**0.015**	0.00060
—	9140	234	—	—	**309.999**	12.2047	**310.029**	12.2059	**0.033**	0.0013	—	—	**309.949**	12.2027	**309.999**	12.2047	**0.008**	0.0003	—	—
—	—	236	330	—	**319.999**	12.5984	**320.035**	12.5998	**0.038**	0.0015	—	—	**319.943**	12.5962	**319.999**	12.5984	**0.008**	0.0003	—	—
—	9144	238	—	—	**339.999**	13.3858	**340.035**	13.3872	**0.038**	0.0015	—	—	**339.943**	13.3836	**339.999**	13.3858	**0.008**	0.0003	—	—
—	9146	240	—	—	**359.999**	14.1732	**360.035**	14.1746	**0.038**	0.0015	—	—	**359.943**	14.1710	**359.999**	14.1732	**0.008**	0.0003	—	—
—	—	242	336	—	**380.007**	14.9606	**380.035**	14.9620	**0.038**	0.0015	—	—	**379.943**	14.9584	**379.999**	14.9606	**0.008**	0.0003	—	—
—	9152	244	338	—	**399.999**	15.7480	**400.035**	15.7494	**0.038**	0.0015	—	—	**399.943**	15.7458	**399.999**	15.7480	**0.008**	0.0003	—	—
—	9156	246	340	—	**419.999**	16.5354	**420.040**	16.5370	**0.038**	0.0017	—	—	**419.936**	16.5329	**419.999**	16.5354	**0.010**	0.0004	—	—
—	—	248	342	—	**439.999**	17.3228	**440.040**	17.3244	**0.038**	0.0017	—	—	**439.936**	17.3203	**439.999**	17.3228	**0.010**	0.0004	—	—
—	9160	250	344	—	**459.999**	18.1102	**460.040**	18.1118	**0.038**	0.0017	—	—	**459.936**	18.1077	**459.999**	18.1102	**0.010**	0.0004	—	—
—	9164	252	—	—	**479.999**	18.8976	**480.040**	18.8992	**0.038**	0.0017	—	—	**479.936**	18.8951	**479.999**	18.8976	**0.010**	0.0004	—	—
—	—	256	348	—	**499.999**	19.6850	**500.040**	19.6866	**0.038**	0.0017	—	—	**499.936**	19.6825	**499.999**	19.6850	**0.010**	0.0004	—	—
—	—	260	352	—	**539.999**	21.2598	**540.042**	21.2615	**0.048**	0.0019	—	—	**539.930**	21.2571	**539.999**	21.2598	**0.010**	0.0004	—	—
—	—	264	356	—	**579.999**	22.8346	**580.042**	22.8363	**0.048**	0.0019	—	—	**579.930**	22.8319	**579.999**	22.8346	**0.010**	0.0004	—	—
—	9180	—	—	—	**599.999**	23.6220	**600.042**	23.6237	**0.048**	0.0019	—	—	**599.930**	23.6193	**599.999**	23.6220	**0.010**	0.0004	—	—

FITTING PRACTICES - *continued*

SHAFT AND HOUSING SHOULDERS

Shaft and housing shoulder diameters for radial roller and thrust ball and roller bearings are also found in the respective dimension tables. Shaft and housing shoulders for ball bearings are shown below.

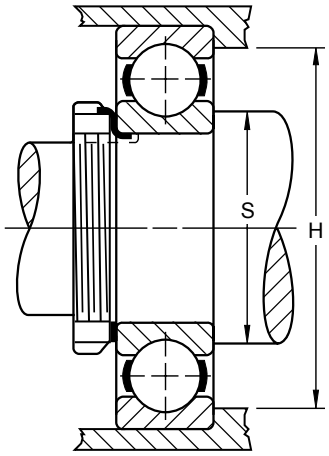
RADIAL BALL BEARINGS

The preferred method of locating bearings on shafts and in housings is to provide accurate shoulders perpendicular to the shaft axis. Shoulders should be large enough to exceed the theoretical point of tangency between the corner radius and the face of the bearing, and small enough to permit bearing removal with proper pullers.

These tables give the suggested maximum and minimum shaft and housing shoulder diameters for the majority of applications. Where design limitations do not permit conformance to these suggested diameters, your Timken representative should be consulted.

Suggested shaft and housing fillet radii are listed in the dimensional tables of each product catalog and must be used to assure proper seating against shaft and housing shoulders.

Shaft and housing diameters for radial ball bearings are shown below and on the following two pages. For radial cylindrical, spherical and tapered roller bearings, refer to the respective dimension tables. Housing shoulders for wide inner ring bearings are shown on page A133.



EXTRA-LIGHT 9300 SERIES

Basic Bearing Number	Shaft Shoulder ± 0.25 mm	Shaft Shoulder ±.010"	Housing Shoulder ± 0.25 mm	Housing Shoulder ±.010"
	mm	in.	mm	in.
9301K	**14.7**	0.58	**21.6**	0.85
9302K	**17.8**	0.70	**25.4**	1.00
9303K	**19.8**	0.78	**27.4**	1.08
9304K	**23.9**	0.94	**33.5**	1.32
9305K	**29.0**	1.14	**38.6**	1.52
9306K	**33.5**	1.32	**43.4**	1.71
9307K	**39.6**	1.56	**50.8**	2.00
9308K	**45.0**	1.77	**57.4**	2.26
9309K	**50.3**	1.98	**63.2**	2.49
9310K	**54.9**	2.16	**67.6**	2.66
9311K	**61.0**	2.40	**74.7**	2.94
9312K	**65.8**	2.59	**79.8**	3.14

EXTRA-SMALL SERIES

Basic Bearing Number	Shoulder Diameters							
	Shaft, S				Housing, H			
	Max.		Min.		Max.		Min.	
	mm	in.	mm	in.	mm	in.	mm	in.
33K3	**5.1**	0.20	**4.8**	0.19	**8.1**	0.32	**7.9**	0.31
33K4	**6.1**	0.24	**5.8**	0.23	**11.2**	0.44	**10.9**	0.43
33K5	**6.6**	0.26	**6.4**	0.25	**11.2**	0.44	**10.9**	0.43
34K	**6.6**	0.26	**6.4**	0.25	**14.2**	0.56	**14.0**	0.55
35K	**9.4**	0.37	**9.1**	0.36	**17.0**	0.67	**16.8**	0.66
36K	**9.4**	0.37	**9.1**	0.36	**17.0**	0.67	**16.8**	0.66
37K	**11.2**	0.44	**10.7**	0.42	**20.1**	0.79	**19.6**	0.77
38K	**11.4**	0.45	**10.9**	0.43	**20.1**	0.79	**19.6**	0.77
38KV	**11.4**	0.45	**10.9**	0.43	**20.1**	0.79	**19.6**	0.77
39K	**13.0**	0.51	**12.5**	0.49	**23.1**	0.91	**22.6**	0.89
S1K7	**8.6**	0.34	**8.1**	0.32	**14.2**	0.56	**13.7**	0.54
S1K	**9.4**	0.37	**8.9**	0.35	**17.5**	0.69	**17.0**	0.67
S3K	**12.7**	0.50	**12.2**	0.48	**20.3**	0.80	**19.8**	0.78
S5K	**16.0**	0.63	**15.5**	0.61	**25.1**	0.99	**24.6**	0.97
S7K	**21.3**	0.84	**20.3**	0.80	**31.5**	1.24	**30.5**	1.20
S8K	**24.6**	0.97	**23.6**	0.93	**37.1**	1.46	**35.6**	1.40
S9K	**28.9**	1.14	**27.9**	1.10	**41.9**	1.65	**40.9**	1.61
S10K	**31.5**	1.24	**30.5**	1.20	**46.7**	1.84	**45.7**	1.80
S11K	**34.0**	1.34	**33.0**	1.30	**49.5**	1.95	**48.5**	1.91
S12K	**39.4**	1.55	**38.4**	1.51	**55.9**	2.20	**50.8**	2.00

FITTING PRACTICES - *continued*

SHAFT AND HOUSING SHOULDERS RADIAL BALL BEARINGS

RADIAL BALL BEARINGS

Basic Bearing Number	Extra-Light • 9100 Series Shoulder Diameters								Basic Bearing Number	Light • 200, 5200, 7200WN Series Shoulder Diameters								Basic Bearing Number	Medium • 300, 5300, 7300WN Series Shoulder Diameters							
	Shaft, S				Housing, H					Shaft, S				Housing, H					Shaft, S				Housing, H			
	Max.		Min.		Max.		Min.			Max.		Min.		Max.		Min.			Max.		Min.		Max.		Min.	
	mm	in.	mm	in.	mm	in.	mm	in.		mm	in.	mm	in.	mm	in.	mm	in.		mm	in.	mm	in.	mm	in.	mm	in.
9100	13.2	0.52	11.9	0.47	24.1	0.95	23.1	0.91	200	14.2	0.56	12.7	0.50	24.9	0.98	24.6	0.97	300	15.0	0.59	12.7	0.50	30.0	1.18	29.2	1.15
9101	18.0	0.71	14.0	0.55	25.9	1.02	24.6	0.97	201	16.3	0.64	14.7	0.58	26.9	1.06	26.7	1.05	301	17.5	0.69	16.0	0.63	31.0	1.22	30.7	1.21
9102	19.0	0.75	17.0	0.67	30.0	1.18	28.7	1.13	202	19.0	0.75	17.5	0.69	30.0	1.18	29.2	1.15	302	20.6	0.81	19.0	0.75	36.1	1.42	35.6	1.40
9103	20.6	0.81	19.0	0.75	33.0	1.30	31.8	1.25	203	21.3	0.84	19.6	0.77	34.0	1.34	33.3	1.31	303	23.1	0.91	21.1	0.83	40.9	1.61	40.6	1.60
9104	24.9	0.98	22.6	0.89	37.1	1.46	35.8	1.41	204	25.4	1.00	23.9	0.94	40.9	1.61	40.1	1.58	304	26.9	1.06	23.9	0.94	45.0	1.77	44.4	1.75
9105	30.0	1.18	27.4	1.08	41.9	1.65	40.6	1.60	205	31.0	1.22	29.0	1.14	46.0	1.81	45.2	1.78	305	33.3	1.31	29.0	1.14	55.1	2.17	53.1	2.09
9106	35.1	1.38	34.0	1.34	49.0	1.93	47.8	1.88	206	37.3	1.47	34.0	1.34	56.1	2.21	54.9	2.16	306	39.6	1.56	34.0	1.34	65.0	2.56	62.0	2.44
9107	41.4	1.63	38.9	1.53	56.1	2.21	54.6	2.15	207	43.7	1.72	38.9	1.53	65.0	2.56	62.7	2.47	307	45.2	1.78	42.9	1.69	71.1	2.80	69.1	2.72
9108	46.0	1.81	43.9	1.73	62.0	2.44	60.7	2.39	208	49.3	1.94	43.9	1.73	72.9	2.87	70.6	2.78	308	50.8	2.00	49.0	1.93	81.0	3.19	77.7	3.06
9109	51.6	2.03	49.3	1.94	69.1	2.72	67.8	2.67	209	54.1	2.13	49.3	1.94	78.0	3.07	75.4	2.97	309	2.28	57.9	2.13	54.1	3.58	90.9	3.41	86.6
9110	56.4	2.22	54.1	2.13	73.9	2.91	72.6	2.86	210	59.4	2.34	54.1	2.13	83.1	3.27	80.5	3.17	310	63.5	2.50	59.9	2.36	100.1	3.94	95.2	3.75
9111	63.0	2.48	59.2	2.33	83.1	3.27	81.8	3.22	211	64.5	2.54	61.2	2.41	93.5	3.68	90.4	3.56	311	69.8	2.75	65.0	2.56	110.0	4.33	104.9	4.13
9112	67.8	2.67	64.3	2.53	88.1	3.47	86.9	3.42	212	71.4	2.81	67.8	2.67	101.1	3.98	98.3	3.87	312	74.7	2.94	72.1	2.84	118.1	4.65	112.8	4.44
9113	72.1	2.84	69.1	2.72	93.0	3.66	81.7	3.61	213	77.0	3.03	72.6	2.86	111.0	4.37	106.4	4.19	313	81.0	3.19	77.0	3.03	128.0	5.04	122.2	4.81
9114	79.0	3.11	73.9	2.91	103.1	4.06	100.8	3.97	214	81.8	3.22	77.7	3.06	116.1	4.57	112.0	4.41	314	87.4	3.44	82.0	3.23	137.9	5.43	130.3	5.13
9115	84.1	3.31	79.0	3.11	108.0	4.25	105.7	4.16	215	87.4	3.44	82.6	3.25	120.9	4.76	116.6	4.59	315	98.6	3.88	87.1	3.43	148.1	5.83	139.7	5.50
9116	90.4	3.56	84.1	3.31	118.1	4.65	114.3	4.50	216	93.7	3.69	90.2	3.55	130.0	5.12	125.2	4.93	316	100.1	3.94	91.9	3.62	158.0	6.22	149.4	5.88
9117	95.2	3.75	88.9	3.50	122.9	4.84	119.6	4.71	217	98.6	3.88	95.2	3.75	140.0	5.51	134.9	5.31	317	104.9	4.13	99.1	3.90	166.1	6.54	157.2	6.19
9118	102.4	4.03	97.5	3.84	131.1	5.16	130.3	5.13	218	105.7	4.16	100.1	3.94	150.1	5.91	142.7	5.62	318	111.3	4.38	103.9	4.09	176.0	6.93	165.1	6.50
9120	111.3	4.38	107.4	4.23	141.0	5.55	138.2	5.44	219	111.3	4.38	106.9	4.21	158.0	6.22	153.9	6.06	319	117.6	4.63	109.0	4.29	185.9	7.32	174.8	6.88
9121	118.4	4.66	115.1	4.53	150.1	5.91	146.0	5.75	220	117.6	4.63	112.0	4.41	167.9	6.61	160.3	6.31	320	124.0	4.88	114.0	4.49	200.9	7.91	187.4	7.38
9122	124.7	4.91	119.9	4.72	160.0	6.30	157.0	6.18	221	124.0	4.88	117.1	4.61	178.1	7.01	174.8	6.88	321	130.3	5.13	119.1	4.69	211.1	8.31	196.8	7.75
9124	134.1	5.28	130.0	5.12	169.9	6.69	165.1	6.50	222	130.3	5.13	121.9	4.80	188.0	7.40	179.3	7.06	322	139.7	5.50	124.0	4.88	226.1	8.90	209.6	8.25
9126	147.6	5.81	140.0	5.51	190.0	7.48	184.1	7.25	224	143.0	5.63	132.1	5.20	202.9	7.99	192.0	7.56	324	152.4	6.00	134.1	5.28	246.1	9.69	226.8	8.93
9128	153.9	6.06	147.6	5.81	200.2	7.88	195.1	7.68	226	152.4	6.00	144.0	5.67	215.9	8.50	206.5	8.13	326	163.6	6.44	148.1	5.83	262.1	10.32	246.1	9.69
9130	167.4	6.59	162.1	6.38	213.1	8.39	206.5	8.13	228	165.1	6.50	153.9	6.06	236.0	9.29	223.8	8.81	328	176.0	6.93	158.0	6.22	281.9	11.10	263.7	10.38
9132	176.8	6.96	166.6	6.56	228.6	9.00	222.2	8.75	230	177.0	6.97	164.1	6.46	256.0	10.08	241.3	9.50	330	189.0	7.44	167.9	6.61	302.0	11.89	280.9	11.06
9134	192.0	7.56	182.1	7.17	247.9	9.76	239.8	9.44	232	186.9	7.36	174.0	6.85	276.1	10.87	260.4	10.25	332	188.0	7.84	178.0	7.01	322.1	12.68	294.1	11.58
9138	212.9	8.38	201.9	7.95	278.1	10.95	266.7	10.50	234	202.7	7.98	188.0	7.40	292.1	11.50	276.4	10.88	334	213.4	8.40	188.0	7.40	342.1	13.47	311.7	12.27
9140	224.5	8.84	212.1	8.35	297.9	11.73	285.0	11.22	236	212.9	8.38	198.1	7.80	302.0	11.89	281.7	11.09	336	223.5	8.80	198.1	7.80	362.0	14.25	331.5	13.05
9144	246.4	9.70	233.9	9.21	326.1	12.84	310.9	12.24	238	222.8	8.77	208.0	8.19	322.1	12.68	301.8	11.88	338	237.5	9.35	212.1	8.35	378.2	14.89	345.2	13.59
9148	266.7	10.50	254.0	10.00	345.9	13.62	330.7	13.02	240	239.3	9.42	217.9	8.58	342.1	13.47	319.3	12.57	340	249.9	9.84	222.0	8.74	398.0	15.67	365.0	14.37
9152	291.8	1 1.49	278.1	10.95	382.0	15.04	366.8	14.44	242	246.1	9.69	225.3	8.87	362.2	14.26	336.8	13.26	342	260.1	10.24	232.2	9.14	418.3	16.47	385.3	15.17
9156	313.2	12.33	297.9	11.73	402.1	15.83	386.8	15.23	244	257.6	10.14	238.0	9.37	382.0	15.04	356.6	14.04	344	272.5	10.73	242.1	9.53	437.9	17.24	405.4	15.96
9160	339.3	1 3.36	318.0	12.52	442.0	17.40	421.6	16.60	246	268.7	10.58	247.9	9.76	402.1	15.83	370.8	14.60	348	292.6	11.52	262.1	10.32	478.0	18.82	439.9	17.32
9164	360.4	14.19	338.1	13.31	462.0	18.19	441.7	17.39	248	283.5	11.16	258.1	10.16	421.9	16.61	385.6	15.18	352	318.5	12.54	288.0	11.34	512.1	20.16	474.0	18.66
9180	457.2	18.00	431.8	17.00	561.8	22.12	549.1	21.62	250	293.4	11.55	268.0	10.55	442.0	17.40	398.8	15.70	356	341.1	13.43	308.1	12.13	551.9	21.73	511.3	20.13

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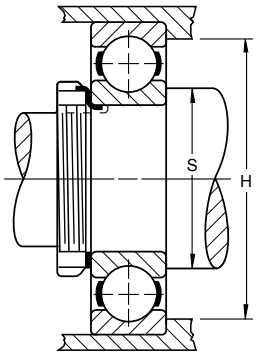
FITTING PRACTICES - *continued*

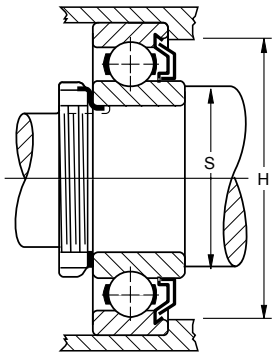
SHAFT AND HOUSING SHOULDERS RADIAL BALL BEARINGS

HEAVY • 400, 7400 SERIES

Basic Bearing Number	Shoulder Diameters Shaft, S Max.		Shaft, S Min.		Housing, H Max.		Housing, H Min.	
	mm	in.	mm	in.	mm	in.	mm	in.
7405	**37.3**	1.47	**34.0**	1.34	**71.1**	2.80	**66.8**	2.63
7406	**43.7**	1.72	**39.1**	1.54	**81.0**	3.19	**76.2**	3.00
7407	**49.0**	1.93	**43.9**	1.73	**90.9**	3.58	**85.9**	3.38
7408	**55.6**	2.19	**50.0**	1.97	**100.1**	3.94	**93.7**	3.69
7409	**62.0**	2.44	**55.1**	2.17	**110.0**	4.33	**101.6**	4.00
7410	**68.3**	2.69	**62.0**	2.44	**118.1**	4.65	**111.3**	4.38
7411	**74.4**	2.93	**67.1**	2.64	**128.0**	5.04	**120.7**	4.75
7412	**81.0**	3.19	**72.1**	2.84	**137.9**	5.43	**130.3**	5.13
7413	**88.9**	3.50	**77.0**	3.03	**148.1**	5.83	**139.7**	5.50
7414	**93.7**	3.69	**84.1**	3.31	**166.1**	6.54	**155.7**	6.13
7415	**99.8**	3.93	**88.9**	3.50	**176.0**	6.93	**163.6**	6.44
7416	**104.9**	4.13	**94.0**	3.70	**185.9**	7.32	**173.0**	6.81
7418	**119.1**	4.69	**108.0**	4.25	**207.0**	8.15	**196.9**	7.75
7420	**131.3**	5.17	**119.9**	4.72	**233.9**	9.21	**223.3**	8.79



Non-Standard Extra-Large



Mechani-Seal KL, KLD, KLL Types

Housing shoulder diameters of bearings with Mechani-Seals differ slightly from those of other types to allow for clearance between the external rotating member of the seal and the housing shoulder.

NON-STANDARD EXTRA-LARGE

Basic Bearing Number	Shoulder Diameters Shaft, S Max.		Shaft, S Min.		Housing, H Max.		Housing, H Min.	
	mm	in.	mm	in.	mm	in.	mm	in.
120W2	**117.6**	4.63	**111.8**	4.40	**150.1**	5.91	**146.0**	5.75
122W	**124.7**	4.91	**120.1**	4.73	**162.8**	6.41	**158.8**	6.25
124W	**134.1**	5.28	**130.0**	5.12	**178.1**	7.01	**174.5**	6.87
126W	**147.8**	5.82	**139.7**	5.50	**193.0**	7.60	**185.7**	7.31
128W	**157.2**	6.19	**150.1**	5.91	**207.8**	8.18	**202.2**	7.96
130W	**167.4**	6.59	**162.1**	6.38	**223.0**	8.78	**216.2**	8.51
132W	**189.0**	7.44	**174.0**	6.85	**234.7**	9.24	**223.8**	8.81
134W	**191.0**	7.52	**185.2**	7.29	**249.7**	9.83	**244.1**	9.61
136W	**203.2**	8.00	**195.3**	7.69	**264.7**	10.42	**257.8**	10.15
138W	**214.4**	8.44	**205.2**	8.08	**284.7**	11.21	**276.1**	10.87
224W	**143.0**	5.63	**132.1**	5.20	**203.2**	8.00	**192.0**	7.56
226	**152.4**	6.00	**144.0**	5.67	**215.9**	8.50	**206.5**	8.13
228	**165.1**	6.50	**153.9**	6.06	**236.0**	9.29	**223.8**	8.81
276–2	**401.8**	15.82	**400.1**	15.75	**463.6**	18.25	**461.5**	18.17

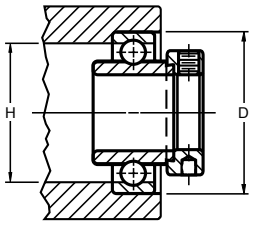
MECHANI-SEAL KL, KLD, KLL TYPES

Basic Bearing Number	Housing Shoulder Diameter, H Max.		Housing Shoulder Diameter, H Min.	
	mm	in.	mm	in.
36	**17.0**	0.67	**16.8**	0.66
36V	**17.0**	0.67	**16.8**	0.66
37	**20.1**	0.79	**19.6**	0.77
37V	**20.1**	0.79	**19.6**	0.77
34	**20.1**	0.79	**19.6**	0.77
38V	**20.1**	0.79	**19.6**	0.77
39	**23.1**	0.91	**22.6**	0.89
39V	**23.1**	0.91	**22.6**	0.89
200	**27.7**	1.09	**26.2**	1.03
201	**29.5**	1.16	**27.7**	1.09
20-2	**29.5**	1.16	**27.7**	1.09
201-3	**29.5**	1.16	**27.7**	1.09
202	**32.5**	1.28	**31.0**	1.22
202-2	**32.5**	1.28	**31.0**	1.22
202-3	**32.5**	1.28	**31.0**	1.22
202-4	**32.5**	1.28	**31.0**	1.22
203	**36.6**	1.44	**35.8**	1.41
204	**43.7**	1.72	**41.1**	1.62
204-2	**43.7**	1.72	**41.1**	1.62
205	**48.5**	1.91	**46.7**	1.84
205-2	**48.5**	1.91	**46.7**	1.84
206	**57.9**	2.28	**56.4**	2.22
207	**67.6**	2.66	**64.3**	2.53
208	**75.4**	2.97	**71.4**	2.81
209	**80.3**	3.16	**77.0**	3.03
209-2	**80.3**	3.16	**77.0**	3.03
211	**93.7**	3.69	**90.4**	3.56

FITTING PRACTICES - *continued*

WIDE INNER RING BALL BEARINGS

When shafts are selected for use with wide inner ring bearings, a minimum slip fit is very desirable for the most satisfactory mounting. Special shaft limits are required in certain cases, and a variety of standard fits can be used, including a press fit. The suggested figures are noted below. In some applications, it may be permissible to use increased shaft tolerances. In such cases, applications should be forwarded to your Timken representative for complete suggestions.



Bearing bore tolerance:
½" - 2 3⁄16" = nominal to **+.013 mm** +.0005";
2 ¼" - 3 3⁄16" = nominal to **+.015 mm** +.0006";
3 7⁄16" - 3 15⁄16" = nominal to **+.018 mm** +.0007";

Shaft tolerances:
½" - 1 15⁄16" = nominal to **-.013 mm** -.0005";
2" - 3 15⁄16" = nominal to **-.025 mm** -.0010";

HOUSING, SHOULDERS AND SHAFT DIAMETERS

BEARING NUMBER					Shaft Size	Basic Outer Ring Size	House Stationary[1]			Shoulder Diameter H	
KRR Type	G-KRR Type	RA-RR Type	GRA-RR Type	GYA-RR* Type	mm in.		Housing Bore, D Min. mm in.	Max. mm in.	Mean Fit Loose mm in.	Max. mm in.	Min. mm in.
1008KRR	—	RA008RR	GRA008RR	GYA0008RR	½						
—	—	RA009RR	GRA009RR	GYA009RR	9⁄16	203	1.5748	1.5754	0.0005	1.37	1.34
1010KRR(KR)	G1010KRR	RA010RR	GRA010RR	GYA010RR	5⁄8		**40.000**	**40.015**	**0.013**	**34.8**	**34.0**
1011KRR	G1011KRR	—	—	—	11⁄16						
E17KRR	GE17KRR	RAE17RR	GRAE17RR	GYAE17RR	**17**						
1012KRR(KR)	G1012KRR	RA012RR	GRA012RR	GYA012RR	¾	204	1.8504	1.8510	0.0005	1.61	1.60
E20KRR	GE20KRR	RAE20RR	GRAE20RR	GYAE20RR	**20**		**47.000**	**47.015**	**0.013**	**40.9**	**40.6**
1013KRR	—	RA013RR	GRA013RR	GYA013RR	13⁄16						
1014KRR	G1014KRR	RA014RR	GRA014RR	GYA014RR	7⁄8	205	2.0472	2.0479	0.0006	1.81	1.80
1015KRR(KR)	G1015KRR	RA015RR	GRA015RR	GYA015RR	15⁄16		**51.999**	**52.017**	**0.015**	**46.0**	**45.7**
1100KRR(KR)	G1100KRR	RA100RR	GRA100RR	GYA100RR	1						
E25KRR	GE25KRR	RAE25RR	GRAE25RR	GYAE25RR	**25**						
—	G1101KRR	RA101RR	GRA101RR	GYA101RR	1 1⁄16						
1102KRR(KR)	G1102KRR	RA102RR	GRA102RR	GYA102RR	1 1⁄8	206	2.4409	2.4416	0.0006	2.21	2.16
1103KRR(KR)	G1103KRR	RA103RR	GRA103RR	GYA103RR	1 3⁄16		**61.999**	**62.017**	**0.015**	**56.1**	**54.9**
—	—	—	—	GYA103RR2	1 ¼						
E30KRR	GE30KRR	RAE30RR	GRAE30RR	GYAE30RR	**30**						
1104KRR(KR)	G1104KRR	RA104RR	GRA104RR	GYA104RR	1 ¼						
1105KRR	—	RA105RR	GRA105RR	GYA105RR	1 5⁄16	207	2.8346	2.8353	0.0006	2.56	2.47
1106KRR	G1106KRR	RA106RR	GRA106RR	GYA106RR	1 3⁄8		**71.999**	**72.017**	**0.015**	**56.1**	**54.9**
1107KRR(KR)	G1107KR	RRA107RR	GRA107RR	GYA107RR	1 7⁄16						
E35KRR	GE35KRR	RAE35RR	GRAE35RR	GYAE35RR	**35**						
1108KRR(KR)	G1108KRR	RA108RR	GRA108RR	GYA108RR	1 ½	208	3.1496	3.1503	0.0006	2.87	2.78
—	—	RA106RR	GRA109RR	GYA109RR	1 9⁄16		**80.000**	**80.018**	**0.020**	**78.0**	**75.4**
—	—	—	GRAE40RR	GYAE40RR	**40**						
1110KRR	G1110KRR	RA110RR	GRA110RR	GYA110RR	1 5⁄8						
1111KRR(KR)	G1111KRR	RA111RR	GRA111RR	GYA111RR	1 11⁄16	209	3.3465	3.3474	0.0008	3.07	2.97
1112KRR(KR)	G1112KRR	RA112RR	GRA112RR	GYA112RR	1 ¾		**85.001**	**85.024**	**0.020**	**78.0**	**75.4**
E45KRR	—	—	GRAE45RR	GYAE45RR	**45**						
—	—	RA113RR	GRA113RR	GYA113RR	1 13⁄16						
1114KRR	—	RA114RR	GRA114RR	GYA114RR	1 7⁄8	210	3.5433	3.5442	0.0008	3.27	3.19
1115KRR(KR)	G1115KRR	RA115RR	GRA115RR	GYA115RR	1 15⁄16		**90.000**	**90.023**	**0.020**	**83.1**	**81.0**
—	—	—	GRA115RR2	—	2						
E50KRR	GE50KRR	RAE50RR	GRAE50RR	GYAE50RR	**50**						
1200KRR(KR)	G1200KRR	RA200RR	GRA200RR	GYA200RR	2						
—	—	RA201RR	GRA201RR	GYA201RR	2 1⁄16	211	3.9370	3.9379	0.0008	3.58	3.56
1202KRR	—	RA202RR	GRA202RR	GYA202RR	2 1⁄8		**100.000**	**100.023**	**0.020**	**90.9**	**90.4**
1203KRR(KR)	G1203KRR	RA203RR	GRA203RR	GYA203RR	2 3⁄16						
E55KRR	GE55KRR	RAE55RR	GRAE55RR	GYAE55RR	**55**						
1204KRR	—	—	—	—	2 ¼	212	4.3307	4.3316	0.0008	3.98	3.87
1207KRR(KR)	G1207KRR	—	—	—	2 7⁄16		**110.000**	**110.02**	**0.020**	**101.1**	**98.3**
E60KRR	GE60KRR	—	—	—	**60**						
1215KRR	—	—	—	—	2 15⁄16	215	5.1181	5.1191	0.0009	4.76	4.59
E75KRR	—	—	—	—	**75**		**130.000**	**130.025**	**0.023**	**120.9**	**116.6**

[1] When the housing revolves in relation to the shaft, housing bore dimensions shown on page A134 should be used. Outer ring tolerances and housing fillet radii correspond to equivalent 299 Series single-row radial bearings.

* Available as non-relubricatable type (omit Prefix "G").

A

FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS
RADIAL SPHERICAL ROLLER BEARINGS

These charts are guidelines for specifying shaft and housing fits related to particular operating conditions.

SHAFT

Conditions		Examples	Shaft Diameter mm		Tolerance Symbol(1)	Remarks
Stationary inner ring load	The inner ring to be easily displaced on the shaft	Two-bearing shaft mechanism	See table below for shaft size		s4	See table below for shaft size
	The inner ring not to be easily displaced on the shaft	Wheel on non-rotating shaft	All diameters		g6	
		Tension pulleys and rope sheaves			h6	
Rotating inner ring load or indeterminate load direction	Light and variable loads P ≤ 0.07C	Electrical apparatus, machine tools, pumps, ventilators, industrial trucks	over	incl.		In very accurate applications k5 and m5 are used instead of k6 and m6 respectively.
			18	**100**	k6	
			100	**200**	m6	
	Normal and heavy loads P > 0.07C ≤ 0.25C	Applications in general, electrical motors, turbines, pumps, combustion engines, gear transmissions, woodworking machines	**18**	**65**	m5	
			65	**100**	m6	
			100	**140**	n6	
			140	**280**	p6	
			280	**500**	r6	
			500	**and up**	r7	
	Very heavy loads and shock loads P > 0.25C	Journal boxes for locomotives and other heavy rail vehicles, traction motors	**18**	**65**	m6	Bearings with greater clearance than normal must be used.
			65	**100**	n6	
			100	**140**	p6	
			140	**200**	r6	
			200	**500**	r7	
Bearings with Tapered Bore and Adapter Sleeve						
	All loads	Applications in general	All diameters			See tables for Reduction of RIC on page A76.

(1) For solid steel shaft. See tables on pages A62-A72 for numerical value.

s4 fits

A centrifugal force load produces a rotating outer ring load and a stationary inner ring load, even though the inner ring rotates. This makes it desirable to fit the outer ring tight in the housing (using a P6 fit as shown on pages A63 and A69), and the inner ring loose on the shaft using an s4 fit as listed in the table. The standard W33 bearing with oil groove and oil holes can be used.

Note: The s4 fit designation as referenced on this page is a special fit tolerance developed by The Timken Company for this specific application. It DOES NOT conform to ISO standards similarly published as s4 preferred shaft fits.

S4 FITS

Data shown in thousandths of a millimeter (15=0.015 mm) or ten-thousandths of an inch (6=.0006"). See dimensional tables for nominal bore.

Bore mm over	incl.	Variance from Nominal Bore Tolerance +0	Shaft Diameter Max.	Min.	Fit
		mm in.	mm in.	mm in.	mm in.
50	**80**	**-15**	**-25**	**-36**	**10L**
					36L
		-6	-10	-14	4L
					14L
80	**120**	**-20**	**-33**	**-43**	**13L**
					43L
		-8	-13	-17	5L
					17L
120	**180**	**-25**	**-41**	**-53**	**15L**
					53L
		-10	-16	-21	6L
					21L
180	**250**	**-30**	**-48**	**-64**	**18L**
					64L
		-12	-19	-25	7L
					25L

FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS
RADIAL SPHERICAL ROLLER BEARINGS

These charts are guidelines for specifying shaft and housing fits related to particular operating conditions.

HOUSING					
Conditions			Examples	Tolerance Symbol[2]	Remarks
One piece bearing housing	Rotating outer ring load	Variable load direction	Two-bearing eccentric shaft mechanism	P6	The outer ring is not displaceable axially
		Heavy loads on bearings in thin walled housings	Supporting wheels in cranes, wheel hubs, crank bearings	P7	
		Normal and heavy loads	Wheel hubs, crank bearings	N7	
		Light and variable loads	Conveyor rollers, rope sheaves, tension pulleys	M7	
		Heavy shock loads	Electrical traction motors		
	Indeterminate load direction	Heavy and normal loads, axial displacement of outer ring not required	Electrical motors, pumps, crankshaft main bearings	K7	The outer ring is, as a rule, not displaceable axially.
		Normal and light loads, axial displacement of the outer ring desirable	Electrical motors, pumps, crankshaft main bearings	J7	The outer ring is, as a rule, displaceable axially.
Split or one piece bearing housing	Stationary outer ring load	Shock loads, temporarily complete unloading	Journal boxes for rail vehicles		
		All loads	Bearing applications in general, journal boxes for rail vehicles	H7	The outer ring is easily displaced axially.
		Normal and light loads, loads under simple operating conditions	Line shaftings	H8	
		Heat supplied through the shaft	Dryer cylinders	G7	
One piece bearing housing	Applications requiring particular accuracy	Very accurate running and small deflections under variable loads	For main spindles in machine tools: O.D. less than 125 mm; O.D. 125 to 250 mm; O.D. over 250 mm	M6; N6; P6	The outer ring is not displaceable axially.
		Very accurate running under light loads and indeterminate load direction	Held bearings in high speed centrifugal force compressors	K6	The outer ring is, as a rule not displaceable axially.
		Very accurate running, axial displacement of outer ring desirable	Floating bearings in high speed centrifugal force compressors	J6	The outer ring is easily displaced axially.

[2] Cast iron or steel housing. For numerical values see tables on pages A62-A69.
For housings of light metal, tolerances generally are selected which give a slightly tighter fit than those given in the table.

A

FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS THRUST BALL BEARINGS

TYPE TVB
SHAFT

TYPE TVL AND DTVL
SHAFT

Shaft and housing diameters shown as variance from nominal dimensions. Shaft and housing data shown in millimeters over inches.

Bearing Bore Nominal (Min.) over	Bearing Bore Nominal (Min.) incl.	Shaft Diameter Max.	Shaft Diameter Min.	Bearing Bore Nominal (Max.) over	Bearing Bore Nominal (Max.) incl.	Shaft Diameter Interference Fit* Max.	Shaft Diameter Interference Fit* Min.	Shaft Diameter Loose Fit** Max.	Shaft Diameter Loose Fit** Min.
mm	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
0.000	**171.450**	**+0**	**-0.030**	**0.000**	**504.825**	**+0.076**	**+0**	**-0.152**	**-0.076**
0.0000	6.7500	+0	-0.0012	0.0000	19.8750	+0.0030	+0	-0.0060	-0.0030
171.450	**508.000**	**+0**	**-0.038**	**504.825**	**1524.000**	**+0.127**	**+0**	**-0.254**	**-0.127**
6.7500	20.0000	+0	-0.0015	19.8750	60.0000	+0.0050	+0	-0.0100	-0.0050

HOUSING

HOUSING

Bearing Bore Nominal (Min.) over	Bearing Bore Nominal (Min.) incl.	Housing Bore Max.	Housing Bore Min.	Bearing O. D. Nominal (Max.) over	Bearing O. D. Nominal (Max.) incl.	Shaft Diameter Loose Fit** Max.	Shaft Diameter Loose Fit** Min.	Shaft Diameter Interference Fit* Max.	Shaft Diameter Interference Fit* Min.
mm	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
119.858	**441.325**	**+0.229**	**+0.127**	**0.000**	**584.000**	**+0.152**	**0.076**	**-0.152**	**-0.076**
4.7188	17.3750	+0.0090	+0.0050	0.0000	23.0000	+0.0060	0.0030	-0.0060	-0.0030
441.325	**1000.000**	**+0.254**	**+0.152**	**584.000**	**1778.000**	**+0.254**	**0.127**	**-0.254**	**-0.127**
17.3750	39.3701	+0.0100	+0.0060	23.0000	70.0000	+0.0100	0.0050	-0.0100	-0.0050

* Dowel pin suggested.
** Dowel pin required.

FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS THRUST SPHERICAL ROLLER BEARING

Tolerances for housing bore and for shaft diameters are shown as variance from nominal bearing dimension. Data is shown in inches over millimeters. When application calls for thrust loads only, the housing must be relieved by 1/16 in. on diameter so that no radial load is carried on the bearing. All tolerances are in number of micrometers (μm) and ten thousandths of an inch (.0001 in.).

SHAFT

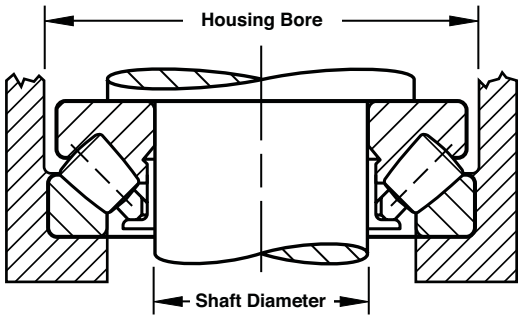
Tolerances are 1/1000 of a millimeter (μm) and 1/10,000 of an inch (5 = .0005")

Bearing Bore Nominal (Max.) inches over	incl.	Shaft Diameter Stationary Load Max.	Stationary Load Min.	Rotating Load Max.	Rotating Load Min.
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
80 3.1496	**120** 4.7244	**+13** +5	**-10** -4	**+25** +10	**+3** +1
120 4.7244	**180** 7.0866	**+15** +6	**-10** -4	**+28** +11	**+3** +1
180 7.0866	**200** 7.8740	**+18** +7	**-13** -5	**+36** +14	**+5** +2
200 7.8740	**240** 9.4488	**+18** +7	**-13** -5	**+46** +18	**+15** +6
240 9.4488	**315** 12.4016	**+18** +7	**-15** -6	**+51** +20	**+20** +8
315 12.4016	**400** 15.7480	**+18** +7	**-18** -7	**+56** +22	**+20** +8
400 15.7480	**500** 19.6850	**+23** +9	**-18** -7	**+86** +34	**+46** +18
500 19.6850	**630** 24.8031	**+23** +9	**-20** -8	**+86** +34	**+43** +17

HOUSING

Tolerances are 1/1000 of a millimeter (μm) and 1/10,000 of an inch (5 = .0005")

Bearing O.D. Nominal (Max.) inches over	incl.	Housing Bore Springs in Housing Light Radial Load Min.	Springs in Housing Light Radial Load Max.	Combined Axial & Radial Load Stationary Outer Ring Min.	Stationary Outer Ring Max.	Rotating Outer Ring Min.	Rotating Outer Ring Max.
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
180 7.0866	**250** 9.8425	**+15** +6	**+61** +24	**-18** -7	**+28** +11	**-33** -13	**+13** +5
250 9.8425	**315** 12.4016	**+18** +7	**+69** +27	**-18** -7	**+33** +13	**-36** -14	**+15** +6
315 12.4016	**400** 15.7480	**+18** +7	**+74** +29	**-18** -7	**+38** +15	**-41** -16	**+15** +6
400 15.7480	**500** 19.6850	**+20** +8	**+84** +33	**-23** -9	**+41** +16	**-46** -18	**+18** +7
500 19.6850	**630** 24.8031	**+23** +9	**+91** +36	**-23** -9	**+46** +18	**-48** -19	**+20** +8
630 24.8031	**800** 31.4960	**+23** +9	**+102** +40	**-23** -9	**+51** +20	**-51** -20	**+23** +9
800 31.4960	**1000** 39.3700	**+25** +10	**+109** +43	**-25** -10	**+58** +23	**-58** -23	**+25** +10
1000 39.3700	**1250** 49.2126	**+28** +11	**+122** +48	**-28** -11	**+66** +26	**-64** -25	**+30** +12



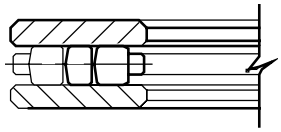
FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS
THRUST CYLINDRICAL ROLLER BEARINGS

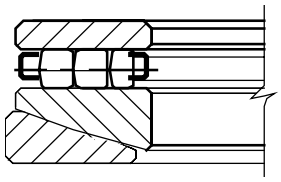
SHAFT
TYPE TP AND TPS

Tolerances for housing bore and for shaft diameters shown as variance from nominal bearing dimension. Data shown in millimeters over inches.

Bearing Bore Nominal (Min.)		Shaft Diameter	
over	incl.	Max.	Min.
mm in.	**mm** in.	**mm** in.	**mm** in.
47.625 1.8750	**53.975** 2.1250	**-0.025** -0.0010	**-0.051** -0.0020
53.975 2.1250	**63.500** 2.5000	**-0.028** -0.0011	**-0.053** -0.0021
63.500 2.5000	**76.200** 3.0000	**-0.030** -0.0012	**-0.056** -0.0022
76.200 3.0000	**88.900** 3.5000	**-0.033** -0.0012	**-0.058** -0.0023
88.900 3.5000	**177.800** 7.0000	**-0.038** -0.0015	**-0.064** -0.0025
177.800 7.0000	**228.600** 9.0000	**-0.038** -0.0015	**-0.076** -0.0030
228.600 9.0000	**304.800** 12.0000	**-0.046** -0.0018	**-0.084** -0.0330
304.800 12.0000	**381.000** 15.0000	**-0.051** -0.0020	**-0.089** -0.0035
381.000 15.0000	**482.600** 19.0000	**-0.051** -0.0020	**-0.102** -0.0040
482.600 19.0000	**584.200** 23.0000	**-0.064** -0.0025	**-0.114** -0.0045
584.200 23.0000	**762.000** 30.0000	**-0.076** -0.0030	**-0.140** -0.0055



TP



TPS

HOUSING
TYPE TPS

Deviations in µm /0.0001 inches

Bearing O. D. Nominal (Min.)		Housing Diameter Deviation from D	
over	incl.	high	low
mm in.	**mm** in.	**mm** in.	**mm** in.
50.800 2.0000	**60.325** 2.3750	**+38** +15	**+13** +5
60.325 2.3750	**82.550** 3.2500	**+43** +17	**+18** +7
82.550 3.2500	**93.663** 3.6875	**+48** +19	**+23** +9
93.663 3.6875	**101.600** 4.0000	**+53** +21	**+28** +11
101.600 4.0000	**115.092** 4.5312	**+71** +28	**+33** +13
115.092 4.5312	**254.000** 10.0000	**+76** +30	**+38** +15
254.000 10.0000	**457.200** 18.0000	**+102** +40	**+51** +20
457.200 18.0000	**558.800** 22.0000	**+127** +50	**+64** +25
558.800 22.0000	**660.400** 26.0000	**+140** +55	**+64** +25
660.400 26.0000	**711.200** 28.0000	**+152** +60	**+76** +30
711.200 28.0000	**863.600** 34.0000	**+178** +70	**+76** +30
863.600 34.0000	**965.200** 38.0000	**+203** +80	**+89** +35
965.200 38.0000	**1117.600** 44.0000	**+229** +90	**+102** +40

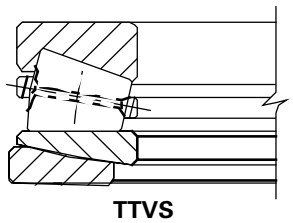
HOUSING
TYPE TP

Bearing O. D. Nominal (Min.)		Housing Bore	
over	incl.	Max.	Min.
mm in.	**mm** in.	**mm** in.	**mm** in.
115.092 4.5312	**254.000** 10.0000	**+0.076** +0.0030	**+0.038** +0.0015
254.000 10.0000	**457.200** 18.0000	**+0.102** +0.0040	**+0.051** +0.002
457.200 18.0000	**558.800** 22.0000	**+0.127** +0.0050	**+0.064** +0.0025
558.800 22.0000	**660.400** 26.0000	**+0.140** +0.0055	**+0.064** +0.0025
660.400 26.0000	**711.200** 28.0000	**+0.152** +0.0060	**+0.076** +0.0030
711.200 28.0000	**863.600** 34.0000	**+0.178** +0.0070	**+0.076** +0.0030
863.600 34.0000	**965.200** 38.0000	**+0.203** +0.0080	**+0.089** +0.0035
965.200 38.0000	**1117.600** 44.0000	**+0.229** +0.0090	**+0.102** +0.0040

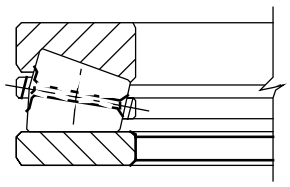
FITTING PRACTICES - *continued*

SHAFT AND HOUSING FITS THRUST TAPERED ROLLER BEARINGS

Tolerances for housing bore and shaft diameters are shown as variance from nominal bearing dimension. Data is shown in millimeters over inches. When one washer is piloted by the housing, sufficient clearances must be allowed at the outside diameter of the other washer as well as at the bore of both washers to prevent cross-loading of the rollers. For most applications, this clearance is approximately 1/16 in. (**1.588 mm,** .0625 in.).



TTVS



TTVF

SHAFT

TYPES TTVS AND TTVF

Bearing Bore Nominal (Min.) over	Bearing Bore Nominal (Min.) incl.	Shaft Diameter Max. +0 Min.
mm in.	mm in.	mm in.
0.000 0.0000	**304.800** 12.0000	**-0.051** -0.0020
304.800 12.0000	**508.000** 20.0000	**-0.051** -0.0020
508.000 20.0000	**711.200** 28.0000	**-0.076** -0.0030
711.200 28.0000	**1219.200** 48.0000	**-0.102** -0.0040
1219.200 48.0000	**1727.200** 68.0000	**-0.127** -0.0050

HOUSING

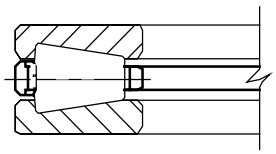
TYPES TTVS AND TTVF

Bearing Bore Nominal (Min.) over	Bearing Bore Nominal (Min.) incl.	Housing Bore Max.	Housing Bore Min.
mm in.	mm in.	mm in.	mm in.
161.925 6.3750	**265.113** 10.4375	**+0.060** +0.0025	**+0.025** +0.0010
265.113 10.3475	**317.500** 12.5000	**+0.076** +0.0030	**+0.025** +0.0010
317.500 12.5000	**482.600** 19.0000	**+0.102** +0.0040	**+0.051** +0.0020
482.600 19.0000	**603.250** 23.7500	**+0.113** +0.0045	**+0.051** +0.0020
603.250 23.7500	**711.200** 28.0000	**+0.152** +0.0060	**+0.076** +0.0030
711.200 28.0000	**838.200** 33.0000	**+0.178** +0.0070	**+0.076** +0.0030

FITTING GUIDELINES - TTHD BEARINGS

(Tolerances and fits in µm and 0.0001 in.)

BORE mm (in.) over	BORE mm (in.) incl.	Rotating Race Class 2 Tolerance	Rotating Race Class 2 Shaft O.D. Deviation	Rotating Race Class 2 Resultant Fit	Rotating Race Class 3 Tolerance	Rotating Race Class 3 Shaft O.D. Deviation	Rotating Race Class 3 Resultant Fit	Stationary Race Class 2 and 3
0	**304.800**	**0**	**+ 76**	**76 T**	**0**	**+ 51**	**51 T**	
		+ 25	**+ 50**	**25 T**	**+ 13**	**+ 38**	**25 T**	
0	12	0	+ 30	30 T	0	+ 20	20 T	
		+ 10	+ 20	10 T	+ 5	+ 15	10 T	
304.800	**609.600**	**0**	**+ 152**	**152 T**	**0**	**+102**	**102 T**	
		+ 51	**+ 102**	**51 T**	**+ 25**	**+ 76**	**51 T**	
12	24	0	+ 60	60 T	0	+ 40	40 T	
		+ 20	+ 40	20 T	+ 10	+ 30	20 T	
609.600	**914.400**	**0**	**+ 204**	**204 T**	**0**	**+ 127**	**127 T**	**All sizes** Provide a minimum radial clearance of 2.5 mm (0.1 in.) between race bore and shaft O.D.
		+ 76	**+127**	**51 T**	**+ 38**	**+ 89**	**51 T**	
24	36	0	+ 80	80 T	0	+ 50	50 T	
		+ 30	+ 50	20 T	+ 15	+ 35	20 T	
914.400	**1219.200**	**0**	**+254**	**254 T**	**0**	**+ 153**	**153 T**	
		+ 102	**+ 153**	**51 T**	**+ 51**	**+ 102**	**51 T**	
36	48	0	+100	100 T	0	+ 60	60 T	
		+ 40	+ 60	20 T	+ 20	+ 40	20 T	
1219.200		**0**	**+ 305**	**305 T**	**0**	**+ 204**	**204 T**	
		+ 127	**+178**	**51 T**	**+ 76**	**+ 127**	**51 T**	
48		0	120	+120 T	0	+ 80	80 T	
		+ 50	+ 70	20 T	+ 30	+ 50	20 T	



TTHD

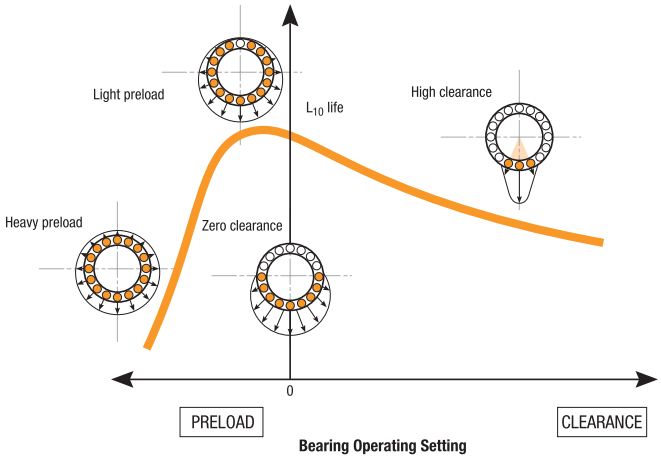
- Rotating race O.D. must have a minimum radial clearance of 2.5 mm (0.1 in.)
- TTHD stationary race O.D. must have a minimum loose fit of 0.25 to 0.37 mm (0.01 to 0.015 in.)
- TTHDFL washer when stationary may be loose fit on its O.D. (same as the TTHD) or may be 0.025 to 0.076 mm (0.001 to 0.003 in.) tight.

A

BEARING SETTING

SETTING TAPERED ROLLER BEARINGS

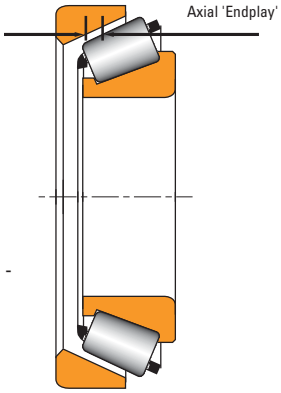
Setting is defined as a specific amount of either endplay or preload. Establishing the setting at the time of assembly is an inherent advantage of tapered roller bearings. They can be set to provide optimum performance in almost any application. The following figure gives an example of the relationship between fatigue life and bearing setting. Unlike some types of anti-friction bearings, tapered roller bearings do not rely strictly on housing or shaft fits to obtain a certain bearing setting. One race can be moved axially relative to the other to obtain the desired bearing setting.



Relationship between bearing setting and fatigue life.

At assembly, the conditions of bearing setting are defined as:

- **Endplay** – An axial clearance between rollers and races producing a measurable axial shaft movement when a small axial force is applied - first in one direction, then in the other, while oscillating or rotating the shaft.



- **Preload** – An axial interference between rollers and races such that there is no measurable axial shaft movement when a small axial force is applied – in both directions, while oscillating or rotating the shaft.
- **Line-to-line** – A zero setting condition: the transitional point between endplay and preload.

Bearing setting obtained during initial assembly and adjustment is the cold or ambient bearing setting and is established before the equipment is subjected to service.

Bearing setting during operation is known as the operating bearing setting and is a result of changes in the ambient bearing setting due to thermal expansion and deflections encountered during service.

The ambient bearing setting necessary to produce the optimum operating bearing setting varies with the application. Application experience, or testing, generally permits the determination of optimum settings. Frequently, however, the exact relationship of ambient to operating bearing setting is an unknown and an educated estimate has to be made. To determine a suggested ambient bearing setting for a specific application, consult your Timken representative.

Generally, the ideal operating bearing setting is near zero to maximize bearing life. Most bearings are set with endplay at assembly to reach the desired near zero setting at operating temperature when mounted.

Standard mounting

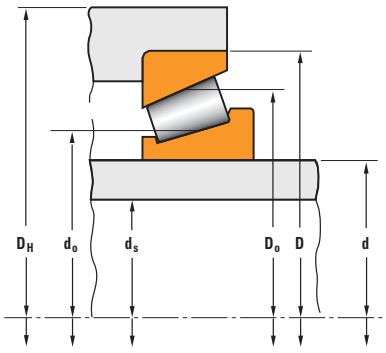
Operating setting = mounted setting ± temperature effect ± deflection

Pre-set assemblies

Mounted EP or PL = Bench EP or Bench PL - effect of fits

Operating setting = mounted EP or PL (MEP or MPL) ± temperature effect ± deflection

The temperature and fit effects will depend upon the type of mounting, bearing geometry and size, shaft and housing size and material according to the following sketch:



Dimensions affecting the effects of temperature and fit.

BEARING SETTING - *continued*

TEMPERATURE EFFECT (IN A TWO-ROW MOUNTING)

Symbols used:

δ_S = interference fit of inner race on shaft
δ_H = interference fit of outer race in housing
K_n = K-factor for bearing #n
d = bearing bore diameter
d_o = mean inner race diameter
D = bearing outside diameter
D_o = mean outer race diameter
L = distance between bearing geometric center lines, mm (in.)
α = coefficient of linear expansion: 11 x 10^{-6}/ °C (6.1 x 10^{-6}/ °F) for ferrous metal shaft and housing materials
d_S = shaft inside diameter
D_H = housing outside diameter
ΔT = temperature difference between shaft/inner race + rollers and housing/bearing outer race

DIRECT MOUNTING

$$\text{Thermal Lateral Loss} = \alpha \Delta T \left[\left(\frac{K_1}{0.39} \times \frac{D_{o1}}{2} \right) + \left(\frac{K_2}{0.39} \times \frac{D_{o2}}{2} \right) + L \right]$$

INDIRECT MOUNTING

$$\text{Thermal Lateral Loss} = \alpha \Delta T \left[\left(\frac{K_1}{0.39} \times \frac{D_{o1}}{2} \right) + \left(\frac{K_2}{0.39} \times \frac{D_{o2}}{2} \right) - L \right]$$

Note: Positive lateral loss is the amount of setting reduction or loss of endplay.

FIT EFFECT (SINGLE-ROW)

SOLID SHAFT/HEAVY SECTION HOUSING

Inner Race:

$$F = 0.5 \left(\frac{K}{0.39} \right) \left(\frac{d}{d_o} \right) \delta_S$$

Outer Race:

$$F = 0.5 \left(\frac{K}{0.39} \right) \left(\frac{D}{D_o} \right) \delta_H$$

Hollow shaft/thin wall section

Inner Race:

$$F = 0.5 \left(\frac{K}{0.39} \right) \left(\frac{d}{d_o} \right) \left[\frac{1 - \left(\frac{d_s}{d} \right)^2}{1 - \left(\frac{d_s}{d_o} \right)^2} \right] \delta_S$$

Outer Race:

$$F = 0.5 \left(\frac{K}{0.39} \right) \left(\frac{D_o}{D} \right) \left[\frac{1 - \left(\frac{D}{D_H} \right)^2}{1 - \left(\frac{D_o}{D_H} \right)^2} \right] \delta_H$$

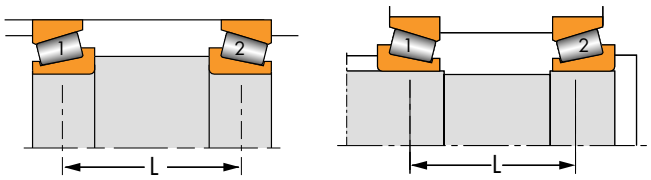
Note: These equations apply only to ferrous shaft and housing.

SETTING METHODS FOR TAPERED ROLLER BEARINGS

Upper and lower limits of bearing setting value are determined by consideration of the following factors:

- Application type.
- Duty.
- Operational features of adjacent mechanical drive elements.
- Changes in bearing setting due to temperature differentials and deflections.
- Size of bearing and method of obtaining bearing setting.
- Lubrication method.
- Housing and shaft material.

The setting value to be applied during assembly will depend on any changes that may occur during operation. In the absence of experience with bearings of similar size and operating conditions, bearing setting range suggestions should be obtained from your Timken representative.



Direct mounting Indirect mounting

Use the push-pull method (manual setting) to measure any axial endplay (used as reference) while rotating the shaft or the housing. Correct this reference value to the final required endplay or preload by changing the setting on the adjusting device. Fig. A-25 and A-26 are typical examples of manual setting applications.

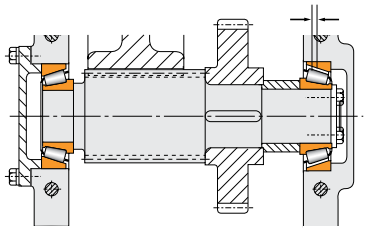


Fig. A-25
Axial clearance (endplay).

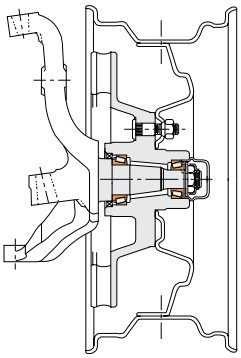
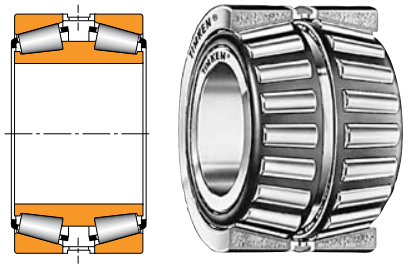


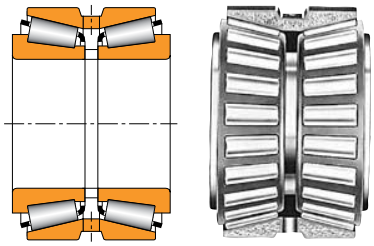
Fig. A-26
Truck nondriven wheel.

BEARING SETTING - *continued*

PRESET BEARING ASSEMBLIES

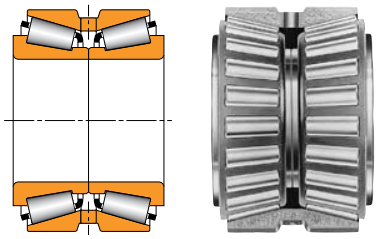


TDI with outer race spacer

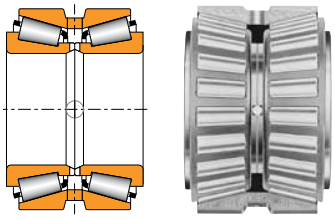


TDO with inner race spacer

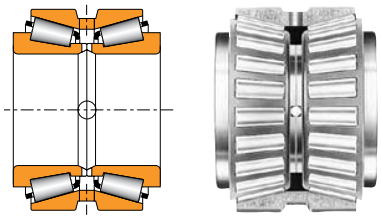
Fig. A-27
Typical preset bearing assemblies.



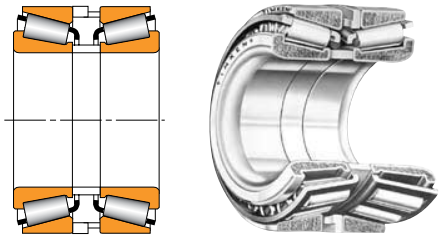
TNA



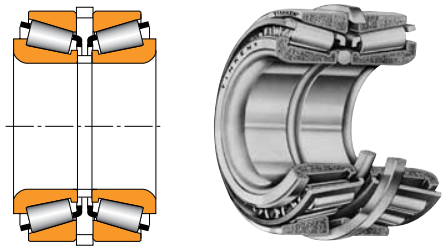
TNASW



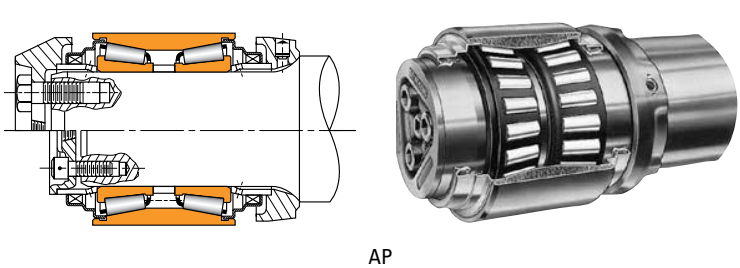
TNASWE



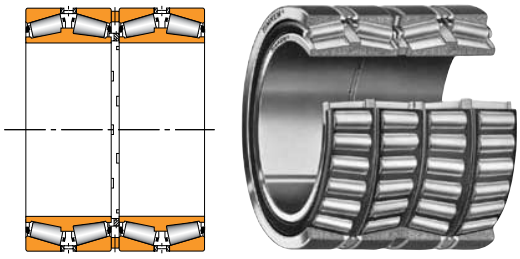
SR



SS



AP



TQO

If the application requires the use of multi-row bearing assemblies, preset bearings can be used (Fig. A-27). Various types of multi-row bearing combinations can be provided with spacers that are ground and custom-fitted to provide a bearing setting to meet the requirements of the application (Fig. A-28). Types SS, TDI, TDIT and TDO, listed in this publication, are examples.

Each matched assembly has an identifying serial number marked on each outer race, inner race and spacer. Some small preset assemblies are not marked with a serial number but their component parts are supplied as a boxed set.

A preset bearing assembly contains a specific fixed internal clearance (or preload) built in during manufacture. The value of this "setting" is referred to as "bench endplay" (BEP) or "bench preload" (BPL) and is normally determined by The Timken Company during the design stage of new equipment. Components from one bearing assembly are NOT interchangeable with similar parts from another.

Bearing settings for types TNA, TNASW, TNASWE (standard version) and SR bearings are obtained through close axial tolerance control and components from these assemblies are interchangeable for bearings having bore sizes under 305 mm (12 in.).

BEARING SETTING - *continued*

The Timken Company has developed various automated bearing setting techniques. The advantages of these techniques are:

- Reduced set-up time.
- Reduced assembly cost.
- Increased consistency and reliability of bearing settings.
- In most cases they can be applied to the assembly line for moderate and high volume production.

It is possible to select and adapt one of the following automated setting methods for a wide range of applications.

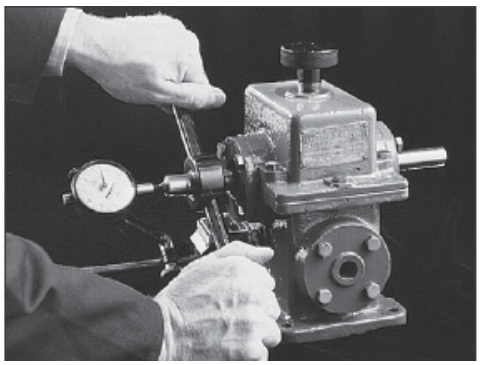


Fig. A-28
Bearing setting.

"Set-Right"™

This technique applies the laws of probability. The setting in the bearing is controlled by the radial and axial tolerances of the various components of the assembly.

"Acro-Set"™

The Acro-Set method is achieved through measurement of a shim or spacer gap with a specified set-up load applied. The correct shim or spacer dimension is then taken from a prepared chart or by a direct instrument reading. This technique is based on Hooke's law, which states that within the elastic limit, deformation or deflection is proportional to the load applied. It is applicable to either endplay or preload bearing settings.

"Torque-Set"™

The Torque-Set technique is a method of obtaining correct bearing settings by using low-speed bearing rolling torque as a basis for determining the amount of deformation or deflection of the assembly parts affecting bearing settings. This technique is applicable regardless of whether the final bearing setting is preload or endplay.

"Projecta-Set"™

The Projecta-Set technique is used to "project" an inaccessible shim or spacer gap to a position where it can easily be measured. This is achieved using a spacer and a gauging sleeve. The Projecta-Set technique is of most benefit on applications where the inner and outer races are an interference fit and therefore disassembly for adjustment is more difficult and time-consuming than with loose-fitting races.

Deciding which automated bearing setting technique should be used must be made early in the design sequence. It is necessary to review each application to determine the most economical method and necessary fixtures and tools. The final decision will be based on the size and weight of the unit, machining tolerances, production volume, access to retaining devices (locknuts, end plates, etc.) and available tools. Your Timken representative can assist in determining the best method to obtain the correct bearing setting.

DUPLEX SETS OF BALL BEARINGS AND PRELOADING

Two single-row ball bearings manufactured specially for use as a unit are known as a duplex bearing. It may be considered analogous to a double-row bearing having the same bore and outside diameter, but twice the single-row bearing width.

The main purpose of duplex bearings in an application is to achieve greater axial and radial rigidity than is possible with one single-row bearing. The extra "stiffness" in these bearings is obtained by "preloading." Preloading is incorporated into bearings by selective face grinding which is described in detail below.

Although angular contact bearings, such as the 7000, M-WI and MMWI types, are more commonly used in duplex arrangements, other types of bearings such as radial single-row open, shielded and sealed types, can be duplexed where required to meet specific conditions.

PRELOADING

Preloading to a predetermined value is accomplished by grinding a certain amount of material off inner or outer ring faces so that before mounting the two single bearings as a duplex pair, the faces on abutting sides are offset an amount equal to the deflection under the "preload."

When mounted, these faces are clamped together so that the bearings are subjected to an internal load caused by one bearing opposing the other. This "preloading" materially decreases subsequent deflection due to external loads applied to the clamped-up pair.

Timken has established, for each bearing size, standard preload levels which are considered proper for most duplex bearing applications. Special preloads can also be provided to satisfy

A

BEARING SETTING - *continued*

extreme requirements. For example, a heavily loaded, slow-speed rotating shaft may require heavier than normal preload in order to minimize deflection. It must be remembered, however, that although heavy preload provides slightly greater rigidity, it reduces bearing life and increases power consumption; therefore preload levels should be chosen with care.

The axial deflection of a bearing subject to thrust loading is based on Hertz's theories for elastic bodies in contact. The general expression is:

$$\delta = K \left(\frac{T^2}{nd^2}\right)^{1/3}$$

where δ = axial deflection
K = a constant based on bearing geometry
T = thrust load applied
n = number of balls
d = ball diameter

A typical axial deflection curve for an unpreloaded single-row angular contact bearing is shown in Figure A-29, as curve A. This curve represents the deflection characteristics of bearing "A" being subjected to thrust load T. The amount of deflection due to load T_1 is much greater than the increase in deflection caused by doubling the thrust load to T_2. This illustrates the non-linear deflection of a ball bearing.

Curves C_1 and C_2 show the deflection of bearings A and B flushmounted as a pair, shown below, with each bearing having a preload of T_1 and T_2 lbs., respectively. Comparing curves C_1 and C_2 with A shows the deflection of the preloaded pair is much less than that of a single unpreloaded bearing. This has been accomplished essentially by eliminating the "high deflection" points of curve A (from no load to T_1 or T_2 lbs.).

Curves B_1 and B_2 show the axial deflection of bearing B as mounted in Figure A-30 below from the preloaded conditions T_1 or T_2 to a no preload condition.

Preloading can be accomplished by the use of springs or spacer width adjustment, but your Timken representative should be consulted for design review.

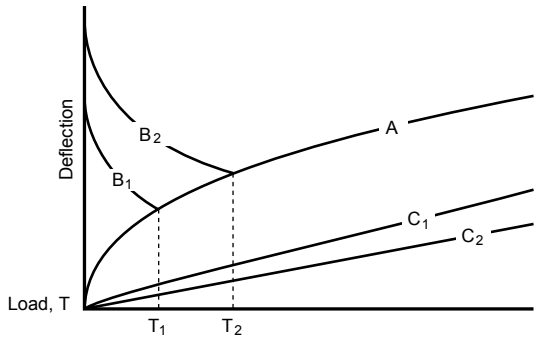


Fig. A-29
Axial load-deflection curve of back-to-back mounted angular-contact bearings. Curve A is for Bearing A, B is for bearing B, and C_1 and C_2 are preload curves.

TYPICAL APPLICATIONS

Deep well pumps, marine propeller shafts, machine tool spindles, gear shafts, speed reducers, elevator worm drives, and similar applications often require the use of preloaded duplex bearings.

WIDTH TOLERANCES

To allow for face grinding of single bearings to specified preload for use in duplex pairs or other multiple bearing units, the inner and outer ring width tolerance of each bearing is greater than that for a standard single bearing as follows:

Bearing Bore mm		Width Tolerance ABEC	Width Tolerance ABEC
over	incl.	1,3	5,7,9
0	50	+.000" -.010"	+.000" -.010"
50	80	+.000" -.015"	+.000" -.010"
80	120	+.000" -.015"	+.000" -.015"
120	180	+.000" -.020"	+.000" -.015"
180	315	+.000" -.020"	+.000" -.020"
315	400	+.000" -.025"	+.000" -.025"

The inner and outer ring width tolerances of duplex pairs and other multiple bearing units equal the tolerances listed above times the number of bearings in the unit. For example, a duplex pair of 2MM9115 WI DUL bearings has an inner and outer ring width tolerance of .010 in x 2 or .020 in.

MOUNTINGS OF BALL BEARINGS

Duplex bearings may be used with spacers between the matching faces in order to increase the system's resistance to moment loading or to increase the system rigidity by using the bearings to minimize shaft deflection. Shaft and housing spacers should be ground together on a surface grinder to obtain exactly equal lengths to assure that the built-in preload will be maintained. Since duplex bearings provide a very rigid mounting, it is important that special attention be given to correct shaft and housing fits, squareness of shaft and housing shoulders and alignment of all mating parts. In order to prevent cramping of bearings and an abnormal increase in preload which could result in excessive heat and possible bearing damage, suggested shaft and housing tolerances must be followed, shaft and housing shoulders must be square, bearing spacers must be of equal length and all parts must be free of nicks and burrs.

Typical preloaded mountings are shown here.

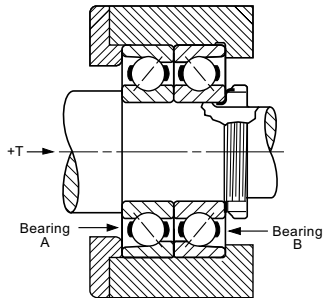


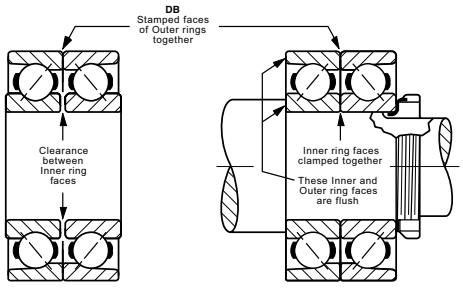
Fig. A-30
Typical preload mountings

BEARING SETTING - *continued*

TYPICAL MOUNTINGS OF DUPLEX BEARINGS

Back-to-Back Mounting, DB or ("O")
(Contact angles diverging toward shaft centerline)

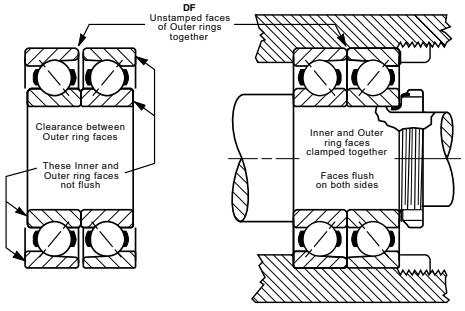
Before mounting, there is clearance between the two adjacent inner ring faces. After mounting, these faces are clamped together to provide an internal preload on each bearing. This arrangement is well suited for pulleys, sheaves and in other applications where there are overturning loads and also in all floating positions where thermal expansion of shaft occurs. It also provides axial and radial rigidity and equal thrust capacity in either direction when used in a fixed location. Back-to-back is the most commonly used of all duplex arrangements. Specify bearing number followed by suffix DU. Examples: 7207W-DU, 2MM207WI-DU. Also available as two single flush-ground bearings, e.g., 7207W SU (2 bearings).



Before Mounting Mounted

Face-to-Face Mounting, DF or ("X")
(Contact angles converging toward shaft centerline)

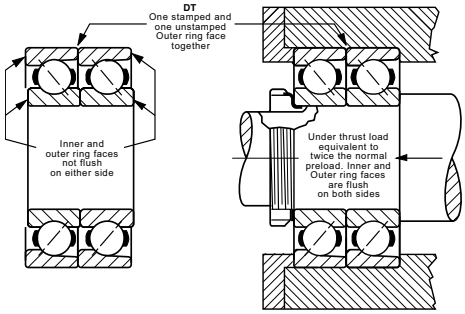
Before mounting, there is clearance between the two adjacent outer ring faces. After mounting, these faces are clamped together between the housing shoulder and cover plate shoulder providing an internal preload on each bearing. This arrangement provides equal thrust capacity in either direction as well as radial and axial rigidity. Since the face-to-face mounting has inherent disadvantages of low resistance to moment loading and thermal instability, it should not be considered unless a significantly more convenient method of assembly or disassembly occurs from its use. Timken pairs for face-to-face mounting should be ordered as DU. Examples: 7212W-DU, 2M212WI-DU. Also available as two single flush-ground bearings, e.g., 7212W SU (two bearings).



Before Mounting Mounted

Tandem Mounting, DT

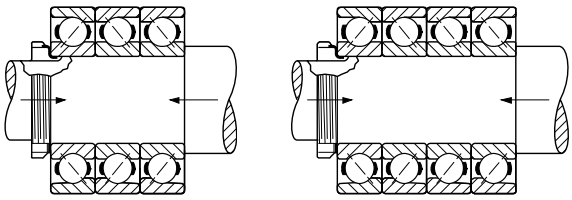
Before mounting, the inner ring faces of each bearing are offset from the outer ring faces. After mounting, when a thrust load is applied equal to that of twice the normal preload, the inner and outer ring faces are brought into alignment on both sides. This arrangement provides double thrust capacity in one direction only. More than two bearings can be used in tandem if additional thrust capacity is required. Timken pairs for tandem mounting should be specified as DU. Examples: 7205W-DU, 2M205WI-DU. Also available as two single flush-ground bearings with suffix SU, e.g., 7210W SU (two bearings).



Before Mounting Mounted

Other Mountings

Flush ground (DU) pairs may be mounted in combination with a single flush-ground bearing as a "triplex" (TU) set shown below illustrates a "quadruplex" (QU) set where three bearings in tandem are mounted back-to-back with a single bearing. These arrangements provide high capacity in one direction and also a positively rigid mounting capable of carrying a moderate amount of reverse thrust.



TU QU

A

LUBRICATION AND SEALS

LUBRICATION

To help maintain a rolling bearing's anti-friction characteristics, lubrication is needed to:

- Minimize rolling resistance due to deformation of the rolling elements and raceway under load by separating the mating surfaces.
- Minimize sliding friction occurring between rolling elements, raceways and cage.
- Transfer heat (with oil lubrication).
- Protect from corrosion and, with grease lubrication, from contaminant ingress.

Modern lubricants do this very effectively, although in many applications the means by which they accomplish this are extremely complex and not completely understood. Because the principles involved with lubricating rolling element bearings are complex and do not have to be known to employ lubricants successfully, this discussion will stress the practical rather than the theoretical aspects of lubrication.

LUBRICATION SELECTION

The wide range of bearing types and operating conditions precludes any simple, all-inclusive statement or guideline allowing the selection of the proper lubricant. At the design level, the first consideration is whether oil or grease is best for the particular operation. The advantages of oil and grease are outlined in the table below. When heat must be carried away from the bearing, oil must be used. It is nearly always preferred for very high-speed applications. For limiting speeds of grease and oil-lubricated bearings, refer to the section entitled "Speed, Heat and Torque" section.

ADVANTAGES OF OIL AND GREASE

OIL	GREASE
Carries heat away from the bearings	Simplifies seal design and acts as a sealant
Carries away moisture and particulate matter	Permits prelubrication of sealed or shielded bearings
Easily controlled lubrication	Generally requires less frequent lubrication

LUBRICANT ADDITIVES

Additives are materials, usually chemicals, that improve specific properties when added to lubricants. Additives, when properly formulated into a lubricant, can increase lubricant life, provide greater resistance to corrosion, increase load-carrying capacity and enhance other properties. Additives are very complex and should not be added indiscriminately to lubricants as a cure-all for all lubrication problems.

The more common lubricant additives include:

- Oxidation inhibitors for increasing lubricant service life.
- Rust or corrosion inhibitors to protect surfaces from rust or corrosion.
- Demulsifiers to promote oil and water separation.
- Viscosity-index improvers to decrease viscosity sensitivity to temperature change.
- Pour-point depressants to lower the pouring point at low temperatures.
- Lubricity agents to modify friction.
- Antiwear agents to retard wear.
- Extreme pressure (EP) additives to prevent scoring under boundary-lubrication conditions.
- Detergents and dispersants to maintain cleanliness.
- Antifoam agents to reduce foam.
- Tackiness agents to improve adhesive properties.

Inorganic additives such as molybdenum disulphide, graphite, and zinc oxide are sometimes included in lubricants. In most tapered roller bearing applications, inorganic additives are of no significant benefit; conversely, as long as the concentration is low and the particle size small, they are not harmful.

Recently, the effects of lubricant chemistry on bearing life (as opposed to the purely physical characteristics) have received much emphasis. Rust, oxidation, extreme pressure and anti-wear additive packages are widely used in engine and gear oils. Fatigue testing has shown these additives may, depending on their chemical formulation, concentration and operating temperature, have a positive or negative impact on bearing life.

Consult your Timken representative for more information regarding lubricant additives.

GUIDANCE FOR OIL/GREASE SELECTION

Oil lubrication

Oils used for bearing lubrication should be high-quality, non-oxidizing mineral oils or synthetic oils with similar properties. Selection of the proper type of oils depends on bearing speed, load, operating temperature and method of lubrication.

Some features and advantages of oil lubrication, in addition to the above, are as follows:

- Oil is a better lubricant for high speeds or high temperatures. It can be cooled to help reduce bearing temperature.
- With oil, it is easier to handle and control the amount of lubricant reaching the bearing. It is harder to retain in the bearing. Lubricant losses may be higher than with grease.
- As a liquid, oil can be introduced to the bearing in many ways, such as drip-feed, wick-feed, pressurized circulating systems, oil-bath or air-oil mist. Each is suited to certain types of applications.
- Oil is easier to keep clean for recirculating systems. Oil may be introduced to the bearing housing in many ways.

LUBRICATION AND SEALS - *continued*

The most common systems are:

- **Oil bath.** The housing is designed to provide a sump through which the rolling elements of the bearing will pass. Generally, the oil level should be no higher than the center point of the lowest rolling element. If speed is high, lower oil levels should be used to reduce churning. Gages or controlled elevation drains are used to achieve and maintain the proper oil level.

- **Circulating system.** This system has the advantages of:
  - An adequate supply of oil for both cooling and lubrication.
  - Metered control of the quantity of oil delivered to each bearing.
  - Removal of contaminants and moisture from the bearing by flushing action.
  - Suitability for multiple bearing installations.
  - Large reservoir, which reduces deterioration. Increased lubricant life provides economical efficiency.
  - Incorporation of oil filtering devices.
  - Positive control to deliver the lubricant where needed.

  A typical circulating oil system consists of an oil reservoir, pump, piping and filter. A cooler may be required.

- **Oil-mist lubrication.** Oil-mist lubrication systems are used in high-speed, continuous operation applications. This system permits close control of the amount of lubricant reaching the bearings. The oil may be metered, atomized by compressed air and mixed with air, or it may be picked up from a reservoir using a venturi effect. In either case, the air is filtered and supplied under sufficient pressure to assure adequate lubrication of the bearings. Control of this type of lubrication system is accomplished by monitoring the operating temperatures of the bearings being lubricated. The continuous passage of the pressurized air and oil through the labyrinth seals used in the system prevents the entrance of contaminants from the atmosphere to the system. The successful operation of this type of system is based upon the following factors: proper location of the lubricant entry ports in relation to the bearings being lubricated, avoidance of excessive pressure drops across void spaces within the system, the proper air pressure and oil quantity ratio to suit the particular application, and the adequate exhaust of the air-oil mist after lubrication has been accomplished. To ensure "wetting" of the bearings and to prevent possible damage to the rolling elements and races, it is imperative that the oil mist system be turned on for several minutes before the equipment is started. The importance of "wetting" the bearing before starting cannot be overstated and has particular significance for equipment that has been idled for extended periods of time.

WARNING

Proper maintenance and handling practices are critical. Failure to follow installation instructions and to maintain proper lubrication can result in equipment failure, creating a risk of serious bodily harm.

OIL LUBRICATION GUIDELINES

Oil lubrication

Lubricating oils are commercially available in many forms for automotive, industrial, aircraft and other uses. Oils are classified as either petroleum types (refined from crude oil) or synthetic types (produced by chemical synthesis).

Petroleum oils

Petroleum oils are used for nearly all oil-lubricated applications of Timken bearings. These oils have physical and chemical properties that can help in the selection of the correct oil for any bearing application.

Synthetic oils

Synthetic oils cover a broad range of categories, and include polyalphaolefins, silicones, polyglycols, and various esters. In general, synthetic oils are less prone to oxidation and can operate at extreme hot or cold temperatures. Physical properties such as pressure-viscosity coefficients tend to vary between oil types and caution should be used when making oil selections.

The polyalphaolefins (PAO) have a hydrocarbon chemistry, which parallel petroleum oil both in their chemical structures and pressure-viscosity coefficients. Therefore, PAO oil is mostly used in the oil-lubricated applications of Timken bearings when severe temperature environments (hot and cold) are encountered or when extended lubricant life is required. The silicone, ester and polyglycol oils have an oxygen based chemistry that is structurally quite different from petroleum oils and PAO oils. This difference has a profound effect on its physical properties where pressure-viscosity coefficients can be lower compared to mineral and PAO oils. This means that these types of synthetic oils may actually generate a smaller EHD film thickness than a mineral or PAO oil of equal viscosity at operating temperature. Reductions in bearing fatigue life and increases in bearing wear could result from this reduction of lubricant film thickness.

SELECTION OF OILS

The selection of oil viscosity for any bearing application requires consideration of several factors: load, speed, bearing setting, type of oil, and environmental factors. Since viscosity varies inversely with temperature, a viscosity value must always be stated with the temperature at which it was determined. High viscosity oil is used for low-speed or high-ambient temperature applications. Low viscosity oil is used for high-speed or low-ambient temperature applications.

Approximate Temperature Limits For Oils

Petroleum	149° C	300° F
Super Refined Petroleum	177° C	350° F
Synthetic Hydrocarbon	204° C	400° F
Synthetic Esters	204° C	400° F
Silicones	260° C	500° F
Polyphenylether	288° C	550° F
Perfluorinated	316° C	600° F

LUBRICATION AND SEALS - *continued*

CLASSIFICATION

There are several classifications of oils based on viscosity grades. The most familiar are the Society of Automotive Engineers (SAE) classifications for automotive engine and gear oils. The American Society for Testing and Materials (ASTM) and the International Organization for Standardization (ISO) have adopted standard viscosity grades for industrial fluids. Fig. A-31 shows the viscosity comparisons of ISO/ASTM with SAE classification systems at 40° C.

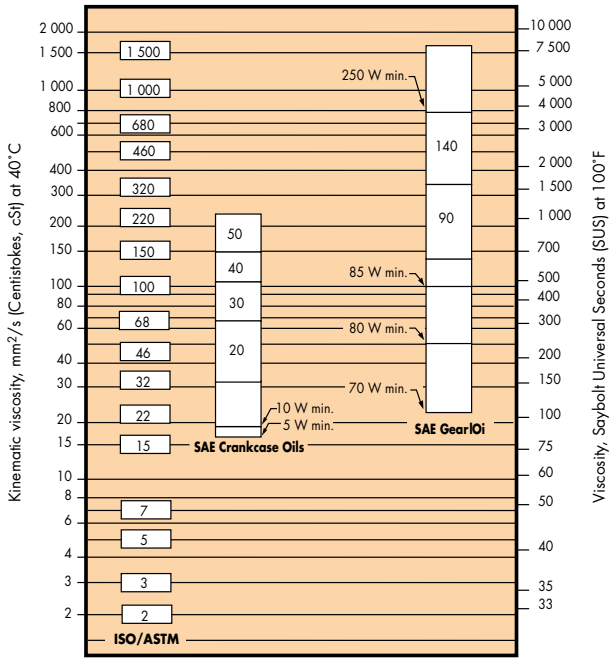


Fig. A-31
Viscosity classification comparison between ISO/ASTM grades (ISO 3448/ ASTM D2442) and SAE grades (SAE J 300-80 for crankcase oils, SAE J 306-81 for axle and manual transmission oils).

The figure below can be used to predict the oil's kinematic viscosity versus temperature (use base oil for grease).

TEMPERATURE VS. KINEMATIC VISCOSITY

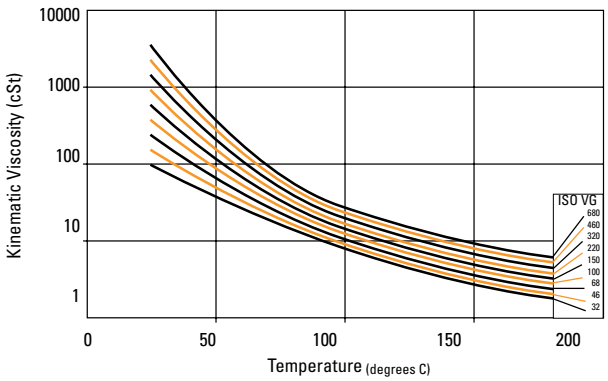


Fig. A-31a

TYPICAL OIL LUBRICATION GUIDELINES

In this section, the properties and characteristics of lubricants for typical tapered roller bearing applications are listed. These general characteristics have resulted from long successful performance in these applications.

General purpose rust and oxidation lubricating oil

General purpose rust and oxidation (R&O) inhibited oils are the most common type of industrial lubricant. They are used to lubricate Timken bearings in all types of industrial applications where conditions requiring special considerations do not exist.

SUGGESTED GENERAL PURPOSE R&O LUBRICATING OIL PROPERTIES

Base stock	Solvent refined, high viscosity-index petroleum oil
Additives	Corrosion and oxidation inhibitors
Viscosity index	80 min.
Pour point	-10° C max.
Viscosity grades	ISO/ ASTM 32 through 220

Some low-speed and/or high-ambient temperature applications require the higher viscosity grades, and high-speed and/or low-temperature applications require the lower viscosity grades.

Industrial extreme pressure (EP) gear oil

Extreme pressure gear oils are used to lubricate Timken bearings in all types of heavily loaded industrial equipment. They should be capable of withstanding heavy loads including abnormal shock loads common in heavy-duty equipment.

SUGGESTED INDUSTRIAL EP GEAR OIL PROPERTIES

Base stock	Solvent refined, high viscosity index petroleum oil
Additives	Corrosion and oxidation inhibitors. Extreme pressure (EP) additive* - 15.8 kg (35 lb) min. "OK" Timken load rating
Viscosity index	80 min.
Pour point	-10° C max.
Viscosity grades	ISO/ ASTM 100, 150, 220, 320, 460

* ASTM D 2782

Industrial EP gear oils should be composed of a highly refined petroleum oil-based stock plus appropriate inhibitors and additives. They should not contain materials that are corrosive or abrasive to bearings. The inhibitors should provide long-term protection from oxidation and protect the bearing from corrosion in the presence of moisture. The oils should resist foaming in service and have good water separation properties. An EP additive protects against scoring under boundary-lubrication conditions. The viscosity grades suggested represent a wide range. High temperature and/or slow-speed applications generally require the higher viscosity grades. Low temperatures and/or high speeds require the use of lower viscosity grades.

LUBRICATION AND SEALS - *continued*

LUBRICATING GREASES

Definition

According to the ASTM definition, lubricating grease is a "solid to semi-fluid product of the dispersion of a thickening agent in a liquid lubricant; other ingredients imparting special properties may be included." If this definition were applied in the manner a chemist would use to illustrate a chemical reaction, the composition of a grease could be described by the formula below.

Fluids	+Thickening Agents	+Special Ingredients	=Lubricating Grease
Mineral Oils	Soaps	Oxidation Inhibitors	
Esters	Lithium, Sodium	Rust Inhibitors	
Organic Esters	Barium, Calcium	VI Improver	
Glycols	Strontium	Tackiness	
Silicones	Non-Soap (Inorganic)	Perfumes	
	Microgel (Clay)	Dyes	
	Carbon Black	Metal Deactivator	
	Silica-gel		
	Non-Soap (Organic)		
	Urea compounds		
	Terepthlamate		
	Organic Dyes		

At this time, there is no known universal anti-friction bearing grease. Each individual grease has certain limiting properties and characteristics.

Synthetic lubricating fluids, such as esters, organic esters and silicones, are used with conventional thickeners or chemical additives to provide greases capable of performing over an extremely wide range of temperatures, from as low as -73° C (-100° F) to a high of 288° C (550° F).

The successful use of lubricating grease in roller bearings depends on the physical and chemical properties of the lubricant pertaining to the bearing, its application, installation and general environmental factors. Because the choice of a lubricating grease for a particular bearing under certain service conditions is often difficult to make, your Timken representative should be consulted for proper suggestions.

Grease lubrication

The simplest lubrication system for any bearing application is grease. Conventionally, greases used in Timken bearing applications are petroleum oils of some specific viscosity that are thickened to the desired consistency by some form of metallic soap. Greases are available in many soap types such as sodium, calcium, lithium, calcium-complex and aluminium-complex. Organic and inorganic type non-soap thickeners also are used in some products.

Soap type

Calcium greases have good water resistance. Sodium greases generally have good stability and will operate at higher temperatures, but they absorb water and cannot be used where moisture is present. Lithium, calcium-complex and aluminium-complex greases generally combine the higher temperature properties and stability of sodium grease with the water resistance of calcium grease. These greases are often referred to as multi-purpose greases since they combine the two most important lubricant advantages into one product.

CHARACTERISTICS AND OPERATING ENVIRONMENTS

Listed below are the general characteristics of prominent rolling bearing greases.

Thickener	Typical Dropping PT C	Typical Dropping PT F	Usable** Temperature C	Usable** Temperature F	Typical Water Resistance
Sodium Soap	260+	500+	121	250	Poor
Lithium Soap	193	380	104	220	Good
Polyurea	238	460	149	300	Excellent
Lithium Complex Soap	260+	500+	163	325	Good

** Continuous operation with no relubrication. Depending upon the formulation the service limits may vary. The usable limit can be extended significantly with relubrication.

Polyurea as a thickener for lubricating fluids is one of the most significant lubrication developments in more than 30 years. Polyurea grease performance in a wide range of bearing applications is outstanding, and in a relatively short time it has gained acceptance as a factory-packed lubricant for ball bearings.

Consistency

Greases may vary in consistency from semifluids hardly thicker than a viscous oil, to solid grades almost as hard as a soft wood.

Consistency is measured by a penetrometer, in which a standard weighted cone is dropped into the grease. The distance the cone penetrates (measured in tenths of a millimeter in a specific time) is the penetration number.

The National Lubricating Grease Institute (N.L.G.I.) classification of grease consistency is shown below:

NLGI Grease Grades	Penetration Number
0	355-385
1	310-340
2	265-295
3	220-250
4	175-205
5	130-160
6	85-115

Grease consistency is not fixed; it normally becomes softer when sheared or "worked." In the laboratory this "working" is accomplished by forcing a perforated plate up and down through a closed container of grease. This "working" does not compare with the violent shearing action that takes place in a ball bearing and does not necessarily correlate with actual performance.

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LUBRICATION AND SEALS - *continued*

Low Temperatures

Starting torque in a grease-lubricated ball bearing at low temperatures can be critical. Some greases may function adequately as long as the bearing is operating, but resistance to initial movement is such that the starting torque is excessive. In certain smaller machines, starting is an impossibility when very cold. Under such operating circumstances, the greases containing low-temperature characteristic oils are generally required.

If the operating temperature range is wide, synthetic fluid greases offer definite advantages. Greases are available to provide very low starting and running torque at temperatures as low as -73° C (-100° F). In certain instances, these greases perform better in this respect than oil.

An important point concerning lubricating greases is that the starting torque is not necessarily a function of the consistency or the channel properties of the grease. It appears to be more a function of the individual properties of the particular grease and is difficult to measure. Experience alone will indicate whether one grease is superior to another.

High Temperatures

The high temperature limit for modern grease is generally a function of the thermal and oxidation stability of the fluid and the effectiveness of the oxidation inhibitors. The graph, to the right, was prepared using military-specification greases to illustrate the thermal limitations of mineral oil, ester, silicone, and fluorinated ether greases. The limits as shown apply only to prelubricated bearings or to applications where relubrication is not possible. Where provisions have been made for relubrication, the temperature limits may be extended provided the interval between cycles is reduced accordingly.

A rule of thumb, developed from years of testing grease-lubricated bearings, indicates that grease life is halved for every 10° C (18° F) increase in temperature. For example, if a particular grease is providing 2,000 hours of life at 90° C (194° F) by raising the temperature to 100° C (212° F) reduction in life to approximately 1,000 hours would result. On the other hand, 4,000 hours could be expected by lowering the temperature to 80° C (176° F).

It becomes obvious that the reactions started by the normal reaction of lubricant with oxygen increases rapidly at higher temperatures. The lubricants undergo a series of chemical reactions, that ultimately result in the development of viscous or hard residues that interfere with the operation of the bearing.

Thermal stability, oxidation resistance, and temperature limitations must be considered when selecting greases for high-temperature applications. In non-relubricatable applications, highly refined mineral oils or chemically stable synthetic fluids are required as the oil component of greases for operation at temperatures above 121° C (250° F).

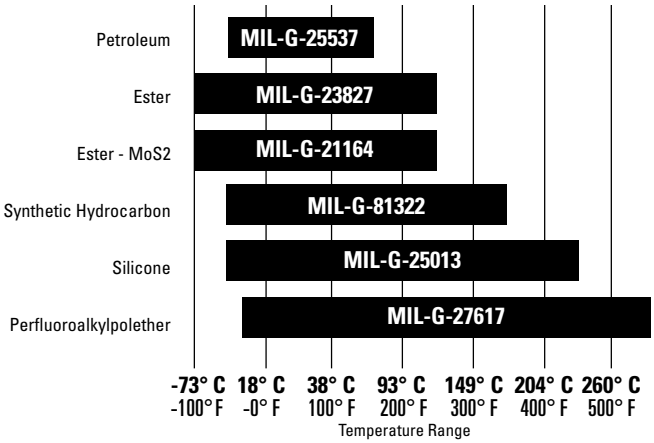
Approximate Temperature Limits For Grease Thickeners

Soaps	121° C	250° F
Complexes	177° C	350° F
Polyureas	177° C	350° F
Non-soap	>260° C	>500° F

Timken Multi-Use Lithium Grease

Soap Type:	Lithium
Consistency:	NLGI No. 1 or No. 2
Additives:	Corrosion and oxidation inhibitors
Base Oil:	Petroleum/Mineral
Base Oil Viscosity at 40° C:	145.6
Pour Point:	-18° C max.
Color:	Light Brown

LUBRICATION GREASE TEMPERATURE RANGES



LUBRICATION AND SEALS - *continued*

Grease Compatibility Chart

■ = Best Choice
■ = Compatible
■ = Borderline
■ = Incompatible

	Al Complex	Ba Complex	Ca Stearate	Ca 12 Hydroxy	Ca Complex	Ca Sulfonate	Clay Non-Soap	Li Stearate	Li 12 Hydroxy	Li Complex	Polyurea	Polyurea S S
Aluminum Complex	■	■	■	■	■	■	■	■	■	■	■	■
Timken Food Safe	■	■	■	■	■	■	■	■	■	■	■	■
Barium Complex	■	■	■	■	■	■	■	■	■	■	■	■
Calcium Stearate	■	■	■	■	■	■	■	■	■	■	■	■
Calcium 12 Hydroxy	■	■	■	■	■	■	■	■	■	■	■	■
Calcium Complex	■	■	■	■	■	■	■	■	■	■	■	■
Calcium Sulfonate	■	■	■	■	■	■	■	■	■	■	■	■
Timken Premium Mill Timken Heavy Duty Moly	■	■	■	■	■	■	■	■	■	■	■	■
Clay Non-Soap	■	■	■	■	■	■	■	■	■	■	■	■
Lithium Stearate	■	■	■	■	■	■	■	■	■	■	■	■
Lithium 12 Hydroxy	■	■	■	■	■	■	■	■	■	■	■	■
Lithium Complex	■	■	■	■	■	■	■	■	■	■	■	■
Polyurea Conventional	■	■	■	■	■	■	■	■	■	■	■	■
Polyurea Shear Stable	■	■	■	■	■	■	■	■	■	■	■	■
Timken Multi-Use	■	■	■	■	■	■	■	■	■	■	■	■
Timken All Purpose Timken Premium Synthetic	■	■	■	■	■	■	■	■	■	■	■	■
Timken High Speed	■	■	■	■	■	■	■	■	■	■	■	■
Timken Pillow Block	■	■	■	■	■	■	■	■	■	■	■	■

WARNING

Mixing grease types can cause the lubricant to become ineffective, which can result in equipment failure, creating a risk of serious bodily harm.

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LUBRICATION AND SEALS - *continued*

WET CONDITIONS

Water and moisture can be particularly conducive to bearing damage. Lubricating greases may provide a measure of protection from this contamination. Certain greases, the calcium, lithium and non-soap type, for example, are highly water-resistant. However, these greases exhibit poor rust preventative characteristics unless properly inhibited.

Sodium-soap greases emulsify with small amounts of moisture that may be present and prevent the moisture from coming in contact with the bearing surfaces. In certain applications, this characteristic may be advantageous; however, emulsions are generally considered undesirable.

Many bearing applications require lubricants with special properties or lubricants formulated specifically for certain environments, such as:

- Friction Oxidation (Fretting Corrosion).
- Chemical and Solvent Resistance.
- Food Handling.
- Quiet Running.
- Space and/or Vacuum.
- Electrical Conductivity.

For assistance with these or other areas requiring special lubricants, consult your Timken representative.

CONTAMINATION

Abrasive particles

When tapered roller bearings operate in a clean environment, the primary cause of damage is the eventual fatigue of the surfaces where rolling contact occurs. However, when particle contamination enters the bearing system, it is likely to cause damage such as bruising, which can shorten bearing life.

When dirt from the environment or metallic wear debris from some component in the application is allowed to contaminate the lubricant, wear can become the predominant cause of bearing damage. If, due to particle contamination of the lubricant, bearing wear becomes significant, changes will occur to critical bearing dimensions that could adversely affect machine operation.

Bearings operating in a contaminated lubricant exhibit a higher initial rate of wear than those running in an uncontaminated lubricant. But, with no further contaminant ingress, this wear rate quickly diminishes as the contamination particles are reduced in size as they pass through the bearing contact area during normal operation.

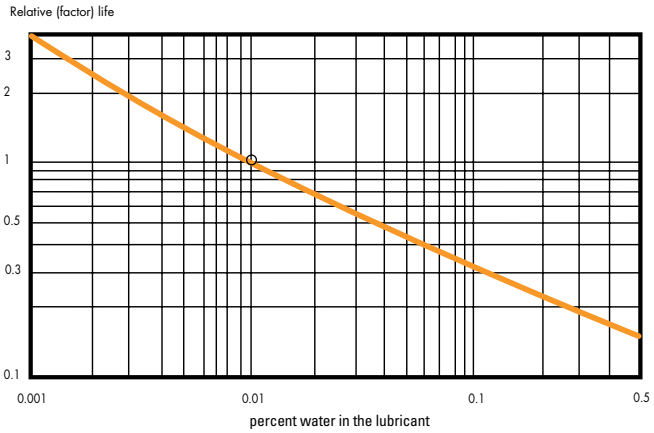
Water

Either dissolved or suspended water in lubricating oils can exert a detrimental influence on bearing fatigue life. Water can cause bearing etching that also can reduce bearing fatigue life. The exact mechanism by which water lowers fatigue life is not fully understood. It has been suggested that water enters microcracks in the bearing races that are caused by repeated stress cycles. This leads to corrosion and hydrogen embrittlement in the microcracks, reducing the time required for these cracks to propagate to an unacceptable size spall.

Water-base fluids such as water glycol and invert emulsions also have shown a reduction in bearing fatigue life. Although water from these sources is not the same as contamination, the results support the previous discussion concerning water-contaminated lubricants.

The following chart gives a good idea of the influence of water on bearing life. Based on Timken Technology tests, it was determined that water content of 0.01 percent (100 parts per million) or less, had no effect on bearing life. Greater amounts of water in the oil will reduce bearing life significantly.

LIFE REDUCTION WITH WATER CONTAMINATION



LUBRICATION AND SEALS - *continued*

GREASES - APPLICATIONS AND LUBRICATING METHODS

Grease lubrication is generally applicable to the following conditions, and features low-to-moderate speed applications within operating temperature limits of the grease:

- Easily confined in the housing. This is important in the food, textile and chemical industries.
- Bearing enclosure and seal design simplified.
- Improves the efficiency of external mechanical seals to give better protection to the bearing.
- Successfully used for integrally-sealed, prelubricated ball bearings.

Advantages of prelubricated ball bearings

Prelubricated shielded and sealed bearings are extensively used with much success in applications where:

- Grease might be injurious to other parts of the mechanism.
- Cost and space limitations preclude the use of a grease filled housing.
- Housings cannot be kept free of dirt and grit, water or other contaminants.
- Relubrication is impossible or would be a hazard to satisfactory use.

Prelubricated Timken bearings are prepacked with greases that have chemical and mechanical stability and have demonstrated long life characteristics in rotating bearings. Greases are filtered several times to remove all harmful material and accurately metered so that each bearing receives the proper amount of grease.

GREASE LUBRICATION FOR BEARING / HOUSING ASSEMBLIES

Polyurea and lithium-based greases are normally preferred for general purpose bearing lubrication and are advantageous in high moisture applications. Both greases have good water-resistant characteristics. For temperature ranges of standard greases, see chart below.

The grease must be carefully selected with regard to its consistency at operating temperature. It should not exhibit thickening, separation of oil, acid formation or hardening to any marked degree. It should be smooth, non-fibrous and entirely free from chemically active ingredients. Its melting point should be considerably higher than the operating temperature.

Frictional torque is influenced by the quantity and the quality of lubricant present. Excessive quantities of grease cause churning. This results in excessive temperatures, separation of the grease components, and breakdown in lubrication values. In normal speed applications, the housings should be kept approximately one-third to one-half full.

Only on low speed applications may the housing be entirely filled with grease. This method of lubrication is a safeguard against the entry of foreign matter, where sealing provisions are inadequate for exclusion of contaminants or moisture.

During periods of non-operation, it is often wise to completely fill the housings with grease to protect the bearing surfaces. Prior to subsequent operation, the excess grease should be removed and the proper level restored.

Applications utilizing grease lubrication should have a grease fitting and a vent at opposite ends of the housing near the top. A drain plug should be located near the bottom of the housing to allow purging of the old grease from the bearing.

Relubricate at regular intervals to prevent damage to the bearing. Relubrication intervals are difficult to determine. If plant practice or experience with other applications is not available, consult your lubricant supplier.

STANDARD LUBRICATION - TIMKEN BALL BEARINGS

Bearing Type	Grease Type	Grease Temperature Range
Radial Bearings (Double shielded and Single and Double Sealed)	Polyurea thickener Petroleum oil	-30° to +275° F
Wide Inner Ring Bearings (Contact Seal Types)	Polyurea thickener Petroleum oil	-30° to +275° F
Wide Inner Ring Bearings (Labyrinth Seal Types)	Synthetic thickener Synthetic hydrocarbon fluid	-65° to +325° F

Note: Open type bearings and single shielded types are NOT prelubricated. They have a rust preventative coating only and must be lubricated by the customer or end-user before operation.

LUBRICATION AND SEALS - *continued*

Multi-purpose industrial grease

These are typical of greases that can be used to lubricate many Timken bearing applications in all types of standard equipment. Special consideration should be given to applications where speed, load, temperature or environmental conditions are extreme.

Timken Multi-Use Lithium Grease	
Soap Type:	Lithium
Consistency:	NLGI No. 1 or No. 2
Additives:	Corrosion and oxidation inhibitors
Base Oil:	Petroleum/Mineral
Base Oil Viscosity at 40° C:	145.6
Pour Point:	-18° C max.
Color:	Light Brown

General purpose industrial grease should be a smooth, homogeneous and uniform, premium-quality product composed of petroleum oil, a thickener, and appropriate inhibitors. It should not contain materials that are corrosive or abrasive to tapered roller bearings. The grease should have excellent mechanical and chemical stability and should not readily emulsify with water. The grease should contain inhibitors to provide long-term protection against oxidation in high-performance applications and protect the bearings from corrosion in the presence of moisture.

The suggested base oil viscosity covers a fairly wide range. Lower viscosity products should be used in high-speed and/or lightly loaded applications to minimize heat generation and torque. Higher viscosity products should be used in moderate- to low-speed applications and under heavy loads to maximize lubricant film thickness.

Mineral grease

When conventional (mineral) greases are used, the rib speed should be limited to 5 m/s. This limit can be increased under pure radial loads up to 13 m/s provided that the bearings remain in endplay under all operating conditions. Generally, No. 2 consistency greases are used with medium- to low-viscosity base oils.

$$V_{mg} = f_{mg} \times V = f_{mg} \times \left[\frac{\pi}{4} \times T \times (D^2 - d^2) \times 10^{-3} - \frac{M}{7.8 \times 10^{-3}}\right] \ (cm^3)$$

where:

f_{mg} = factor depending on speed: $0.3 < f_{mg} < 0.5$
V = free volume of the bearing (cm^3)
T = overall bearing width (mm)
D = cup outer diameter (mm)
d = cone bore (mm)
M = bearing weight (kg)

Synthetic grease fill

The use of "low torque" greases (or synthetic greases) can be considered for rib speeds over 2,560 fpm (13 m/s), up to maximum of 4,920 fpm (25 m/s). Experience has shown that stabilized temperatures, around 15° C to 20° C (60° F to 68° F) above ambient, can be obtained at the maximum permissible speed.

The following procedures must be respected to achieve the above performance:

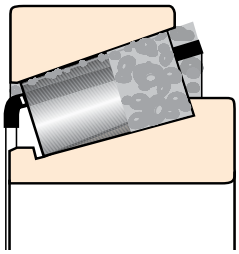
- Very small initial quantity of grease is applied to prevent excessive churning.
- Initial run-in period to evacuate unnecessary grease from the bearing.
- Good spindle design to retain grease around the bearings.
- Efficient sealing to protect against external contamination.

$$V_{sg} = f_{sg} \times V = f_{sg} \times \left[\frac{\pi}{4} \times T \times (D^2 - d^2) \times 10^{-3} - \frac{M}{7.8 \times 10^{-3}}\right] \ (cm^3)$$

where:

f_{sg} = factor depending on speed: $0.15 < fsg < 0.3$

LUBRICATION AND SEALS - *continued*



Filling a bearing with synthetic grease

When using synthetic greases, the limiting factor is the "lubrication for life" concept (without re-greasing).

A normal way to fill the bearing with grease is to do it by hand before heating and fitting the components. For the cone, the free volume corresponding to the first third of the rollers, starting from their large end, is filled with grease; an additional quantity is provided below the cage. For the cup, a thin film of grease is spread all around the race.

Grease lubrication of spindle bearings is generally preferred by machine tool builders over oil circulation lubrication due to its simplicity and low heat generation. For high loads or high speeds, circulating oil is probably the most widely used method because of its capability to remove heat from the spindle.

RE-GREASING CYCLE

The two primary considerations that determine the re-greasing cycle on any application are operating temperature and sealing efficiency. Obviously, seal leakage will dictate frequent relubrication. Every attempt should be made to maintain seals at peak efficiency. It is generally stated that the higher the temperature, the more rapidly the grease oxidizes. Grease life is reduced by approximately half for every 10° C rise in temperature.

The higher the operating temperature, the more often the grease must be replenished. In most cases, experience in the specific application will dictate the frequency of lubrication.

LUBRICATION AND SEALS - *continued*

Timken application specific lubricants have been developed by leveraging our knowledge of tribology and anti-friction bearings and how these two elements affect overall system performance. Timken lubricants help bearings and related components operate effectively in demanding industrial operations. High-temperature, anti-wear and water-resistant additives offer superior protection in challenging environments. This chart is intended to provide an overview of the Timken greases available for general applications. Contact your local Timken representative for a more detailed publication on Timken lubrication solutions.

LUBRICATION SELECTION GUIDE

Environment		Application
High Wear • Moderate Loads Moderate Speeds Moderate Temperatures	Timken Premium All Purpose Industrial Grease	Agriculture • Bushings/Ball Joints Truck and Auto Wheel Bearings Heavy Duty Industrial
High Speeds • Light Loads Moderate Temperatures Moderate Water	Timken Ball Bearing Electric Motor Grease	Alternators • Generators Electric Motors • Fans/Pumps
Extreme Heat • Heavy Loads High Sliding Wear Dirty Environments Slow Speeds • Shock Loading	Timken Construction and Off-Highway Grease	Agriculture/Mining • Cement Plants Construction/Off Road • Rock Quarry Earth Moving Equipment Fleet Equipment • Heavy Industry Pivot Pins/Splined Shafts
Wet and Corrosive Conditions Quiet Environments • Light Loads Moderate to High Speeds Moderate Temperatures	Timken Ball Bearing Pillow Block Grease	Lightly Loaded Pillow Blocks Idler Pulleys • Oven Conveyors Chemical Manufacture Noise-Sensitive Applications
Corrosive Media • Extreme Heat Heavy Loads • Wet Conditions Slow to Moderate Speeds	Timken Mill Grease	Aluminum Mills • Paper Mills Steel Mills • Offshore Rigs Power Generation
Incidental Food Contact Hot and Cold Temperatures Moderate to High Speeds Medium Loads	Timken Food Safe Grease	Food and Beverage Industries Pharmaceuticals
Extreme Low and High Temperatures Severe Loads Corrosive Media Slow to Moderate Speeds	Timken Synthetic Industrial Grease	Wind Energy Main Bearing Pulp and Paper Machines General Heavy Industry Marine Applications Centralized Grease Systems
Ultra-High Speeds Extreme Low Temperatures	Timken Ultra-High Speed Spindle Grease	Machine Tools Associated with: Grinding • Drilling • Turning Milling • Lathes
Moderate Speeds Light to Moderate Loads Moderate Temperatures Moderate Water	Timken Multi-Use Lithium Grease	General Industrial Applications Pins and Bushings • Track Rollers Water Pumps Plain and Antifriction Bearings

This selection guide is not intended to replace the specifications by the equipment builder.

LUBRICATION AND SEALS - *continued*

SEALS

SELECTING THE RIGHT SEAL

When selecting the proper seal design for any Timken bearing application, it is necessary to consider the type of lubricant, the operation environment, the speed of the application and general operating conditions.

Shaft finish

It is important to ensure that no spiral grooves result from machining of shaft surfaces since these will tend to draw lubricant out of, or contaminant into, the bearing cavity. Plunge grinding normally produces a satisfactory surface finish.

Grease lubrication - venting

Venting should be provided in the cavity between the two bearings when grease lubrication is used in conjunction with rubbing or non-rubbing seals. This will prevent an ingress of contamination past the seals, in the event of a pressure differential between the bearing cavity and atmosphere.

Vertical shaft closures - oil lubrication

Lubricating vertical shaft bearings is a difficult problem. Normally, grease, oil mist or oil-air lubrication is used because of the simplicity. However, some high speed and/or heavy load applications will use circulating oil. This requires a very good sealing system and a suction pump to remove the oil from the bottom bearing position.

NON-RUBBING SEALS

Metal stampings

Metal stamping closures are effective in clean applications. Where environmental conditions are dirty, stampings are used in combination with other closure elements to provide an effective labyrinth against the entry of foreign matter into the bearing chamber.

The stamping shown in Fig. A-32 is effective for applications that are grease-lubricated and operate in clean conditions. The design illustrated in Fig. A-33 uses stampings on both sides of the bearing to keep the grease in close proximity to the bearing. The flinger mounted at the outer side of the bearing adds a labyrinth effect.

Stampings should be designed to provide a clearance of 0.5 to 0.6 mm (0.020 to 0.025 in.) on diameters between rotating and stationary parts. A minimum axial clearance of 3 mm (0.125 in.) should be provided.

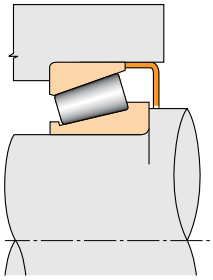


Fig. A-32
Metal stamping.

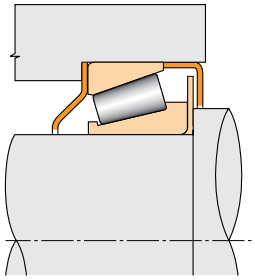


Fig. A-33
Metal stampings.

Machined flingers

Machined parts, along with other closure elements, can be used in place of stampings where closer clearances are desired. This results in a more efficient retention of lubricant and exclusion of foreign matter from the bearing housing. Examples are shown in Fig. A-34 and A-35.

An umbrella-shaped flinger is shown in Fig. A-35 combined with an annular groove closure. At high shaft speeds this combination effectively retains oil and keeps out dirt.

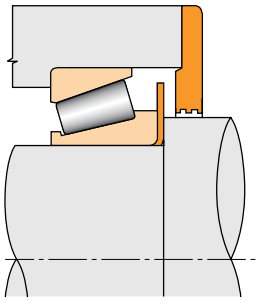


Fig. A-34
Machined flinger combined with annular grooves.

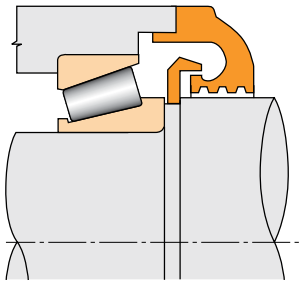


Fig. A-35
Machined umbrella flinger combined with annular grooves.

A

LUBRICATION AND SEALS - *continued*

Annular grooves

Annular groove closures are often used with grease lubrication in place of radial lip seals where considerable grit and dust are encountered. The closure usually has several grooves machined in the bore or on the outside diameter depending on the design. They become filled with grease, which tends to harden and provide a tight closure. When used with oil, the grooves tend to interrupt the capillary action which would otherwise draw oil out of the bearing cavity. Annular grooves with a machined labyrinth effectively protect a grease-lubricated bearing when the unit is required to operate in an extremely dirty environment (Fig. A-36). This type of closure is most effective when applied with close-running clearances and the maximum possible number of grooves. Suggested dimensions are shown in Fig. A-37.

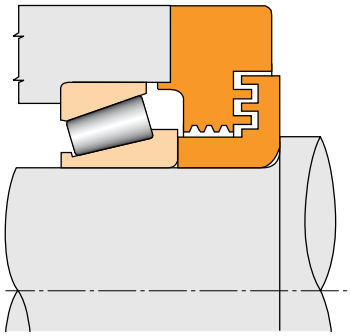
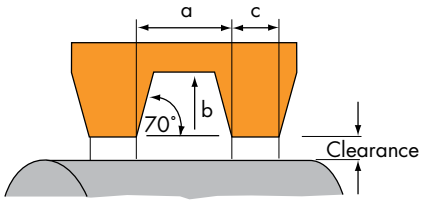


Fig. A-36
Annular grooves combined with machined labyrinth.



dimension "a"	3.20 - 4.80 0.125 - 0.190	
dimension "b"	4.00 - 4.80 0.160 - 0.190	
dimension "c"	0.5a	
diametral clearance	0.25 - 0.40 0.010 - 0.016	for diameters to 50 mm (2 in)
	1.3 max. 0.05 max.	for diameters over 50 mm (2 in)

Fig. A-37
Annular grooves. Suggested dimensions (mm, in.).

RUBBING SEALS

Radial lip seals

Many types and styles of radial lip seals are commercially available to satisfy different sealing requirements. In clean environments, where the primary requirement is the retention of lubricant in the bearing housing, a single lip seal with the lip pointing inward is often used. Where the critical concern is exclusion of contaminants, the lip is usually pointed outwards (Fig. A-38).

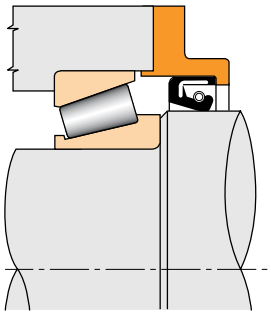


Fig. A-38
Radial lip seals.

Lip seals are available with or without a spring-loaded lip. The spring maintains a constant pressure of the lip on the sealing surface, thereby providing a more efficient seal for a longer period of time. When environmental conditions require a seal to prevent contaminants from entering the bearing chamber as well as retaining the lubricant, a double or triple lip seal is often used. Additional flingers or shrouds should be used as primary seals where extremely dirty conditions are present so that the seal lip and sealing surface are protected to avoid rapid wear and premature seal damage (Fig. A-39).

Seal wear surfaces are normally required to have a surface finish in the order of 0.25-0.40 µm (10-15 µin.) R_a. For applications exposed to severe contamination, the seal wear surface should in general have a minimum surface hardness of Rockwell C-45. The seal supplier should be consulted for more specific guidance.

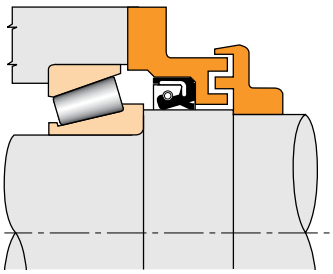


Fig. A-39
Lip seal plus machined labyrinth.

LUBRICATION AND SEALS - *continued*

"DUO FACE®-PLUS" seals

The "DUO FACE®-PLUS" seal (Fig. A-40) has double lips that seal in the housing bore and the ground surface of the outer race front face. This eliminates the need to machine a special seal surface. The "DUO FACE®-PLUS" seal has proven successful in many different types of grease-lubricated applications. The range of Timken bearings available with "DUO FACE®-PLUS" seals is listed in this book. Also, a brochure showing application examples is available on request.

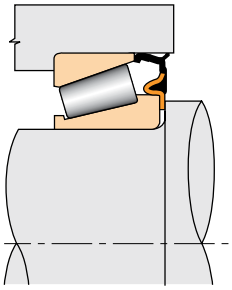


Fig. A-40
DUO FACE® –PLUS seal.

Mechanical face seals

These are often used in extremely dirty environments where rotational speeds are low. Fig. A-42 shows one of the proprietary types of mechanical face seals available. This type of seal generally needs to run in an oil bath. Designs are also available for high-speed and other special applications.

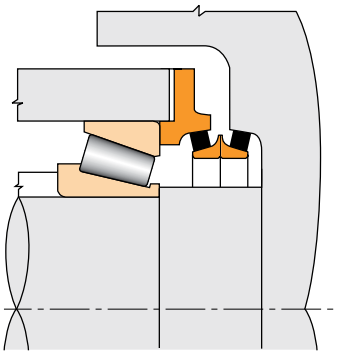


Fig. A-42
Mechanical face seal for low speeds and contaminated environment.

Diaphragm seals

Diaphragm seals (Fig. A-41) are commercially available. The metallic lip is designed to be spring-loaded against the narrow face of the outer race. The type shown in Fig. A-41b has a second lip which seals against the housing.

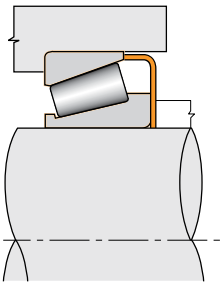


Fig. A-41
Diaphragm seal.

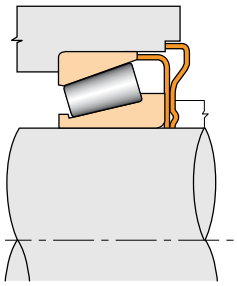


Fig. A-41b
Diaphragm seal.

V-ring seals

V-ring seals can be used in conjunction with grease or oil lubrication. As rotational speeds increase, the lip tends to pull away from the sealing surface and act like a flinger. This seal may be used with either oil or grease lubrication (Fig A-43). Consult your V-ring seal supplier for application restrictions.

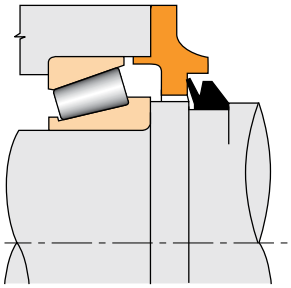


Fig. A-43
V-ring seals.

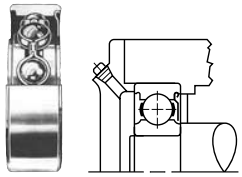
LUBRICATION AND SEALS - *continued*

BALL BEARINGS WITH SHIELDS AND SEALS

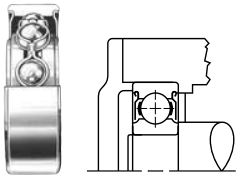
Shields (D-Type)

Both K and W single-row radial types are available with one shield, designated by suffix D, or two shields, suffix DD. A shield on one side provides protection against the entrance of coarse dirt or chips and makes it possible to relubricate the bearing from the open side as shown (at right).

Double-shielded bearings are prelubricated with the correct amount of Timken suggested ball bearing grease and are designed for applications where relubrication is not required. Typical mountings are shown.



One Shield-Suffix D



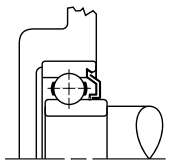
Two Shields-Suffix DD

Labyrinth or Mechani-Seals (L-Type)

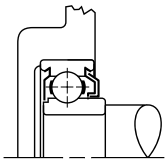
Bearings with Mechani-Seals are made in the non-filling slot type only and are available with a single seal, designated by suffix L, one seal and one shield, suffix LD, and two seals, suffix LL. These bearings have standard bores, outside diameters and outer ring widths, but the inner ring is wider than standard unshielded and shielded sizes. As illustrated, in the L and LD-Types, the inner rings are offset slightly on the side opposite the seal in order to permit clearance when the bearings are mounted in blind housings.

The Mechani-Seal was developed by Timken to provide a frictionless seal for effective grease retention and exclusion of foreign material. It consists of two "dished" steel plates. The inner member is fixed securely in the outer ring of the bearing and provides an ample grease chamber plus effective grease retention. The outer member is pressed on the outside diameter of the inner ring and rotates as a slinger to throw off contaminants. Close running clearances between the inner and outer members assure effective sealing under extremely severe conditions. This seal configuration is very effective under high speed, because it is virtually frictionless and utilizes slinger action. Mechani-Seal bearings are very popular in high-speed pneumatic tools, small electric motors, pumps, domestic appliances and similar high-speed applications. A typical mounting arrangement for the LL-Type is shown.

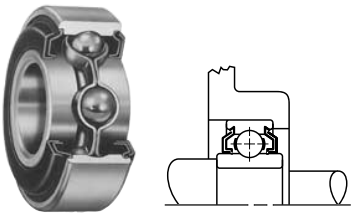
Wide-type radial bearings (W-LL-Type) with Mechani-Seals are designated by the prefix W and suffix LL for two seals. They are made in standard bores and outside diameters, but in widths the same as those of corresponding size double-row bearings. The extra width affords greater space for long-life factory-filtered grease and provides extra support on shafts and in housings so that locknuts and lockwashers are not needed on applications such as electric motors. A typical mounting is shown (at right).



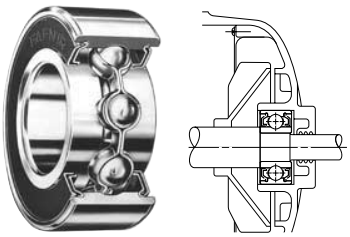
Suffix L



Suffix LD



Two Mechani-Seals Suffix LL



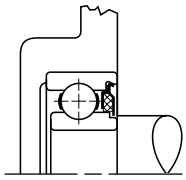
W-LL-Type Typical Mounting

LUBRICATION AND SEALS - *continued*

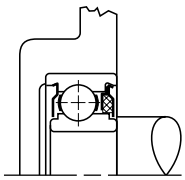
Felt Seals (T-Type)

The felt seal consists of two metal plates fixed in the outer ring of the bearing that enclose a felt washer. This felt washer, which is saturated with oil before assembly in the bearing, contacts the ground outside diameter of the inner ring to provide sealing with minimum friction drag.

Bearings with felt seals are made only in the non-filling slot type and are available with one seal (designated by the suffix T), one seal and one shield (identified by suffix TD), and two seals (suffix TT). Bores and outside diameters of these bearings are the same as standard unshielded and shielded types, but overall widths are greater. As illustrated, in the T-and TD-types, the inner rings are offset slightly on the opposite side of the seal to permit clearance when the bearings are mounted in blind housings as illustrated.



Suffix T



Suffix TD

Rubber Seals (P-Type)

Radial bearings with rubber seals having one or two seals are designated by the suffixes P and PP, respectively. With the exception of the extra-small sizes, they are dimensionally interchangeable with open-type and shielded bearings.

The P-Type design is a positive contact seal using a molded synthetic rubber. Firmly fixed to the outer ring, the seal flares outward and rides on the inner ring. The flare-out of the seal against the inner ring radius assures constant positive contact to provide an effective barrier against the entrance of contaminants or loss of lubricants.

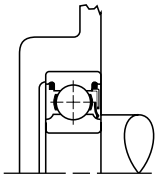
Because they interchange dimensionally with standard single-row radial types, Timken® rubber seal bearings provide a convenient compact design.

Wide-type radial rubber seal bearings (W-PP Type) designated by prefix W and suffix PP for two seals are made with standard bores and outside diameters, but with widths the same as those as corresponding double-row bearings. This design also utilizes a molded seal.

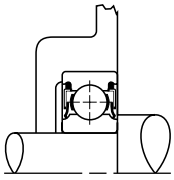
The extra width offers a larger contact area for the shaft and housing and also provides additional space for displacement of grease under agitation.

These wide type rubber seal bearings are particularly well-suited for use by electric motor manufacturers where their advantages have helped simplify design. A typical example of motor design simplification is illustrated (right).

Suffix PP



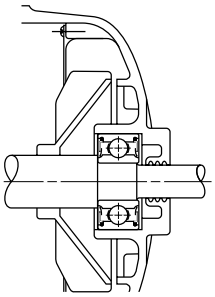
P Type



PP Type

Typical Mounting Arrangements

Electric Motor Assembly with W-PP Type Bearing



W-PP Type Typical Mounting

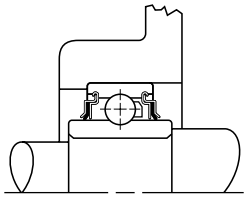
LUBRICATION AND SEALS - *continued*

Rubber Seals (R-Type)

One of the most advanced sealing designs introduced by Timken is the R-Type rubber seal bearing. This is a positive contact seal of three-piece construction, utilizing a synthetic rubber seal retained by two steel caps. The seal flares outward and rides or wipes on the ground land of the inner ring. In this design, the rubber sealing element is completely protected by a closely fitting outer cap or shroud, which nests tightly against the seal member following its flared-out shape at the inner ring of the outside diameter. The innermost member is crimped into a groove in the outer ring and encapsulates the seal and outside shroud. Providing firm seal contact, the back-up plate of the seal assembly has a close clearance with the outside diameter of the inner ring, preventing the seal from being pushed inward.

Laboratory tests have clearly established the superior performance of the shroud-type R-Seal. With improved lubricant retention and greater protection against contaminants, the shroud design guards the rubber seal against abrasive damage by dirt and fiber wrap, which may be prevalent in agriculture and textile applications. This seal construction also is available in standard and heavy series wide inner ring bearings.

Shroud Seal suffix RR



Shroud Seal suffix RR

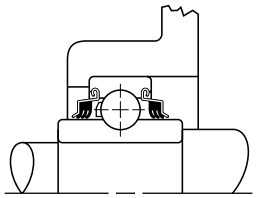
Tri-Ply Seals

Tri-Ply Shroud Seal ball bearings are designed for bearing applications involving exceptionally severe contamination or abrasion environments. They are produced in many types and sizes, both in the radial and wide inner ring designs.

Each Tri-Ply seal consists of a triple-lip nitrile seal molded to a heavy metal shroud cap. All three seal lips have heavy flare-out contact with the inner ring outside diameter and provide exceptionally effective protection against the loss of lubricant and the entrance of wet or abrasive contaminants. The shroud cap, which nests closely with the outside seal lip, helps protect the rubber seal members from wrap and abrasion.

A feature of these bearings is the balanced design, consisting of deep raceways, large ball size, and extra-wide or heavy inner rings. The use of Tri-Ply bearings simplifies housing designs, and their extra inner ring width provides greater support on the shaft. These bearings are widely used on conveyors and farm machinery such as disc harrows, hillers, tomato harvesters, cotton harvesters, etc.

Tri-Ply Seals



SPEED, HEAT AND TORQUE

SPEED RATINGS

RADIAL BALL BEARINGS

There is no precise method for determining the maximum speed at which a ball bearing may operate. Bearing characteristics and features of surrounding parts, shafts, housing and other component as well as basic service conditions are all variables dependent upon each other for continued satisfactory high-speed performance.

The safe operating speed of a bearing is often limited by the temperature within the bearing, which, in turn, is dependent upon the temperature surrounding the application, accuracy of bearings, shafts, housings, auxiliary parts, etc., and the type and amount of lubricant.

Radial bearings with proper internal refinements will operate at high speeds for long periods if properly installed and lubricated. Tolerance grade, cage design, and lubricant are bearing characteristics which affect speed limitations.

Bearings with ABEC 1 tolerances are generally satisfactory for normal speeds with grease or oil lubrication.

Ball bearings with ABEC 5 tolerances or better and ring-piloted composition cages lubricated with an efficient, non-churning, cooling oil-mist system have exceptional high-speed ability.

In the case of duplex mountings, as frequently used in a high-speed machine tool spindles, bearing preload and contact angle affect the permissible speeds.

The values in the accompanying table may be used as a general guide for determining the safe maximum speed of standard types of Timken ball bearings. To obtain the speed value for any bearing size with inner ring rotating, multiply the pitch diameter in millimeters (or, in the case of extra-small inch dimension bearings, the nearest millimeter equivalent) by the speed in revolutions per minute. Refer to page A164 for the most suitable bearing type, cage style, tolerance guide and type of lubrication.

For outer ring rotation of ball bearings, multiply the speed value (pitch or mean dia. in. mm x RPM of the outer ring) by the following factors before referring to the table of speed values.

BALL BEARING SERIES FACTOR	
Extra-small (30 and S) and extra-light (9100 and M9300)	1.3
Light (200, 5200 and 7200)	1.5
Medium (300, 5300 and 7300)	1.7

Although the speed values shown in the tables on the following page are based on many years of research and accumulated data, numerous application of Timken bearings are successfully operating with speed values far in excess of those tabulated. Such applications require particular consideration of proper tolerance grade, lubrication, the effect of centrifugal force on rolling elements and other factors. For further information consult your Timken representative.

Conversely, under certain application conditions of load, temperature, contamination, etc., limiting speeds may be less than the figures shown. These values do not apply to certain special bearings, such as radial Tri-Ply series, square or hex bore bearings.

The speed capability of a bearing in any application is subject to a number of factors including:

- Temperature.
- Bearing setting or clearance.
- Lubrication.
- Bearing design.

The relative importance of each of these factors depends on the nature of the application. The effect of each factor is not isolated – each contributes in varying degrees, depending on the application and overall speed capability of the design.

An understanding of how each of these factors affects performance as speeds change is required to achieve the speed capabilities inherent in a bearing.

SPHERICAL AND CYLINDRICAL ROLLER BEARINGS

For Timken cylindrical and spherical roller bearings, the thermal speed ratings are listed in the bearing tables. These values have been determined by balancing the heat generated within the bearing with the heat dissipated from the bearing. In calculating these numbers, the following assumptions have been made:

- The radial load is five percent of the static load rating.
- For oil, it is assumed to be in a bath with the fill to the middle of the lowest rolling element. For grease it is assumed a 30 percent bearing cavity fill.
- The oil viscosity is assumed to be 12 cSt (ISO VG32) operated at 70° C, (158° F) and the grease base oil viscosity is assumed to be 22 cSt operated at 70° C (158° F). The bearing and its components are at 70° C and the bearing environment is at 20° C (68° F).
- The housing and shaft are steel or cast iron.
- The bearing rotational axis is horizontal.
- The outer ring is stationary and the inner ring is rotating.
- The bearing radial internal clearance complies with class normal and standard fits are used.
- The bearing does not contain seals.
- The bearing does not experience misalignment or axial load.

The thermal speed ratings are for reference only and can be considerably lower or higher depending on your application. Consult your Timken representative for more accurate information regarding a bearing's speed limitations in your application.

SPEED, HEAT AND TORQUE - *continued*

RADIAL BALL BEARINGS
d_m X N VALUES (d_m* IN MILLIMETERS X RPM)

Bearing Type / Series	Cage Type	ABEC 1		ABEC 3			ABEC 5 and 7		
		Grease	Oil(1)	Grease	Oil(1)	Grease	Grease	Circulating Oil(1)	Oil Mist
BALL BEARINGS									
SINGLE-ROW									
Non-Filling Slot	Ball Piloted Molded Nylon(PRB)	250,000	300,000	250,000	300,000	—	300,000	300,000	300,000
9300K, 9100K									
200K,	Pressed Steel, Brass	300,000	350,000	300,000	350,000	—	350,000	400,000	450,000
300K,	Ring Piloted Molded Reinforced Nylon(PRC)	350,000	400,000	350,000	450,000	—	400,000	550,000	650,000
XLS, and variations	Composition (CR)								
Filling Slot	Ball Piloted Molded Nylon(PRB)	250,000	250,000	—	—	—	—	—	—
200W and variations	Pressed Steel	250,000	300,000	—	—	—	—	—	—
300W and variations									
Angular Contact	Ball Piloted Pressed Steel, Molded Nylon (PRB)	200,000	300,000	300,000	350,000	—	—	—	—
7200WN	Ring Piloted Brass (MBR), Ball Piloted Br (MBR)	300,000	400,000	—	—	—	—	—	—
7300WN	Ring Piloted Molded Reinforced Nylon (PRC)	350,000	400,000	350,000	400,000	—	—	—	—
Angular Contact-Extra precision									
2M9300WI, 2M200WI,									
2M300WI, 2M9100WI,	Ring Piloted Composition (CR) or (PRC)	350,000	400,000	750,000	1,000,000	1,200,000			
2MM9300WI, 2MM9100,							1,000,000	1,400,000	1,700,000
2MM200WI, 2MM300WI									
DOUBLE-ROW									
5200	Ball Piloted Molded Nylon (PRB), Pressed Steel	250,000	300,000	—	—	—	—	—	—
5300	Ball Piloted Brass (BR)								

* $\frac{\text{Bore} + \text{O.D.}}{2}$

(1) For oil bath lubrication, oil level should be maintained covering between ⅓ to ½ up from the bottom of the lowest ball.

Note: Single or double normal contact (P or PP) sealed bearings should not exceed 300,000 PDN. Consult your Timken representative for limiting speed of RR or Tri-Ply sealed bearings.

SPEED, HEAT AND TORQUE - *continued*

TAPERED ROLLER BEARINGS

The usual measure of the speed of a tapered roller bearing is the circumferential velocity at the midpoint of the inner race large end rib (Fig. A-44). This may be calculated as:

Rib speed:

$$V_r = \frac{\pi D_m n}{60000} \text{ (m/s)}$$

$$= \frac{\pi D_m n}{12} \text{ (ft/min)}$$

where:

D_m = Mean inner race large rib diameter mm, in.
n = Bearing speed rev/min

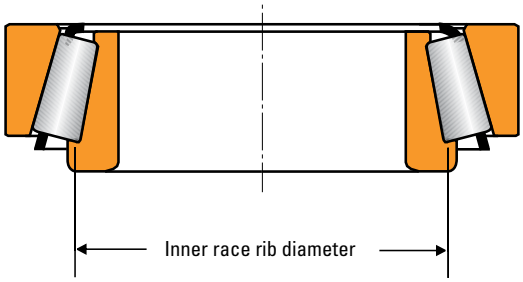


Fig. A-44
Cone rib diameter. The inner race rib diameter may be scaled from a print.

The mean large rib diameter at the midpoint of the roller end contact can be scaled from a drawing of the bearing, if available, or this diameter can be determined by consulting your Timken representative. The inner cone mean large rib diameter can be approximated by taking 99 percent of larger rib O.D.

DN values (the product of the inner race bore in mm and the speed in rev/min) are often used as a measure of bearing speed by other bearing manufacturers. There is no direct relationship between the rib speed of a tapered roller bearing and DN value because of the wide variation in bearing cross sectional thickness. However, for rough approximation, one meter per second rib speed is about equal to 16,000 DN for average section bearings. One foot per minute is equal to approximately 80 DN.

SPEED CAPABILITY GUIDELINES FOR VARIOUS TYPES OF LUBRICATION SYSTEMS

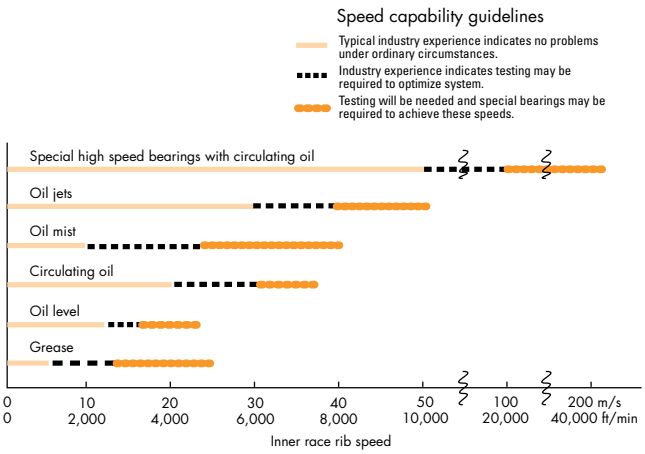


Fig. A-45

Fig. A-45 is a summary of guidelines relating to speed and temperature based on customer experience, customer tests and research conducted by The Timken Company. Consult your Timken representative with questions regarding high-speed capability.

OPERATING TEMPERATURES

TEMPERATURE LIMITATIONS

Bearing equilibrium temperature is not simply a question of speed. It is also dependent on the heat generation rate of all contributing heat sources, nature of the heat flow between sources, and heat dissipation rate of the system. Seals, gears, clutches, and oil supply temperature affect bearing operating temperature.

Heat dissipation rate is governed by such factors as type of lubrication system, materials and masses of the shaft and housing and intimacy of contact with the bearing, and surface area and character of the fluid both inside and outside the housing.

Temperature of the outer surface of the housing is not an accurate indication of bearing temperature. The inner ring temperature is often greater than the outer ring temperature and both are usually greater than the outer surface of the housing. There are temperature gradients within the bearing with the temperature of the internal parts usually being greater than the outer surfaces. Although the temperature of the outer ring O.D. or the inner ring I.D., or the oil outlet is often used as an indicator of bearing temperature, it should be recognized that these are generally not the highest bearing temperatures.

During transient conditions, such as at startup, bearing temperatures will often peak and then reduce to a lower level. This is due to the thermal changes taking place between the bearing, shaft and housing causing variations in setting and internal loading. Also, a new bearing will usually generate more heat until it runs in.

The allowable operating temperature depends on:

- Equipment requirements
- Lubrication limitations
- Bearing material limitations
- Reliability requirements

Each factor is an area of increasing concern as operating temperatures rise.

The equipment designer must decide how operating temperature will affect the performance of the equipment being designed. Precision machine tools, for example, can be very sensitive to thermal expansions. In many cases it is important that the temperature rise over ambient be minimized and held to 20 to 25° C (36 to 45° F) for some precision spindles.

Most industrial equipment can operate satisfactorily with considerably higher temperature rises. Thermal ratings on gear drives, for example, are based on 93° C (200° F).

Some equipment such as plastic calendars and gas turbine engines operate continuously at temperatures well above 100° C (212° F).

Standard bearing steels cannot maintain the desired minimum hot hardness of 58 HRC much above 135° C (275° F).

Standard Timken spherical roller bearings are dimensionally stabilized up to 200° C. Upon request, the bearings can be ordered with dimensional stabilization up to 250° C (S2 suffix) or 300° C (S3 suffix). Consult your Timken representative for availability in specific part numbers.

Standard Timken cylindrical roller bearings are dimensionally stabilized up to 150° C. Upon request, the bearings can be ordered with dimensional stabilization up to 200° C (S1 suffix), 250° C (S2 suffix) or 300° C (S3 suffix).

Dimensional stability of Timken ball bearings is achieved by tempering the hardened steel until any further growth by transformation of austenite to martensite is balanced by shrinkage from tempering martensite. This balance is never perfect, and some size change will always occur, the amount depending upon the operating time and temperature of the bearings and the composition of and heat treatment of the steel. The ABMA definition for stabilized rings and balls permits a change of less than .0001 inch per inch after exposure to a temperature of 300° F for 2,500 hours. Rings and balls used at elevated temperatures are defined as stable by ABMA where there is a size change of less than .00015 inch per inch after 1,500 hours exposure at temperatures of 450°, 600° and 800° F.

Above this, special high-temperature steels are used by Timken.

Timken CBS 600™ steel should be considered for temperatures between 150 to 230° C (300 to 450° F) and Timken CBS 1000M™ steel should be used for temperatures above 230° C (450° F) . Also, CBS 600 and CBS 1000M have increased resistance to scoring - important in very high-speed applications. Consult your Timken representative for availability of S1, S2, S3 suffixes or high-temperature steels in specific part numbers and applications.

Although bearings can operate satisfactorily at higher temperatures, an upper temperature limit of 80 to 95° C (176 to 203° F) is usually more practical for small, high volume equipment where prototype testing is possible. Higher operating temperatures increase the risk of damage from some unforeseen transient condition. If prototype testing is not practical, an upper design limit of 80° C (176° F) is appropriate unless prior experience on similar equipment suggests otherwise.

History on some machines operating at higher temperatures, such as high-speed rolling mills, offers good background data for establishing limits on new similar machines.

Obviously none of the above examples of equipment, lubricant or bearing materials limitations are single point limitations but rather areas of gradually increasing concern. It is the responsibility of the equipment designer to weigh all relevant factors and make the final determination of what operating temperature is satisfactory for his particular machine.

Suggested materials for use in rings, balls and rollers at various operating temperatures are listed together with data on chemical composition, hardness and dimensional stability. A temperature of 427° C (800° F) is generally the top limit for successful bearing operation using steels. Above 427° C (800° F), or below where lubricant is not permitted, cast or wrought cobalt alloys are generally used. Although chosen primarily for their good retention of physical properties, they also possess good oxidation resistance at elevated temperatures.

Suggested materials for cages, shields, and seals are tabulated on page A168 with their temperature capabilities.

SPEED, HEAT AND TORQUE - *continued*

Other Considerations

Until now, temperature limitation has been discussed in reference to metallurgical considerations. However, installations which operate at high temperatures for extended periods may lose the quality of shaft and housing fits. Carefully machined and heat-treated shafts and housings will minimize trouble from this source. In some applications the internal clearance of bearings may be partially absorbed. For example, during the first few seconds of rotation a massive housing may keep the outer race cooler than the inner race and rolling elements even if the housing is already at some elevated temperature and, also, during heat soakback when rotation stops heat may flow back to the bearing along the shaft. If, while stationary, the effects of heat soakback more than removes the radial internal clearance, radial brinell of the races may occur and the bearing will be rough during subsequent rotation. Bearings with extra internal looseness may be required to compensate for the above conditions.

HEAT GENERATION AND DISSIPATION

One of the major benefits of oil-lubricated systems is that the heat generated by the bearings is carried away by the circulating oil and dissipated through the system.

Heat generation

Under normal operating conditions, most of the torque and heat generated by the bearing is due to the elastohydrodynamic losses at the roller/race contacts.

The following equation is used to calculate the heat generated by the bearing:

$$Q_{gen} = k_4 n M$$
$$M = k_1 G_1 (n\mu)^{0.62} (P_{eq})^{0.3}$$

where:

Q_{gen} = generated heat (W or Btu/min)
M = running torque N.m or lbf-in.
n = rotational speed (RPM)
G_1 = geometry factor from bearing data tables
μ = viscosity at operating temperature (cP)
P_{eq} = equivalent dynamic load (N or lbf)
k_1 = bearing torque constant
= 2.56×10^{-6} for M in N-m
= 3.54×10^{-5} for M in lbf-in.

Heat dissipation

The heat dissipation rate of a bearing system is affected by many factors. The modes of heat transfer need to be considered. Major heat transfer modes in most systems are conduction through the housing walls, convection at the inside and outside surfaces of the housing, and convection by the circulating lubricant. In many applications, overall heat dissipation can be divided into two categories: Heat removed by circulating oil and heat removed through the housing.

Heat dissipation by circulating oil

Heat dissipated by a circulating oil system is:

$$Q_{oil} = k_5 f \quad (\theta_o - \theta_i)$$

If a circulating lubricant other than petroleum oil is used, the heat carried away by that lubricant will be:

$$Q_{oil} = k_6 C_p \rho f (\theta_o - \theta_i)$$

The following factors apply to the heat generation and dissipation equations listed on this page.

k_4 Dimensional factor to calculate heat generation rate
k_4 = 0.105 for Q_{gen} in W when M in N-m
= 6.73×10^{-4} for Q_{gen} in Btu/min when M in lbf-in.

k_5 Dimensional factor to calculate heat carried away by a petroleum oil
k_5 = 28 for Q_{oil} in W when f in L/min and θ in °C
= 0.42 for Q_{oil} in Btu/min when f in U.S. pt/min and θ in °F

k_6 Dimensional factor to calculate heat carried away by a circulating fluid
k_6 = 1.67×10^{-5} for Q_{oil} in W
= 1.67×10^{-2} for Q_{oil} in Btu/min

Q_{oil}	Heat dissipation rate of circulating oil	W, Btu/min
θ_i	Oil inlet temperature	°C, °F
θ_o	Oil outlet temperature	°C, °F
C_p	Specific heat of lubricant	J/(kg x °C), Btu/(lb x °F)
f	Lubricant flow rate	L/min, U.S. pt/min
ρ	Lubricant density	kg/m^3, lb/ft^3

SPEED, HEAT AND TORQUE - *continued*

These tables provide standard operating temperatures for common bearing component materials. They should be used for reference purposes only. Other bearing component materials are available on request. Contact your Timken representative for further information.

OPERATING TEMPERATURES FOR BEARING COMPONENT MATERIALS

RINGS, BALLS AND ROLLERS SINGLE-ROW

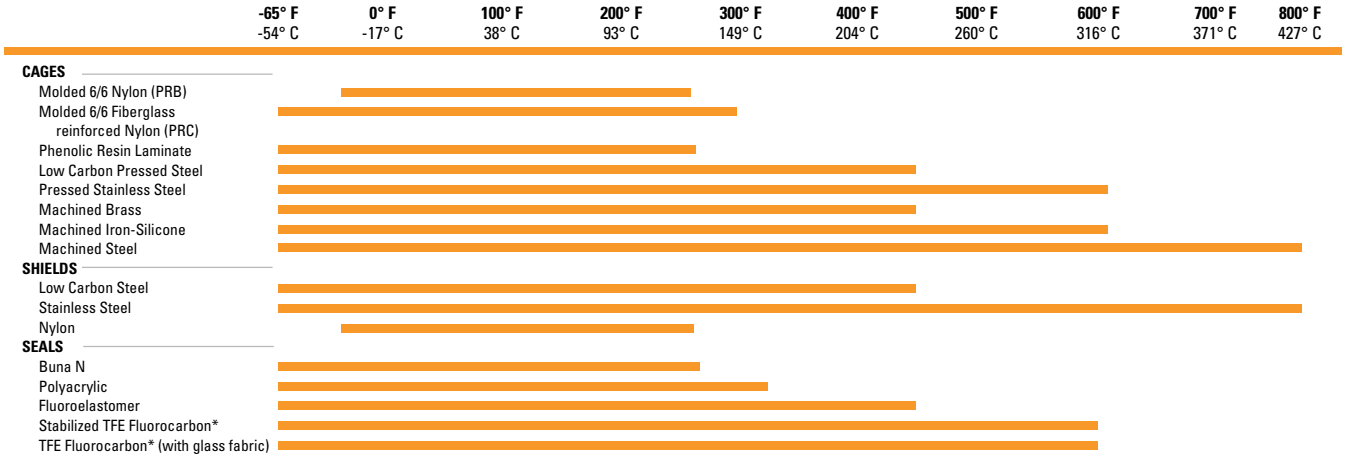
Material	Approximate Chemical Analysis-%	Temp. °F	Hardness HRC	Operating Temperature -100° F -73° C / -65° F / 0° F -17° C / 100° F 38° C / 200° F 93° C / 250° F / 300° F 149° C / 400° F 204° C / 500° F 260° C / 600° F 316° C / 700° F 371° C / 800° F 427° C
Low alloy carbon-chromium bearing steels. 52100 and others per ASTM A295	1C 0.5-1.5Cr 0.35Mn	70	60	STANDARD DIMENSIONAL STABILIZATION <0.0001 in/in dimensional change in 2,500 hours at 212° F. Good oxidation resistance.
Low alloy carbon-chromium bearing steels. 52100 and others per ASTM A295	1C 0.5-1.5Cr 0.35Mn	70 350 450	58 56 54	Heat stabilized per FS136 <.0001 in./in dimensional change in 2,500 hours at 300° F When given a stabilizing heat treatment, A295 steel is suitable for many applications in the 350-450° F range; however, it is not as stable dimensionally as it is at temperatures below 350° F. If utmost stability is required, use materials in the 600° F group below.
Deep hardening steels for heavy sections per ASTM A485	1C 1-1.8Cr 1-1.5 Mn .06Si	70 450 600	58 55 52	As heat treated and tempered, it is stabilized, <.0001 in/in dimensional change in 2500 HR at 300 ° F (149° C).
Carburizing steels per ASTM A534 (a) low alloy 4118 (b) 8620 (c) high nickel 3310	.2C, .5Cr, .80Mn, .12Mo .2C, .5Cr, .80 Mn, .20 Mo, .55Ni .10C, 1.60Cr, .50Mn, 3.50Ni	70	58	4118,8620 steel frequently used to achieve extra ductility in inner rings for locking device bearings. 3310 and others used for extra thick section rings.
Corrosion Resistant 440C stainless steel per ASTM A756	1C 18Cr	70	58	Excellent corrosion resistance.
Corrosion Resistant 440C stainless steel per ASTM A756	1C 18Cr	70 450 600	58 55 52	As heat stabilized for maximum hardness at high temperatures (FS238). Good oxidation resistance at higher temperatures. Note load capacity drops off more rapidly at higher temperatures than M50 shown below, which should be considered if loads are high. <.0001 in/in dimensional change in 1,200 hours.
M-50 Medium High Speed	4 Cr. 4 Mo 1V 0.8C	70 450 600	60 59 57	Recommended where stable high hardness at elevated temperature is required. <.0001 in/in dimensional change in 1,200 hours at 600° F.

Dimensional stability data shown above is the permanent metallurgical growth and/or shrinkage only. Thermal expansion effects are not included. Bearings have been made of special material for operation at temperatures above 800° F. Consult your Timken representative regarding the application.

Note: ASTM A295 bearing steels are suitable for many applications up to 250° F but are not as dimensionally stable as they are at temperatures below 212° F.

OPERATING TEMPERATURES FOR BEARING COMPONENT MATERIALS

CAGES, SHIELDS AND SEALS



* Limited life above these temperatures.

SPEED, HEAT AND TORQUE - *continued*

TORQUE

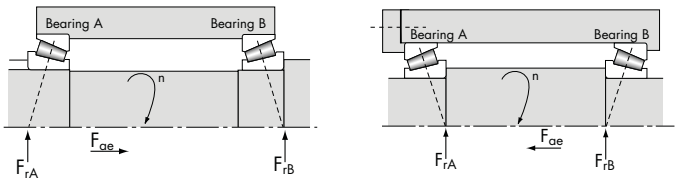
TAPERED ROLLER BEARINGS

Running torque-M

The rotational resistance of a rolling bearing is dependent on load, speed, lubrication conditions and bearing internal characteristics.

The following formulas yield approximations to values of bearing running torque. The formulas apply to bearings lubricated by oil. For bearings lubricated by grease or oil mist, torque is usually lower, although for grease lubrication this depends on amount and consistency of the grease. The formulas also assume the bearing running torque has stabilized after an initial period referred to as "running-in."

Single-row tapered roller bearing

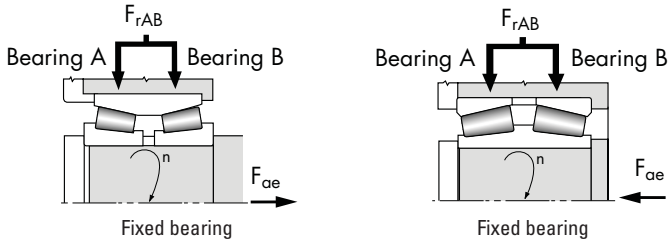


Design (external thrust, F_{ae}, onto bearing A)

Thrust condition	Net bearing thrust load	
$\frac{0.47\ F_{rA}}{K_A} \leq \frac{0.47\ F_{rB}}{K_B} + F_{ae}$	$F_{aA} = \frac{0.47\ F_{rB}}{K_B} + F_{ae}$ $F_{aB} = \frac{0.47\ F_{rB}}{K_B}$	$M = k_1\ G_1\ (n\mu)^{0.62} \left(\frac{f_1\ F_r}{K}\right)^{0.3}$ $n_{min} = \frac{k_2}{G_2 \mu} \left(\frac{f_2\ F_r}{K}\right)^{2/3}$
$\frac{0.47\ F_{rA}}{K_A} > \frac{0.47\ F_{rB}}{K_B} + F_{ae}$	$F_{aA} = \frac{0.47\ F_{rA}}{K_A}$ $F_{aB} = \frac{0.47\ F_{rA}}{K_A} - F_{ae}$	

NOTE: The torque equations will be underestimated if operating speed, n, is less than n_{min}.
For values of f_1 and f_2, refer to figure A-46 on page A171.

Double-row tapered roller bearing



Design (external thrust, F_{ae}, onto bearing A)

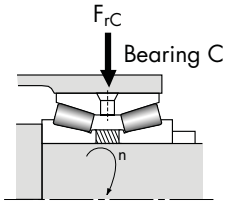
Fixed position

Load condition	Radial load on each row F_r	
$F_{ae} > \frac{0.47\ F_{rAB}}{K_A}$	Bearing B is unloaded $F_{rA} = F_{rAB}$ $F_{aA} = F_{ae}$	$M = k_1\ G_1\ (n\mu)^{0.62} \left(\frac{f_1\ F_{rAB}}{K}\right)^{0.3}$ $n_{min} = \frac{k_2}{G_2\mu} \left(\frac{f_2\ F_{rAB}}{K}\right)^{2/3}$
$F_{ae} \leq \frac{0.47\ F_{rAB}}{K_A}$	$F_{rA} = \frac{F_{rAB}}{2} + 1.06\ K\ F_{ae}$ $F_{rB} = \frac{F_{rAB}}{2} - 1.06\ K\ F_{ae}$	$M = k_1\ G_1\ (n\mu)^{0.62} \left(\frac{0.060}{K}\right)^{0.3} (F_{rA}^{0.3} + F_{rB}^{0.3})$ $n_{minA} = \frac{k_2}{G_2\mu} \left(\frac{1.78F_{rA}}{K}\right)^{2/3}$; $n_{minB} = \frac{k_2}{G_2\mu} \left(\frac{1.78F_{rB}}{K}\right)^{2/3}$

Floating position

$$M = 2\ k_1\ G_1\ (n\mu)^{0.62} \left(\frac{0.030\ F_{rC}}{K}\right)^{0.3}$$

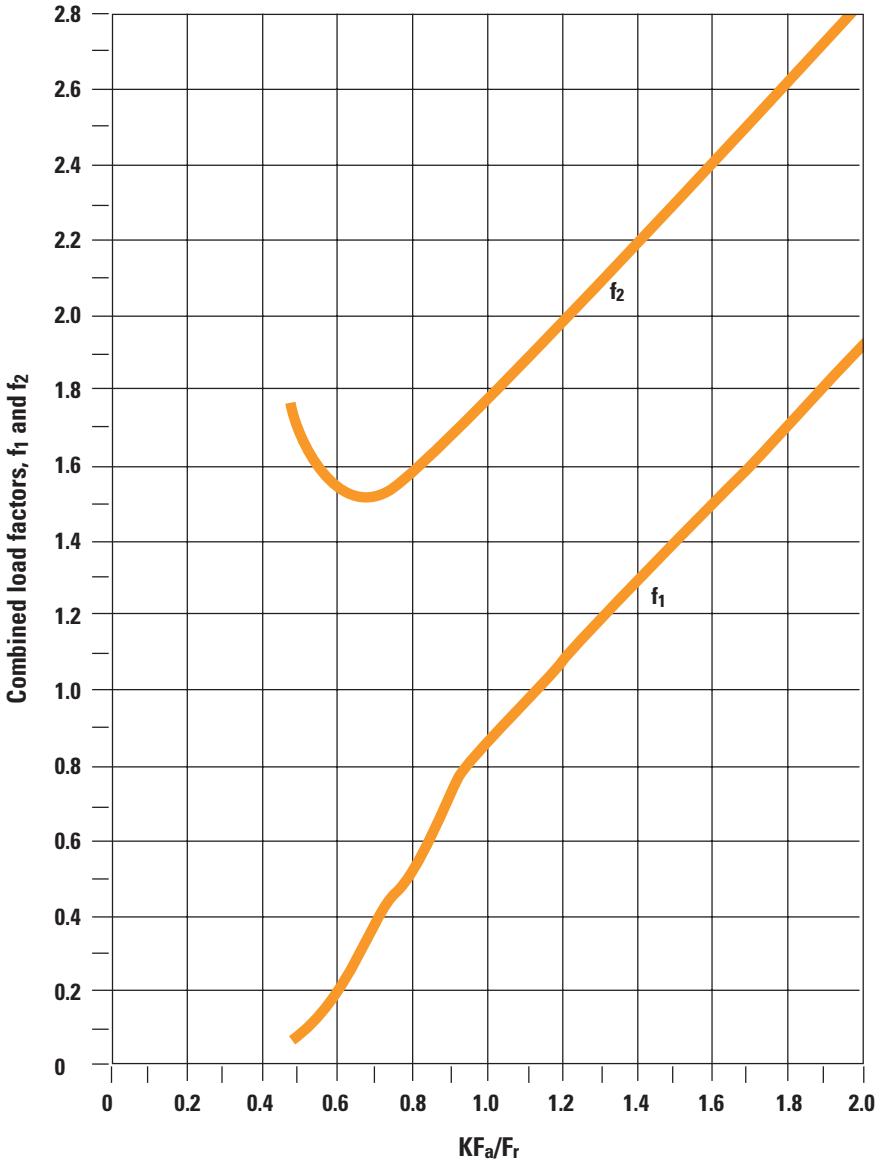
$$n_{min} = \frac{k_2}{G_2\mu} \left(\frac{0.890\ F_r}{K}\right)^{2/3}$$



NOTE: The torque equations will be underestimated if operating speed, n, is less than n_{min}.
For values of f_1 and f_2, refer to figure A-46 on page A171.

M = running torque, N.m (lbf-in.)
F_r = radial load, N (lbf)
G_1 = geometry factor from bearing data tables
G_2 = geometry factor from bearing data tables
K = K-factor
n = speed of rotation, rev/min
k_1 = 2.56×10^{-6} (metric) or 3.54×10^{-5} (inch)
k_2 = 625 (metric) or 1700 (inch)
μ = lubricant dynamic viscosity at operating temperature centipoise
For grease, use the base oil viscosity.
f_1 = combined load factor, see chart on A171
f_2 = combined load factor, see chart on A171

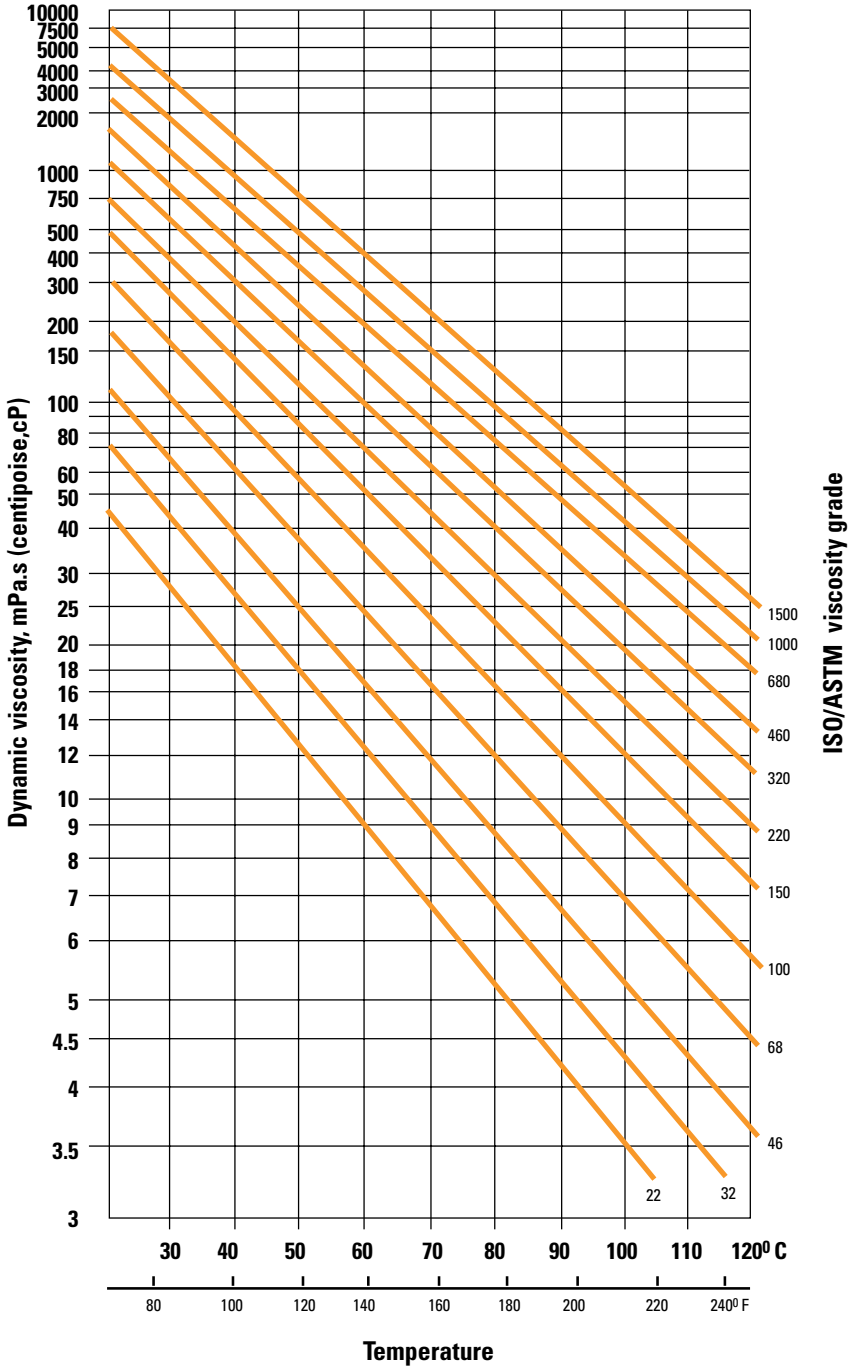
SPEED, HEAT AND TORQUE - *continued*



DETERMINATION OF COMBINED LOAD FACTORS f_1 AND f_2

Load condition	f_1 and f_2
$KF_a/F_r > 2.0$	$f_1 = KF_a/F_r$ $f_2 = f_1 + 0.8$
$0.47 \le KF_a/F_r \le 2.0$	use graph above
$KF_a/F_r = 0.47$	$f_1 = 0.06$ $f_2 = 1.78$

Fig. A-46



Viscosities in mPa.s (centipoise, cP) for ISO/ASTM industrial fluid lubricant grade designations. Assumes: Viscosity Index 90; Specific Gravity 0.875 at 40° C.

Fig. A-47

SPEED, HEAT AND TORQUE - *continued*

NEEDLE ROLLER BEARINGS

Empirical torque equations for radial and thrust needle bearings were developed by Timken:

$$M = d_m (4.5 \times 10^{-7} v^{0.3} n^{0.6} + 0.12 F_r^{0.4})$$

Testing also showed that full complement radial needle roller bearings operate at 1.5 to 2 times the torque determined for caged radial needle roller bearings. Similarly, the running torque of thrust needle roller bearings is given:

$$M = 4.5 \times 10^{-7} v^{0.3} n^{0.6} d_m + 0.016 F_a l$$

In both equations, the mean diameter d_m is the average of the bore and O.D. Of the bearings, while the length (l) in the thrust bearing torque equation can be approximated using the bearing's radial section (e.g., $l = {}^1/_2 [E_a - E_b]$). Finally, note that the viscosity is in units of centistokes, while that for tapered roller bearings was in centipoise. A typical conversion factor for mineral oil is 1 cSt = 0.875 cp.

Both of the aforementioned equations were determined for circulating oil lubrication systems. For grease lubrication, the viscosity of the base oil should be used to estimate the running torque.

CYLINDRICAL AND SPHERICAL ROLLER AND BALL BEARINGS

The torque equations for cylindrical and spherical roller bearings are given as follows, where the coefficients are based on series and found in the following table:

$$M = \begin{Bmatrix} f_1 F_\beta d_m + 10^{-7} f_0 (v \bullet n)^{2/3} d_m^3 & \text{if } (v \bullet n) \geq 2000 \\ f_1 F_\beta d_m + 160 \times 10^{-7} f_0 d_m^3 & \text{if } (v \bullet n) < 2000 \end{Bmatrix}$$

Again, note that the viscosity is in units of centistokes. The load term (F_β) is dependent on bearing type as follows:

Radial Ball: $F_\beta = \max \begin{pmatrix} 0.9F_a \cot\alpha - 0.1F_r \\ \text{or} \\ F_r \end{pmatrix}$

Radial Cylindrical and Spherical Roller: $F_\beta = \max \begin{pmatrix} 0.8F_a \cot\alpha \\ \text{or} \\ F_r \end{pmatrix}$

Thrust Ball and Cylindrical and Spherical Roller: $F_\beta = F_a$

COEFFICIENTS FOR THE TORQUE EQUATION

Bearing Type	Dimension Series	f_0	f_1
Single-row deep groove ball bearings	18	1.7	0.00010
	28	1.7	0.00010
	38	1.7	0.00010
	19	1.7	0.00015
	39	1.7	0.00015
	00	1.7	0.00015
	10	1.7	0.00015
	02	2	0.00020
	03	2.3	0.00020
	04	2.3	0.00020
Single-row angular contact ball bearings $22^\circ < \alpha \leq 45^\circ$	02	2	0.00025
	03	3	0.00035
Double-row or paired single-row angular contact ball bearings	32	5	0.00035
	33	7	0.00035
Gothic Arch ball bearings	02	2	0.00037
	03	3	0.00037
Single-row cylindrical roller bearings with cage	10	2	0.00020
	02	2	0.00030
	22	3	0.00040
	03	2	0.00035
	23	4	0.00040
	04	2	0.00040
Single-row cylindrical roller bearings full complement	18	5	0.00055
	29	6	0.00055
	30	7	0.00055
	22	8	0.00055
	23	12	0.00055
Spherical Roller Bearings	39	4.5	0.00017
	30	4.5	0.00017
	40	6.5	0.00027
	31	5.5	0.00027
	41	7	0.00049
	22	4	0.00019
	32	6	0.00036
	03	3.5	0.00019
	23	4.5	0.00030
Double-row cylindrical roller bearings full complement	48	9	0.00055
	49	11	0.00055
	50	13	0.00055
Thrust cylindrical roller bearings	11	3	0.00150
	12	4	0.00150
Thrust spherical roller bearings	92	2.5	0.00023
	93	2.5	0.00023
	94	3	0.00030

A

CONVERSION TABLES

TO CONVERT FROM	TO		MULTIPLY BY
ACCELERATION			
foot/second^2	meter/second^2	m/s^2	0.3048
inch/second^2	meter/second^2	m/s^2	0.0254
AREA			
foot^2	meter^2	m^2	0.09290304
inch^2	meter^2	m^2	0.00064516
inch^2	millimeter^2	mm^2	645.16
yard^2	meter^2	m^2	0.836127
mile^2 (U S. statute)	meter^2	m^2	2589988
BENDING MOMENT OR TORQUE			
dyne-centimeter	newton-meter	N • m	0.0000001
kilogram-force-meter	newton-meter	N • m	9.806650
pound-force-inch	newton-meter	N • m	0.1129848
pound-force-foot	newton-meter	N • m	1.355818
ENERGY			
BTU (International Table)	joule	J	1055.056
foot-pound-force	joule	J	1.355818
kilowatt-hour	megajoule	MJ	3.6
FORCE			
kilogram-force	newton	N	9.806650
kilopound-force	newton	N	9.806650
pound-force (lbf)	newton	N	4.448222
LENGTH			
fathom	meter	m	1.8288
foot	meter	m	0.3048
inch	millimeter	mm	25.4
microinch	micrometer	µm	0.0254
micron (µm)	millimeter	mm	0.0010
mile (U.S. statute)	meter	m	1609.344
yard	meter	m	0.9144
nautical mile	meter	m	1852
MASS			
kilogram-force-second^2/meter(mass)	kilogram	kg	9.806650
kilogram-mass	kilogram	kg	1.0
pound-mass (lbm avoirdupois)	kilogram	kg	0.4535924
ton (long, 2240 lbm)	kilogram	kg	1016.047
ton (short, 2000 lbm)	kilogram	kg	907.1847
tonne	kilogram	kg	1000.000
POWER			
BTU (International Table)/hour	watt	W	0.293071
BTU (International Table)/minute	watt	W	17.58427
horsepower (550 ft lbf/s)	kilowatt	kW	0.745700
BTU (Thermochemical)/minute	watt	W	17.57250
PRESSURE OR STRESS (FORCE/AREA)			
newton/meter^2	pascal	Pa	1 .0000
kilogram-force/centimeter^2	pascal	Pa	98066.50
kilogram-force/meter^2	pascal	Pa	9.806650
kilogram-force/millimeter^2	pascal	Pa	9806650
pound-force/foot^2	pascal	Pa	47.88026
pound-force/inch^2 (psi)	megapascal	MPa	0.006894757
TEMPERATURE			
degree Celsius	kelvin	k	$t_k = t_c + 273.15$
degree Fahrenheit	kelvin	k	$k = \frac{5}{9}(t_f + 459.67)$
degree Fahrenheit	degree Celsius	°C	$t_c = \frac{5}{9}(t_f - 32)$
VELOCITY			
foot/minute	meter/second	m/s	0.00508
foot/second		meter/second	m/s
0.3048			
inch/second	meter/second	m/s	0.0254
kilometer/hour	meter/second	m/s	0.27778
mile/hour (U.S. statute)	meter/second	m/s	0.44704
mile/hour (U.S. statute)	kilometer/hour	km/h	1.609344
VOLUME			
foot^3	meter^3	m^3	0.02831685
gallon (U.S. liquid)	liter	l	3.785412
liter	meter^3	m^3	0.001
inch^3	meter^3	m^3	0.00001638706
inch^3	centimeter^3	cm^3	16.38706
inch^3	millimeter^3	mm^3	16387.06
ounce (U.S. fluid)	centimeter^3	cm^3	29.57353
yard^3	meter^3	m^3	0.7645549

VISCOSITY CONVERSION TABLE

SUS	R'	E	cSt
Saybolt (sec.)	Redwood (sec.)	Engler (deg.)	Centistokes
35	32.2	1.18	2.7
40	36.2	1.32	4.3
45	40.6	1.46	5.9
50	44.9	1.60	7.4
55	49.1	1.75	8.9
60	53.5	1.88	10.4
65	57.9	2.02	11.8
70	62.3	2.15	13.1
75	67.6	2.31	14.5
80	71.0	2.42	15.8
85	75.1	2.55	17.0
90	79.6	2.68	18.2
95	84.2	2.81	19.4
100	88.4	2.95	20.6
110	97.1	3.21	23.0
120	105.9	3.49	25.0
130	114.8	3.77	27.5
140	123.6	4.04	29.8
150	132.4	4.32	32.1
160	141.1	4.59	34.3
170	150.0	4.88	36.5
180	158.8	5.15	38.8
190	167.5	5.44	41.0
200	176.4	5.72	43.2
220	194.0	6.28	47.5
240	212	6.85	51.9
260	229	7.38	56.5
280	247	7.95	60.5
300	265	8.51	64.9
325	287	9.24	70.3
350	309	9.95	75.8
375	331	10.7	81.2
400	353	11.4	86.8
425	375	12.1	92.0
450	397	12.8	97.4
475	419	13.5	103
500	441	14.2	108
550	485	15.6	119
600	529	17.0	130
650	573	18.5	141
700	617	19.9	152
750	661	21.3	163
800	705	22.7	173
850	749	24.2	184
900	793	25.6	195
950	837	27.0	206
1000	882	28.4	217
1200	1058	34.1	260
1400	1234	39.8	302
1600	1411	45.5	347
1800	1587	51	390
2000	1763	57	433
2500	2204	71	542
3000	2646	85	650
3500	3087	99	758
4000	3526	114	867
4500	3967	128	974
5000	4408	142	1082
5500	4849	156	1150
6000	5290	170	1300
6500	5730	185	1400
7000	6171	199	1510
7500	6612	213	1630
8000	7053	227	1740
8500	7494	242	1850
9000	7934	256	1960
9500	8375	270	2070
10000	8816	284	2200

CONVERSION TABLES - *continued*

INCHES TO MILLIMETERS — UNITS

inches		0	1	2	3	4	5	6	7	8	9
0	0.0000	0.000	25.400	50.800	76.200	101.600	127.000	152.400	177.800	203.200	228.600
1/16	0.0625	1.588	26.988	52.388	77.788	103.188	128.588	153.988	179.388	204.788	230.188
1/8	0.1250	3.175	28.575	53.975	79.375	104.775	130.175	155.575	180.975	206.375	231.775
3/16	0.1875	4.763	30.162	55.562	80.962	106.362	131.762	157.162	182.562	207.962	233.362
1/4	0.2500	6.350	31.750	57.150	82.550	107.950	133.350	158.750	184.150	209.550	234.950
5/16	0.3125	7.938	33.338	58.738	84.138	109.538	134.938	160.338	185.735	211.138	236.538
3/8	0.3750	9.525	34.925	60.325	85.725	111.125	136.525	161.925	187.325	212.725	238.125
7/16	0.4375	11.112	36.512	61.912	87.312	112.712	138.112	163.512	188.912	214.312	239.712
1/2	0.5000	12.700	38.100	63.500	88.900	114.300	139.700	165.100	190.500	215.900	241.300
9/16	0.5625	14.288	39.688	65.088	90.488	115.888	141.288	166.688	192.088	217.488	242.888
5/8	0.6250	15.875	41.275	66.675	92.075	117.475	142.875	168.275	193.675	219.075	244.475
11/16	0.6875	17.462	42.862	68.262	93.662	119.062	144.462	169.862	195.262	220.662	246.062
3/4	0.7500	19.050	44.450	69.850	95.250	120.650	146.050	171.450	196.850	222.250	247.650
13/16	0.8125	20.638	46.038	71.438	96.838	122.238	147.638	173.038	198.438	223.838	249.238
7/8	0.8750	22.225	47.625	73.025	98.425	123.825	149.225	174.625	200.025	225.425	250.825
15/16	0.9375	23.812	49.212	74.612	100.012	125.412	150.812	176.212	201.612	227.012	252.412

inches		10	11	12	13	14	15
0	0.0000	254.000	279.400	304.800	330.200	355.600	381.000
1/16	0.0625	255.588	280.988	306.388	331.788	357.188	382.588
1/8	0.1250	257.175	282.575	307.975	333.375	358.775	384.175
3/16	0.1875	258.762	284.162	309.562	334.962	360.362	385.762
1/4	0.2500	260.350	285.750	311.150	336.550	361.950	387.350
5/16	0.3125	261.938	287.338	312.738	338.138	363.538	388.938
3/8	0.3750	263.525	288.925	314.325	339.725	365.125	390.525
7/16	0.4375	265.112	290.512	315.912	341.312	366.712	392.112
1/2	0.5000	266.700	292.100	317.500	342.900	368.300	393.700
9/16	0.5625	268.288	293.688	319.088	344.488	369.888	395.288
5/8	0.6250	269.875	295.275	320.675	346.075	371.475	396.875
11/16	0.6875	271.462	296.862	322.262	347.662	373.062	398.462
3/4	0.7500	273.050	298.450	323.850	349.250	374.650	400.050
13/16	0.8125	274.638	300.038	325.438	350.838	376.238	401.638
7/8	0.8750	276.225	301.625	327.025	352.425	377.825	403.225
15/16	0.9375	277.812	303.212	328.612	354.012	379.412	404.812

B.S.I. Norm No. 350
A.S.A. Norm No. B48.1 } 1 inch = 25.400 mm (exact)

DIN 4890, 1 mm = $\frac{1}{25.4}$ inches

UNITS

inches		10
0	—	254
1	25.4	279.4
2	50.8	304.8
3	76.2	330.2
4	101.6	355.6
5	127	381
6	152.4	406.4
7	177.8	431.8
8	203.2	457.2
9	228.6	482.6

FRACTIONS

1/10"

inch	mm
0.1	2.54
0.2	5.08
0.3	7.62
0.4	10.16
0.5	12.70
0.6	15.24
0.7	17.78
0.8	20.32
0.9	22.86

1/100"

inches	mm
0.01	0.254
0.02	0.508
0.03	0.762
0.04	1.016
0.05	1.270
0.06	1.524
0.07	1.778
0.08	2.032
0.09	2.286

1/1000"

inches	mm
0.001	0.0254
0.002	0.0508
0.003	0.0762
0.004	0.1016
0.005	0.1270
0.006	0.1524
0.007	0.1778
0.008	0.2032
0.009	0.2286

1/10000"

inches	mm
0.0001	0.00254
0.0002	0.00508
0.0003	0.00762
0.0004	0.01016
0.0005	0.01270
0.0006	0.01524
0.0007	0.01778
0.0008	0.02032
0.0009	0.02286

MILLIMETERS TO INCHES — UNITS

mm		10	20	30	40	50	60	70	80	90
0	—	0.39370	0.78740	1.18110	1.57480	1.96850	2.36220	2.75591	3.14961	3.54331
1	0.03937	0.43307	0.82677	1.22047	1.61417	2.00787	2.40157	2.79528	3.18898	3.58268
2	0.07874	0.47244	0.86614	1.25984	1.65354	2.04724	2.44094	2.83465	3.22835	3.62205
3	0.11811	0.51181	0.90551	1.29921	1.69291	2.08661	2.48031	2.87402	3.26772	3.66142
4	0.15748	0.55118	0.94488	1.33858	1.73228	2.12598	2.51969	2.91339	3.30709	3.70079
5	0.19685	0.59055	0.98425	1.37795	1.77165	2.16535	2.55906	2.95276	3.34646	3.74016
6	0.23622	0.62992	1.02362	1.41732	1.71102	2.20472	2.59843	2.99213	3.38583	3.77953
7	0.27559	0.66929	1.06299	1.45669	1.85039	2.24409	2.63780	3.03150	3.42520	3.81890
8	0.31496	0.70866	1.10236	1.49606	1.88976	2.28346	2.67717	3.07087	3.46457	3.85827
9	0.35433	0.74803	1.14173	1.53543	1.92913	2.32283	2.71654	3.11024	3.50394	3.89764

mm		100	200	300
0	—	3.93701	7.87402	11.81100
10	0.39370	4.33071	8.26772	12.20470
20	0.78740	4.72441	8.66142	12.59840
30	1.18110	5.11811	9.05512	12.99210
40	1.57480	5.51181	9.44882	13.38580
50	1.96850	5.90551	9.84252	13.77950
60	2.36220	6.29921	10.23620	14.17320
70	2.75591	6.69291	10.62990	14.56690
80	3.14961	7.08661	11.02360	14.96060
90	3.54331	7.48031	11.41730	15.35430

FRACTIONS

1/10 mm

mm	inches
0.1	0.00394
0.2	0.00787
0.3	0.01181
0.4	0.01575
0.5	0.01969
0.6	0.02362
0.7	0.02756
0.8	0.03150
0.9	0.03543

1/100 mm

mm	inches
0.01	0.00039
0.02	0.00079
0.03	0.00118
0.04	0.00157
0.05	0.00197
0.06	0.00236
0.07	0.00276
0.08	0.00315
0.09	0.00354

1/1000 mm

mm	inches
0.001	0.000039
0.002	0.000079
0.003	0.000118
0.004	0.000157
0.005	0.000197
0.006	0.000236
0.007	0.000276
0.008	0.000315
0.009	0.000354

STEEL HARDNESS NUMBERS*

APPROXIMATE HARDNESS CONVERSION NUMBERS FOR STEEL, BASED ON ROCKWELL C

		Brinell Hardness Number 10 mm Ball 3000 kg Load			Rockwell Hardness Number			Rockwell Superficial Hardness Number Superficial Brale Penetrator					
Rockwell C-Scale Hardness Number	Diamond Pyramid Hardness Number Vickers	Standard Ball	Hultgren Ball	Tungsten Carbide Ball	A-Scale 60 kg Load Brale Penetrator	B-Scale 100 kg Load 1/16" Dia. Ball	D-Scale 100 kg Brale Penetrator	15-N Scale 15 kg Load	30-N Scale 30 kg Load	45-N Scale 45 kg Load	Shore Scleroscope Hardness Number	Tensile Strength (approx.) 1000 psi	Rockwell C-Scale Hardness Number
68	940	—	—	—	85.6	—	76.9	93.2	84.4	75.4	97	—	68
67	900	—	—	—	85	—	76.1	92.9	83.6	74.2	95	—	67
66	865	—	—	—	84.5	—	75.4	92.5	82.8	73.3	92	—	66
65	832	—	—	739	83.9	—	74.5	92.2	81.9	72	91	—	65
64	800	—	—	722	83.4	—	73.8	91.8	81.1	71	88	—	64
63	772	—	—	705	82.8	—	73	91.4	80.1	69.9	87	—	63
62	746	—	—	688	82.3	—	72.2	91.1	79.3	68.8	85	—	62
61	720	—	—	670	81.8	—	71.5	90.7	78.4	67.7	83	—	61
60	697	—	613	654	81.2	—	70.7	90.2	77.5	66.6	81	—	60
59	674	—	599	634	80.7	—	69.9	89.8	76.6	65.5	80	326	59
58	653	—	587	615	80.1	—	69.2	89.3	75.7	64.3	78	315	58
57	633	—	575	595	79.6	—	68.5	88.9	74.8	63.2	76	305	57
56	613	—	561	577	79	—	67.7	88.3	73.9	62	75	295	56
55	595	—	546	560	78.5	—	66.9	87.9	73	60.9	74	287	55
54	577	—	534	543	78	—	66.1	87.4	72	59.8	72	278	54
53	560	—	519	525	77.4	—	65.4	86.9	71.2	58.6	71	269	53
52	544	500	508	512	76.8	—	64.6	86.4	70.2	57.4	69	262	52
51	528	487	494	496	76.3	—	63.8	85.9	69.4	56.1	68	253	51
50	513	475	481	481	75.9	—	63.1	85.5	68.5	55	67	245	50
49	498	464	469	469	75.2	—	62.1	85	67.6	53.8	66	239	49
48	484	451	455	455	74.7	—	61.4	84.5	66.7	52.5	64	232	48
47	471	442	443	443	74.1	—	60.8	83.9	65.8	51.4	63	225	47
46	458	432	432	432	73.6	—	60	83.5	64.8	50.3	62	219	46
45	446	421	421	421	73.1	—	59.2	83	64	49	60	212	45
44	434	409	409	409	72.5	—	58.5	82.5	63.1	47.8	58	206	44
43	423	400	400	400	72	—	57.7	82	62.2	46.7	57	201	43
42	412	390	390	390	71.5	—	56.9	81.5	61.3	45.5	56	196	42
41	402	381	381	381	70.9	—	56.2	80.9	60.4	44.3	55	191	41
40	392	371	371	371	70.4	—	55.4	80.4	59.5	43.1	54	186	40
39	382	362	362	362	69.9	—	54.6	79.9	58.6	41.9	52	181	39
38	372	353	353	353	69.4	—	53.8	79.4	57.7	40.8	51	176	38
37	363	344	344	344	68.9	—	53.1	78.8	56.8	39.6	50	172	37
36	354	336	336	336	68.4	(109)	52.3	78.3	55.9	38.4	49	168	36
35	345	327	327	327	67.9	(108.5)	51.5	77.7	55	37.2	48	163	35
34	336	319	319	319	67.4	(108)	50.8	77.2	54.2	36.1	47	159	34
33	327	311	311	311	66.8	(107.5)	50	76.6	53.3	34.9	46	154	33
32	318	301	301	301	66.3	(107)	49.2	76.1	52.1	33.7	44	150	32
31	310	294	294	294	65.8	(106)	48.4	75.6	51.3	32.5	43	146	31
30	302	286	286	286	65.3	(105.5)	47.7	75	50.4	31.3	42	142	30
29	294	279	279	279	64.7	(104.5)	47	74.5	49.5	30.1	41	138	29
28	286	271	271	271	64.3	(104)	46.1	73.9	48.6	28.9	41	134	28
27	279	264	264	264	63.8	(103)	45.2	73.3	47.7	27.8	40	131	27
26	272	258	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	127	26
25	266	253	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	124	25
24	260	247	247	247	62.4	(101)	43.1	71.6	45	24.3	37	121	24
23	254	243	243	243	62	100	42.1	71	44	23.1	36	118	23
22	248	237	237	237	61.5	99	41.6	70.5	43.2	22	35	115	22
21	243	231	231	231	61	98.5	40.9	69.9	42.3	20.7	35	113	21
20	238	226	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	110	20

* Source ASTM

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TIMKEN

ROLLER BEARINGS

B

B ROLLER BEARINGS

TAPERED ROLLER BEARINGS

Overview: Timken offers the most extensive line of tapered roller bearings in the world. Tapered roller bearings consist of four interdependent components: the cone (inner ring), the cup (outer ring), the tapered rollers (rolling elements) and the cage (roller retainer). Tapered bearings are uniquely designed to manage both thrust and radial loads on rotating shafts. The steeper the cup angle, the greater the ability of the bearing to handle thrust loads.

- **Sizes:** 8 mm (0.31496 in.) bore to 2222.5 mm (87.5 in.) outside diameter (O.D.).
- **Markets:** Automotive, industrial, rail, rolling mills, crane wheels, sheaves.
- **Features:** Available in single-, double- and four-row configurations. Customized surface geometries and coatings are available.
- **Benefits:** Enhanced performance in demanding applications.

ROLLER BEARINGS

B

HOW TO RECOGNIZE YOUR PART NUMBER

The part numbering systems for single-row tapered roller bearings (type TS) are internationally recognized. Several part number systems have been developed that can be classified according to "metric" or "inch" systems. Within both the metric and inch systems, different part number systems have been developed. Inch system bearings are normally assigned individual part numbers for the inner race and outer races, whereas ISO bearings are assigned a unique part number for the bearing assembly (inner race and outer race).

BEARING SERIES

In all the part numbering systems the term "bearing series" is used to describe bearings having the same basic internal geometry (e.g. roller size, included inner race and outer race angle). Any inner race (including roller set) can be matched with any outer race within the same series providing that the same type of bearing is being used.

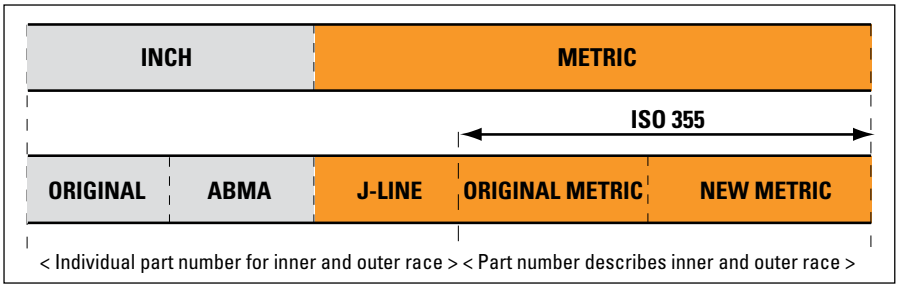
INCH PART NUMBERING SYSTEMS

ORIGINAL INCH PART NUMBERING SYSTEM

The original system developed by The Timken Company was based on a family of bearings designed around a common roller. Varying the number of rollers and the angle of the raceways allows different bearings to be designed for predominant radial load (shallow angle) or thrust load (steep angle).

For example, all the tapered roller bearings in the 500 family use the same roller. However, the 595 Series has a steep angle and 24 rollers while the 525 Series has a shallow angle and 15 rollers.

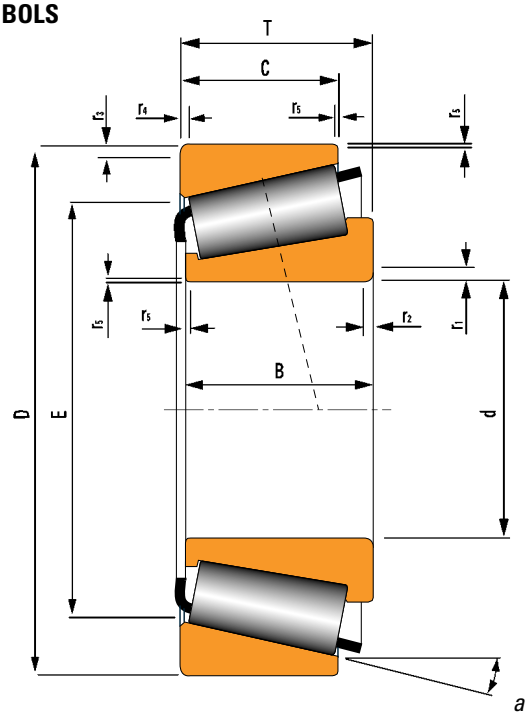
Individual part numbers are assigned to the inner race and outer races. Although there are exceptions, the general rule is that the outer race has a part number that is lower than the series number, whereas the inner race is assigned a higher number.



For example:

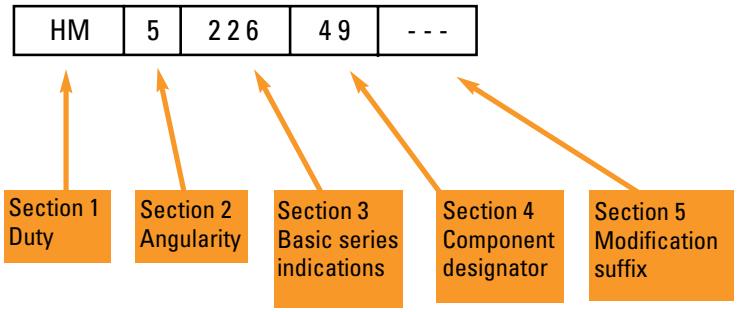
Series	575
Outer race	572
Inner race	576

SYMBOLS



d	=	bearing bore diameter
D	=	bearing outside diameter
T	=	bearing width
B	=	inner race width
C	=	outer race width
E	=	outer race small inside diameter
a	=	1/2 included outer race contact angle
r1	=	inner race back face radius height
r2	=	inner race back face radius width
r3	=	outer race back face radius height
r4	=	outer race back face radius width
r5	=	inner race and outer race front face chamfer height and width

ABMA INCH PART NUMBERING SYSTEM



A new inch part numbering system was developed by the American Bearing Manufacturers Association (ABMA) to address the expansion in the number of new applications and tapered roller bearing designs. This part numbering system has become the international standard for inch-sized bearings.

The ABMA part numbering system applies to new bearing seriesonly. Existing part numbers according to the original system, new part numbers that are added to the existing series and proprietary part numbers of special bearings continue to be used.

The new part number is divided into 5 alpha-numeric sections:

Section 1 - Prefix Letters

The prefixes will consist of one or two letters and will designate the duty class for which the bearing is designed.

EL	Extra Light	HM	Heavy Medium
LL	Lighter than Light	H	Heavy
L	Light	HH	Heavier than Heavy
LM	Light Medium	EH	Extra Heavy
M	Medium	T	Thrust only

Section 2 - Angularity Designator

The first digit following the prefix will represent the angle coding as determined by the included angle of the outer race.

Included Outer race Angle		Code
0	to 23° 59′ 59.99″	1
24°	to 25° 29′ 59.99″	2
25° 30′	to 26° 59′ 59.99″	3
27°	to 28° 29′ 59.99″	4
28° 30′	to 30° 29′ 59.99″	5
30° 30′	to 32° 29′ 59.99″	6
32° 30′	to 35° 59′ 59.99″	7
36°	to 44° 59′ 59.99″	8
45°	Up, but not thrust only	9
90°	Thrust bearing only	0

Section 3 - Basic Series Indication

The 2nd, 3rd, and 4th digits following the prefix letters are reserved for the basic series indication.

The selection of the basic series indication in relation to the maximum theoretical bore of the bearing will then be in accordance with the following tabulation:

Maximum Bore Range (inches)	Series Indication	Maximum Bore Range (inches)	Series Indication
0 - 1	00 to 19 incl.	15 - 16	640 to 659 incl.
1 - 2	20 to 99 incl.	16 - 17	660 to 679 incl.
	000 to 029 incl.	17 - 18	680 to 694 incl.
2 - 3	030 to 129 incl.	18 - 19	695 to 709 incl.
3 - 4	130 to 189 incl.	19 - 20	710 to 724 incl.
4 - 5	190 to 239 incl.	20 - 21	725 to 739 incl.
5 - 6	240 to 289 incl.	21 - 22	740 to 754 incl.
6 - 7	290 to 339 incl.	22 - 23	755 to 769 incl.
7 - 8	340 to 389 incl.	23 - 24	770 to 784 incl.
8 - 9	390 to 429 incl.	24 - 25	785 to 799 incl.
9 - 10	430 to 469 incl.	25 - 30	800 to 829 incl.
10 - 11	470 to 509 incl.	30 - 35	830 to 859 incl.
11 - 12	510 to 549 incl.	35 - 40	860 to 879 incl.
12 - 13	550 to 579 incl.	40 - 50	880 to 889 incl.
13 - 14	580 to 609 incl.	50 - 72.5	890 to 899 incl.
14 - 15	610 to 639 incl.	72.5 and over	900 to 999 incl.

Section 4 - Component Designator

The 5th and 6th digits, or the last two digits, following the prefix letters will indicatethe actual part number of the bearing component.

Outer race numbers will beindicated by the digits 10 to 19, inclusive, the first outer race made to minimum section in any series starting with the number 10. If more than 10 outer races appear in any series, numbers 20 to 29 will be utilized where available.

Inner race numbers will be indicated by the digits 30 to 49, inclusive, the first inner race made to minimum section in any series being numbered 49.

Section 5 - Suffix

This will consist of one letter to three letters in pre-arranged combinations, indicating modifications in external form or internal arrangement.

PREFIXES AND SUFFIXES

Some of the symbols used by The Timken Company and prefixes and suffixes that are part of the ABMA part numbering standard:

PREFIX	SUFFIX	INNER RACE OR OUTER RACE	EXPLANATION
A		Inner race & Outer race	Standard basic series part number.
	A	Inner race	Different radius from basic part number.
	A	Inner race	Different bore from basic part number.
	A	Inner race	Different complement of rollers.
	A	Outer race	Different O.D. from basic part number.
	A	Outer race	Different radius from basic part number.
	A	Outer race	Different width from basic part number.
	AA	Inner race & Outer race	Different bore, O.D., width or radius from basic part number.
	AB	Inner race	Different bore, width or radius from basic part number, assembled with brass cage.
	AB	Outer race	Flanged outer race. (Non-interchangeable with basic part number.)
	AC	Inner race	Different bore or radius, different internal geometry.
	AC	Outer race	Different O.D., width or radius from basic part number.
	AD	Outer race	Double Outer race. (Non-interchangeable with basic part number.)
	ADW	Inner race	Double Inner race. Pilots and slots each end, holes in large rib.
	AH	Inner race	Assembled with special cage, rollers, and/or internal geometry
	AL	Inner race	Assembled with Duo-Face seal.
	ARB	Outer race	Single outer race with snap ring groove in O.D.
	AS	Inner race & Outer race	Different bore, O.D., width, or radius from basic part number.
	ASB	Inner race	Single inner race, different bore or width from basic part number, assembled with brass cage.
	AV	Inner race & Outer race	Made of special steel.
	AW	Inner race & Outer race	Keyway or slotted inner race or outer race.
	AX	Inner race & Outer race	Different bore, O.D., width, or radius from basic part number.
	AXB	Inner race	Different bore, width, or radius from basic part number, assembled with brass cage.
	AXD	Outer race	ISO outer race - double outer race without oil holes or groove.
	AXV	Inner race & Outer race	Different O.D., width, or radius from basic part number. Made of special steel.
	AXX	Inner race & Outer race	Different O.D., width, or radius from basic part number. Made of special steel.
	B	Outer race	Flanged outer race. (Non-interchangeable with basic part number.)
	B	Inner race	Inner race using brass cage.
	B	Inner race & Outer race	ISO bearing with same boundary dimensions as basic part number, but with different internal geometry, steeper included outer race angle.
	BA	Outer race	Flanged outer race. (Non-interchangeable with basic part number.)
	BNA	Inner race	ISO inner race used in assemblies with 2 inner races mated with double outer race to form a double row non-adjusting bearing. (Non-interchangeable with other inner races having the same basic part numbers, which may vary in bore or width dimensions.)
	BR	Outer race	Single outer race with groove in O.D. for snap ring.
	BS	Outer race	Flanged outer race. (Non-interchangeable with basic part number.)
	BW	Outer race	Flanged outer race with slot. (Non-interchangeable with basic part number.)
	BX	Outer race	Flanged Outer race. (Non-interchangeable with basic part number.)
	BXX	Outer race	Flanged single outer race. Made of special steel.
	C	Inner race	Single inner race, envelope dimensions same as basic part number, different internal geometry.
	C	Outer race	Dimensionally different from basic part number. (Non-interchangeable.)
	CA	Inner race	Single inner race, envelope dimensions same as basic part number, different internal geometry.
	CB	Inner race	Single inner race, dimensionally different from basic part number.
	CD	Outer race	Double outer race with oil holes and groove. One hole counter-bored for locking pin.
	CE	Outer race	Dimensionally different from basic part number. (Non-interchangeable.)
CN		Outer race	Neoprene cushioned outer race.

PREFIX	SUFFIX	INNER RACE OR OUTER RACE	EXPLANATION
	CP	Inner race & outer race	Flash chrome plated. Otherwise, interchangeable with basic part number
	CP	Inner race & outer race	Envelope dimensions same as basic part number, different internal geometry, customized for performance.
	CR	Inner race & outer race	Ribbed outer race bearing series.
	CS	Inner race & outer race	Dimensionally different from basic part number. (Non-interchangeable.)
	CX	Inner race	Dimensionally different from basic part number. (Non-interchangeable.)
	D	Inner race & outer race	Double inner race or Double outer race. (Non-interchangeable with basic part number.)
	DA	Inner race	Double inner race. (Non-interchangeable with inner races having same basic part number.)
	DA	Outer race	Spherical O.D. double outer race. (Non-interchangeable with basic part number or other double outer races having same basic numbers.)
	DB	Outer race	Double outer race with flange. (Non-interchangeable with basic part number or double outer races having same basic numbers.)
	DB	Inner race	Double inner race assembled with brass cages.
	DC	Outer race	Double outer race with hole for locking pin.
	DD	Inner race & outer Race	Special long double inner race or outer race. (Non-interchangeable with basic part number or other double parts having same basic numbers.)
	DE	Inner race & outer race	Double inner race or double outer race having different dimensions or other characteristics from single and double parts identified with same basic part number.
	DF	Outer race	Double outer race with oil holes and groove. Snap ring groove on O.D..
	DG	Inner race	Double inner race with pressure removal groove or helical groove in bore.
	DGA	Inner race	Double inner race with pressure removal groove or helical groove in bore. (Non-interchangeable with basic part number.)
	DGE	Inner race	Double inner race with pressure removal groove or helical groove in bore. (Non-interchangeable with basic part number.)
	DGH	Inner Race	Double inner race with presure removal groove or helical groove in bore and with special cage, rollers, and/or internal geometry.
	DGW	Inner race	Double inner race with pressure removal groove or helical groove in bore, and having face slots.
	DH	Inner race	Double inner race with special cage, rollers, and/or internal geometry.
	DP	Inner race	Double inner race with puller groove.
	DR	Outer race	Double outer race for ribbed outer race series. (Non-interchangeable with single and double outer races identified with same basic part number.)
	DRB	Outer race	Double outer race with snap ring groove.
	DS	Outer race	Crowned O.D. double outer race. (Non-interchangeable with other outer races having same basic part numbers.)
	DT	Outer race	Tapered O.D. double outer race. (Non-interchangeable with other outer races having same basic part numbers.)
	DV	Inner race & outer race	Double inner race or double outer race made of special steel.
	DVH	Inner race	Double inner race, special steel, and/or internal geometry.
	DW	Inner race & outer race	Double inner race or double outer race with keyway or slot. (Non-interchangeable with inner races or outer races identified with same basic part numbers.)
	DWA	Inner race	Double inner race with one end extended and with oil slots in extended end. (Asymmetrical)
	DWH	Inner race	Double inner race with oil slots, assembled with special cage, rollers, and/or internal geometry.
	DWV	Inner race & outer race	Double inner race or double outer race with keyway or slot. (Non-interchangeable with inner races or outer races identified with same basic part numbers.) Made of special steel.
	DX	Outer race	Adaptor for spherical or straight O.D. outer race.
	DX	Outer race	Threaded O.D. double outer race. (Non-interchangeable with outer races identified with same basic part numbers.)
	DXX	Inner race & outer race	Double inner race or double outer race made of special steel.
	E	Inner race & outer race	Inner races or outer races having special characteristics differing from and non-interchangeable with other inner races or outer races identified with the same

PREFIX	SUFFIX	INNER RACE OR OUTER RACE	EXPLANATION
			basic part numbers.
	ED	Outer race	Double outer races. (Non-interchangeable with other outer races identified with same basic part numbers.)
	EDC		Outer race Double outer races, special hole in O.D. for locking pin.
EE		Inner race	Large and small ribs - close guided rollers. (Non-interchangeable with other inner races identified with same basic part numbers.)
EH		Inner race & outer race	Extra heavy series.
EL		Inner race & Outer race	Extra light series.
EX		Inner race & outer race	Experimental.
	EXX	Inner race & outer race	Inner races or outer races having special characteristics differing from and non-interchangable with other inner races or outer races identified with the same basic part numbers. Made of special steel.
	F	Inner race	Assembled with polymer cage.
FL		Inner race & outer race	'Free lateral' series, no large or small ribs.
FX		Inner race & outer race	Factory identification number only.
	G	Inner race	Retainer groove in bore.
H		Inner race & outer race	Heavy series. (Non-interchangeable with other inner races and outer races identified with same basic part numbers.)
	H	Inner race	Assembled with special cage, rollers, and/or internal geometry.
	HV	Inner race	Assembled with special cage, rollers, and/or internal geometry. Made of special steel.
	HH	Inner race & Outer race	Heavy-Heavy series. (Non-interchangeable with other inner races and outer races identified with same basic part numbers.)
HM		Inner race & outer race	Heavy-Medium series. (Non-interchangeable with other inner races outer races identified with same basic part numbers.)
	HP	Inner race	Assembled with special cage and/or roller, different internal geometry. Customized for performance.
	HR	Outer race	Special outer race used in 'Hydra-Rib' bearing.
J		Inner race & outer race	Used alone or with other prefix letters to indicate metric bore and/or O.D..
JC		Inner race & outer race	Metric Series.
JD		Inner race & outer race	Metric Series.
JE		Inner race & outer race	Metric Series.
JF		Inner race & outer race	Metric Series.
JG		Inner race & outer race	Metric Series.
JN		Inner race & outer race	Metric Series.
JP		Inner race & outer race	Metric Series.
JR		Inner race & outer race	Metric Series.
JRM		Inner race & outer race	Metric Series, UNIPAC bearing.
JS		Inner race & outer race	Metric Series.
JT		Inner race & outer race	Metric Series.
JU		Inner race & outer race	Metric Series.
JW		Inner race & outer race	Metric Series.
K		Outer race	Double outer race with heavy section. May have unusual features such as flange, tapered O.D., etc.
K		Inner race & outer race	Through hardened components, Non-DIN 720 Part Numbers
K		Miscellaneous	K prefix with 5 or 6 digits following also used for miscellaneous components (seals, bolts, filler rings, etc.)
	KP	Thrust Bearing	Cadmium plated.
L		Inner race & outer race	Light series. (Non-interchangeable with other inner races and outer races identified with same basic part numbers.)
	L	Inner race	Inner race assembled with Duo-Face seal.
	L	Outer race	Loose rib. (Part of Unit-Bearing.)

ROLLER BEARINGS

PREFIX	SUFFIX	INNER RACE OR OUTER RACE	EXPLANATION
	LA	Inner race	Inner race assembled with Duo-Face-Plus seal.
	LA, LB, LC, etc.	Seal	These suffixes are used on a basic Duo-Face-Plus seal number to identify the assembly resulting from the use of the seal with various inner races in the series.
LL		Inner race & outer race	Light-Light series.
LM		Inner race & outer race	Light-Medium series.
M		Inner race & outer race	Medium series.
	M	Inner race & outer race	Through hardened components, DIN 720 Part Numbers, IsoClass Part Numbers
N		Inner race	Bock or Gilliam type bearings.
NA	NA	Inner race	Two inner races mated with double outer race to form double row non-adjustable bearing. (Non-interchangeable with other inner races having same basic part numbers which may vary in bore, O.D., and width dimensions.)
	NA	Outer race	Etched electric pencil on double outer races mated with two 'NA' type single inner races to form double row non-adjustable bearings.
	NAV	Inner race	'NA' inner race made of special steel.
	NC	Outer race	Cushioned outer race (usually neoprene.)
	NI	Inner race	Tapered or threaded bore.
NP		Inner race & outer race	Used with random numbers for product differentiation.
	NR	Inner race	'NA' type ribless inner race for ribbed outer race series.
	NW	Inner race	'NA' type inner race with slotted front face.
	NWV	Inner race	'NA' type inner race with slotted front face. Made of special steel.
	NX	Inner race	Lapped front face.
	P	Inner race	Puller groove.
	P	Inner race & outer race	Customized for performance.
R		Inner race & outer race	Gilliam replacement series. (Non-interchangeable with other inner races and outer races identified with same basic numbers.)
	R	Inner race & outer race	Special feature bearing. (Non-interchangeable with bearings having the same basic part numbers.)
	R	Inner race & outer race	Bock type bearing.
	R	Inner race	Basic part number with polymer lubricant.
	RB	Outer race	Snap ring on O.D.
RC		Inner race & outer race	Special ribbed outer race bearing.
	RN	Various	Used with random numbers, not to exceed six (6) digits, for purchased items that are distributed by Timken.
	RR	Inner race & outer race	'Relieved race.'
	S	Inner race & outer race	Special feature bearing. (Non-interchangable with bearings having same basic part numbers.)
	SA	Inner race & outer race	Special feature bearing. (Non-interchangable with bearings having same basic part numbers.)
	SB	Inner race	Assembled with brass cage.
	SB	Outer race	Flanged outer race.
	SC	Inner race	With square bore.
	SD	Inner race & outer race	Double inner race with square bore or double outer race.
	SH	Inner race	Special feature bearing, with special cage, rollers, and/or internal geometry. (Non-interchangeable with bearings having same basic part numbers.)
	SL	Thrust bearing	Basic part number with polymer lubricant.
	SR	Inner race	Different radius from basic part numbers.
	SW	Inner race & outer race	Slot or keyway. (Non-interchangeable with bearings having same basic part numbers.)
	SWB	Inner race	Slot or keyway assembled with brass cage. (Non-interchangeable with bearings having same basic part numbers.)
	SWV	Inner race	Slot or keyway made of special steel. (Non-interchangable with bearings having same basic part numbers.)

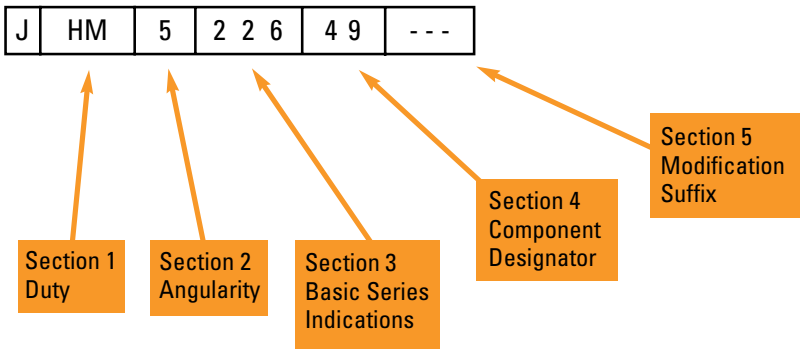
PREFIX	SUFFIX	INNER RACE OR OUTER RACE	EXPLANATION
	SX	Outer race	Special feature bearing. (Non-interchangeable with bearings having same basic part numbers.)
T		Race	Thrust bearing assemblies.
T		Outer race	Double outer race with heavy section. May have unusual feature such as flange, tapered O.D., etc.
	T	Inner race	Tapered bore.
	T	Outer race	Tapered O.D.
	TA	Inner race	Tapered bore 'NA' type inner race.
	TA	Outer race	Tapered O.D.
	TB	Inner race	Tapered bore inner race with brass cage.
TC		Race	Thrust bearing assembly.
	TC	Inner race	Tapered bore.
	TD	Inner race	Double with tapered bore.
	TDB	Inner race	Double with tapered bore, assembled with brass cages.
	TDE	Inner race	Double with tapered bore and extended rib.
	TDG	Inner race	Double with tapered bore, pressure removal groove or spiral groove in bore.
	TDGV	Inner race	Double with tapered bore, pressure removal groove or spiral groove in bore. Made of special steel.
	TDH	Inner race	Double with tapered bore, special cage, rollers or internal geometry.
	TDL	Inner race	Double with tapered bore, interlock feature.
	TDV	Inner race	Double with tapered bore. Made of special steel.
	TDW	Inner race	Double with tapered bore and slots or keys.
	TDXX	Inner race	Double with tapered bore. Made of special steel.
	TE	Inner race	Single, tapered bore, extended large rib.
	TEV	Inner race	Single, tapered bore, extended large rib. Made of special steel.
	TL	Inner race	Tapered bore with interlock feature.
	TLE	Inner race	Tapered bore with interlock feature and extended rib.
	TP	Inner race	Tapered bore inner race with puller groove.
	TPE	Inner race	Tapered bore inner race with puller groove, extended inner race large rib.
	TV	Inner race & outer race	Tapered bore inner race or outer race O.D. Made of special steel.
	TW	Inner race & outer race	Tapered bore inner race or outer race O.D. with slots or keys.
	TWE	Inner race & outer race	Tapered bore inner race or outer race O.D. with locking keyway in front face, extended inner race large rib or outer race width.
	TXX	Inner race	Tapered bore. Made of special steel.
U		Inner race & outer race	Basic series part number, unitized, self-contained.
	U	Inner race & outer race	Basic series part number, unitized, self-contained.
	US	Inner race & outer race	Special close stand.
V		Inner race & outer race	Special close stand.
	V	Inner race & outer race	Made of special steel.
	VC	Inner race	Special internal geometry. Made of special steel.
	VH	Inner race	Special cage, rollers, and/or internal geometry. Made of special steel.
	W	Inner race & outer race	Slot(s) or keyway(s).
	W	Thrust Bearing	Oil holes in retainer.
	WA	Inner race & outer race	Slot(s) or keyway(s).
	WB	Inner race	Slot(s) or keyway(s) with brass cage.
	WC	Inner race & outer race	Slot(s) or keyway(s).
	WD	Inner race & outer race	Double inner race or outer race with slot(s) or keyway(s).
	WE	Inner race & outer race	Extended face with slot(s) or keyway(s).
	WS	Inner race & outer race	Slot(s) or keyway(s).
WV	Inner race & Outer race		Slot(s) or keyway(s). Made of special steel.

PREFIX	SUFFIX	INNER RACE OR OUTER RACE	EXPLANATION
	WXX	Inner race & Outer race	Slot(s) or keyway(s). Made of special steel.
X		Inner race	ISO part number.
	X	Inner race	Slot(s) or keyway(s).
	X	Inner race & Outer race	Special feature bearing. (Non-interchangable with bearings having the same basic part number.)
	X	Inner race & Outer race	ISO bearing with same boundary dimensions as basic part number but with different internal geometry, yielding increased rating.
	XA	Inner race & Outer race	Special feature bearing. (Non-interchangeable with bearings having the same basic part number.)
XAA		Inner race	ISO single inner race. (Non-interchangeable with bearings having the same basic part number.)
XAB		Inner race	ISO single inner race. (Non-interchangeable with bearings having the same basic part number.)
	XB	Inner race	Different bore, width, or radius, from basic part number. Assembled with brass cage.
	XB	Outer race	Special feature flanged outer race. (Non-interchangeable with bearings having the same basic part number.)
XC		Inner race & Outer race	Limited production bearings to which standard series part numbers have not been assigned.
	XD	Outer race	Double outer race, no oil holes or groove.
	XD	Inner race	Double inner race, different bore or width from basic part numbers.
	XD	Inner race	Double inner race, oil holes in large rib.
	XDXP	Outer race	Double outer race, no oil holes or groove, special material and process.
	XE	Outer race	Different bore, width, or radius from basic part number.
XGA		Inner race	ISO single inner race. (Non-interchangeable with bearings having the same basic part number.)
XGB		Inner race	ISO single inner race. (Non-interchangeable with bearings having the same basic part number.)
	XP	Inner race	Special steel and process.
XR		Inner race & Outer race	Crossed roller bearings.
	XS	Inner race & Outer race	Different bore, O.D., width, or radius from basic part number.
	XV	Inner race & Outer race	Special feature inner race or outer race made of special steel.
	XW	Inner race	Slotted.
	XX	Inner race & Outer race	Single inner race or single outer race. Made of special steel.
Y		Outer race	ISO part number.
	YD	Outer race	Double outer race with oil holes, no groove.
	YDA	Outer race	Double outer race with oil holes, no groove. (Non-interchangeable with bearings having the same basic part number.)
	YDV	Outer race	Double outer race with oil holes, no groove. made of special steel.
	YDW	Inner race	Double outer race with oil holes, no groove. Slot(s) or keyway(s) in face(s).
YKA		Outer race	ISO single outer race. (Non-interchangeable with bearings having the same basic part number.)
YKB		Outer race	ISO single outer race. (Non-interchangeable with bearings having the same basic part number.)
YSA		Outer race	ISO single outer race. (Non-interchangeable with bearings having the same basic part number.)
	Z	Inner race & Outer race	Close stand part.

METRIC PART NUMBERING SYSTEMS

J-LINE PART NUMBERS

The "J" prefix letter is used in conjunction with the ABMA part numbering system to identify metric dimensioned and toleranced inner race and outer races. The bearing series designation does not contain the prefix letter "J". J-Line bearings are referred to as inch bearings in metric bore, O.D. and width.



ISO PART NUMBERING SYSTEM

The original metric part numbering system for tapered roller bearings was based on the ISO 15 dimensional plan for radialbearings. A 5-digit part number commencing with numeral 3 describes the bearing assembly (inner race and outer races).

Section 1 - Symbol for bearing type

3 always applies to tapered roller bearings.

Section 2 - Width series

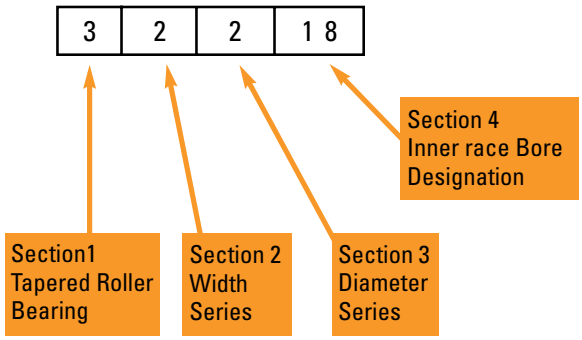
The bearing width is classified from 0 to 3 in increasing order of width.

Section 3 - Diameter series

The bearing section height is classified from 0 through 3 in increasing order of O.D. for a given bore size.

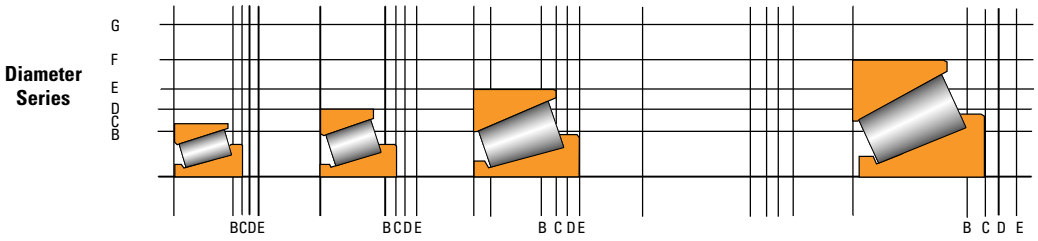
Section 4 - Inner race bore designation

The 2 last digits relate to the inner race bore diameter that can be calculated by multiplying the number indicated by 5, if the bore diameter is between 20 and 500 mm. For example, bearing 32218 has a 90 mm bore. If the bore diameter is less than 20 mm, the last two digits can interpreted as follows: 00=10 mm, 01=12 mm, 02=15 mm and 03=17 mm. If the bore diameter is greater than 500 mm, then the last 3 digits (preceded by a slash) correspond to the bore size.



NEW ISO 355 PART NUMBERING SYSTEM

Finding that tapered roller bearings did not conform to the ISO 15 general plan, because dimensions given were not found to be optimal, the ISO introduced a new numbering system for tapered roller bearings in ISO 355. This system uses 3 alpha-numeric fields to define the bearing series. The bearing part number is then defined by adding the inner race diameter in mm after the bearing series. Although all original metric part numbers were assigned a new designation in the ISO 355 plan, the original part number is still used.



T	4	C	B	100

Symbol for tapered roller bearings (optional)

Angle Series Designation	a	
	over	incl.
1	Reserved for future use	
2	10°	13° 52′
3	13° 52′	15° 59′
4	15° 59′	18° 55′
5	18° 55′	23°
6	23°	27°
7	27°	30°

Diameter Series Designation	$\frac{D}{d^{0.77}}$	
	over	incl.
A	Reserved for future use	
B	3.40	3.80
C	3.80	4.40
D	4.40	4.70
E	4.70	5.00
F	5.00	5.60
G	5.60	7.00

Width Series Designation	$\frac{T}{(D-d)^{0.95}}$	
	over	incl.
A	Reserved for future use	
B	0.50	0.68
C	0.68	0.80
D	0.80	0.88
E	0.88	1.00

Bearing bore diameter (mm)

"NEW" METRIC BEARINGS

A new range of metric bearings were also included in the ISO 355 plan. These new bearings are specifically applicationoriented and are designed for optimum performance.

To easily identify these part numbers against the application type, The Timken Company introduced an alpha-numeric part number designation. The part number construction is similar to that of J-Line part numbers and separate numbers are assigned to both inner race and outer races.

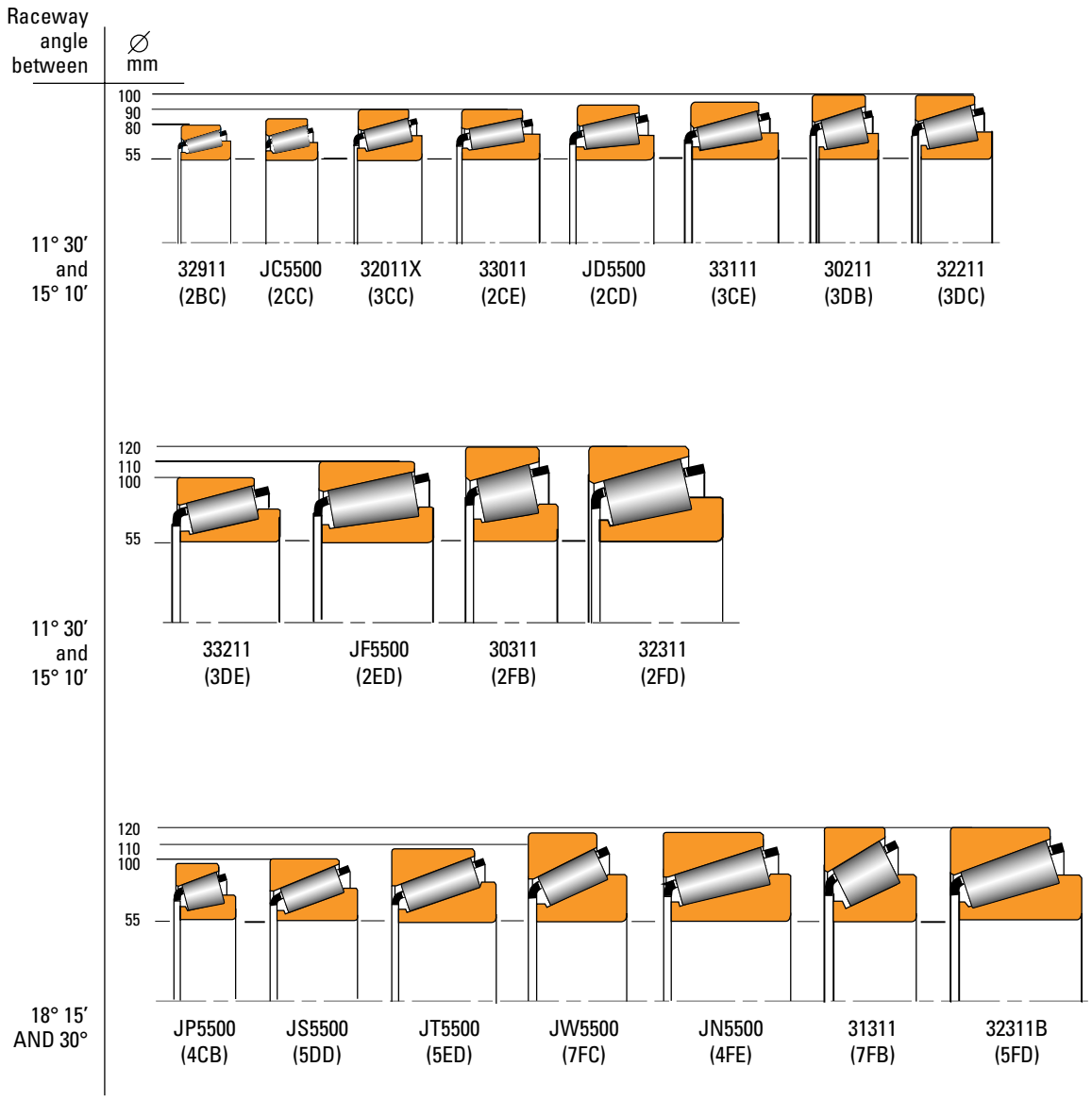
J-prefix

All of the new metric bearings are identified with a J-prefix that indicates a new metric dimensioned and toleranced bearing.

Section 1 - Duty

Indicates application type:
C, D & F = general purpose
N = combination of general purpose and pinion
P = high speed
S and T = pinions
W = high axial loads

COMPARISON TABLE: INCREASE IN SECTION FOR A 55 MM BORE BEARING



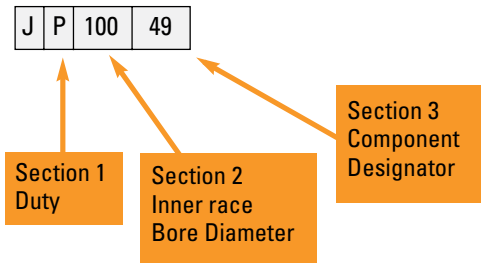
Section 2 - Inner race Bore

The inner race bore metric diameter is included in the part number designation of both the inner race and outer races.

Section 3 - Component Designator

Same identification as in the ABMA part numbering system.

For further explanation of prefix and suffix symbols, or proprietary part numbers of special bearings, consult your Timken sales representative.



OPTIMUM BEARING SELECTION: ISO 355

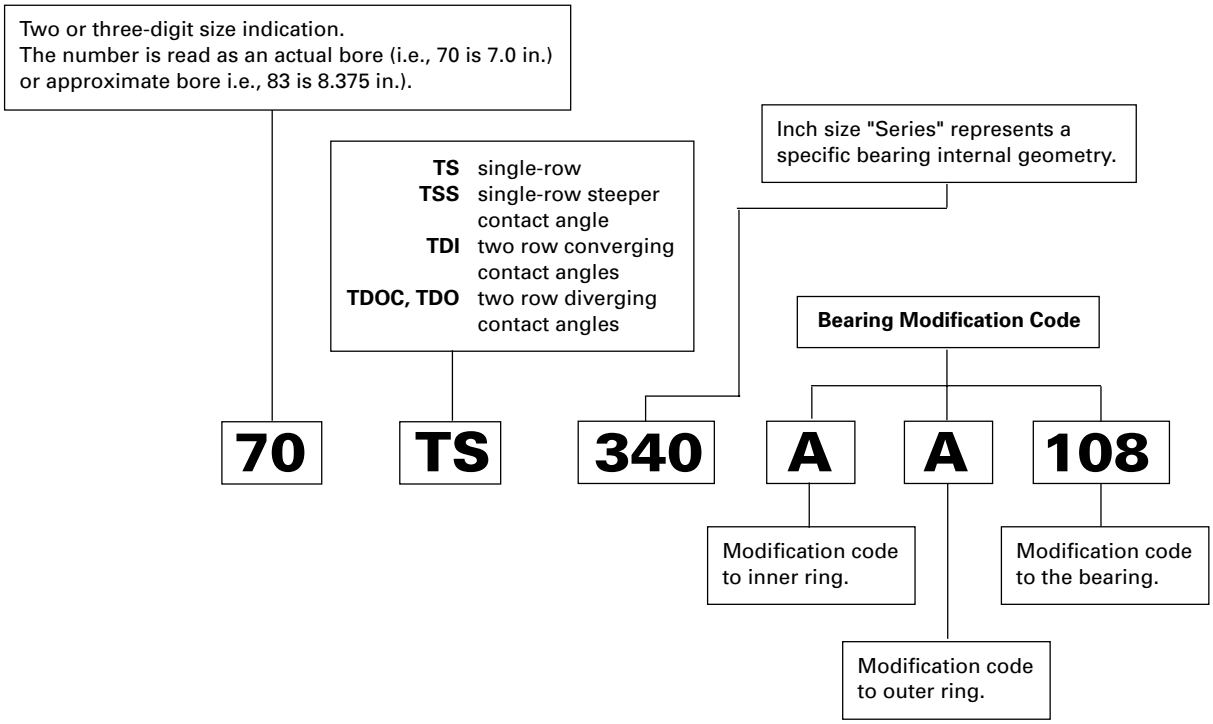
ISO 355 offers many application-specific bearing selection options for a given bore. Depending on application and type of load, thrust and/or radial, the bearing with the optimum angle and section can be selected. For example, pinion bearings have a steep angle, whereas bearings for machine tools are generally designed with a shallow angle and a light-section. The previous table demonstrates this feature for 55 mm bore bearings.

BEARING ASSEMBLY NUMBERS

Multiple-row bearings and matched bearing assemblies are assigned a 5-digit alpha-numeric code, in combination with the inner race part number to describe the individual component parts, inspection level and the adjustment value of pre-set assemblies: e.g., LM48548-9K2A7.

An assembly number is assigned on receipt of the first order for new applications. It is very important for correct function of the bearing in a given application that the same assembly number is quoted for all subsequent orders.The Timken Company should be consulted if additional information is required on the assembly number.

Radial Tapered Roller Bearings - Torrington



TS

TAPERED ROLLER BEARINGS

- TS style is the most widely used tapered roller bearing.
- Part numbers give specifiers the widest possible choice from the comprehensive range of metric (ISO and 'J' prefix) and inch-sizes available from The Timken Company.
- Consult your Timken representative before making a final bearing selection to ensure suitability, availability and the most cost-effective application.
- To place an order or obtain a quotation, specify the inner and outer part numbers.

  Example: inner race outer race

  JH211749 - JH211710
- In most ISO bearings, only one bearing number is specified for both races:

  Example: **32310**

  Conforms to the ISO 355 standard.

B

BEARING DATA TABLES

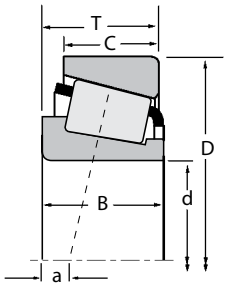
In the following bearing data tables, part numbers are listed in ascending order of bore, outside diameter and width.

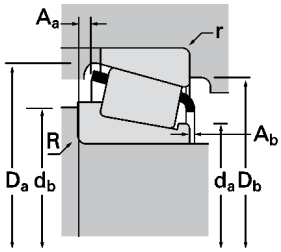
Bearing ratings shown in tables are based on environmental reference conditions. Effects of known operating conditions on bearing performance in an application should be investigated before final bearing selection is made.

Approximate mass is listed for every part number. For weight-critical applications or exact freight cost evaluation purposes, a more accurate value should be obtained from your Timken representative.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
7.938 0.3125	31.991 1.2595	10.008 0.3940	10600 2380	0.41	1.48	2750 618	1910 429	1.44	9230 2070	A2031	A2126
9.525 0.3750	31.991 1.2595	10.008 0.3940	10600 2380	0.41	1.48	2750 618	1910 429	1.44	9230 2070	A2037	A2126
11.112 0.4375	34.988 1.3775	10.998 0.4330	12200 2740	0.45	1.32	3160 710	2450 550	1.29	11500 2580	A4044	A4138
11.987 0.4719	31.991 1.2595	10.008 0.3940	10600 2380	0.41	1.48	2750 618	1910 429	1.44	9230 2070	A2047	A2126
12.680 0.4992	34.988 1.3775	10.998 0.4330	12200 2740	0.45	1.32	3160 710	2450 550	1.29	11500 2580	A4049	A4138
12.700 0.5000	34.988 1.3775	10.998 0.4330	12200 2740	0.45	1.32	3160 710	2450 550	1.29	11500 2580	A4050	A4138
12.700 0.5000	38.100 1.5000	13.495 0.5313	19300 4340	0.28	2.18	5010 1130	2360 531	2.12	17100 3840	00050	00150
14.987 0.5901	34.988 1.3775	10.998 0.4330	12200 2740	0.45	1.32	3160 710	2450 550	1.29	11500 2580	A4059	A4138
15.875 0.6250	34.988 1.3775	10.998 0.4330	14100 3160	0.32	1.88	3650 820	1990 447	1.83	13900 3130	L21549	L21511
15.875 0.6250	39.992 1.5745	12.014 0.4730	12400 2790	0.53	1.14	3220 724	2900 653	1.11	12300 2770	A6062	A6157
15.875 0.6250	41.275 1.6250	14.288 0.5625	22200 5000	0.31	1.93	5770 1300	3070 690	1.88	21300 4780	03062	03162
15.875 0.6250	42.862 1.6875	14.288 0.5625	17400 3910	0.70	0.85	4510 1010	5430 1220	0.83	17400 3920	11590	11520
15.875 0.6250	42.862 1.6875	16.670 0.6563	29100 6540	0.33	1.81	7550 1700	4280 962	1.76	29200 6560	17580	17520
15.875 0.6250	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05062	05185
15.875 0.6250	49.225 1.9380	19.845 0.7813	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09062	09195
15.875 0.6250	49.225 1.9380	23.020 0.9063	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09062	09194
15.875 0.6250	53.975 2.1250	22.225 0.8750	43000 9670	0.59	1.02	11200 2510	11300 2540	0.99	42500 9560	21063	21212
15.987 0.6294	46.975 1.8494	21.000 0.8268	37100 8350	0.55	1.10	9630 2170	9000 2020	1.07	39300 8840	HM81649	HM81610
16.993 0.6690	39.982 1.5741	12.014 0.4730	12400 2790	0.53	1.14	3220 724	2900 653	1.11	12300 2770	A6067	A6157A
16.993 0.6690	39.992 1.5745	12.014 0.4730	12400 2790	0.53	1.14	3220 724	2900 653	1.11	12300 2770	A6067	A6157
16.993 0.6690	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05066	05185
17.455 0.6872	36.525 1.4380	11.112 0.4375	12100 2720	0.49	1.23	3130 704	2610 587	1.20	11600 2600	A5069	A5144
17.462 0.6875	39.878 1.5700	13.843 0.5450	22900 5160	0.29	2.10	5950 1340	2910 655	2.04	23400 5260	LM11749	LM11710
17.462 0.6875	44.450 1.7500	12.700 0.5000	19900 4460	0.48	1.25	5150 1160	4220 950	1.22	20600 4640	4C	6
17.462 0.6875	44.450 1.7500	15.494 0.6100	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05068	05175
17.987 0.7082	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05070XS	05185-S
18.000 0.7087	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05070X	05185-S
19.004 0.7482	56.896 2.2400	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1774	1729

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
10.785 0.4246	7.938 0.3125	-3.0 -0.12	0.5 0.02	12.5 0.49	13.0 0.51	1.3 0.05	29.0 1.14	26.0 1.02	-0.20 -0.01	1.40 0.06	1.7	3.17	0.0308	0.05 0.10
10.785 0.4246	7.938 0.3125	-3.0 -0.12	1.3 0.05	13.5 0.53	15.0 0.59	1.3 0.05	29.0 1.14	26.0 1.02	-0.20 -0.01	1.40 0.06	1.7	3.17	0.0308	0.04 0.10
10.988 0.4326	8.730 0.3437	-2.5 -0.10	1.3 0.05	15.5 0.61	17.5 0.69	1.3 0.05	32.0 1.26	29.0 1.14	0.10 0.00	1.10 0.04	2.3	4.12	0.0355	0.06 0.13
10.785 0.4246	7.938 0.3125	-3.0 -0.12	0.8 0.03	15.5 0.61	16.5 0.65	1.3 0.05	29.0 1.14	26.0 1.02	-0.20 -0.01	1.40 0.06	1.7	3.17	0.0308	0.04 0.09
10.988 0.4326	8.730 0.3437	-2.5 -0.10	0.8 0.03	17.5 0.69	17.5 0.69	1.3 0.05	32.0 1.26	29.0 1.14	0.10 0.00	1.10 0.04	2.3	4.12	0.0355	0.05 0.12
10.988 0.4326	8.730 0.3437	-2.5 -0.10	1.3 0.05	17.0 0.67	18.5 0.73	1.3 0.05	32.0 1.26	29.0 1.14	0.10 0.00	1.10 0.04	2.3	4.12	0.0355	0.05 0.12
14.072 0.5540	11.112 0.4375	-5.1 -0.20	1.5 0.06	16.5 0.65	19.0 0.75	0.8 0.03	34.0 1.34	33.0 1.30	-0.40 -0.02	1.30 0.05	3.1	2.92	0.0330	0.08 0.18
10.988 0.4326	8.730 0.3437	-2.5 -0.10	0.8 0.03	19.0 0.75	19.5 0.77	1.3 0.05	32.0 1.26	29.0 1.14	0.10 0.00	1.10 0.04	2.3	4.12	0.0355	0.05 0.11
10.998 0.4330	8.712 0.3430	-3.3 -0.13	1.3 0.05	19.5 0.77	21.5 0.85	1.3 0.05	32.5 1.28	29.0 1.14	-0.30 -0.01	1.30 0.05	3	5.36	0.0348	0.05 0.11
11.153 0.4391	9.525 0.3750	-1.5 -0.06	1.3 0.05	20.5 0.81	22.0 0.87	1.3 0.05	37.0 1.46	34.0 1.34	0.50 0.02	1.60 0.06	2.9	5.64	0.0404	0.07 0.16
14.681 0.5780	11.112 0.4375	-5.1 -0.20	1.3 0.05	20.0 0.79	21.5 0.85	2.0 0.08	37.5 1.48	34.0 1.34	0.40 0.02	1.30 0.05	4.2	4.01	0.0384	0.09 0.21
14.288 0.5625	9.525 0.3750	-1.3 -0.05	1.5 0.06	22.5 0.89	24.5 0.96	1.5 0.06	39.5 1.56	34.5 1.36	1.50 0.06	0.60 0.02	3.4	4.63	0.0465	0.10 0.22
16.670 0.6563	13.495 0.5313	-5.8 -0.23	1.5 0.06	21.0 0.83	23.0 0.91	1.5 0.06	39.0 1.54	36.5 1.44	0.40 0.02	1.90 0.08	5.3	4.53	0.0423	0.12 0.27
14.381 0.5662	11.112 0.4375	-4.1 -0.16	1.5 0.06	21.0 0.83	23.5 0.93	1.3 0.05	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.13 0.29
21.539 0.8480	14.288 0.5625	-9.1 -0.36	0.8 0.03	21.5 0.85	22.0 0.87	1.3 0.05	44.5 1.75	42.0 1.65	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.20 0.44
21.539 0.8480	17.462 0.6875	-9.1 -0.36	0.8 0.03	21.5 0.85	22.0 0.87	3.5 0.14	44.5 1.75	39.0 1.54	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.21 0.47
21.839 0.8598	15.875 0.6250	-5.8 -0.23	0.8 0.03	26.0 1.03	29.0 1.14	2.3 0.09	50.0 1.97	43.0 1.69	* *	* *	7	4.14	0.0558	0.26 0.57
21.000 0.8268	16.000 0.6299	-6.1 -0.24	1.0 0.04	23.0 0.90	27.5 1.08	2.0 0.08	43.0 1.69	37.5 1.48	1.40 0.06	1.30 0.05	6.1	4.57	0.0526	0.19 0.42
11.153 0.4391	9.525 0.3750	-1.5 -0.06	0.8 0.03	21.0 0.83	22.0 0.87	1.3 0.05	36.5 1.44	34.0 1.34	0.50 0.02	1.60 0.06	2.9	5.64	0.0404	0.07 0.16
11.153 0.4391	9.525 0.3750	-1.5 -0.06	0.8 0.03	21.0 0.83	22.0 0.87	1.3 0.05	37.0 1.46	34.0 1.34	0.50 0.02	1.60 0.06	2.9	5.64	0.0404	0.07 0.16
14.381 0.5662	11.112 0.4375	-4.1 -0.16	1.5 0.06	22.0 0.87	24.5 0.96	1.3 0.05	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.13 0.28
11.112 0.4375	7.938 0.3125	-2.0 -0.08	1.5 0.06	21.5 0.84	23.5 0.93	1.5 0.06	33.5 1.32	30.0 1.18	0.00 0.00	1.30 0.05	2.5	4.61	0.0376	0.05 0.11
14.605 0.5750	10.668 0.4200	-5.1 -0.20	1.3 0.05	22.0 0.87	23.5 0.93	1.3 0.05	37.0 1.46	34.0 1.34	0.40 0.02	0.70 0.03	4.8	4.74	0.0392	0.08 0.18
11.908 0.4688	9.525 0.3750	-1.8 -0.07	1.5 0.06	22.0 0.87	24.5 0.96	1.5 0.06	41.0 1.61	38.0 1.50	0.80 0.03	1.60 0.06	4.6	2.61	0.0456	0.10 0.21
14.381 0.5662	11.430 0.4500	-4.1 -0.16	0.8 0.03	22.5 0.89	23.0 0.91	1.5 0.06	42.0 1.65	38.0 1.50	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.12 0.25
14.381 0.5662	11.112 0.4375	-4.1 -0.16	2.0 0.08	22.5 0.89	26.0 1.02	1.5 0.06	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.12 0.27
14.381 0.5662	11.112 0.4375	-4.1 -0.16	1.5 0.06	22.5 0.89	25.0 0.98	1.5 0.06	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.13 0.28
19.837 0.7810	15.875 0.6250	-6.9 -0.27	1.5 0.06	25.0 0.98	27.0 1.06	1.3 0.05	51.0 2.01	49.0 1.93	* *	* *	10.6	5.39	0.0521	0.27 0.59

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

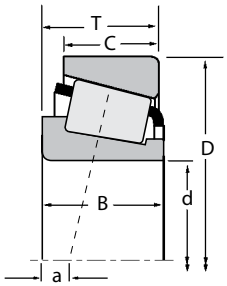
(7) Compound radius on inner race. Details on drawing for bearing.

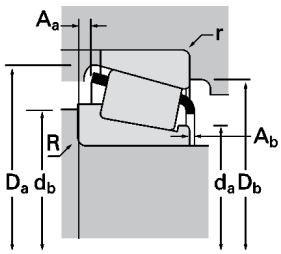
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
19.004 0.7482	56.896 2.2400	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1774	1729X
19.050 0.7500	39.992 1.5745	12.014 0.4730	12400 2790	0.53	1.14	3220 724	2900 653	1.11	12300 2770	A6075	A6157
19.050 0.7500	41.275 1.6250	11.905 0.4687	12400 2790	0.53	1.14	3220 724	2900 653	1.11	12300 2770	A6075	A6162
19.050 0.7500	44.450 1.7500	12.700 0.5000	19900 4460	0.48	1.25	5150 1160	4220 950	1.22	20600 4640	4A	6
19.050 0.7500	45.237 1.7810	15.494 0.6100	30600 6870	0.30	2.00	7930 1780	4080 917	1.94	32000 7200	LM11949	LM11910
19.050 0.7500	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05075	05185
19.050 0.7500	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05075X	05185-S
19.050 0.7500	49.225 1.9380	18.034 0.7100	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09067	09195
19.050 0.7500	49.225 1.9380	19.845 0.7813	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09074	09195
19.050 0.7500	49.225 1.9380	19.845 0.7813	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09078	09195
19.050 0.7500	49.225 1.9380	21.209 0.8350	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09067	09194
19.050 0.7500	49.225 1.9380	21.209 0.8350	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09067	09196
19.050 0.7500	49.225 1.9380	23.020 0.9063	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09074	09194
19.050 0.7500	49.225 1.9380	23.020 0.9063	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09074	09196
19.050 0.7500	49.225 1.9380	23.020 0.9063	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09078	09194
19.050 0.7500	49.225 1.9380	23.020 0.9063	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09078	09196
19.050 0.7500	50.800 2.0000	20.638 0.8125	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09074	09201
19.050 0.7500	52.800 2.0787	18.034 0.7100	30600 6870	0.30	2.00	7930 1780	4080 917	1.94	32000 7200	LM11949	LM11919
19.050 0.7500	52.883 2.0820	18.430 0.7256	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09067	09194-S
19.050 0.7500	52.883 2.0820	20.241 0.7969	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09074	09194-S
19.050 0.7500	53.975 2.1250	22.225 0.8750	43000 9670	0.59	1.02	11200 2510	11300 2540	0.99	42500 9560	21075	21212
19.050 0.7500	53.975 2.1250	22.225 0.8750	43000 9670	0.59	1.02	11200 2510	11300 2540	0.99	42500 9560	21075	21213
19.050 0.7500	53.975 2.1250	22.225 0.8750	43000 9670	0.59	1.02	11200 2510	11300 2540	0.99	42500 9560	21075A	21212
19.050 0.7500	56.896 2.2400	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1775	1729
19.987 0.7869	46.982 1.8497	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05079	05185A
19.987 0.7869	46.990 1.8500	15.250 0.6004	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05079	05186
19.987 0.7869	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05079	05185
19.987 0.7869	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05079	05185-S

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
19.837 0.7810	15.875 0.6250	-6.9 -0.27	1.5 0.06	25.0 0.98	27.0 1.06	1.5 0.06	51.0 2.01	49.0 1.93	* *	* *	10.6	5.39	0.0521	0.27 0.59
11.153 0.4391	9.525 0.3750	-1.5 -0.06	1.0 0.04	23.0 0.91	24.0 0.94	1.3 0.05	37.0 1.46	34.0 1.34	0.50 0.02	1.60 0.06	2.9	5.64	0.0404	0.07 0.14
11.153 0.4391	8.730 0.3437	-1.5 -0.06	1.0 0.04	23.0 0.91	24.0 0.94	1.3 0.05	37.0 1.46	34.5 1.36	0.50 0.02	1.60 0.06	2.9	5.64	0.0404	0.07 0.15
11.908 0.4688	9.525 0.3750	-1.8 -0.07	1.5 0.06	23.5 0.93	25.5 1.00	1.5 0.06	41.0 1.61	38.0 1.50	0.80 0.03	1.60 0.06	4.6	2.61	0.0456	0.09 0.20
16.637 0.6550	12.065 0.4750	-5.6 -0.22	1.3 0.05	23.5 0.93	25.0 0.98	1.3 0.05	41.5 1.63	39.5 1.56	0.20 0.01	0.70 0.03	6.6	5.49	0.0441	0.13 0.28
14.381 0.5662	11.112 0.4375	-4.1 -0.16	1.3 0.05	23.5 0.93	25.0 0.98	1.3 0.05	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.12 0.27
14.381 0.5662	11.112 0.4375	-4.1 -0.16	1.5 0.06	23.5 0.93	25.5 1.00	1.5 0.06	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.12 0.27
19.050 0.7500	14.288 0.5625	-7.4 -0.29	1.3 0.05	24.0 0.94	25.5 1.00	1.3 0.05	44.5 1.75	42.0 1.65	0.50 0.02	1.30 0.05	8	4.05	0.0452	0.17 0.39
21.539 0.8480	14.288 0.5625	-9.1 -0.36	1.5 0.06	24.0 0.94	26.0 1.02	1.3 0.05	44.5 1.75	42.0 1.65	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.18 0.40
21.539 0.8480	14.288 0.5625	-9.1 -0.36	1.3 0.05	24.0 0.94	25.5 1.00	1.3 0.05	44.5 1.75	42.0 1.65	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.18 0.41
19.050 0.7500	17.462 0.6875	-7.4 -0.29	1.3 0.05	24.0 0.94	25.5 1.00	3.5 0.14	44.5 1.75	39.0 1.54	0.50 0.02	1.30 0.05	8	4.05	0.0452	0.19 0.42
19.050 0.7500	17.462 0.6875	-7.4 -0.29	1.3 0.05	24.0 0.94	25.5 1.00	1.5 0.06	44.5 1.75	41.5 1.63	0.50 0.02	1.30 0.05	8	4.05	0.0452	0.19 0.43
21.539 0.8480	17.462 0.6875	-9.1 -0.36	1.5 0.06	24.0 0.94	26.0 1.02	3.5 0.14	44.5 1.75	39.0 1.54	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.20 0.43
21.539 0.8480	17.462 0.6875	-9.1 -0.36	1.5 0.06	24.0 0.94	26.0 1.02	1.5 0.06	44.5 1.75	41.5 1.63	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.20 0.45
21.539 0.8480	17.462 0.6875	-9.1 -0.36	1.3 0.05	24.0 0.94	25.5 1.00	3.5 0.14	44.5 1.75	39.0 1.54	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.20 0.44
21.539 0.8480	17.462 0.6875	-9.1 -0.36	1.3 0.05	24.0 0.94	25.5 1.00	1.5 0.06	44.5 1.75	41.5 1.63	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.20 0.45
21.539 0.8480	17.462 0.6875	-9.1 -0.36	1.5 0.06	24.0 0.94	26.0 1.02	0.5 0.02	45.5 1.79	44.0 1.73	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.21 0.47
16.637 0.6550	14.605 0.5750	-5.6 -0.22	1.3 0.05	23.5 0.93	25.0 0.98	1.3 0.05	45.5 1.79	42.0 1.65	0.20 0.01	0.70 0.03	6.6	5.49	0.0441	0.20 0.44
19.050 0.7500	14.684 0.5781	-7.4 -0.29	1.3 0.05	24.0 0.94	25.5 1.00	3.3 0.13	46.5 1.83	42.0 1.65	0.50 0.02	1.30 0.05	8	4.05	0.0452	0.21 0.45
21.539 0.8480	14.684 0.5781	-9.1 -0.36	1.5 0.06	24.0 0.94	26.0 1.02	3.3 0.13	46.5 1.83	42.0 1.65	2.30 0.09	0.60 0.02	8	4.05	0.0452	0.21 0.47
21.839 0.8598	15.875 0.6250	-5.8 -0.23	1.5 0.06	26.0 1.03	31.5 1.24	2.3 0.09	50.0 1.97	43.0 1.69	3.30 0.13	1.80 0.07	7	3.55	0.0558	0.25 0.54
21.839 0.8598	15.875 0.6250	-5.8 -0.23	1.5 0.06	26.0 1.03	31.5 1.24	0.5 0.02	50.0 1.97	44.5 1.75	3.30 0.13	1.80 0.07	7	3.55	0.0558	0.25 0.55
21.839 0.8598	15.875 0.6250	-5.8 -0.23	1.5 0.06	26.0 1.03	31.5 1.24	2.3 0.09	50.0 1.97	43.0 1.69	3.30 0.13	1.80 0.07	7	3.55	0.0558	0.25 0.54
19.837 0.7810	15.875 0.6250	-6.9 -0.27	1.5 0.06	25.0 0.98	27.0 1.06	1.3 0.05	51.0 2.01	49.0 1.93	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.27 0.59
14.381 0.5662	11.112 0.4375	-4.1 -0.16	1.5 0.06	24.0 0.94	26.5 1.04	1.5 0.06	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.12 0.26
14.381 0.5662	12.000 0.4724	-4.1 -0.16	1.5 0.06	24.0 0.94	26.5 1.04	1.5 0.06	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.12 0.27
14.381 0.5662	11.112 0.4375	-4.1 -0.16	1.5 0.06	24.0 0.94	26.5 1.04	1.3 0.05	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.12 0.26
14.381 0.5662	11.112 0.4375	-4.1 -0.16	1.5 0.06	24.0 0.94	26.5 1.04	1.5 0.06	42.5 1.67	40.5 1.59	0.20 0.01	1.20 0.05	5.8	5.55	0.0448	0.12 0.26

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

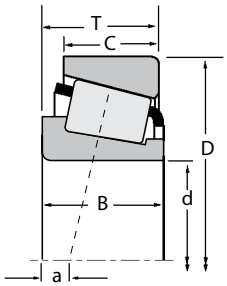
(7) Compound radius on inner race. Details on drawing for bearing.

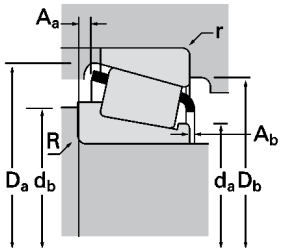
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
19.987 0.7869	51.994 2.0470	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07079X	07204
20.000 0.7874	42.000 1.6535	15.000 0.5906	25700 5770	0.37	1.60	6660 1500	4260 959	1.56	29400 6600	XAA32004X	YAA32004X
20.000 0.7874	51.994 2.0470	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07079	07204
20.627 0.8121	56.896 2.2400	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1778	1729
20.638 0.8125	49.225 1.9380	19.845 0.7813	40400 9080	0.32	1.86	10500 2360	5790 1300	1.81	43200 9720	12580	12520
21.430 0.8437	50.005 1.9687	17.526 0.6900	40800 9170	0.28	2.16	10600 2380	5030 1130	2.10	43500 9780	M12649	M12610
21.987 0.8656	45.237 1.7810	15.494 0.6100	30200 6780	0.31	1.96	7820 1760	4100 921	1.91	35300 7930	LM12749	LM12710
21.987 0.8656	45.974 1.8100	15.494 0.6100	30200 6780	0.31	1.96	7820 1760	4100 921	1.91	35300 7930	LM12749	LM12711
22.225 0.8750	42.070 1.6563	11.176 0.4400	15300 3450	0.40	1.51	3980 895	2700 607	1.47	16800 3770	LL52549	LL52510
22.225 0.8750	50.005 1.9687	13.495 0.5313	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07087	07196
22.225 0.8750	50.005 1.9687	13.495 0.5313	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07087X	07196
22.225 0.8750	50.005 1.9687	17.526 0.6900	40800 9170	0.28	2.16	10600 2380	5030 1130	2.10	43500 9780	M12648A	M12610
22.225 0.8750	50.005 1.9687	17.526 0.6900	40800 9170	0.28	2.16	10600 2380	5030 1130	2.10	43500 9780	M12648	M12610
22.225 0.8750	51.994 2.0470	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07087	07204
22.225 0.8750	52.000 2.0472	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07087X	07205
22.225 0.8750	52.388 2.0625	19.368 0.7625	44300 9960	0.29	2.05	11500 2580	5740 1290	2.00	48300 10900	1380	1328
22.225 0.8750	53.975 2.1250	19.368 0.7625	44300 9960	0.29	2.05	11500 2580	5740 1290	2.00	48300 10900	1380	1329
22.225 0.8750	53.975 2.1250	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1755	1730
22.225 0.8750	56.896 2.2400	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1755	1729
22.225 0.8750	56.896 2.2400	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1755	1729X
22.225 0.8750	57.150 2.2500	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1975	1922
22.225 0.8750	57.150 2.2500	22.225 0.8750	51200 11500	0.35	1.73	13300 2990	7880 1770	1.69	55100 12400	1280	1220
22.225 0.8750	58.738 2.3125	19.050 0.7500	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1975	1932
22.225 0.8750	60.325 2.3750	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1975	1931
22.225 0.8750	61.912 2.4375	36.512 1.4375	82000 18400	0.28	2.13	21300 4780	10300 2310	2.07	89800 20200	3655	3620
22.225 0.8750	62.000 2.4409	17.983 0.7080	48200 10800	0.24	2.48	12500 2810	5170 1160	2.42	49200 11100	246X	242
22.225 0.8750	66.421 2.6150	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2684	2631
22.606 0.8900	47.000 1.8504	15.500 0.6102	27500 6170	0.47	1.27	7120 1600	5760 1300	1.24	33000 7420	LM72849	LM72810

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	26.0 1.02	27.5 1.08	1.3 0.05	48.0 1.89	45.0 1.77	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.16 0.36
15.000 0.5906	12.000 0.4724	-4.6 -0.18	2.0 0.08	25.5 1.00	29.0 1.14	1.0 0.04	39.5 1.56	36.5 1.44	0.40 0.02	1.40 0.06	6.2	6.1	0.0469	0.10 0.21
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	26.0 1.02	27.5 1.08	1.3 0.05	48.0 1.89	45.0 1.77	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.16 0.36
19.837 0.7810	15.875 0.6250	-6.9 -0.27	0.8 0.03	26.0 1.02	27.0 1.06	1.3 0.05	51.0 2.01	49.0 1.93	* *	* *	10.6	5.39	0.0521	0.26 0.57
19.845 0.7813	15.875 0.6250	-7.1 -0.28	1.5 0.06	26.0 1.02	28.5 1.12	1.5 0.06	45.5 1.79	42.5 1.67	0.90 0.04	1.10 0.04	8.6	6.21	0.0495	0.18 0.40
18.288 0.7200	13.970 0.5500	-6.4 -0.25	1.3 0.05	27.5 1.08	29.5 1.16	1.3 0.05	46.0 1.81	44.0 1.73	0.30 0.01	1.10 0.04	9.1	5.63	0.0479	0.17 0.37
16.637 0.6550	12.065 0.4750	-5.3 -0.21	1.3 0.05	26.0 1.02	27.5 1.08	1.3 0.05	42.0 1.65	39.5 1.56	0.60 0.02	0.40 0.02	8.2	6.98	0.0480	0.12 0.26
16.637 0.6550	12.065 0.4750	-5.3 -0.21	1.3 0.05	26.0 1.02	27.5 1.08	1.3 0.05	42.5 1.67	40.0 1.57	0.60 0.02	0.40 0.02	8.2	6.98	0.0480	0.12 0.27
11.176 0.4400	8.636 0.3400	-1.8 -0.07	1.3 0.05	26.0 1.02	27.5 1.08	1.3 0.05	39.5 1.56	36.5 1.44	-0.20 -0.01	1.10 0.04	4.7	8.62	0.0431	0.07 0.14
14.260 0.5614	9.525 0.3750	-2.8 -0.11	1.3 0.05	27.0 1.06	28.5 1.12	1.0 0.04	47.0 1.85	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.13 0.28
14.260 0.5614	9.525 0.3750	-2.8 -0.11	1.5 0.06	27.0 1.06	29.0 1.14	1.0 0.04	47.0 1.85	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.13 0.28
18.288 0.7200	13.970 0.5500	-6.4 -0.25	0.4 0.02	26.5 1.04	26.5 1.04	1.3 0.05	46.0 1.81	44.0 1.73	0.30 0.01	1.10 0.04	9.1	5.63	0.0479	0.16 0.36
18.288 0.7200	13.970 0.5500	-6.4 -0.25	1.3 0.05	26.5 1.04	28.5 1.12	1.3 0.05	46.0 1.81	44.0 1.73	0.30 0.01	1.10 0.04	9.1	5.63	0.0479	0.16 0.36
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.3 0.05	27.0 1.06	28.5 1.12	1.3 0.05	48.0 1.89	45.0 1.77	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.15 0.34
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	27.0 1.06	29.0 1.14	2.0 0.08	48.0 1.89	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.15 0.34
20.168 0.7940	14.288 0.5625	-7.6 -0.30	1.5 0.06	27.0 1.06	29.5 1.16	1.5 0.06	48.5 1.91	45.0 1.77	1.30 0.05	1.10 0.04	10.3	5.21	0.0508	0.20 0.45
20.168 0.7940	14.288 0.5625	-7.6 -0.30	1.5 0.06	27.0 1.06	29.5 1.16	1.5 0.06	49.0 1.93	46.0 1.81	1.30 0.05	1.10 0.04	10.3	5.21	0.0508	0.22 0.48
19.837 0.7810	15.875 0.6250	-6.9 -0.27	1.3 0.05	27.5 1.08	29.0 1.14	0.8 0.03	50.0 1.97	48.5 1.91	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.22 0.49
19.837 0.7810	15.875 0.6250	-6.9 -0.27	1.3 0.05	27.5 1.08	29.0 1.14	1.3 0.05	51.0 2.01	49.0 1.93	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.25 0.56
19.837 0.7810	15.875 0.6250	-6.9 -0.27	1.3 0.05	27.5 1.08	29.0 1.14	1.5 0.06	51.0 2.01	49.0 1.93	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.25 0.55
19.355 0.7620	15.875 0.6250	-5.8 -0.23	0.8 0.03	28.0 1.10	29.0 1.14	1.5 0.06	53.5 2.11	51.0 2.01	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.26 0.57
22.225 0.8750	17.462 0.6875	-6.9 -0.27	0.8 0.03	29.0 1.14	29.5 1.16	1.5 0.06	52.0 2.05	49.0 1.93	* *	* *	11.4	5.52	0.0556	0.28 0.63
19.355 0.7620	15.080 0.5937	-5.8 -0.23	0.8 0.03	28.0 1.10	29.0 1.14	1.3 0.05	54.0 2.13	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.27 0.60
19.355 0.7620	15.875 0.6250	-5.8 -0.23	0.8 0.03	28.0 1.10	29.0 1.14	1.3 0.05	55.0 2.17	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.29 0.65
38.354 1.5100	23.812 0.9375	-19.8 -0.78	0.3 0.01	30.5 1.20	30.5 1.20	3.3 0.13	57.5 2.27	52.0 2.05	9.90 0.39	0.20 0.01	17	6.38	0.0592	0.51 1.12
19.000 0.7480	16.002 0.6300	-6.1 -0.24	3.5 0.14	30.0 1.18	34.5 1.36	2.0 0.08	57.0 2.24	55.0 2.17	0.10 0.00	0.70 0.03	12.8	8.24	0.0509	0.29 0.63
25.433 1.0013	19.050 0.7500	-9.4 -0.37	1.5 0.06	32.0 1.26	34.0 1.34	1.3 0.05	60.0 2.36	58.0 2.28	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.46 1.02
15.500 0.6102	12.000 0.4724	-3.0 -0.12	1.5 0.06	28.0 1.10	30.0 1.18	1.0 0.04	44.0 1.73	40.5 1.59	0.60 0.02	0.90 0.04	7.5	8.95	0.0538	0.12 0.28

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

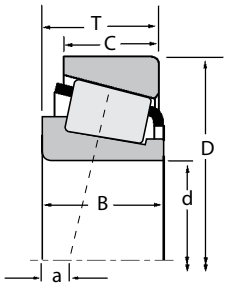
(7) Compound radius on inner race. Details on drawing for bearing.

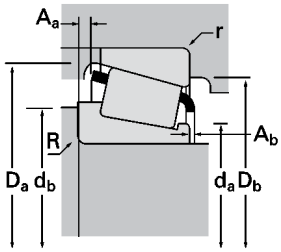
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
23.812 0.9375	50.005 1.9687	13.495 0.5313	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07093	07196
23.812 0.9375	50.292 1.9800	14.224 0.5600	27800 6260	0.37	1.60	7210 1620	4620 1040	1.56	32900 7400	L44640	L44610
23.812 0.9375	50.800 2.0000	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07093	07210X
23.812 0.9375	51.994 2.0470	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07093	07204
23.812 0.9375	53.975 2.1250	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1779	1730
23.812 0.9375	56.896 2.2400	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1779	1729
23.812 0.9375	61.912 2.4375	28.575 1.1250	82000 18400	0.28	2.13	21300 4780	10300 2310	2.07	89800 20200	3659	3620
23.812 0.9375	65.088 2.5625	22.225 0.8750	50600 11400	0.73	0.82	13100 2950	16400 3690	0.80	55800 12500	23092	23256
23.812 0.9375	66.421 2.6150	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2685	2631
24.000 0.9449	55.000 2.1654	25.000 0.9842	62100 14000	0.35	1.70	16100 3620	9740 2190	1.65	71000 16000	JHM33449	JHM33410
24.384 0.9600	79.375 3.1250	25.400 1.0000	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43096	43312
24.981 0.9835	50.005 1.9687	13.495 0.5313	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07098	07196
24.981 0.9835	51.994 2.0470	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07098	07204
24.981 0.9835	52.000 2.0472	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07098	07205
24.981 0.9835	61.981 2.4402	16.002 0.6300	40000 9000	0.38	1.57	10400 2330	6800 1530	1.53	44100 9910	17098	17244A
24.981 0.9835	62.000 2.4409	16.002 0.6300	40000 9000	0.38	1.57	10400 2330	6800 1530	1.53	44100 9910	17098	17244
25.000 0.9843	47.000 1.8504	15.000 0.5906	28500 6410	0.43	1.39	7390 1660	5440 1220	1.36	35400 7950	XAA32005X	YAA32005X
25.000 0.9843	50.005 1.9687	13.495 0.5313	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07097	07196
25.000 0.9843	51.994 2.0470	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07097	07204
25.000 0.9843	52.000 2.0472	14.220 0.5600	27800 6260	0.37	1.60	7210 1620	4620 1040	1.56	32900 7400	JL44642A	JL44615
25.000 0.9843	52.000 2.0472	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07097	07205
25.000 0.9843	61.912 2.4375	21.018 0.8275	48200 10800	0.24	2.48	12500 2810	5170 1160	2.42	49200 11100	247	244X
25.400 1.0000	50.005 1.9687	13.495 0.5313	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07100-S	07196
25.400 1.0000	50.292 1.9800	14.224 0.5600	27800 6260	0.37	1.60	7210 1620	4620 1040	1.56	32900 7400	L44642	L44610
25.400 1.0000	50.292 1.9800	14.224 0.5600	27800 6260	0.37	1.60	7210 1620	4620 1040	1.56	32900 7400	L44643	L44610
25.400 1.0000	50.800 2.0000	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07100-S	07210X
25.400 1.0000	50.800 2.0000	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07100-SA	07210X
25.400 1.0000	51.986 2.0467	15.011 0.5910	27800 6260	0.37	1.60	7210 1620	4620 1040	1.56	32900 7400	L44643	L44613

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
14.260 0.5614	9.525 0.3750	-2.8 -0.11	1.5 0.06	28.5 1.12	30.5 1.20	1.0 0.04	47.0 1.85	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.12 0.27
14.732 0.5800	10.668 0.4200	-3.3 -0.13	1.5 0.06	28.5 1.12	30.5 1.20	1.3 0.05	47.0 1.85	44.5 1.75	0.80 0.03	0.50 0.02	8.9	8.93	0.0526	0.13 0.29
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	28.5 1.12	30.5 1.20	1.5 0.06	47.5 1.87	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.14 0.30
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	28.5 1.12	30.5 1.20	1.3 0.05	48.0 1.89	45.0 1.77	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.15 0.33
19.837 0.7810	15.875 0.6250	-6.9 -0.27	0.8 0.03	28.5 1.12	29.5 1.16	0.8 0.03	50.0 1.97	48.5 1.91	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.21 0.47
19.837 0.7810	15.875 0.6250	-6.9 -0.27	0.8 0.03	28.5 1.12	29.5 1.16	1.3 0.05	51.0 2.01	49.0 1.93	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.24 0.54
30.416 1.1975	23.812 0.9375	-11.9 -0.47	2.3 0.09	31.5 1.24	35.5 1.40	3.3 0.13	57.5 2.27	52.0 2.05	2.00 0.08	0.20 0.01	17	6.38	0.0592	0.43 0.96
21.463 0.8450	15.875 0.6250	-2.3 -0.09	1.5 0.06	34.5 1.36	38.5 1.52	1.5 0.06	63.0 2.48	53.0 2.09	3.80 0.15	2.00 0.08	11.3	6.57	0.0700	0.37 0.81
25.433 1.0013	19.050 0.7500	-9.4 -0.37	0.8 0.03	30.0 1.18	31.0 1.22	1.3 0.05	60.0 2.36	58.0 2.28	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.45 0.99
25.000 0.9843	21.000 0.8268	-8.9 -0.35	2.0 0.08	30.0 1.18	35.0 1.38	2.0 0.08	52.0 2.05	47.0 1.85	0.40 0.02	1.80 0.07	13.3	5.79	0.0592	0.29 0.65
24.074 0.9478	17.462 0.6875	-2.0 -0.08	0.8 0.03	39.5 1.56	40.5 1.59	1.5 0.06	74.0 2.91	67.0 2.64	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.64 1.42
14.260 0.5614	9.525 0.3750	-2.8 -0.11	1.5 0.06	29.0 1.14	31.0 1.22	1.0 0.04	47.0 1.85	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.12 0.26
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	29.0 1.14	31.0 1.22	1.3 0.05	48.0 1.89	45.0 1.77	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.14 0.31
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	29.0 1.14	31.0 1.22	2.0 0.08	48.0 1.89	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.14 0.31
16.566 0.6522	14.288 0.5625	-3.6 -0.14	1.5 0.06	30.5 1.20	33.0 1.30	1.5 0.06	57.0 2.24	54.0 2.13	0.30 0.01	1.80 0.07	11.8	7.49	0.0579	0.25 0.56
16.566 0.6522	14.288 0.5625	-3.6 -0.14	1.5 0.06	30.5 1.20	33.0 1.30	1.5 0.06	57.0 2.24	54.0 2.13	0.30 0.01	1.80 0.07	11.8	7.49	0.0579	0.25 0.56
15.000 0.5906	11.500 0.4528	-3.3 -0.13	3.3 0.13	30.0 1.18	37.0 1.46	1.0 0.04	44.5 1.75	41.0 1.61	0.60 0.02	1.20 0.05	8.6	8.7	0.0546	0.11 0.25
14.260 0.5614	9.525 0.3750	-2.8 -0.11	1.5 0.06	29.0 1.14	31.0 1.22	1.0 0.04	47.0 1.85	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.12 0.26
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	29.0 1.14	31.0 1.22	1.3 0.05	48.0 1.89	45.0 1.77	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.14 0.31
14.732 0.5800	10.668 0.4200	-3.3 -0.13	1.3 0.05	30.0 1.18	32.0 1.26	1.3 0.05	48.0 1.89	45.5 1.79	0.80 0.03	0.50 0.02	8.9	8.93	0.0526	0.14 0.31
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	29.0 1.14	31.0 1.22	2.0 0.08	48.0 1.89	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.14 0.31
19.000 0.7480	17.462 0.6875	-6.1 -0.24	2.0 0.08	30.0 1.18	33.5 1.32	3.3 0.13	57.0 2.24	52.0 2.05	0.10 0.00	0.70 0.03	12.8	8.24	0.0509	0.29 0.63
14.260 0.5614	9.525 0.3750	-2.8 -0.11	1.5 0.06	29.5 1.16	31.5 1.24	1.0 0.04	47.0 1.85	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.12 0.25
14.732 0.5800	10.668 0.4200	-3.3 -0.13	3.5 0.14	29.5 1.16	36.0 1.42	1.3 0.05	47.0 1.85	44.5 1.75	0.80 0.03	0.50 0.02	8.9	8.93	0.0526	0.12 0.27
14.732 0.5800	10.668 0.4200	-3.3 -0.13	1.3 0.05	30.0 1.18	32.0 1.26	1.3 0.05	47.0 1.85	44.5 1.75	0.80 0.03	0.60 0.02	8.9	8.93	0.0526	0.13 0.28
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	29.5 1.16	31.5 1.24	1.5 0.06	47.5 1.87	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.13 0.29
14.260 0.5614	12.700 0.5000	-2.8 -0.11	3.3 0.13	29.5 1.16	35.0 1.38	1.5 0.06	47.5 1.87	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.13 0.28
14.732 0.5800	12.700 0.5000	-3.3 -0.13	1.3 0.05	30.0 1.18	32.0 1.26	2.0 0.08	48.0 1.89	44.5 1.75	0.80 0.03	0.60 0.02	8.9	8.93	0.0526	0.15 0.32

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

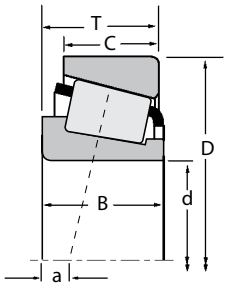
[7] Compound radius on inner race. Details on drawing for bearing.

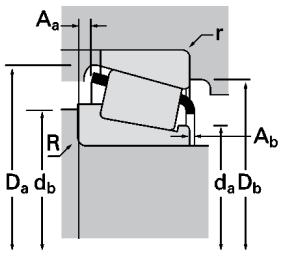
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
25.400 1.0000	52.000 2.0472	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07100-S	07205
25.400 1.0000	52.000 2.0472	15.011 0.5910	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07100-SA	07205
25.400 1.0000	53.975 2.1250	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1780	1730
25.400 1.0000	56.896 2.2400	19.368 0.7625	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1780	1729
25.400 1.0000	57.150 2.2500	17.462 0.6875	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	15578	15520
25.400 1.0000	57.150 2.2500	19.431 0.7650	44900 10100	0.55	1.10	11700 2620	10900 2450	1.07	52900 11900	M84548	M84510
25.400 1.0000	57.150 2.2500	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1986	1922
25.400 1.0000	57.150 2.2500	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1994X	1922
25.400 1.0000	57.150 2.2500	20.218 0.7960	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1780	1738X
25.400 1.0000	58.738 2.3125	19.050 0.7500	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1986	1932
25.400 1.0000	59.530 2.3437	23.368 0.9200	53800 12100	0.55	1.10	13900 3140	13000 2930	1.07	63300 14200	M84249	M84210
25.400 1.0000	60.325 2.3750	19.842 0.7812	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	15578	15523
25.400 1.0000	60.325 2.3750	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1986	1931
25.400 1.0000	60.325 2.3750	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1994X	1931
25.400 1.0000	62.000 2.4409	18.161 0.7150	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15100-SR	15245
25.400 1.0000	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15100	15245
25.400 1.0000	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15101	15245
25.400 1.0000	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15102	15245
25.400 1.0000	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15100	15244
25.400 1.0000	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15101	15244
25.400 1.0000	63.100 2.4843	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2687	2630
25.400 1.0000	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15100	15250
25.400 1.0000	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15101	15250
25.400 1.0000	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15102	15250
25.400 1.0000	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15100-S	15250X
25.400 1.0000	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15101	15250X
25.400 1.0000	63.500 2.5000	20.638 0.8125	50600 11400	0.73	0.82	13100 2950	16400 3690	0.80	55800 12500	23101X	23250X
25.400 1.0000	65.088 2.5625	22.225 0.8750	50600 11400	0.73	0.82	13100 2950	16400 3690	0.80	55800 12500	23100	23256

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
14.260 0.5614	12.700 0.5000	-2.8 -0.11	1.5 0.06	29.5 1.16	31.5 1.24	2.0 0.08	48.0 1.89	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.14 0.31
14.260 0.5614	12.700 0.5000	-2.8 -0.11	3.3 0.13	29.5 1.16	35.0 1.38	2.0 0.08	48.0 1.89	44.5 1.75	0.30 0.01	1.40 0.06	7.6	7.07	0.0509	0.14 0.30
19.837 0.7810	15.875 0.6250	-6.9 -0.27	0.8 0.03	30.0 1.18	30.5 1.20	0.8 0.03	50.0 1.97	48.5 1.91	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.20 0.45
19.837 0.7810	15.875 0.6250	-6.9 -0.27	0.8 0.03	30.0 1.18	30.5 1.20	1.3 0.05	51.0 2.01	49.0 1.93	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.23 0.52
17.462 0.6875	13.495 0.5313	-5.1 -0.20	1.3 0.05	30.5 1.20	32.5 1.28	1.5 0.06	53.0 2.09	51.0 2.01	0.50 0.02	1.80 0.07	12.7	10.3	0.0577	0.22 0.48
19.431 0.7650	14.732 0.5800	-3.0 -0.12	1.5 0.06	33.0 1.30	37.5 1.48	1.5 0.06	54.0 2.13	48.5 1.91	1.20 0.05	1.20 0.05	11.3	7.39	0.0644	0.24 0.53
19.355 0.7620	15.875 0.6250	-5.8 -0.23	1.3 0.05	30.5 1.20	32.5 1.28	1.5 0.06	53.5 2.11	51.0 2.01	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.24 0.53
19.355 0.7620	15.875 0.6250	-5.8 -0.23	3.5 0.14	30.5 1.20	37.0 1.46	1.5 0.06	53.5 2.11	51.0 2.01	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.24 0.52
19.837 0.7810	17.551 0.6910	-6.9 -0.27	0.8 0.03	30.0 1.18	30.5 1.20	2.3 0.09	51.0 2.01	48.5 1.91	1.90 0.07	0.30 0.01	10.6	5.39	0.0521	0.25 0.54
19.355 0.7620	15.080 0.5937	-5.8 -0.23	1.3 0.05	30.5 1.20	32.5 1.28	1.3 0.05	54.0 2.13	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.25 0.56
23.114 0.9100	18.288 0.7200	-5.1 -0.20	0.8 0.03	32.5 1.27	36.0 1.42	1.5 0.06	56.0 2.20	49.5 1.95	1.30 0.05	1.60 0.06	12.7	7.56	0.0670	0.32 0.71
17.462 0.6875	15.875 0.6250	-5.1 -0.20	1.3 0.05	30.5 1.20	32.5 1.28	1.5 0.06	54.0 2.13	51.0 2.01	0.50 0.02	1.80 0.07	12.7	10.3	0.0577	0.27 0.60
19.355 0.7620	15.875 0.6250	-5.8 -0.23	1.3 0.05	30.5 1.20	32.5 1.28	1.3 0.05	55.0 2.17	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.28 0.61
19.355 0.7620	15.875 0.6250	-5.8 -0.23	3.5 0.14	30.5 1.20	37.0 1.46	1.3 0.05	55.0 2.17	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.27 0.60
19.050 0.7500	14.288 0.5625	-4.8 -0.19	1.3 0.05	32.5 1.28	33.5 1.32	1.3 0.05	58.0 2.28	55.0 2.17	0.30 0.01	1.70 0.07	14.6	7.58	0.0606	0.28 0.63
20.638 0.8125	14.288 0.5625	-5.8 -0.23	3.5 0.14	31.5 1.24	38.0 1.50	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.29 0.65
20.638 0.8125	14.288 0.5625	-5.8 -0.23	0.8 0.03	31.5 1.24	32.5 1.28	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.30 0.65
20.638 0.8125	14.288 0.5625	-5.8 -0.23	1.5 0.06	31.5 1.24	34.0 1.34	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.30 0.65
20.638 0.8125	15.875 0.6250	-5.8 -0.23	3.5 0.14	31.5 1.24	38.0 1.50	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.31 0.67
20.638 0.8125	15.875 0.6250	-5.8 -0.23	0.8 0.03	31.5 1.24	32.5 1.28	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.31 0.68
25.433 1.0013	19.050 0.7500	-9.4 -0.37	1.3 0.05	31.5 1.24	33.5 1.32	0.8 0.03	59.0 2.32	57.0 2.24	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.39 0.86
20.638 0.8125	15.875 0.6250	-5.8 -0.23	3.5 0.14	31.5 1.24	38.0 1.50	1.3 0.05	59.0 2.32	56.0 2.20	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.32 0.71
20.638 0.8125	15.875 0.6250	-5.8 -0.23	0.8 0.03	31.5 1.24	32.5 1.28	1.3 0.05	59.0 2.32	56.0 2.20	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.33 0.72
20.638 0.8125	15.875 0.6250	-5.8 -0.23	1.5 0.06	31.5 1.24	34.0 1.34	1.3 0.05	59.0 2.32	56.0 2.20	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.33 0.72
20.638 0.8125	15.875 0.6250	-5.8 -0.23	1.3 0.05	31.5 1.24	33.5 1.32	1.5 0.06	59.0 2.32	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.33 0.72
20.638 0.8125	15.875 0.6250	-5.8 -0.23	0.8 0.03	31.5 1.24	32.5 1.28	1.5 0.06	59.0 2.32	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.33 0.72
20.650 0.8130	14.681 0.5780	-1.3 -0.05	2.3 0.09	34.5 1.36	40.5 1.59	2.3 0.09	60.0 2.36	52.0 2.05	2.70 0.11	1.80 0.07	11.3	6.57	0.0700	0.32 0.70
21.463 0.8450	15.875 0.6250	-2.3 -0.09	1.5 0.06	34.5 1.36	39.0 1.54	1.5 0.06	63.0 2.48	53.0 2.09	3.80 0.15	2.00 0.08	11.3	6.57	0.0700	0.36 0.78

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

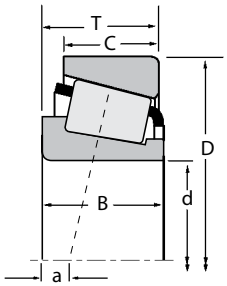
[7] Compound radius on inner race. Details on drawing for bearing.

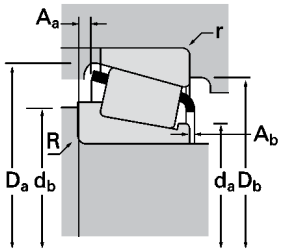
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
25.400 1.0000	66.421 2.6150	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2687	2631
25.400 1.0000	68.262 2.6875	22.225 0.8750	62600 14100	0.34	1.77	16200 3650	9420 2120	1.72	73300 16500	2473	2420
25.400 1.0000	68.262 2.6875	22.225 0.8750	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02473	02420
25.400 1.0000	68.262 2.6875	22.225 0.8750	59600 13400	0.55	1.10	15500 3470	14400 3250	1.07	77400 17400	M88036	M88010
25.400 1.0000	69.723 2.7450	19.050 0.7500	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26100	26274
25.400 1.0000	72.233 2.8438	25.400 1.0000	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88630	HM88610
25.400 1.0000	72.233 2.8438	25.400 1.0000	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88630	HM88610A
25.400 1.0000	72.626 2.8593	24.608 0.9688	64600 14500	0.60	1.00	16700 3760	17300 3880	0.97	64100 14400	41100	41286
25.400 1.0000	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3189	3120
25.400 1.0000	73.025 2.8750	26.543 1.0450	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88630	HM88612
25.987 1.0231	51.986 2.0467	15.011 0.5910	27800 6260	0.37	1.60	7210 1620	4620 1040	1.56	32900 7400	L44645	L44613
25.987 1.0231	57.150 2.2500	17.462 0.6875	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	15579X	15520
26.157 1.0298	61.912 2.4375	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15103	15243
26.157 1.0298	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15103	15245
26.162 1.0300	61.912 2.4375	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15103-S	15243
26.162 1.0300	66.421 2.6150	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2682	2631
26.975 1.0620	58.738 2.3125	19.050 0.7500	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1987	1932
26.975 1.0620	60.325 2.3750	19.355 0.7620	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1987	1931
26.987 1.0625	50.292 1.9800	14.224 0.5600	27800 6260	0.37	1.60	7210 1620	4620 1040	1.56	32900 7400	L44649	L44610
26.987 1.0625	51.986 2.0467	15.011 0.5910	27800 6260	0.37	1.60	7210 1620	4620 1040	1.56	32900 7400	L44649	L44613
26.987 1.0625	57.150 2.2500	17.462 0.6875	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	15580	15520
26.987 1.0625	57.150 2.2500	19.431 0.7650	44900 10100	0.55	1.10	11700 2620	10900 2450	1.07	52900 11900	M84549	M84510
26.988 1.0625	57.150 2.2500	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1997X	1922
26.987 1.0625	60.325 2.3750	19.842 0.7812	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	15580	15523
26.987 1.0625	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15106	15245
26.987 1.0625	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15106	15250X
26.987 1.0625	66.421 2.6150	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2688	2631
26.987 1.0625	72.626 2.8593	24.608 0.9688	64600 14500	0.60	1.00	16700 3760	17300 3880	0.97	64100 14400	41106	41286

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.433 1.0013	19.050 0.7500	-9.4 -0.37	1.3 0.05	31.5 1.24	33.5 1.32	1.3 0.05	60.0 2.36	58.0 2.28	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.44 0.97
23.812 0.9375	17.462 0.6875	-6.6 -0.26	0.8 0.03	32.5 1.28	33.5 1.32	1.5 0.06	63.0 2.48	60.0 2.36	1.00 0.04	0.30 0.01	18.8	10.5	0.0652	0.44 0.96
22.225 0.8750	17.462 0.6875	-5.1 -0.20	0.8 0.03	33.5 1.32	34.5 1.36	1.5 0.06	63.0 2.48	59.0 2.32	1.20 0.05	0.90 0.04	17.5	8.48	0.0681	0.43 0.94
22.225 0.8750	17.462 0.6875	-2.8 -0.11	0.8 0.03	36.5 1.44	37.0 1.46	1.5 0.06	65.0 2.56	58.0 2.28	1.70 0.07	0.90 0.04	19.4	10	0.0771	0.44 0.97
18.923 0.7450	19.050 0.7500	-4.1 -0.16	1.5 0.06	32.5 1.28	34.5 1.36	1.5 0.06	65.0 2.56	61.0 2.40	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.40 0.88
25.400 1.0000	19.842 0.7812	-4.6 -0.18	0.8 0.03	39.5 1.56	39.5 1.56	2.3 0.09	69.0 2.72	60.0 2.36	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.58 1.28
25.400 1.0000	19.842 0.7812	-4.6 -0.18	0.8 0.03	39.5 1.56	39.5 1.56	0.8 0.03	69.0 2.72	61.0 2.40	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.58 1.29
24.257 0.9550	17.462 0.6875	-4.1 -0.16	2.3 0.09	36.5 1.44	41.0 1.61	1.5 0.06	68.0 2.68	61.0 2.40	3.00 0.12	2.30 0.09	13	5.83	0.0686	0.50 1.09
29.997 1.1810	23.812 0.9375	-10.2 -0.40	0.8 0.03	35.0 1.38	35.5 1.40	3.3 0.13	67.0 2.64	61.0 2.40	* *	* *	23.4	8.76	0.0697	0.65 1.43
25.400 1.0000	20.985 0.8262	-4.6 -0.18	0.8 0.03	39.5 1.56	39.5 1.56	2.3 0.09	69.0 2.72	60.0 2.36	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.61 1.35
14.732 0.5800	12.700 0.5000	-3.3 -0.13	3.5 0.14	30.0 1.18	36.5 1.44	2.0 0.08	48.0 1.89	44.5 1.75	0.80 0.03	0.50 0.02	8.9	8.93	0.0526	0.14 0.30
17.462 0.6875	13.495 0.5313	-5.1 -0.20	3.5 0.14	31.0 1.22	37.5 1.48	1.5 0.06	53.0 2.09	51.0 2.01	* *	* *	12.7	10.3	0.0577	0.21 0.46
20.638 0.8125	14.288 0.5625	-5.8 -0.23	0.8 0.03	32.5 1.28	33.0 1.30	2.0 0.08	58.0 2.28	54.0 2.13	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.29 0.64
20.638 0.8125	14.288 0.5625	-5.8 -0.23	0.8 0.03	32.5 1.28	33.0 1.30	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.29 0.64
19.939 0.7850	14.288 0.5625	-5.8 -0.23	0.8 0.03	33.5 1.32	33.5 1.32	2.0 0.08	58.0 2.28	54.0 2.13	1.20 0.05	1.70 0.07	14.6	9.98	0.0606	0.29 0.64
25.433 1.0013	19.050 0.7500	-9.4 -0.37	1.5 0.06	32.0 1.26	34.5 1.36	1.3 0.05	60.0 2.36	58.0 2.28	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.43 0.95
19.355 0.7620	15.080 0.5937	-5.8 -0.23	0.8 0.03	31.5 1.24	32.5 1.28	1.3 0.05	54.0 2.13	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.24 0.54
19.355 0.7620	15.875 0.6250	-5.8 -0.23	0.8 0.03	31.5 1.24	32.5 1.28	1.3 0.05	55.0 2.17	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.27 0.59
14.732 0.5800	10.668 0.4200	-3.3 -0.13	3.5 0.14	31.0 1.22	37.5 1.48	1.3 0.05	47.0 1.85	44.5 1.75	0.80 0.03	0.60 0.02	8.9	8.93	0.0526	0.12 0.26
14.732 0.5800	12.700 0.5000	-3.3 -0.13	3.5 0.14	31.0 1.22	37.5 1.48	2.0 0.08	48.0 1.89	44.5 1.75	0.80 0.03	0.60 0.02	8.9	8.93	0.0526	0.14 0.30
17.462 0.6875	13.495 0.5313	-5.1 -0.20	3.5 0.14	32.0 1.26	38.5 1.52	1.5 0.06	53.0 2.09	51.0 2.01	0.50 0.02	1.80 0.07	12.7	10.3	0.0577	0.20 0.45
19.431 0.7650	14.732 0.5800	-3.0 -0.12	1.5 0.06	33.0 1.30	38.5 1.52	1.5 0.06	54.0 2.13	48.5 1.91	1.20 0.05	1.20 0.05	11.3	7.39	0.0644	0.23 0.51
19.355 0.7620	15.875 0.6250	-5.8 -0.23	3.3 0.13	31.5 1.24	37.5 1.48	1.5 0.06	53.5 2.11	51.0 2.01	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.23 0.50
17.462 0.6875	15.875 0.6250	-5.1 -0.20	3.5 0.14	32.0 1.26	38.5 1.52	1.5 0.06	54.0 2.13	51.0 2.01	0.50 0.02	1.80 0.07	12.7	10.3	0.0577	0.26 0.57
20.638 0.8125	14.288 0.5625	-5.8 -0.23	0.8 0.03	33.0 1.30	33.5 1.32	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.29 0.63
20.638 0.8125	15.875 0.6250	-5.8 -0.23	0.8 0.03	33.0 1.30	33.5 1.32	1.5 0.06	59.0 2.32	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.32 0.70
25.433 1.0013	19.050 0.7500	-9.4 -0.37	1.5 0.06	33.0 1.30	35.0 1.38	1.3 0.05	60.0 2.36	58.0 2.28	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.43 0.94
24.257 0.9550	17.462 0.6875	-4.1 -0.16	2.3 0.09	36.5 1.44	42.0 1.65	1.5 0.06	68.0 2.68	61.0 2.40	3.00 0.12	2.30 0.09	13	5.83	0.0686	0.48 1.07

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

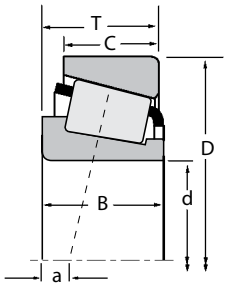
[7] Compound radius on inner race. Details on drawing for bearing.

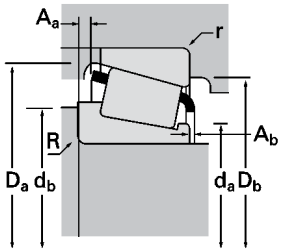
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
27.000 1.0630	59.131 2.3280	15.880 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	JLM67042	LM67010
27.987 1.1019	66.987 2.6373	20.500 0.8071	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02473X	02419
28.000 1.1024	57.150 2.2500	17.460 0.6875	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	J15585	15520
28.575 1.1250	56.896 2.2400	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1985	1930
28.575 1.1250	57.150 2.2500	17.462 0.6875	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	15590	15520
28.575 1.1250	57.150 2.2500	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1985	1922
28.575 1.1250	58.738 2.3125	19.050 0.7500	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1985	1932
28.575 1.1250	59.131 2.3280	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67043	LM67010
28.575 1.1250	60.325 2.3750	19.845 0.7813	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1985	1931
28.575 1.1250	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15112	15245
28.575 1.1250	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15113	15245
28.575 1.1250	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15112	15244
28.575 1.1250	63.100 2.4843	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2689	2630
28.575 1.1250	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15112	15250
28.575 1.1250	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15113	15250
28.575 1.1250	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15112	15250X
28.575 1.1250	64.292 2.5312	21.433 0.8438	55700 12500	0.55	1.10	14500 3250	13500 3040	1.07	71700 16100	M86647	M86610
28.575 1.1250	66.421 2.6150	19.050 0.7500	51700 11600	0.34	1.77	13400 3010	7790 1750	1.72	55200 12400	24112	24261
28.575 1.1250	66.421 2.6150	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2689	2631
28.575 1.1250	68.262 2.6875	22.225 0.8750	62600 14100	0.34	1.77	16200 3650	9420 2120	1.72	73300 16500	2474	2420
28.575 1.1250	68.262 2.6875	22.225 0.8750	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02474	02420
28.575 1.1250	69.723 2.7450	19.050 0.7500	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26112	26274
28.575 1.1250	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2578	2523
28.575 1.1250	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2578	2523-S
28.575 1.1250	72.000 2.8346	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26112	26283
28.575 1.1250	72.626 2.8593	24.608 0.9688	64600 14500	0.60	1.00	16700 3760	17300 3880	0.97	64100 14400	41125	41286
28.575 1.1250	72.626 2.8593	24.608 0.9688	64600 14500	0.60	1.00	16700 3760	17300 3880	0.97	64100 14400	41126	41286
28.575 1.1250	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3192	3120

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
16.764 0.6600	11.811 0.4650	-3.0 -0.12	0.5 0.02	33.0 1.30	33.5 1.32	1.3 0.05	56.0 2.20	52.0 2.05	0.70 0.03	0.80 0.03	12.8	9.93	0.0612	0.21 0.47
20.500 0.8071	16.000 0.6299	-5.1 -0.20	0.8 0.03	35.5 1.40	36.5 1.44	1.5 0.06	62.0 2.44	59.0 2.32	1.20 0.05	2.60 0.10	17.5	8.48	0.0681	0.36 0.80
17.462 0.6875	13.495 0.5313	-5.1 -0.20	3.5 0.14	32.5 1.28	39.0 1.54	1.5 0.06	53.0 2.09	51.0 2.01	* *	* *	12.7	10.3	0.0577	0.20 0.44
19.355 0.7620	15.875 0.6250	-5.8 -0.23	0.8 0.03	33.5 1.32	34.0 1.34	0.8 0.03	53.5 2.11	51.0 2.01	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.22 0.48
17.462 0.6875	13.495 0.5313	-5.1 -0.20	3.5 0.14	33.5 1.32	39.5 1.56	1.5 0.06	53.0 2.09	51.0 2.01	0.50 0.02	1.80 0.07	12.7	10.3	0.0577	0.19 0.43
19.355 0.7620	15.875 0.6250	-5.8 -0.23	0.8 0.03	33.5 1.32	34.0 1.34	1.5 0.06	53.5 2.11	51.0 2.01	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.22 0.49
19.355 0.7620	15.080 0.5937	-5.8 -0.23	0.8 0.03	33.5 1.32	34.0 1.34	1.3 0.05	54.0 2.13	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.23 0.51
16.764 0.6600	11.811 0.4650	-3.0 -0.12	0.0 0.00	35.0 1.38	41.5 1.63	1.3 0.05	56.0 2.20	52.0 2.05	0.70 0.03	0.80 0.03	12.8	9.93	0.0612	0.20 0.44
19.355 0.7620	15.875 0.6250	-5.8 -0.23	0.8 0.03	33.5 1.32	34.0 1.34	1.3 0.05	55.0 2.17	52.0 2.05	0.80 0.03	1.10 0.04	12.5	6.33	0.0565	0.26 0.57
20.638 0.8125	14.288 0.5625	-5.8 -0.23	3.5 0.14	34.0 1.34	40.0 1.57	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.27 0.60
20.638 0.8125	14.288 0.5625	-5.8 -0.23	0.8 0.03	34.0 1.34	34.5 1.36	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.28 0.61
20.638 0.8125	15.875 0.6250	-5.8 -0.23	3.5 0.14	34.0 1.34	40.0 1.57	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.28 0.62
25.433 1.0013	19.050 0.7500	-9.4 -0.37	1.3 0.05	34.0 1.34	36.0 1.42	0.8 0.03	59.0 2.32	57.0 2.24	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.36 0.80
20.638 0.8125	15.875 0.6250	-5.8 -0.23	3.5 0.14	34.0 1.34	40.0 1.57	1.3 0.05	59.0 2.32	56.0 2.20	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.30 0.66
20.638 0.8125	15.875 0.6250	-5.8 -0.23	0.8 0.03	34.0 1.34	34.5 1.36	1.3 0.05	59.0 2.32	56.0 2.20	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.31 0.67
20.638 0.8125	15.875 0.6250	-5.8 -0.23	3.5 0.14	34.0 1.34	40.0 1.57	1.5 0.06	59.0 2.32	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.30 0.66
21.433 0.8438	16.670 0.6563	-3.3 -0.13	1.5 0.06	38.0 1.50	40.0 1.57	1.5 0.06	61.0 2.40	54.0 2.13	1.40 0.05	1.20 0.05	16.8	9.36	0.0736	0.35 0.77
18.974 0.7470	15.875 0.6250	-4.8 -0.19	1.5 0.06	34.0 1.34	36.0 1.42	1.5 0.06	61.0 2.40	58.0 2.28	0.40 0.02	1.50 0.06	14	8.28	0.0589	0.31 0.69
25.433 1.0013	19.050 0.7500	-9.4 -0.37	1.3 0.05	34.0 1.34	36.0 1.42	1.3 0.05	60.0 2.36	58.0 2.28	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.41 0.91
23.812 0.9375	17.462 0.6875	-6.6 -0.26	0.8 0.03	35.0 1.38	36.0 1.42	1.5 0.06	63.0 2.48	60.0 2.36	1.00 0.04	0.30 0.01	18.8	10.5	0.0652	0.41 0.90
22.225 0.8750	17.462 0.6875	-5.1 -0.20	0.8 0.03	36.0 1.42	36.5 1.44	1.5 0.06	63.0 2.48	59.0 2.32	1.20 0.05	0.90 0.04	17.5	8.48	0.0681	0.40 0.89
18.923 0.7450	19.050 0.7500	-4.1 -0.16	1.5 0.06	35.0 1.38	37.0 1.46	1.5 0.06	65.0 2.56	61.0 2.40	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.38 0.83
25.357 0.9983	19.050 0.7500	-8.6 -0.34	2.3 0.09	35.0 1.38	39.0 1.54	1.3 0.05	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.48 1.06
25.357 0.9983	19.050 0.7500	-8.6 -0.34	2.3 0.09	35.0 1.38	39.0 1.54	1.5 0.06	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.48 1.06
18.923 0.7450	15.875 0.6250	-4.1 -0.16	1.5 0.06	35.0 1.38	37.0 1.46	1.5 0.06	65.0 2.56	62.0 2.44	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.39 0.87
24.257 0.9550	17.462 0.6875	-4.1 -0.16	4.8 0.19	36.5 1.44	48.0 1.89	1.5 0.06	68.0 2.68	61.0 2.40	3.00 0.12	2.30 0.09	13	5.83	0.0686	0.46 1.02
24.257 0.9550	17.462 0.6875	-4.1 -0.16	1.5 0.06	36.5 1.44	41.5 1.63	1.5 0.06	68.0 2.68	61.0 2.40	3.00 0.12	2.30 0.09	13	5.83	0.0686	0.47 1.04
29.997 1.1810	23.812 0.9375	-10.2 -0.40	3.5 0.14	37.0 1.46	43.5 1.71	3.3 0.13	67.0 2.64	61.0 2.40	1.50 0.06	0.50 0.02	23.4	8.76	0.0697	0.61 1.35

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

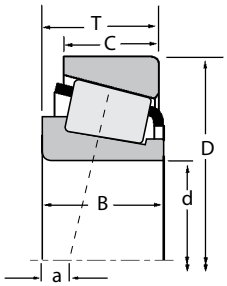
[7] Compound radius on inner race. Details on drawing for bearing.

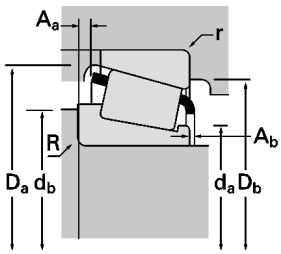
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
28.575 1.1250	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3198	3120
28.575 1.1250	73.025 2.8750	22.225 0.8750	60800 13700	0.45	1.32	15800 3550	12300 2750	1.29	74900 16800	02872	02820
28.575 1.1250	73.025 2.8750	22.225 0.8750	60800 13700	0.45	1.32	15800 3550	12300 2750	1.29	74900 16800	02872	02830
28.575 1.1250	76.200 3.0000	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26112	26300
28.575 1.1250	76.200 3.0000	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3198	3129
28.575 1.1250	79.375 3.1250	25.400 1.0000	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43112	43312
29.000 1.1417	50.292 1.9800	14.224 0.5600	27700 6230	0.37	1.62	7190 1620	4550 1020	1.58	36200 8130	L45449	L45410
29.367 1.1562	66.421 2.6150	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2690	2631
29.367 1.1562	66.421 2.6150	23.812 0.9375	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2691	2631
29.987 1.1806	61.981 2.4402	16.002 0.6300	40000 9000	0.38	1.57	10400 2330	6800 1530	1.53	44100 9910	17118	17244A
29.987 1.1806	62.000 2.4409	16.002 0.6300	40000 9000	0.38	1.57	10400 2330	6800 1530	1.53	44100 9910	17118	17244
29.987 1.1806	62.000 2.4409	18.161 0.7150	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15115	15245
29.987 1.1806	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15117	15245
29.987 1.1806	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15117	15244
29.987 1.1806	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15117	15244X
29.987 1.1806	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15117	15250
29.987 1.1806	68.262 2.6875	21.000 0.8268	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02474A	02420A
29.987 1.1806	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14118AS	14276
29.987 1.1806	72.000 2.8346	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26118	26283
29.987 1.1806	76.200 3.0000	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26118	26300
29.987 1.1806	76.200 3.0000	24.608 0.9688	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43117	43300
30.000 1.1811	62.000 2.4409	16.002 0.6300	40000 9000	0.38	1.57	10400 2330	6800 1530	1.53	44100 9910	17118-S	17244
30.000 1.1811	68.956 2.7148	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14117A	14274A
30.000 1.1811	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14118	14274
30.000 1.1811	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14118	14276
30.000 1.1811	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14117A	14276
30.000 1.1811	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14118A	14274
30.000 1.1811	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2586	2523

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
29.997 1.1810	23.812 0.9375	-10.2 -0.40	1.3 0.05	37.0 1.46	39.0 1.54	3.3 0.13	67.0 2.64	61.0 2.40	1.50 0.06	0.50 0.02	23.4	8.76	0.0697	0.62 1.36
22.225 0.8750	17.462 0.6875	-3.8 -0.15	0.8 0.03	37.0 1.46	37.5 1.48	3.3 0.13	68.0 2.68	62.0 2.44	1.40 0.06	0.90 0.04	20.6	10.1	0.0740	0.48 1.05
22.225 0.8750	17.462 0.6875	-3.8 -0.15	0.8 0.03	37.0 1.46	37.5 1.48	0.8 0.03	68.0 2.68	64.0 2.52	1.40 0.06	0.90 0.04	20.6	10.1	0.0740	0.48 1.07
18.923 0.7450	15.875 0.6250	-4.1 -0.16	1.5 0.06	35.0 1.38	37.0 1.46	1.5 0.06	66.0 2.60	64.0 2.52	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.45 1.00
29.997 1.1810	23.812 0.9375	-10.2 -0.40	1.3 0.05	37.0 1.46	39.0 1.54	0.8 0.03	69.0 2.72	65.0 2.56	1.50 0.06	0.50 0.02	23.4	8.76	0.0697	0.71 1.55
24.074 0.9478	17.462 0.6875	-2.0 -0.08	0.8 0.03	41.5 1.63	42.5 1.67	1.5 0.06	74.0 2.91	67.0 2.64	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.61 1.35
14.732 0.5800	10.668 0.4200	-3.3 -0.13	3.5 0.14	33.5 1.32	40.0 1.57	1.3 0.05	48.0 1.89	44.5 1.75	0.50 0.02	0.80 0.03	10.8	12.4	0.0559	0.11 0.25
25.433 1.0013	19.050 0.7500	-9.4 -0.37	3.5 0.14	35.0 1.38	41.0 1.61	1.3 0.05	60.0 2.36	58.0 2.28	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.40 0.88
25.433 1.0013	19.050 0.7500	-9.4 -0.37	0.8 0.03	36.5 1.44	37.5 1.48	1.3 0.05	60.0 2.36	58.0 2.28	0.80 0.03	0.80 0.03	19.3	8	0.0598	0.41 0.89
16.566 0.6522	14.288 0.5625	-3.6 -0.14	1.5 0.06	34.5 1.36	37.0 1.46	1.5 0.06	57.0 2.24	54.0 2.13	0.30 0.01	1.80 0.07	11.8	7.49	0.0579	0.23 0.50
16.566 0.6522	14.288 0.5625	-3.6 -0.14	1.5 0.06	34.5 1.36	37.0 1.46	1.5 0.06	57.0 2.24	54.0 2.13	0.30 0.01	1.80 0.07	11.8	7.49	0.0579	0.23 0.50
19.050 0.7500	14.288 0.5625	-4.8 -0.19	1.3 0.05	36.0 1.42	37.5 1.48	1.3 0.05	58.0 2.28	55.0 2.17	0.30 0.01	1.70 0.07	14.6	7.58	0.0606	0.26 0.56
20.638 0.8125	14.288 0.5625	-5.8 -0.23	1.3 0.05	35.0 1.38	36.5 1.44	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.10 0.04	14.6	7.58	0.0606	0.26 0.58
20.638 0.8125	15.875 0.6250	-5.8 -0.23	1.3 0.05	35.0 1.38	36.5 1.44	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.10 0.04	14.6	7.58	0.0606	0.28 0.61
20.638 0.8125	15.875 0.6250	-5.8 -0.23	1.3 0.05	35.0 1.38	36.5 1.44	1.5 0.06	58.0 2.28	55.0 2.17	1.20 0.05	1.10 0.04	14.6	7.58	0.0606	0.28 0.61
20.638 0.8125	15.875 0.6250	-5.8 -0.23	1.3 0.05	35.0 1.38	36.5 1.44	1.3 0.05	59.0 2.32	56.0 2.20	1.20 0.05	1.10 0.04	14.6	7.58	0.0606	0.29 0.65
22.225 0.8750	16.238 0.6393	-5.1 -0.20	0.8 0.03	38.5 1.52	39.5 1.56	1.5 0.06	63.0 2.48	59.0 2.32	1.20 0.05	0.90 0.04	17.5	8.48	0.0681	0.38 0.84
19.202 0.7560	15.875 0.6250	-4.3 -0.17	0.8 0.03	37.0 1.46	37.5 1.48	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.80 0.07	18	9.4	0.0668	0.36 0.80
18.923 0.7450	15.875 0.6250	-4.1 -0.16	1.5 0.06	36.0 1.42	38.0 1.50	1.5 0.06	65.0 2.56	62.0 2.44	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.38 0.85
18.923 0.7450	15.875 0.6250	-4.1 -0.16	1.5 0.06	36.0 1.42	38.0 1.50	1.5 0.06	66.0 2.60	64.0 2.52	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.44 0.98
24.074 0.9478	16.670 0.6563	-2.0 -0.08	1.5 0.06	42.0 1.66	44.5 1.75	3.3 0.13	73.0 2.87	64.0 2.52	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.53 1.16
16.566 0.6522	14.288 0.5625	-3.6 -0.14	1.5 0.06	34.5 1.36	37.0 1.46	1.5 0.06	57.0 2.24	54.0 2.13	0.30 0.01	1.80 0.07	11.8	7.49	0.0579	0.23 0.50
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	40.0 1.57	43.0 1.69	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.35 0.78
19.202 0.7560	15.875 0.6250	-4.3 -0.17	0.8 0.03	36.5 1.44	37.0 1.46	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.80 0.07	18	9.4	0.0668	0.35 0.78
19.202 0.7560	15.875 0.6250	-4.3 -0.17	0.8 0.03	36.5 1.44	37.0 1.46	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.80 0.07	18	9.4	0.0668	0.36 0.79
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	40.0 1.57	43.0 1.69	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.36 0.80
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	37.0 1.46	43.0 1.69	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.36 0.78
25.357 0.9983	19.050 0.7500	-8.6 -0.34	3.5 0.14	36.0 1.42	42.5 1.67	1.3 0.05	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.46 1.02

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

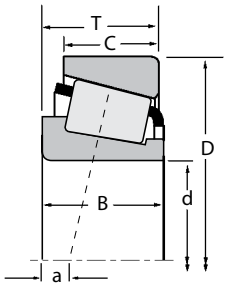
[7] Compound radius on inner race. Details on drawing for bearing.

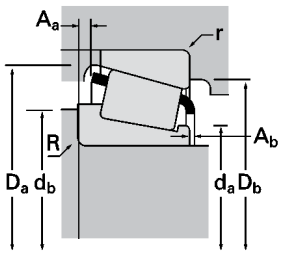
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
30.000 1.1811	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2560X	2523
30.000 1.1811	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2560X	2523-S
30.000 1.1811	72.000 2.8346	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26118-S	26283-S
30.000 1.1811	72.000 2.8346	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2560X	2526X
30.000 1.1811	72.000 2.8346	29.370 1.1563	80600 18100	0.55	1.10	20900 4700	19500 4390	1.07	111000 24900	JHM88540	JHM88513
30.000 1.1811	72.022 2.8355	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2586	2525
30.000 1.1811	72.034 2.8360	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3190	3126
30.000 1.1811	72.085 2.8380	22.385 0.8813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14118	14283
30.000 1.1811	72.085 2.8380	22.385 0.8813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14117A	14283
30.112 1.1855	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15116	15245
30.112 1.1855	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15116	15250
30.162 1.1875	58.738 2.3125	14.684 0.5781	29300 6600	0.47	1.27	7610 1710	6170 1390	1.23	35000 7880	08118	08231
30.162 1.1875	58.788 2.3145	14.684 0.5781	29300 6600	0.47	1.27	7610 1710	6170 1390	1.23	35000 7880	08118	08237
30.162 1.1875	62.000 2.4409	16.002 0.6300	40000 9000	0.38	1.57	10400 2330	6800 1530	1.53	44100 9910	17119	17244
30.162 1.1875	64.292 2.5312	21.433 0.8438	55700 12500	0.55	1.10	14500 3250	13500 3040	1.07	71700 16100	M86649	M86610
30.162 1.1875	64.292 2.5312	21.433 0.8438	55700 12500	0.55	1.10	14500 3250	13500 3040	1.07	71700 16100	M86649P	M86610P
30.162 1.1875	66.421 2.6150	19.050 0.7500	51700 11600	0.34	1.77	13400 3010	7790 1750	1.72	55200 12400	24118	24261
30.162 1.1875	66.421 2.6150	25.400 1.0000	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2558	2530
30.162 1.1875	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2558	2523
30.162 1.1875	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2558	2523-S
30.162 1.1875	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3187	3120
30.162 1.1875	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3191	3120
30.162 1.1875	76.200 3.0000	20.638 0.8125	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28118	28300
30.162 1.1875	76.200 3.0000	24.608 0.9688	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43118	43300
30.162 1.1875	79.375 3.1250	25.400 1.0000	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43118	43312
30.162 1.1875	80.000 3.1496	21.006 0.8270	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28118	28315
30.175 1.1880	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15120A	15245
30.213 1.1895	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15118	15244

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.357 0.9983	19.050 0.7500	-8.6 -0.34	2.0 0.08	36.0 1.42	39.5 1.56	1.3 0.05	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.47 1.03
25.357 0.9983	19.050 0.7500	-8.6 -0.34	2.0 0.08	36.0 1.42	39.5 1.56	1.5 0.06	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.47 1.03
18.923 0.7450	15.875 0.6250	-4.1 -0.16	1.5 0.06	36.0 1.42	38.0 1.50	2.0 0.08	65.0 2.56	62.0 2.44	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.38 0.84
25.357 0.9983	19.050 0.7500	-8.6 -0.34	2.0 0.08	36.0 1.42	39.5 1.56	2.0 0.08	65.0 2.56	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.50 1.11
27.783 1.0938	23.020 0.9063	-5.6 -0.22	1.3 0.05	42.5 1.67	44.5 1.75	3.3 0.13	69.0 2.72	58.0 2.28	1.90 0.08	1.80 0.07	26.3	11.7	0.0857	0.61 1.34
25.357 0.9983	19.050 0.7500	-8.6 -0.34	3.5 0.14	36.0 1.42	42.5 1.67	0.8 0.03	65.0 2.56	63.0 2.48	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.50 1.10
29.997 1.1810	23.812 0.9375	-10.2 -0.40	3.5 0.14	38.0 1.50	44.5 1.75	2.8 0.11	67.0 2.64	61.0 2.40	* *	* *	23.4	8.76	0.0697	0.59 1.30
19.202 0.7560	18.415 0.7250	-4.3 -0.17	0.8 0.03	36.5 1.44	37.0 1.46	2.3 0.09	65.0 2.56	60.0 2.36	1.00 0.04	1.80 0.07	18	9.4	0.0668	0.44 0.96
19.583 0.7710	18.415 0.7250	-4.3 -0.17	3.5 0.14	40.0 1.57	43.0 1.69	2.3 0.09	65.0 2.56	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.44 0.96
20.638 0.8125	14.288 0.5625	-5.8 -0.23	0.8 0.03	35.5 1.40	36.0 1.42	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.26 0.58
20.638 0.8125	15.875 0.6250	-5.8 -0.23	0.8 0.03	35.5 1.40	36.0 1.42	1.3 0.05	59.0 2.32	56.0 2.20	1.20 0.05	1.00 0.04	14.6	7.58	0.0606	0.29 0.65
15.080 0.5937	10.716 0.4219	-1.3 -0.05	3.5 0.14	35.0 1.38	41.5 1.63	1.0 0.04	55.0 2.17	52.0 2.05	0.90 0.03	1.10 0.04	10.7	10.6	0.0601	0.17 0.38
15.080 0.5937	10.716 0.4219	-1.3 -0.05	3.5 0.14	35.0 1.38	41.5 1.63	1.0 0.04	55.0 2.17	52.0 2.05	0.90 0.03	1.10 0.04	10.7	10.6	0.0601	0.17 0.38
16.566 0.6522	14.288 0.5625	-3.6 -0.14	1.5 0.06	34.5 1.36	37.0 1.46	1.5 0.06	57.0 2.24	54.0 2.13	0.30 0.01	1.80 0.07	11.8	7.49	0.0579	0.23 0.50
21.433 0.8438	16.670 0.6563	-3.3 -0.13	1.5 0.06	38.0 1.50	41.0 1.61	1.5 0.06	61.0 2.40	54.0 2.13	1.40 0.05	1.20 0.05	16.8	9.36	0.0736	0.34 0.74
21.433 0.8438	16.670 0.6563	-3.3 -0.13	1.5 0.06	38.0 1.50	41.0 1.61	1.5 0.06	61.0 2.40	54.0 2.13	1.40 0.06	1.20 0.05	16.8	9.36	0.0736	0.34 0.74
18.974 0.7470	15.875 0.6250	-4.8 -0.19	1.5 0.06	35.0 1.38	37.5 1.48	1.5 0.06	61.0 2.40	58.0 2.28	0.40 0.02	1.50 0.06	14	8.28	0.0589	0.30 0.67
25.357 0.9983	20.638 0.8125	-8.6 -0.34	2.3 0.09	36.5 1.44	40.0 1.57	0.8 0.03	62.5 2.46	60.0 2.36	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.43 0.94
25.357 0.9983	19.050 0.7500	-8.6 -0.34	2.3 0.09	36.5 1.44	40.0 1.57	1.3 0.05	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.46 1.02
25.357 0.9983	19.050 0.7500	-8.6 -0.34	2.3 0.09	36.5 1.44	40.0 1.57	1.5 0.06	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.46 1.02
29.997 1.1810	23.812 0.9375	-10.2 -0.40	0.8 0.03	38.5 1.52	39.0 1.54	3.3 0.13	67.0 2.64	61.0 2.40	* *	* *	23.4	8.76	0.0697	0.60 1.33
29.997 1.1810	23.812 0.9375	-10.2 -0.40	3.5 0.14	38.5 1.52	44.5 1.75	3.3 0.13	67.0 2.64	61.0 2.40	* *	* *	23.4	8.76	0.0697	0.60 1.32
20.940 0.8244	15.507 0.6105	-4.8 -0.19	1.5 0.06	37.5 1.48	40.0 1.57	1.3 0.05	71.0 2.80	68.0 2.68	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.47 1.04
24.074 0.9478	16.670 0.6563	-2.0 -0.08	1.5 0.06	42.0 1.65	45.0 1.77	3.3 0.13	73.0 2.87	64.0 2.52	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.52 1.16
24.074 0.9478	17.462 0.6875	-2.0 -0.08	1.5 0.06	42.0 1.65	45.0 1.77	1.5 0.06	74.0 2.91	67.0 2.64	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.60 1.31
20.940 0.8244	15.875 0.6250	-4.8 -0.19	1.5 0.06	37.5 1.48	40.0 1.57	1.5 0.06	73.0 2.87	69.0 2.72	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.53 1.17
20.638 0.8125	14.288 0.5625	-5.8 -0.23	0.5 0.02	35.5 1.40	35.5 1.40	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.10 0.04	14.6	7.58	0.0606	0.26 0.58
20.638 0.8125	15.875 0.6250	-5.8 -0.23	3.5 0.14	35.5 1.40	41.5 1.63	1.3 0.05	58.0 2.28	55.0 2.17	1.20 0.05	1.10 0.04	14.6	7.58	0.0606	0.27 0.60

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

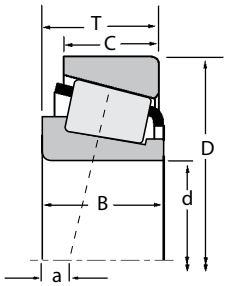
[7] Compound radius on inner race. Details on drawing for bearing.

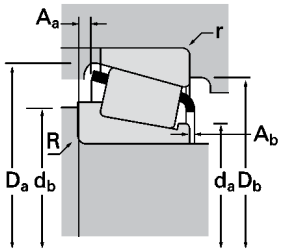
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
30.213 1.1895	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15120	15244
30.213 1.1895	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15118	15250
30.213 1.1895	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15119	15249
30.213 1.1895	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15119	15250
30.213 1.1895	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15120	15250
30.213 1.1895	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15118	15250X
30.213 1.1895	66.421 2.6150	25.400 1.0000	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2561X	2520
30.213 1.1895	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2561X	2523
30.213 1.1895	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2561X	2523-S
30.226 1.1900	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14116	14276
30.955 1.2187	64.292 2.5312	21.433 0.8438	55700 12500	0.55	1.10	14500 3250	13500 3040	1.07	71700 16100	M86648A	M86610
31.623 1.2450	66.675 2.6250	20.638 0.8125	48600 10900	0.37	1.62	12600 2830	8010 1800	1.57	57900 13000	1674	1620
31.750 1.2500	58.738 2.3125	14.684 0.5781	29300 6600	0.47	1.27	7610 1710	6170 1390	1.23	35000 7880	08125	08231
31.750 1.2500	59.131 2.3280	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67045	LM67010
31.750 1.2500	59.131 2.3280	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67047	LM67010
31.750 1.2500	59.131 2.3280	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67048	LM67010
31.750 1.2500	59.131 2.3280	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67049A	LM67010
31.750 1.2500	61.986 2.4404	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67045	LM67014
31.750 1.2500	61.986 2.4404	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67048	LM67014
31.750 1.2500	61.986 2.4404	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67049A	LM67014
31.750 1.2500	62.000 2.4409	18.161 0.7150	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15123	15245
31.750 1.2500	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15125	15245
31.750 1.2500	62.000 2.4409	19.050 0.7500	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15126	15245
31.750 1.2500	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15125	15244
31.750 1.2500	62.000 2.4409	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15126	15244
31.750 1.2500	63.500 2.5000	19.748 0.7775	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15123	15250
31.750 1.2500	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15125	15250
31.750 1.2500	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15126	15250

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**0.8** 0.03	**35.5** 1.40	**36.0** 1.42	**1.3** 0.05	**58.0** 2.28	**55.0** 2.17	**1.20** 0.05	**1.00** 0.04	**14.6**	**7.58**	**0.0606**	**0.28** 0.61
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**3.5** 0.14	**35.5** 1.40	**41.5** 1.63	**1.3** 0.05	**59.0** 2.32	**56.0** 2.20	**1.20** 0.05	**1.10** 0.04	**14.6**	**7.58**	**0.0606**	**0.29** 0.64
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**1.5** 0.06	**35.5** 1.40	**37.5** 1.48	**1.5** 0.06	**59.0** 2.32	**55.0** 2.17	* *	* *	**14.6**	**7.58**	**0.0606**	**0.29** 0.64
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**1.5** 0.06	**35.5** 1.40	**37.5** 1.48	**1.3** 0.05	**59.0** 2.32	**56.0** 2.20	* *	* *	**14.6**	**7.58**	**0.0606**	**0.29** 0.64
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**0.8** 0.03	**35.5** 1.40	**36.0** 1.42	**1.3** 0.05	**59.0** 2.32	**56.0** 2.20	**1.20** 0.05	**1.00** 0.04	**14.6**	**7.58**	**0.0606**	**0.29** 0.65
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**3.5** 0.14	**35.5** 1.40	**41.5** 1.63	**1.5** 0.06	**59.0** 2.32	**55.0** 2.17	**1.20** 0.05	**1.10** 0.04	**14.6**	**7.58**	**0.0606**	**0.29** 0.63
24.714 0.9730	**20.638** 0.8125	**-8.6** -0.34	**2.3** 0.09	**36.5** 1.44	**40.0** 1.57	**3.3** 0.13	**62.5** 2.46	**57.0** 2.24	**0.90** 0.04	**1.40** 0.06	**23.6**	**9.63**	**0.0656**	**0.41** 0.91
24.714 0.9730	**19.050** 0.7500	**-8.6** -0.34	**2.3** 0.09	**36.5** 1.44	**40.0** 1.57	**1.3** 0.05	**64.0** 2.52	**61.0** 2.40	**0.90** 0.04	**1.40** 0.06	**23.6**	**9.63**	**0.0656**	**0.46** 1.02
24.714 0.9730	**19.050** 0.7500	**-8.6** -0.34	**2.3** 0.09	**36.5** 1.44	**40.0** 1.57	**1.5** 0.06	**64.0** 2.52	**61.0** 2.40	**0.90** 0.04	**1.40** 0.06	**23.6**	**9.63**	**0.0656**	**0.46** 1.02
19.583 0.7710	**15.875** 0.6250	**-4.3** -0.17	**0.8** 0.03	**37.0** 1.46	**38.0** 1.50	**1.3** 0.05	**63.0** 2.48	**60.0** 2.36	**1.00** 0.04	**1.40** 0.06	**18**	**9.4**	**0.0668**	**0.36** 0.80
21.433 0.8438	**16.670** 0.6563	**-3.3** -0.13	**1.5** 0.06	**38.0** 1.50	**42.0** 1.65	**1.5** 0.06	**61.0** 2.40	**54.0** 2.13	**1.40** 0.05	**1.20** 0.05	**16.8**	**9.36**	**0.0736**	**0.33** 0.73
20.638 0.8125	**15.875** 0.6250	**-5.3** -0.21	**1.5** 0.06	**37.0** 1.46	**39.5** 1.56	**1.5** 0.06	**61.0** 2.40	**58.0** 2.28	**1.50** 0.06	**1.00** 0.04	**16.6**	**8.67**	**0.0644**	**0.33** 0.72
15.080 0.5937	**10.716** 0.4219	**-1.3** -0.05	**1.0** 0.04	**36.0** 1.42	**37.5** 1.48	**1.0** 0.04	**55.0** 2.17	**52.0** 2.05	**0.90** 0.03	**1.10** 0.04	**10.7**	**10.6**	**0.0601**	**0.17** 0.37
18.500 0.7283	**11.811** 0.4650	**-3.0** -0.12	**2.0** 0.08	**36.0** 1.42	**39.5** 1.56	**1.3** 0.05	**56.0** 2.20	**52.0** 2.05	**0.80** 0.03	**-1.10** -0.04	**12.8**	**9.93**	**0.0612**	**0.19** 0.42
16.764 0.6600	**11.811** 0.4650	**-3.0** -0.12	**2.3** 0.09	**36.0** 1.42	**40.0** 1.57	**1.3** 0.05	**56.0** 2.20	**52.0** 2.05	**0.70** 0.03	**0.80** 0.03	**12.8**	**9.93**	**0.0612**	**0.18** 0.41
16.764 0.6600	**11.811** 0.4650	**-3.0** -0.12	**3.5** 0.14	**36.0** 1.42	**42.5** 1.67	**1.3** 0.05	**56.0** 2.20	**52.0** 2.05	**0.70** 0.03	**0.80** 0.03	**12.8**	**9.93**	**0.0612**	**0.18** 0.39
16.764 0.6600	**11.811** 0.4650	**-3.0** -0.12	**0.8** 0.03	**36.0** 1.42	**37.0** 1.46	**1.3** 0.05	**56.0** 2.20	**52.0** 2.05	**0.70** 0.03	**0.80** 0.03	**12.8**	**9.93**	**0.0612**	**0.19** 0.41
18.500 0.7283	**11.811** 0.4650	**-3.0** -0.12	**2.0** 0.08	**36.0** 1.42	**39.5** 1.56	**1.3** 0.05	**57.0** 2.24	**54.0** 2.13	**0.80** 0.03	**-1.10** -0.04	**12.8**	**9.93**	**0.0612**	**0.21** 0.47
16.764 0.6600	**11.811** 0.4650	**-3.0** -0.12	**3.5** 0.14	**36.0** 1.42	**42.5** 1.67	**1.3** 0.05	**57.0** 2.24	**54.0** 2.13	**0.70** 0.03	**0.80** 0.03	**12.8**	**9.93**	**0.0612**	**0.20** 0.44
16.764 0.6600	**11.811** 0.4650	**-3.0** -0.12	**0.8** 0.03	**36.0** 1.42	**37.0** 1.46	**1.3** 0.05	**57.0** 2.24	**54.0** 2.13	**0.70** 0.03	**0.80** 0.03	**12.8**	**9.93**	**0.0612**	**0.21** 0.46
19.050 0.7500	**14.288** 0.5625	**-4.8** -0.19	**0.0** 0.00	**36.5** 1.44	**42.5** 1.67	**1.3** 0.05	**58.0** 2.28	**55.0** 2.17	**0.30** 0.01	**1.70** 0.07	**14.6**	**7.58**	**0.0606**	**0.23** 0.51
20.638 0.8125	**14.288** 0.5625	**-5.8** -0.23	**3.5** 0.14	**36.5** 1.44	**42.5** 1.67	**1.3** 0.05	**58.0** 2.28	**55.0** 2.17	**1.20** 0.05	**1.00** 0.04	**14.6**	**7.58**	**0.0606**	**0.25** 0.54
20.638 0.8125	**14.288** 0.5625	**-5.8** -0.23	**0.8** 0.03	**36.5** 1.44	**37.0** 1.46	**1.3** 0.05	**58.0** 2.28	**55.0** 2.17	**1.20** 0.05	**1.10** 0.04	**14.6**	**7.58**	**0.0606**	**0.25** 0.55
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**3.5** 0.14	**36.5** 1.44	**42.5** 1.67	**1.3** 0.05	**58.0** 2.28	**55.0** 2.17	**1.20** 0.05	**1.00** 0.04	**14.6**	**7.58**	**0.0606**	**0.26** 0.57
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**0.8** 0.03	**36.5** 1.44	**37.0** 1.46	**1.3** 0.05	**58.0** 2.28	**55.0** 2.17	**1.20** 0.05	**1.10** 0.04	**14.6**	**7.58**	**0.0606**	**0.26** 0.58
19.050 0.7500	**15.875** 0.6250	**-4.8** -0.19	**0.0** 0.00	**36.5** 1.44	**42.5** 1.67	**1.3** 0.05	**59.0** 2.32	**56.0** 2.20	**0.30** 0.01	**1.70** 0.07	**14.6**	**7.58**	**0.0606**	**0.26** 0.58
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**3.5** 0.14	**36.5** 1.44	**42.5** 1.67	**1.3** 0.05	**59.0** 2.32	**56.0** 2.20	**1.20** 0.05	**1.00** 0.04	**14.6**	**7.58**	**0.0606**	**0.28** 0.61
20.638 0.8125	**15.875** 0.6250	**-5.8** -0.23	**0.8** 0.03	**36.5** 1.44	**37.0** 1.46	**1.3** 0.05	**59.0** 2.32	**56.0** 2.20	**1.20** 0.05	**1.10** 0.04	**14.6**	**7.58**	**0.0606**	**0.28** 0.62

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

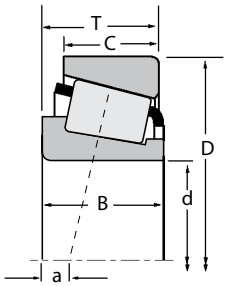
(7) Compound radius on inner race. Details on drawing for bearing.

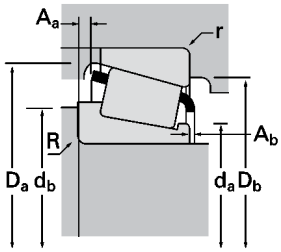
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
31.750 1.2500	63.500 2.5000	20.638 0.8125	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15126	15250X
31.750 1.2500	66.421 2.6150	25.400 1.0000	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2580	2520
31.750 1.2500	66.421 2.6150	25.400 1.0000	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2580	2530
31.750 1.2500	66.421 2.6150	25.400 1.0000	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2580	2520A
31.750 1.2500	66.421 2.6150	25.400 1.0000	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2580A	2520A
31.750 1.2500	68.262 2.6875	21.000 0.8268	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02476	02420A
31.750 1.2500	68.262 2.6875	22.225 0.8750	62600 14100	0.34	1.77	16200 3650	9420 2120	1.72	73300 16500	2475	2420
31.750 1.2500	68.262 2.6875	22.225 0.8750	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02475	02420
31.750 1.2500	68.262 2.6875	22.225 0.8750	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02476	02420
31.750 1.2500	68.262 2.6875	22.225 0.8750	61700 13900	0.28	2.18	16000 3600	7540 1700	2.12	77900 17500	16579	16522
31.750 1.2500	68.262 2.6875	22.225 0.8750	59600 13400	0.55	1.10	15500 3470	14400 3250	1.07	77400 17400	M88046	M88010
31.750 1.2500	68.262 2.6875	26.988 1.0625	74700 16800	0.35	1.71	19400 4360	11700 2620	1.66	91000 20500	23491	23420
31.750 1.2500	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14124	14274
31.750 1.2500	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14124	14276
31.750 1.2500	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14125A	14274
31.750 1.2500	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14125A	14276
31.750 1.2500	69.012 2.7170	22.385 0.8813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14124	14277
31.750 1.2500	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2580	2523
31.750 1.2500	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2582	2523
31.750 1.2500	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2580	2523-S
31.750 1.2500	71.996 2.8345	19.002 0.7481	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14124	14282
31.750 1.2500	72.022 2.8355	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2582	2525
31.750 1.2500	72.233 2.8438	25.400 1.0000	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88644	HM88610
31.750 1.2500	72.626 2.8593	25.400 1.0000	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88644	HM88611AS
31.750 1.2500	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3188	3120
31.750 1.2500	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3193	3120
31.750 1.2500	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3199	3120
31.750 1.2500	73.025 2.8750	22.225 0.8750	67700 15200	0.37	1.63	17600 3950	11100 2490	1.59	83800 18800	2875	2820

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
20.638 0.8125	15.875 0.6250	-5.8 -0.23	0.8 0.03	36.5 1.44	37.0 1.46	1.5 0.06	59.0 2.32	55.0 2.17	1.20 0.05	1.10 0.04	14.6	7.58	0.0606	0.28 0.62
25.357 0.9983	20.638 0.8125	-8.6 -0.34	0.8 0.03	37.5 1.48	38.5 1.52	3.3 0.13	62.5 2.46	57.0 2.24	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.40 0.89
25.357 0.9983	20.638 0.8125	-8.6 -0.34	0.8 0.03	37.5 1.48	38.5 1.52	0.8 0.03	62.5 2.46	60.0 2.36	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.41 0.91
25.357 0.9983	20.638 0.8125	-8.6 -0.34	0.8 0.03	37.5 1.48	38.5 1.52	1.5 0.06	62.0 2.44	59.0 2.32	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.41 0.91
25.357 0.9983	20.638 0.8125	-8.6 -0.34	1.3 0.05	39.5 1.56	41.5 1.63	1.5 0.06	62.0 2.44	59.0 2.32	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.41 0.91
22.225 0.8750	16.238 0.6393	-5.1 -0.20	0.8 0.03	38.5 1.52	39.0 1.54	1.5 0.06	63.0 2.48	59.0 2.32	1.20 0.05	0.90 0.04	17.5	8.48	0.0681	0.37 0.81
23.812 0.9375	17.462 0.6875	-6.6 -0.26	3.5 0.14	37.5 1.48	44.0 1.73	1.5 0.06	63.0 2.48	60.0 2.36	1.00 0.04	0.30 0.01	18.8	10.5	0.0652	0.38 0.83
22.225 0.8750	17.462 0.6875	-5.1 -0.20	3.5 0.14	38.5 1.52	44.5 1.75	1.5 0.06	63.0 2.48	59.0 2.32	1.20 0.05	0.90 0.04	17.5	8.48	0.0681	0.37 0.82
22.225 0.8750	17.462 0.6875	-5.1 -0.20	0.8 0.03	38.5 1.52	39.0 1.54	1.5 0.06	63.0 2.48	59.0 2.32	1.20 0.05	0.90 0.04	17.5	8.48	0.0681	0.38 0.83
22.225 0.8750	17.462 0.6875	-7.4 -0.29	1.5 0.06	37.5 1.48	39.5 1.56	0.8 0.03	63.0 2.48	61.0 2.40	0.70 0.03	1.50 0.06	22.7	13	0.0650	0.39 0.85
22.225 0.8750	17.462 0.6875	-2.8 -0.11	1.5 0.06	40.5 1.59	43.0 1.69	1.5 0.06	65.0 2.56	58.0 2.28	1.70 0.07	0.90 0.04	19.4	10	0.0771	0.39 0.87
26.988 1.0625	22.225 0.8750	-8.6 -0.34	1.5 0.06	39.0 1.54	41.0 1.61	1.5 0.06	64.0 2.52	59.0 2.32	1.60 0.06	0.60 0.02	21.9	10.4	0.0697	0.46 1.02
19.583 0.7710	15.875 0.6250	-4.3 -0.17	0.8 0.03	38.5 1.52	39.0 1.54	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.34 0.76
19.583 0.7710	15.875 0.6250	-4.3 -0.17	0.8 0.03	38.5 1.52	39.0 1.54	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.35 0.78
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	38.5 1.52	44.5 1.75	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.34 0.75
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	38.5 1.52	44.5 1.75	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.35 0.77
19.583 0.7710	18.415 0.7250	-4.3 -0.17	0.8 0.03	38.5 1.52	39.0 1.54	2.3 0.09	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.38 0.84
25.357 0.9983	19.050 0.7500	-8.6 -0.34	0.8 0.03	37.5 1.48	38.5 1.52	1.3 0.05	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.45 1.00
25.357 0.9983	19.050 0.7500	-8.6 -0.34	3.5 0.14	37.5 1.48	44.0 1.73	1.3 0.05	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.45 0.98
25.357 0.9983	19.050 0.7500	-8.6 -0.34	0.8 0.03	37.5 1.48	38.5 1.52	1.5 0.06	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.45 0.99
19.583 0.7710	15.032 0.5918	-4.3 -0.17	0.8 0.03	38.5 1.52	39.0 1.54	1.5 0.06	65.0 2.56	62.0 2.44	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.38 0.84
25.357 0.9983	19.050 0.7500	-8.6 -0.34	3.5 0.14	37.5 1.48	44.0 1.73	0.8 0.03	65.0 2.56	63.0 2.48	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.48 1.07
25.400 1.0000	19.842 0.7812	-4.6 -0.18	1.5 0.06	42.5 1.67	44.5 1.75	2.3 0.09	69.0 2.72	60.0 2.36	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.52 1.15
25.400 1.0000	19.842 0.7812	-4.6 -0.18	1.5 0.06	42.5 1.67	44.5 1.75	3.3 0.13	69.0 2.72	59.0 2.32	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.53 1.16
29.997 1.1810	23.812 0.9375	-10.2 -0.40	0.8 0.03	39.5 1.56	40.0 1.57	3.3 0.13	67.0 2.64	61.0 2.40	1.50 0.06	0.50 0.02	23.4	8.76	0.0697	0.58 1.29
29.997 1.1810	23.812 0.9375	-10.2 -0.40	3.5 0.14	39.5 1.56	45.5 1.79	3.3 0.13	67.0 2.64	61.0 2.40	1.50 0.06	0.50 0.02	23.4	8.76	0.0697	0.58 1.28
29.997 1.1810	23.812 0.9375	-10.2 -0.40	2.3 0.09	39.5 1.56	43.0 1.69	3.3 0.13	67.0 2.64	61.0 2.40	* *	* *	23.4	8.76	0.0697	0.58 1.28
23.812 0.9375	17.462 0.6875	-5.6 -0.22	3.5 0.14	38.5 1.52	45.0 1.77	3.3 0.13	68.0 2.68	63.0 2.48	0.90 0.04	0.20 0.01	23.1	12.4	0.0718	0.46 1.01

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

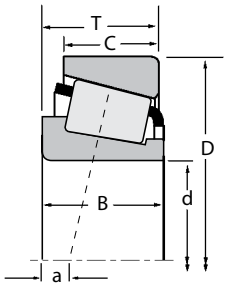
[7] Compound radius on inner race. Details on drawing for bearing.

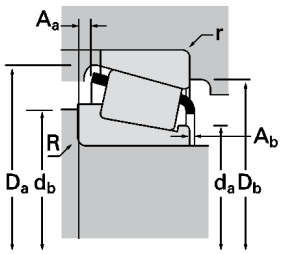
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
31.750 1.2500	73.025 2.8750	22.225 0.8750	67700 15200	0.37	1.63	17600 3950	11100 2490	1.59	83800 18800	2879	2820
31.750 1.2500	73.025 2.8750	22.225 0.8750	60800 13700	0.45	1.32	15800 3550	12300 2750	1.29	74900 16800	02875	02820
31.750 1.2500	73.025 2.8750	22.225 0.8750	60800 13700	0.45	1.32	15800 3550	12300 2750	1.29	74900 16800	02876	02820
31.750 1.2500	73.025 2.8750	26.988 1.0625	82800 18600	0.37	1.62	21500 4830	13600 3050	1.58	102000 22900	23685	23620
31.750 1.2500	73.025 2.8750	29.370 1.1563	80600 18100	0.55	1.10	20900 4700	19500 4390	1.07	111000 24900	HM88542	HM88510
31.750 1.2500	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2783	2720
31.750 1.2500	76.200 3.0000	24.608 0.9688	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43125	43300
31.750 1.2500	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89440	HM89410
31.750 1.2500	76.200 3.0000	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3188	3129
31.750 1.2500	76.200 3.0000	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3193	3129
31.750 1.2500	79.375 3.1250	25.400 1.0000	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43125	43312
31.750 1.2500	79.375 3.1250	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3476	3420
31.750 1.2500	80.000 3.1496	24.176 0.9518	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	346	332A
31.750 1.2500	80.167 3.1562	26.988 1.0625	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	346	3320
31.987 1.2593	66.987 2.6373	20.500 0.8071	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02476X	02419
31.987 1.2593	71.973 2.8336	27.000 1.0630	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88638	HM88611
32.000 1.2598	72.000 2.8346	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26126X	26283
32.004 1.2600	72.000 2.8346	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26126	26283
32.532 1.2808	69.850 2.7500	25.400 1.0000	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2584	2523
33.338 1.3125	66.421 2.6150	25.400 1.0000	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2585	2520
33.338 1.3125	66.675 2.6250	20.638 0.8125	48600 10900	0.37	1.62	12600 2830	8010 1800	1.57	57900 13000	1680	1620
33.338 1.3125	66.675 2.6250	20.638 0.8125	57800 13000	0.35	1.70	15000 3370	9050 2030	1.66	72800 16400	M38545	M38510
33.338 1.3125	68.262 2.6875	22.225 0.8750	61700 13900	0.28	2.18	16000 3600	7540 1700	2.12	77900 17500	16582	16522
33.338 1.3125	68.262 2.6875	22.225 0.8750	59600 13400	0.55	1.10	15500 3470	14400 3250	1.07	77400 17400	M88048A	M88010
33.338 1.3125	68.262 2.6875	22.225 0.8750	59600 13400	0.55	1.10	15500 3470	14400 3250	1.07	77400 17400	M88048	M88010
33.338 1.3125	68.262 2.6875	22.225 0.8750	59600 13400	0.55	1.10	15500 3470	14400 3250	1.07	77400 17400	M88048	M88012
33.338 1.3125	68.262 2.6875	22.225 0.8750	59600 13400	0.55	1.10	15500 3470	14400 3250	1.07	77400 17400	M88048-S	M88010
33.338 1.3125	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14130	14274

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
23.812 0.9375	17.462 0.6875	-5.6 -0.22	0.8 0.03	38.5 1.52	39.5 1.56	3.3 0.13	68.0 2.68	63.0 2.48	0.90 0.04	0.20 0.01	23.1	12.4	0.0718	0.46 1.02
22.225 0.8750	17.462 0.6875	-3.8 -0.15	3.5 0.14	39.5 1.56	45.5 1.79	3.3 0.13	68.0 2.68	62.0 2.44	1.40 0.06	0.90 0.04	20.6	10.1	0.0740	0.44 0.97
22.225 0.8750	17.462 0.6875	-3.8 -0.15	0.8 0.03	39.5 1.56	40.0 1.57	3.3 0.13	68.0 2.68	62.0 2.44	1.40 0.06	0.90 0.04	20.6	10.1	0.0740	0.45 0.99
26.975 1.0620	22.225 0.8750	-8.1 -0.32	3.5 0.14	40.0 1.57	46.0 1.81	1.5 0.06	68.0 2.68	63.0 2.48	1.80 0.07	0.70 0.03	24.4	10.7	0.0734	0.55 1.22
27.783 1.0938	23.020 0.9063	-5.6 -0.22	1.3 0.05	42.5 1.68	45.5 1.79	3.3 0.13	70.0 2.76	59.0 2.32	1.90 0.08	1.80 0.07	26.3	11.7	0.0857	0.61 1.34
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	38.5 1.52	41.0 1.61	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.57 1.25
24.074 0.9478	16.670 0.6563	-2.0 -0.08	1.5 0.06	41.5 1.63	44.0 1.73	3.3 0.13	73.0 2.87	64.0 2.52	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.51 1.12
28.575 1.1250	23.020 0.9063	-5.6 -0.22	0.8 0.03	44.5 1.75	45.5 1.79	3.3 0.13	73.0 2.87	62.0 2.44	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.68 1.50
29.997 1.1810	23.812 0.9375	-10.2 -0.40	0.8 0.03	39.5 1.56	40.0 1.57	0.8 0.03	69.0 2.72	65.0 2.56	1.50 0.06	0.50 0.02	23.4	8.76	0.0697	0.67 1.48
29.997 1.1810	23.812 0.9375	-10.2 -0.40	3.5 0.14	39.5 1.56	45.5 1.79	0.8 0.03	69.0 2.72	65.0 2.56	1.50 0.06	0.50 0.02	23.4	8.76	0.0697	0.67 1.47
24.074 0.9478	17.462 0.6875	-2.0 -0.08	1.5 0.06	41.5 1.63	44.0 1.73	1.5 0.06	74.0 2.91	67.0 2.64	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.58 1.28
29.771 1.1721	23.812 0.9375	-8.6 -0.34	1.3 0.05	41.0 1.61	43.0 1.69	3.3 0.13	74.0 2.91	67.0 2.64	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.74 1.64
22.403 0.8820	21.000 0.8268	-6.4 -0.25	0.8 0.03	39.5 1.56	40.0 1.57	2.3 0.09	75.0 2.95	71.0 2.80	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.59 1.30
22.403 0.8820	23.812 0.9375	-6.4 -0.25	0.8 0.03	39.5 1.56	40.0 1.57	3.3 0.13	75.0 2.95	70.0 2.76	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.63 1.38
20.500 0.8071	16.000 0.6299	-5.1 -0.20	0.8 0.03	38.5 1.52	39.5 1.56	1.5 0.06	62.0 2.44	59.0 2.32	1.20 0.05	2.60 0.10	17.5	8.48	0.0681	0.33 0.73
25.400 1.0000	21.443 0.8442	-4.6 -0.18	3.3 0.13	42.5 1.67	48.5 1.91	1.5 0.06	68.0 2.68	61.0 2.40	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.55 1.21
18.923 0.7450	15.875 0.6250	-4.1 -0.16	2.0 0.08	37.5 1.48	40.5 1.59	1.5 0.06	65.0 2.56	62.0 2.44	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.37 0.81
18.923 0.7450	15.875 0.6250	-4.1 -0.16	1.5 0.06	37.5 1.48	39.5 1.56	1.5 0.06	65.0 2.56	62.0 2.44	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.37 0.81
26.944 1.0608	19.050 0.7500	-10.2 -0.40	5.0 0.20	38.0 1.50	47.5 1.87	1.3 0.05	64.0 2.52	61.0 2.40	2.50 0.10	0.80 0.03	23.6	9.63	0.0656	0.44 0.98
25.357 0.9983	20.638 0.8125	-8.6 -0.34	3.5 0.14	39.0 1.54	45.0 1.77	3.3 0.13	62.5 2.46	57.0 2.24	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.38 0.84
20.638 0.8125	15.875 0.6250	-5.3 -0.21	3.5 0.14	38.5 1.52	44.5 1.75	1.5 0.06	61.0 2.40	58.0 2.28	* *	* *	16.6	8.67	0.0644	0.31 0.68
20.638 0.8125	16.670 0.6563	-5.6 -0.22	3.5 0.14	39.0 1.54	45.0 1.77	2.3 0.09	62.0 2.44	58.0 2.28	0.40 0.02	2.40 0.09	20.3	11.8	0.0680	0.32 0.71
22.225 0.8750	17.462 0.6875	-7.4 -0.29	1.5 0.06	38.5 1.52	41.0 1.61	0.8 0.03	63.0 2.48	61.0 2.40	0.70 0.03	1.50 0.06	22.7	13	0.0650	0.37 0.82
22.225 0.8750	17.462 0.6875	-2.8 -0.11	1.3 0.05	41.0 1.62	43.5 1.71	1.5 0.06	65.0 2.56	58.0 2.28	1.40 0.06	1.00 0.04	19.4	10	0.0771	0.38 0.84
22.225 0.8750	17.462 0.6875	-2.8 -0.11	0.8 0.03	41.0 1.62	42.5 1.67	1.5 0.06	65.0 2.56	58.0 2.28	1.40 0.06	1.00 0.04	19.4	10	0.0771	0.38 0.84
22.225 0.8750	17.462 0.6875	-2.8 -0.11	0.8 0.03	41.0 1.62	42.5 1.67	0.8 0.03	64.0 2.52	59.0 2.32	1.40 0.06	1.00 0.04	19.4	10	0.0771	0.38 0.84
22.225 0.8750	17.462 0.6875	-2.8 -0.11	4.0 0.16	41.0 1.62	49.5 1.95	1.5 0.06	65.0 2.56	58.0 2.28	1.40 0.06	1.00 0.04	19.4	10	0.0771	0.38 0.83
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	39.5 1.56	46.0 1.81	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.33 0.73

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

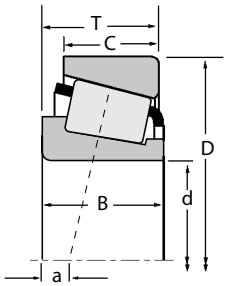
[7] Compound radius on inner race. Details on drawing for bearing.

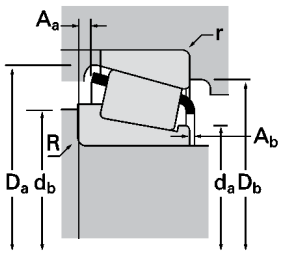
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
33.338 1.3125	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14130	14276
33.338 1.3125	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14131	14274
33.338 1.3125	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14131	14276
33.338 1.3125	69.723 2.7450	19.050 0.7500	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26132	26274
33.338 1.3125	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2581	2523
33.338 1.3125	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2585	2523
33.338 1.3125	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2581	2523-S
33.338 1.3125	69.850 2.7500	23.812 0.9375	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2585	2523-S
33.338 1.3125	71.996 2.8345	19.002 0.7481	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14130	14282
33.338 1.3125	72.000 2.8346	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26131	26283
33.338 1.3125	72.000 2.8346	19.000 0.7480	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26131	26283-S
33.338 1.3125	72.238 2.8440	20.638 0.8125	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16131	16284
33.338 1.3125	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3196	3120
33.338 1.3125	72.626 2.8593	30.162 1.1875	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3197	3120
33.338 1.3125	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2790	2735X
33.338 1.3125	73.025 2.8750	29.370 1.1563	80600 18100	0.55	1.10	20900 4700	19500 4390	1.07	111000 24900	HM88547	HM88510
33.338 1.3125	73.025 2.8750	29.370 1.1563	80600 18100	0.55	1.10	20900 4700	19500 4390	1.07	111000 24900	HM88547	HM88511
33.338 1.3125	73.812 2.9060	29.370 1.1563	80600 18100	0.55	1.10	20900 4700	19500 4390	1.07	111000 24900	HM88547	HM88512
33.338 1.3125	76.200 3.0000	22.225 0.8750	59600 13400	0.55	1.10	15500 3470	14400 3250	1.07	77400 17400	M88048	M88022
33.338 1.3125	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2785	2720
33.338 1.3125	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2785	2729
33.338 1.3125	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2790	2720
33.338 1.3125	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2790	2729
33.338 1.3125	76.200 3.0000	29.370 1.1563	87700 19700	0.40	1.49	22700 5110	15600 3520	1.45	107000 24100	31590	31520
33.338 1.3125	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89443	HM89410
33.338 1.3125	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89443	HM89411
33.338 1.3125	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89444	HM89410
33.338 1.3125	79.375 3.1250	25.400 1.0000	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43131	43312

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	39.5 1.56	46.0 1.81	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.34 0.74
19.583 0.7710	15.875 0.6250	-4.3 -0.17	0.8 0.03	39.5 1.56	40.5 1.59	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.33 0.73
19.583 0.7710	15.875 0.6250	-4.3 -0.17	0.8 0.03	39.5 1.56	40.5 1.59	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.34 0.75
18.923 0.7450	19.050 0.7500	-4.1 -0.16	1.5 0.06	38.5 1.52	40.5 1.59	1.5 0.06	65.0 2.56	61.0 2.40	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.34 0.76
25.357 0.9983	19.050 0.7500	-8.6 -0.34	0.8 0.03	39.0 1.54	39.5 1.56	1.3 0.05	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.44 0.96
25.357 0.9983	19.050 0.7500	-8.6 -0.34	3.5 0.14	39.0 1.54	45.0 1.77	1.3 0.05	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.43 0.95
25.357 0.9983	19.050 0.7500	-8.6 -0.34	0.8 0.03	39.0 1.54	39.5 1.56	1.5 0.06	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.43 0.96
25.357 0.9983	19.050 0.7500	-8.6 -0.34	3.5 0.14	39.0 1.54	45.0 1.77	1.5 0.06	64.0 2.52	61.0 2.40	0.90 0.04	0.80 0.03	23.6	9.63	0.0656	0.43 0.95
19.583 0.7710	15.032 0.5918	-4.3 -0.17	3.5 0.14	39.5 1.56	46.0 1.81	1.5 0.06	65.0 2.56	62.0 2.44	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.37 0.81
18.923 0.7450	15.875 0.6250	-4.1 -0.16	3.5 0.14	38.5 1.52	44.5 1.75	1.5 0.06	65.0 2.56	62.0 2.44	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.35 0.78
18.923 0.7450	15.875 0.6250	-4.1 -0.16	3.5 0.14	38.5 1.52	44.5 1.75	2.0 0.08	65.0 2.56	62.0 2.44	0.60 0.02	1.10 0.04	16.1	10.1	0.0630	0.35 0.78
20.638 0.8125	15.875 0.6250	-4.1 -0.16	3.5 0.14	39.5 1.56	46.0 1.81	1.3 0.05	67.0 2.64	63.0 2.48	1.20 0.05	1.10 0.04	20.3	10.6	0.0707	0.40 0.87
29.997 1.1810	23.812 0.9375	-10.2 -0.40	3.5 0.14	40.5 1.59	47.0 1.85	3.3 0.13	67.0 2.64	61.0 2.40	1.50 0.06	0.50 0.02	23.4	8.76	0.0697	0.56 1.23
29.997 1.1810	23.812 0.9375	-10.2 -0.40	0.8 0.03	40.5 1.59	41.5 1.63	3.3 0.13	67.0 2.64	61.0 2.40	* *	* *	23.4	8.76	0.0697	0.56 1.25
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	40.0 1.57	42.0 1.65	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.51 1.11
27.783 1.0938	23.020 0.9063	-5.6 -0.22	0.8 0.03	42.5 1.68	45.5 1.79	3.3 0.13	70.0 2.76	59.0 2.32	1.90 0.08	1.80 0.07	26.3	11.7	0.0857	0.59 1.30
27.783 1.0938	23.020 0.9063	-5.6 -0.22	0.8 0.03	42.5 1.68	45.5 1.79	0.8 0.03	70.0 2.76	62.0 2.44	1.90 0.08	1.80 0.07	26.3	11.7	0.0857	0.60 1.32
27.783 1.0938	23.020 0.9063	-5.6 -0.22	0.8 0.03	42.5 1.68	45.5 1.79	3.3 0.13	70.0 2.76	60.0 2.36	1.90 0.08	1.80 0.07	26.3	11.7	0.0857	0.61 1.34
22.225 0.8750	17.462 0.6875	-2.8 -0.11	0.8 0.03	41.0 1.62	42.5 1.67	0.8 0.03	68.0 2.68	62.0 2.44	1.40 0.06	1.00 0.04	19.4	10	0.0771	0.50 1.11
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	40.0 1.57	46.0 1.81	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.55 1.21
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	40.0 1.57	46.0 1.81	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.56 1.23
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	40.0 1.57	42.0 1.65	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.55 1.22
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	40.0 1.57	42.0 1.65	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.56 1.24
28.575 1.1250	23.812 0.9375	-7.6 -0.30	0.8 0.03	42.5 1.67	43.0 1.69	3.3 0.13	72.0 2.83	64.0 2.52	1.60 0.06	1.20 0.05	26.3	9.08	0.0773	0.64 1.41
28.575 1.1250	23.020 0.9063	-5.6 -0.22	0.8 0.03	44.5 1.75	46.5 1.83	3.3 0.13	73.0 2.87	62.0 2.44	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.66 1.46
28.575 1.1250	23.020 0.9063	-5.6 -0.22	0.8 0.03	44.5 1.75	46.5 1.83	0.8 0.03	73.0 2.87	65.0 2.56	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.67 1.48
28.575 1.1250	23.020 0.9063	-5.6 -0.22	3.8 0.15	44.5 1.75	53.0 2.09	3.3 0.13	73.0 2.87	62.0 2.44	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.66 1.45
24.074 0.9478	17.462 0.6875	-2.0 -0.08	3.5 0.14	42.0 1.65	51.0 2.01	1.5 0.06	74.0 2.91	67.0 2.64	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.56 1.24

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

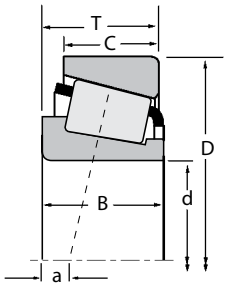
[7] Compound radius on inner race. Details on drawing for bearing.

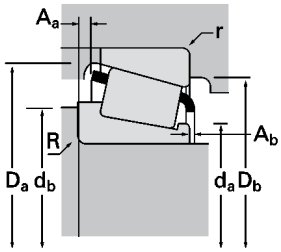
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
33.338 1.3125	79.375 3.1250	25.400 1.0000	71900 16200	0.67	0.90	18600 4190	21300 4790	0.87	76200 17100	43132	43312
33.338 1.3125	79.375 3.1250	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3477	3420
33.338 1.3125	79.375 3.1250	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3483	3420
33.338 1.3125	80.000 3.1496	21.000 0.8268	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	335-S	332
33.338 1.3125	80.167 3.1562	26.988 1.0625	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	335-S	3320
33.338 1.3125	88.500 3.4843	25.400 1.0000	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44131	44348
34.925 1.3750	65.088 2.5625	18.034 0.7100	50500 11300	0.38	1.59	13100 2940	8430 1890	1.55	63100 14200	LM48548A	LM48510
34.925 1.3750	65.088 2.5625	18.034 0.7100	50500 11300	0.38	1.59	13100 2940	8430 1890	1.55	63100 14200	LM48548	LM48510
34.925 1.3750	65.088 2.5625	18.034 0.7100	50500 11300	0.38	1.59	13100 2940	8430 1890	1.55	63100 14200	LM48549	LM48510
34.925 1.3750	65.088 2.5625	18.034 0.7100	50500 11300	0.38	1.59	13100 2940	8430 1890	1.55	63100 14200	LM48549X	LM48510
34.925 1.3750	65.088 2.5625	21.082 0.8300	50500 11300	0.38	1.59	13100 2940	8430 1890	1.55	63100 14200	LM48548A	LM48511A
34.925 1.3750	65.088 2.5625	21.082 0.8300	50500 11300	0.38	1.59	13100 2940	8430 1890	1.55	63100 14200	LM48548	LM48511A
34.925 1.3750	65.987 2.5979	20.638 0.8125	57800 13000	0.35	1.70	15000 3370	9050 2030	1.66	72800 16400	M38549	M38511
34.925 1.3750	66.675 2.6250	20.638 0.8125	57800 13000	0.35	1.70	15000 3370	9050 2030	1.66	72800 16400	M38549	M38510
34.925 1.3750	68.262 2.6875	18.034 0.7100	50500 11300	0.38	1.59	13100 2940	8430 1890	1.55	63100 14200	LM48548	LM48514
34.925 1.3750	68.262 2.6875	20.638 0.8125	54800 12300	0.35	1.70	14200 3200	8590 1930	1.66	68100 15300	14585	14525
34.925 1.3750	68.262 2.6875	20.638 0.8125	57800 13000	0.35	1.70	15000 3370	9050 2030	1.66	72800 16400	M38549	M38514
34.925 1.3750	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14137A	14274
34.925 1.3750	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14137A	14276
34.925 1.3750	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14138A	14274
34.925 1.3750	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14138A	14276
34.925 1.3750	69.012 2.7170	22.385 0.8813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14138A	14277
34.925 1.3750	69.850 2.7500	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14137A	14275A
34.925 1.3750	71.973 2.8336	27.000 1.0630	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88649	HM88611
34.925 1.3750	72.233 2.8438	25.400 1.0000	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88649A	HM88610
34.925 1.3750	72.233 2.8438	25.400 1.0000	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88649	HM88610
34.925 1.3750	72.238 2.8440	20.638 0.8125	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16137	16284
34.925 1.3750	72.626 2.8593	25.400 1.0000	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88649	HM88611AS

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
24.074 0.9478	17.462 0.6875	-2.0 -0.08	2.0 0.08	42.0 1.65	48.0 1.89	1.5 0.06	74.0 2.91	67.0 2.64	3.40 0.13	2.30 0.09	16.8	7.57	0.0774	0.57 1.25
29.771 1.1721	23.812 0.9375	-8.6 -0.34	3.5 0.14	42.5 1.67	49.0 1.93	3.3 0.13	74.0 2.91	67.0 2.64	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.72 1.58
29.771 1.1721	23.812 0.9375	-8.6 -0.34	0.8 0.03	42.5 1.67	43.0 1.69	3.3 0.13	74.0 2.91	67.0 2.64	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.72 1.60
22.403 0.8820	17.826 0.7018	-6.4 -0.25	0.8 0.03	40.5 1.59	41.0 1.61	1.3 0.05	75.0 2.95	73.0 2.87	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.54 1.20
22.403 0.8820	23.812 0.9375	-6.4 -0.25	0.8 0.03	40.5 1.59	41.0 1.61	3.3 0.13	75.0 2.95	70.0 2.76	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.61 1.35
23.698 0.9330	17.462 0.6875	2.3 0.09	2.0 0.08	48.0 1.89	51.0 2.01	1.5 0.06	84.0 3.31	75.0 2.95	3.90 0.15	2.60 0.10	22.9	8.71	0.0899	0.76 1.67
18.288 0.7200	13.970 0.5500	-3.6 -0.14	0.8 0.03	42.0 1.66	40.5 1.59	1.3 0.05	61.0 2.40	58.0 2.28	0.70 0.03	1.30 0.05	18	10.6	0.0666	0.25 0.56
18.288 0.7200	13.970 0.5500	-3.6 -0.14	3.5 0.14	41.5 1.63	48.0 1.89	1.3 0.05	61.0 2.40	58.0 2.28	0.70 0.03	1.30 0.05	18	10.6	0.0666	0.24 0.54
18.288 0.7200	13.970 0.5500	-3.6 -0.14	1.5 0.06	40.0 1.57	42.0 1.65	1.3 0.05	61.0 2.40	58.0 2.28	0.80 0.03	1.10 0.04	18	10.6	0.0666	0.25 0.56
18.288 0.7200	13.970 0.5500	-3.6 -0.14	2.3 0.09	40.0 1.57	43.5 1.71	1.3 0.05	61.0 2.40	58.0 2.28	0.80 0.03	1.10 0.04	18	10.6	0.0666	0.25 0.55
18.288 0.7200	17.018 0.6700	-3.6 -0.14	0.8 0.03	42.0 1.66	40.5 1.59	1.5 0.06	61.0 2.40	58.0 2.28	0.70 0.03	1.30 0.05	18	10.6	0.0666	0.28 0.61
18.288 0.7200	17.018 0.6700	-3.6 -0.14	3.5 0.14	41.5 1.63	48.0 1.89	1.5 0.06	61.0 2.40	58.0 2.28	0.70 0.03	1.30 0.05	18	10.6	0.0666	0.27 0.59
20.638 0.8125	16.670 0.6563	-5.6 -0.22	3.5 0.14	40.0 1.57	46.5 1.83	2.3 0.09	62.0 2.44	58.0 2.28	0.40 0.02	2.40 0.09	20.3	11.8	0.0680	0.30 0.66
20.638 0.8125	16.670 0.6563	-5.6 -0.22	3.5 0.14	40.0 1.57	46.5 1.83	2.3 0.09	62.0 2.44	58.0 2.28	0.40 0.02	2.40 0.09	20.3	11.8	0.0680	0.31 0.68
18.288 0.7200	13.970 0.5500	-3.6 -0.14	3.5 0.14	41.5 1.63	48.0 1.89	1.3 0.05	63.0 2.48	59.0 2.32	0.70 0.03	1.30 0.05	18	10.6	0.0666	0.28 0.62
20.638 0.8125	15.875 0.6250	-5.8 -0.23	3.5 0.14	40.0 1.57	46.0 1.81	2.3 0.09	63.0 2.48	59.0 2.32	0.80 0.03	2.10 0.08	19.5	12.3	0.0670	0.32 0.71
20.638 0.8125	16.670 0.6563	-5.6 -0.22	3.5 0.14	40.0 1.57	46.5 1.83	2.3 0.09	63.0 2.48	59.0 2.32	0.40 0.02	2.40 0.09	20.3	11.8	0.0680	0.33 0.73
19.583 0.7710	15.875 0.6250	-4.3 -0.17	1.5 0.06	41.0 1.61	43.0 1.69	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.32 0.70
19.583 0.7710	15.875 0.6250	-4.3 -0.17	1.5 0.06	41.0 1.61	43.0 1.69	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.33 0.72
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	41.0 1.61	47.0 1.85	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.32 0.70
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	41.0 1.61	47.0 1.85	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.32 0.71
19.583 0.7710	18.415 0.7250	-4.3 -0.17	3.5 0.14	41.0 1.61	47.0 1.85	2.3 0.09	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.35 0.77
19.583 0.7710	15.875 0.6250	-4.3 -0.17	1.5 0.06	41.0 1.61	43.0 1.69	1.5 0.06	64.0 2.52	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.34 0.74
25.400 1.0000	21.443 0.8442	-4.6 -0.18	2.3 0.09	42.5 1.68	48.5 1.91	1.5 0.06	68.0 2.68	61.0 2.40	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.52 1.14
25.400 1.0000	19.842 0.7812	-4.6 -0.18	3.5 0.14	43.0 1.69	51.0 2.01	2.3 0.09	69.0 2.72	60.0 2.36	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.49 1.07
25.400 1.0000	19.842 0.7812	-4.6 -0.18	2.3 0.09	42.5 1.68	48.5 1.91	2.3 0.09	69.0 2.72	60.0 2.36	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.49 1.08
20.638 0.8125	15.875 0.6250	-4.1 -0.16	3.5 0.14	40.5 1.59	47.0 1.85	1.3 0.05	67.0 2.64	63.0 2.48	1.20 0.05	1.10 0.04	20.3	10.6	0.0707	0.38 0.84
25.400 1.0000	19.842 0.7812	-4.6 -0.18	2.3 0.09	42.5 1.68	48.5 1.91	3.3 0.13	69.0 2.72	59.0 2.32	1.70 0.07	1.70 0.07	23.4	10.9	0.0822	0.49 1.08

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

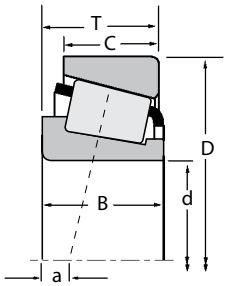
[7] Compound radius on inner race. Details on drawing for bearing.

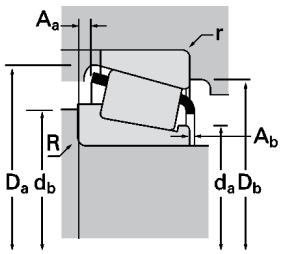
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
34.925 1.3750	73.025 2.8750	22.225 0.8750	67700 15200	0.37	1.63	17600 3950	11100 2490	1.59	83800 18800	2877	2820
34.925 1.3750	73.025 2.8750	22.225 0.8750	67700 15200	0.37	1.63	17600 3950	11100 2490	1.59	83800 18800	2878	2820
34.925 1.3750	73.025 2.8750	22.225 0.8750	67700 15200	0.37	1.63	17600 3950	11100 2490	1.59	83800 18800	2878	2821
34.925 1.3750	73.025 2.8750	22.225 0.8750	60800 13700	0.45	1.32	15800 3550	12300 2750	1.29	74900 16800	02877	02820
34.925 1.3750	73.025 2.8750	22.225 0.8750	60800 13700	0.45	1.32	15800 3550	12300 2750	1.29	74900 16800	02878	02820
34.925 1.3750	73.025 2.8750	22.225 0.8750	60800 13700	0.45	1.32	15800 3550	12300 2750	1.29	74900 16800	02878	02830
34.925 1.3750	73.025 2.8750	23.812 0.9375	78800 17700	0.29	2.07	20400 4590	10200 2280	2.01	97400 21900	25877	25820
34.925 1.3750	73.025 2.8750	23.812 0.9375	78800 17700	0.29	2.07	20400 4590	10200 2280	2.01	97400 21900	25877	25821
34.925 1.3750	73.025 2.8750	23.812 0.9375	78800 17700	0.29	2.07	20400 4590	10200 2280	2.01	97400 21900	25878	25820
34.925 1.3750	73.025 2.8750	23.812 0.9375	78800 17700	0.29	2.07	20400 4590	10200 2280	2.01	97400 21900	25878	25821
34.925 1.3750	73.025 2.8750	23.812 0.9375	78800 17700	0.29	2.07	20400 4590	10200 2280	2.01	97400 21900	25877A	25821
34.925 1.3750	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2786	2735X
34.925 1.3750	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2793	2735X
34.925 1.3750	73.025 2.8750	26.988 1.0625	82800 18600	0.37	1.62	21500 4830	13600 3050	1.58	102000 22900	23690	23620
34.925 1.3750	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2786	2720
34.925 1.3750	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2786	2729
34.925 1.3750	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2793	2720
34.925 1.3750	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2793	2729
34.925 1.3750	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2796	2729
34.925 1.3750	76.200 3.0000	29.370 1.1563	87700 19700	0.40	1.49	22700 5110	15600 3520	1.45	107000 24100	31593	31520
34.925 1.3750	76.200 3.0000	29.370 1.1563	87700 19700	0.40	1.49	22700 5110	15600 3520	1.45	107000 24100	31593	31521
34.925 1.3750	76.200 3.0000	29.370 1.1563	87700 19700	0.40	1.49	22700 5110	15600 3520	1.45	107000 24100	31594	31520
34.925 1.3750	76.200 3.0000	29.370 1.1563	92500 20800	0.35	1.71	24000 5390	14400 3230	1.67	111000 24900	36137	36300
34.925 1.3750	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89446A	HM89410
34.925 1.3750	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89446	HM89410
34.925 1.3750	79.324 3.1230	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3482	3426
34.925 1.3750	79.375 3.1250	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3478	3420
34.925 1.3750	79.375 3.1250	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3482	3420

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
23.812 0.9375	17.462 0.6875	-5.6 -0.22	3.5 0.14	41.0 1.61	47.5 1.87	3.3 0.13	68.0 2.68	63.0 2.48	0.90 0.04	0.20 0.01	23.1	12.4	0.0718	0.43 0.94
23.812 0.9375	17.462 0.6875	-5.6 -0.22	0.8 0.03	41.0 1.61	42.0 1.65	3.3 0.13	68.0 2.68	63.0 2.48	0.90 0.04	0.20 0.01	23.1	12.4	0.0718	0.43 0.96
23.812 0.9375	17.462 0.6875	-5.6 -0.22	0.8 0.03	41.0 1.61	42.0 1.65	0.8 0.03	68.0 2.68	65.0 2.56	0.90 0.04	0.20 0.01	23.1	12.4	0.0718	0.44 0.97
22.225 0.8750	17.462 0.6875	-3.8 -0.15	3.5 0.14	42.0 1.65	48.5 1.91	3.3 0.13	68.0 2.68	62.0 2.44	1.40 0.06	0.90 0.04	20.6	10.1	0.0740	0.41 0.91
22.225 0.8750	17.462 0.6875	-3.8 -0.15	0.8 0.03	42.0 1.65	42.5 1.67	3.3 0.13	68.0 2.68	62.0 2.44	1.40 0.06	0.90 0.04	20.6	10.1	0.0740	0.42 0.92
22.225 0.8750	17.462 0.6875	-3.8 -0.15	0.8 0.03	42.0 1.65	42.5 1.67	0.8 0.03	68.0 2.68	64.0 2.52	1.40 0.06	0.90 0.04	20.6	10.1	0.0740	0.43 0.94
24.608 0.9688	19.050 0.7500	-8.1 -0.32	1.5 0.06	40.5 1.59	43.0 1.69	2.3 0.09	68.0 2.68	64.0 2.52	1.00 0.04	1.50 0.06	26.4	10.9	0.0695	0.47 1.03
24.608 0.9688	19.050 0.7500	-8.1 -0.32	1.5 0.06	40.5 1.59	43.0 1.69	0.8 0.03	68.0 2.68	65.0 2.56	1.00 0.04	1.50 0.06	26.4	10.9	0.0695	0.47 1.04
24.608 0.9688	19.050 0.7500	-8.1 -0.32	3.5 0.14	40.5 1.59	47.0 1.85	2.3 0.09	68.0 2.68	64.0 2.52	1.00 0.04	1.50 0.06	26.4	10.9	0.0695	0.46 1.02
24.608 0.9688	19.050 0.7500	-8.1 -0.32	3.5 0.14	40.5 1.59	47.0 1.85	0.8 0.03	68.0 2.68	65.0 2.56	1.00 0.04	1.50 0.06	26.4	10.9	0.0695	0.47 1.03
24.608 0.9688	19.050 0.7500	-8.1 -0.32	0.8 0.03	42.0 1.65	42.5 1.67	0.8 0.03	68.0 2.68	65.0 2.56	* *	* *	26.4	10.9	0.0695	0.47 1.04
25.654 1.0100	19.050 0.7500	-8.1 -0.32	5.0 0.20	41.0 1.61	51.0 2.01	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.48 1.05
25.654 1.0100	19.050 0.7500	-8.1 -0.32	0.8 0.03	41.0 1.61	42.0 1.65	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.49 1.08
26.975 1.0620	22.225 0.8750	-8.1 -0.32	3.5 0.14	42.0 1.65	49.0 1.93	1.5 0.06	68.0 2.68	63.0 2.48	1.80 0.07	0.70 0.03	24.4	10.7	0.0734	0.52 1.14
25.654 1.0100	19.050 0.7500	-8.1 -0.32	5.0 0.20	41.0 1.61	51.0 2.01	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.52 1.15
25.654 1.0100	19.050 0.7500	-8.1 -0.32	5.0 0.20	41.0 1.61	51.0 2.01	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.53 1.17
25.654 1.0100	19.050 0.7500	-8.1 -0.32	0.8 0.03	41.0 1.61	42.0 1.65	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.54 1.18
25.654 1.0100	19.050 0.7500	-8.1 -0.32	0.8 0.03	41.0 1.61	42.0 1.65	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.54 1.20
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	41.0 1.61	47.5 1.87	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.54 1.19
28.575 1.1250	23.812 0.9375	-7.6 -0.30	3.5 0.14	43.5 1.71	50.0 1.97	3.3 0.13	72.0 2.83	64.0 2.52	1.60 0.06	1.20 0.05	26.3	9.08	0.0773	0.61 1.35
28.575 1.1250	23.812 0.9375	-7.6 -0.30	3.5 0.14	43.5 1.71	50.0 1.97	1.3 0.05	72.0 2.83	66.0 2.60	1.60 0.06	1.20 0.05	26.3	9.08	0.0773	0.62 1.37
28.575 1.1250	23.812 0.9375	-7.6 -0.30	1.5 0.06	43.5 1.71	46.0 1.81	3.3 0.13	72.0 2.83	64.0 2.52	1.60 0.06	1.20 0.05	26.3	9.08	0.0773	0.62 1.36
29.845 1.1750	23.812 0.9375	-9.1 -0.36	1.5 0.06	42.5 1.67	45.0 1.77	3.3 0.13	71.0 2.80	66.0 2.60	* *	* *	26.7	10.5	0.0741	0.62 1.37
28.575 1.1250	23.020 0.9063	-5.6 -0.22	0.8 0.03	44.5 1.75	47.5 1.87	3.3 0.13	73.0 2.87	62.0 2.44	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.64 1.42
28.575 1.1250	23.020 0.9063	-5.6 -0.22	3.5 0.14	44.5 1.75	56.0 2.20	3.3 0.13	73.0 2.87	62.0 2.44	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.64 1.42
29.771 1.1721	23.812 0.9375	-8.6 -0.34	0.8 0.03	43.5 1.71	44.0 1.73	3.3 0.13	74.0 2.91	67.0 2.64	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.70 1.55
29.771 1.1721	23.812 0.9375	-8.6 -0.34	3.5 0.14	43.5 1.71	50.0 1.97	3.3 0.13	74.0 2.91	67.0 2.64	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.70 1.54
29.771 1.1721	23.812 0.9375	-8.6 -0.34	0.8 0.03	43.5 1.71	44.0 1.73	3.3 0.13	74.0 2.91	67.0 2.64	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.70 1.55

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

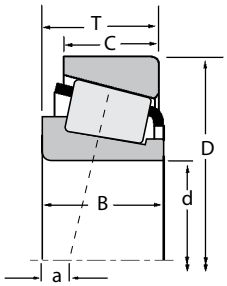
[7] Compound radius on inner race. Details on drawing for bearing.

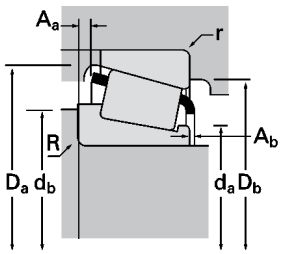
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
34.925 1.3750	80.000 3.1496	21.000 0.8268	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	335	332
34.925 1.3750	80.000 3.1496	24.176 0.9518	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	335	332A
34.925 1.3750	80.035 3.1510	21.433 0.8438	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28137	28317
34.925 1.3750	80.035 3.1510	24.608 0.9688	72200 16200	0.56	1.07	18700 4210	18000 4040	1.04	91100 20500	27875	27820
34.925 1.3750	80.035 3.1510	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3379	3339
34.925 1.3750	80.167 3.1562	26.988 1.0625	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	335	3320
34.925 1.3750	80.167 3.1562	29.367 1.1562	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3379	3320
34.925 1.3750	80.962 3.1875	22.225 0.8750	60800 13700	0.45	1.32	15800 3550	12300 2750	1.29	74900 16800	02877	02831
34.925 1.3750	81.755 3.2187	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3379	3329
34.925 1.3750	84.138 3.3125	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3379	3328
34.925 1.3750	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3872	3820
34.925 1.3750	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3872	3821
34.925 1.3750	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3872A	3820
34.925 1.3750	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3581	3525
34.925 1.3750	88.500 3.4843	26.988 1.0625	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	417	414
34.925 1.3750	90.488 3.5625	39.688 1.5625	155000 34900	0.28	2.11	40200 9040	19600 4400	2.05	204000 45900	4368	4335
34.925 1.3750	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	449	432
34.976 1.3770	68.000 2.6772	16.020 0.6307	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19138	19267X
34.976 1.3770	68.262 2.6875	15.875 0.6250	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19138	19268
34.975 1.3770	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14139	14274
34.975 1.3770	69.012 2.7170	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14139	14276
34.975 1.3770	71.996 2.8345	19.002 0.7481	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14139	14282
34.976 1.3770	72.000 2.8346	17.018 0.6700	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19138	19283
34.975 1.3770	72.085 2.8380	22.385 0.8813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14139	14283
34.975 1.3770	76.200 3.0000	20.625 0.8120	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28138	28300X
34.975 1.3770	80.000 3.1496	21.006 0.8270	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28138	28315
34.987 1.3775	59.131 2.3280	15.875 0.6250	35500 7990	0.42	1.44	9220 2070	6560 1480	1.40	48700 11000	L68149	L68110
34.987 1.3775	59.974 2.3612	15.875 0.6250	35500 7990	0.42	1.44	9220 2070	6560 1480	1.40	48700 11000	L68149	L68111

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

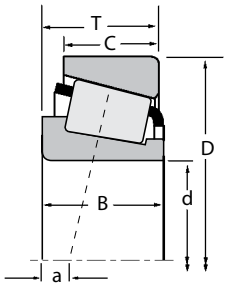
Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
22.403 0.8820	17.826 0.7018	-6.4 -0.25	0.8 0.03	41.5 1.63	42.5 1.67	1.3 0.05	75.0 2.95	73.0 2.87	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.53 1.17
22.403 0.8820	21.000 0.8268	-6.4 -0.25	0.8 0.03	41.5 1.63	42.5 1.67	2.3 0.09	75.0 2.95	71.0 2.80	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.56 1.24
20.940 0.8244	15.875 0.6250	-4.8 -0.19	1.5 0.06	41.0 1.61	43.5 1.71	1.5 0.06	73.0 2.87	69.0 2.72	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.49 1.09
23.698 0.9330	18.512 0.7288	-2.5 -0.10	0.8 0.03	44.5 1.75	45.5 1.79	1.5 0.06	75.0 2.95	68.0 2.68	3.20 0.13	1.50 0.06	24.6	12.6	0.0839	0.59 1.31
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	41.5 1.63	48.0 1.89	1.5 0.06	74.5 2.94	71.0 2.80	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.72 1.59
22.403 0.8820	23.812 0.9375	-6.4 -0.25	0.8 0.03	41.5 1.63	42.5 1.67	3.3 0.13	75.0 2.95	70.0 2.76	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.60 1.31
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	41.5 1.63	48.0 1.89	3.3 0.13	75.0 2.95	70.0 2.76	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.71 1.58
22.225 0.8750	17.462 0.6875	-3.8 -0.15	3.5 0.14	42.0 1.65	48.5 1.91	0.8 0.03	72.0 2.83	67.0 2.64	1.40 0.06	0.90 0.04	20.6	10.1	0.0740	0.55 1.22
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	41.5 1.63	48.0 1.89	3.3 0.13	75.0 2.95	71.0 2.80	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.75 1.66
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	41.5 1.63	48.0 1.89	3.3 0.13	76.0 2.99	72.0 2.83	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.81 1.78
30.162 1.1875	23.812 0.9375	-8.1 -0.32	3.5 0.14	46.0 1.81	53.0 2.09	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.89 1.95
30.162 1.1875	23.812 0.9375	-8.1 -0.32	3.5 0.14	46.0 1.81	53.0 2.09	1.3 0.05	81.0 3.19	75.0 2.95	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.89 1.97
30.162 1.1875	23.812 0.9375	-8.1 -0.32	0.8 0.03	46.0 1.81	47.0 1.85	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.89 1.96
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	43.0 1.69	49.5 1.95	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.91 2.00
29.083 1.1450	22.225 0.8750	-9.7 -0.38	0.8 0.03	42.0 1.65	42.5 1.67	1.5 0.06	80.0 3.15	77.0 3.03	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.87 1.92
40.386 1.5900	33.338 1.3125	-15.0 -0.59	3.5 0.14	49.0 1.93	55.0 2.17	3.3 0.13	85.0 3.35	77.0 3.03	2.30 0.09	0.60 0.02	52.9	16.7	0.0872	1.37 3.01
29.900 1.1772	22.225 0.8750	-9.1 -0.36	0.8 0.03	43.5 1.71	44.0 1.73	2.3 0.09	87.0 3.43	83.0 3.27	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	1.08 2.38
16.520 0.6504	12.000 0.4724	-1.5 -0.06	1.5 0.06	40.5 1.59	42.5 1.67	1.5 0.06	64.0 2.52	61.0 2.40	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.26 0.57
16.520 0.6504	11.908 0.4688	-1.5 -0.06	1.5 0.06	40.5 1.59	42.5 1.67	1.5 0.06	65.0 2.56	61.0 2.40	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.26 0.58
19.583 0.7710	15.875 0.6250	-4.3 -0.17	1.3 0.05	41.0 1.61	42.5 1.67	3.3 0.13	63.0 2.48	59.0 2.32	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.32 0.70
19.583 0.7710	15.875 0.6250	-4.3 -0.17	1.3 0.05	41.0 1.61	42.5 1.67	1.3 0.05	63.0 2.48	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.33 0.72
19.583 0.7710	15.032 0.5918	-4.3 -0.17	1.3 0.05	41.0 1.61	42.5 1.67	1.5 0.06	65.0 2.56	62.0 2.44	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.35 0.78
16.520 0.6504	14.288 0.5625	-1.5 -0.06	1.5 0.06	40.5 1.59	42.5 1.67	1.5 0.06	66.0 2.60	63.0 2.48	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.32 0.70
19.583 0.7710	18.415 0.7250	-4.3 -0.17	1.3 0.05	41.0 1.61	42.5 1.67	2.3 0.09	65.0 2.56	60.0 2.36	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.40 0.88
20.940 0.8244	15.494 0.6100	-4.8 -0.19	1.5 0.06	41.0 1.61	43.5 1.71	1.5 0.06	71.0 2.80	68.0 2.68	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.43 0.95
20.940 0.8244	15.875 0.6250	-4.8 -0.19	1.5 0.06	41.0 1.61	43.5 1.71	1.5 0.06	73.0 2.87	69.0 2.72	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.49 1.08
16.764 0.6600	11.938 0.4700	-2.5 -0.10	0.0 0.00	39.0 1.54	45.5 1.79	1.3 0.05	56.0 2.20	53.0 2.09	0.80 0.03	0.70 0.03	15.7	13.9	0.0657	0.17 0.37
16.764 0.6600	11.938 0.4700	-2.5 -0.10	0.0 0.00	39.0 1.54	45.5 1.79	1.3 0.05	56.0 2.20	53.0 2.09	0.80 0.03	0.70 0.03	15.7	13.9	0.0657	0.17 0.38

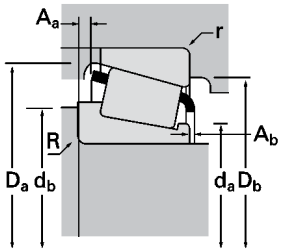
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.
[7] Compound radius on inner race. Details on drawing for bearing.
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
34.987 1.3775	61.973 2.4399	16.700 0.6575	39400 8850	0.44	1.35	10200 2290	7760 1750	1.31	52400 11800	LM78349A	LM78310A
34.987 1.3775	61.973 2.4399	16.700 0.6575	39400 8850	0.44	1.35	10200 2290	7760 1750	1.31	52400 11800	LM78349	LM78310A
34.987 1.3775	61.973 2.4399	18.000 0.7087	39400 8850	0.44	1.35	10200 2290	7760 1750	1.31	52400 11800	LM78349A	LM78310C
34.987 1.3775	61.973 2.4399	18.000 0.7087	39400 8850	0.44	1.35	10200 2290	7760 1750	1.31	52400 11800	LM78349	LM78310C
34.987 1.3775	65.987 2.5979	20.638 0.8125	57800 13000	0.35	1.70	15000 3370	9050 2030	1.66	72800 16400	M38547	M38511
35.000 1.3780	70.000 2.7559	25.270 0.9949	66600 15000	0.55	1.10	17300 3880	16100 3630	1.07	84900 19100	JS-3549A	JS-3510
35.000 1.3780	72.000 2.8346	17.018 0.6700	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19138X	19283
35.000 1.3780	72.000 2.8346	17.018 0.6700	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19138X	19283X
35.000 1.3780	73.025 2.8750	26.988 1.0625	82800 18600	0.37	1.62	21500 4830	13600 3050	1.58	102000 22900	23691	23620
35.000 1.3780	73.025 2.8750	26.988 1.0625	82800 18600	0.37	1.62	21500 4830	13600 3050	1.58	102000 22900	23691	23621
35.000 1.3780	75.311 2.9650	19.845 0.7813	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14139X	14274-S
35.000 1.3780	79.375 3.1250	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26883	26822
35.000 1.3780	80.000 3.1496	21.000 0.8268	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	339	332
35.000 1.3780	80.000 3.1496	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26883	26824
35.000 1.3780	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26883	26820
35.000 1.3780	80.167 3.1562	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3480	3422
35.000 1.3780	82.550 3.2500	28.575 1.1250	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	421	412A
35.000 1.3780	88.500 3.4843	26.988 1.0625	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	421	414
35.128 1.3830	65.088 2.5625	18.034 0.7100	50500 11300	0.38	1.59	13100 2940	8430 1890	1.55	63100 14200	LM48545	LM48510
35.306 1.3900	73.025 2.8750	22.225 0.8750	67700 15200	0.37	1.63	17600 3950	11100 2490	1.59	83800 18800	2880	2820
35.717 1.4062	72.233 2.8438	25.400 1.0000	71100 16000	0.55	1.10	18400 4140	17200 3870	1.07	94200 21200	HM88648	HM88610
36.487 1.4365	73.025 2.8750	23.812 0.9375	78800 17700	0.29	2.07	20400 4590	10200 2280	2.01	97400 21900	25880	25820
36.487 1.4365	73.025 2.8750	23.812 0.9375	78800 17700	0.29	2.07	20400 4590	10200 2280	2.01	97400 21900	25880	25821
36.487 1.4365	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2780	2735X
36.487 1.4365	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2794	2735X
36.487 1.4365	74.612 2.9375	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2780	2736
36.487 1.4365	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2780	2720
36.487 1.4365	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2780	2729

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
17.000 0.6693	13.600 0.5354	-2.5 -0.10	1.5 0.06	39.5 1.56	42.0 1.65	1.5 0.06	59.0 2.32	54.0 2.13	0.70 0.03	1.20 0.05	16.1	13.8	0.0678	0.21 0.46
17.000 0.6693	13.600 0.5354	-2.5 -0.10	3.5 0.14	40.0 1.57	46.0 1.81	1.5 0.06	59.0 2.32	54.0 2.13	* *	* *	16.1	16.2	0.0678	0.20 0.44
17.000 0.6693	15.000 0.5906	-2.5 -0.10	1.5 0.06	39.5 1.56	42.0 1.65	1.5 0.06	59.0 2.32	56.0 2.20	0.70 0.03	1.20 0.05	16.1	13.8	0.0678	0.22 0.48
17.000 0.6693	15.000 0.5906	-2.5 -0.10	3.5 0.14	40.0 1.57	46.0 1.81	1.5 0.06	59.0 2.32	56.0 2.20	* *	* *	16.1	16.2	0.0678	0.21 0.46
20.638 0.8125	16.670 0.6563	-5.6 -0.22	3.5 0.14	40.5 1.59	46.5 1.83	2.3 0.09	62.0 2.44	58.0 2.28	0.40 0.02	2.40 0.09	20.3	11.8	0.0680	0.30 0.66
23.500 0.9252	19.000 0.7480	-3.6 -0.14	2.0 0.08	42.0 1.65	47.0 1.85	1.5 0.06	66.5 2.62	60.0 2.36	1.60 0.06	1.60 0.06	20.7	11	0.0789	0.41 0.91
16.520 0.6504	14.288 0.5625	-1.5 -0.06	2.0 0.08	40.5 1.59	43.5 1.71	1.5 0.06	66.0 2.60	63.0 2.48	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.32 0.70
16.520 0.6504	14.288 0.5625	-1.5 -0.06	2.0 0.08	40.5 1.59	43.5 1.71	2.0 0.08	66.0 2.60	62.0 2.44	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.32 0.70
26.975 1.0620	22.225 0.8750	-8.1 -0.32	3.5 0.14	42.0 1.65	49.0 1.93	1.5 0.06	68.0 2.68	63.0 2.48	1.80 0.07	0.70 0.03	24.4	10.7	0.0734	0.52 1.14
26.975 1.0620	22.225 0.8750	-8.1 -0.32	3.5 0.14	42.0 1.65	49.0 1.93	0.8 0.03	68.0 2.68	63.0 2.48	1.80 0.07	0.70 0.03	24.4	10.7	0.0734	0.52 1.14
19.583 0.7710	15.875 0.6250	-4.3 -0.17	3.5 0.14	41.0 1.61	47.0 1.85	3.3 0.13	66.0 2.60	61.0 2.40	1.00 0.04	1.40 0.06	18	9.4	0.0668	0.40 0.89
25.400 1.0000	19.050 0.7500	-7.4 -0.29	0.8 0.03	42.0 1.65	42.5 1.67	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.60 1.33
22.403 0.8820	17.826 0.7018	-6.4 -0.25	0.8 0.03	41.5 1.63	42.5 1.67	1.3 0.05	75.0 2.95	73.0 2.87	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.53 1.17
25.400 1.0000	19.050 0.7500	-7.4 -0.29	0.8 0.03	42.0 1.65	42.5 1.67	1.3 0.05	74.0 2.91	70.0 2.76	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.62 1.36
25.400 1.0000	20.638 0.8125	-7.4 -0.29	0.8 0.03	42.0 1.65	42.5 1.67	3.3 0.13	74.0 2.91	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.63 1.39
29.771 1.1721	23.812 0.9375	-8.6 -0.34	1.5 0.06	43.5 1.71	46.0 1.81	3.3 0.13	74.0 2.91	68.0 2.68	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.72 1.59
29.083 1.1450	23.812 0.9375	-9.7 -0.38	0.8 0.03	42.0 1.65	42.5 1.67	1.5 0.06	77.5 3.06	74.0 2.91	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.75 1.65
29.083 1.1450	22.225 0.8750	-9.7 -0.38	0.8 0.03	42.0 1.65	42.5 1.67	1.5 0.06	80.0 3.15	77.0 3.03	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.87 1.92
18.288 0.7200	13.970 0.5500	-3.6 -0.14	0.8 0.03	41.0 1.61	41.5 1.63	1.3 0.05	61.0 2.40	58.0 2.28	0.80 0.03	1.10 0.04	18	10.6	0.0666	0.25 0.56
23.812 0.9375	17.462 0.6875	-5.6 -0.22	3.5 0.14	41.5 1.63	48.0 1.89	3.3 0.13	68.0 2.68	63.0 2.48	0.90 0.04	0.20 0.01	23.1	12.4	0.0718	0.42 0.93
25.400 1.0000	19.842 0.7812	-4.6 -0.18	3.5 0.14	42.5 1.67	54.0 2.13	2.3 0.09	69.0 2.72	60.0 2.36	1.70 0.06	1.80 0.07	23.4	10.9	0.0822	0.48 1.05
24.608 0.9688	19.050 0.7500	-8.1 -0.32	1.5 0.06	42.0 1.65	44.0 1.73	2.3 0.09	68.0 2.68	64.0 2.52	1.00 0.04	1.50 0.06	26.4	10.9	0.0695	0.45 0.99
24.608 0.9688	19.050 0.7500	-8.1 -0.32	1.5 0.06	42.0 1.65	44.0 1.73	0.8 0.03	68.0 2.68	65.0 2.56	1.00 0.04	1.50 0.06	26.4	10.9	0.0695	0.45 1.00
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	42.5 1.67	44.5 1.75	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.47 1.04
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	42.5 1.67	49.0 1.93	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.47 1.03
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	42.5 1.67	44.5 1.75	0.8 0.03	70.0 2.76	67.0 2.64	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.50 1.10
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	42.5 1.67	44.5 1.75	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.52 1.14
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	42.5 1.67	44.5 1.75	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.53 1.16

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

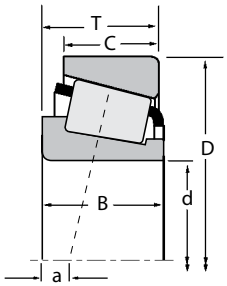
[7] Compound radius on inner race. Details on drawing for bearing.

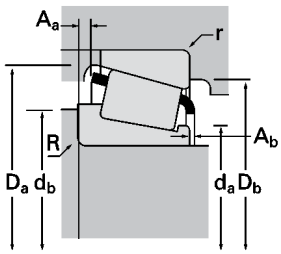
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
36.487 1.4365	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2794	2720
36.487 1.4365	79.375 3.1250	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2780	2731
36.512 1.4375	68.262 2.6875	15.875 0.6250	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19143	19268
36.512 1.4375	69.012 2.7170	19.050 0.7500	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13682	13621
36.512 1.4375	72.000 2.8346	17.018 0.6700	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19143	19283
36.512 1.4375	72.000 2.8346	17.018 0.6700	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19143	19283X
36.512 1.4375	72.000 2.8346	19.000 0.7480	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16143	16282
36.512 1.4375	72.238 2.8440	20.638 0.8125	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16143	16284
36.512 1.4375	76.200 3.0000	29.370 1.1563	87700 19700	0.40	1.49	22700 5110	15600 3520	1.45	107000 24100	31597	31520
36.512 1.4375	76.200 3.0000	29.370 1.1563	87700 19700	0.40	1.49	22700 5110	15600 3520	1.45	107000 24100	31597	31521
36.512 1.4375	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89448	HM89410
36.512 1.4375	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89449	HM89410
36.512 1.4375	76.200 3.0000	29.370 1.1563	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89449	HM89411
36.512 1.4375	79.375 3.1250	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3479	3420
36.512 1.4375	79.375 3.1250	29.370 1.1563	98100 22100	0.55	1.10	25400 5720	23800 5350	1.07	121000 27200	HM89249	HM89210
36.512 1.4375	80.000 3.1496	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26877	26824
36.512 1.4375	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26877	26820
36.512 1.4375	80.167 3.1562	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3479	3422
36.512 1.4375	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25570	25520
36.512 1.4375	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3878	3820
36.512 1.4375	88.500 3.4843	25.400 1.0000	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44143	44348
36.512 1.4375	93.662 3.6875	31.750 1.2500	120000 26900	0.40	1.49	31000 6980	21400 4800	1.45	158000 35500	46143	46368
38.000 1.4961	63.000 2.4803	17.000 0.6693	39800 8960	0.42	1.44	10300 2320	7360 1650	1.40	55000 12400	JL69348	JL69310
38.000 1.4961	63.000 2.4803	17.000 0.6693	39800 8960	0.42	1.44	10300 2320	7360 1650	1.40	55000 12400	JL69349A	JL69310
38.000 1.4961	63.000 2.4803	17.000 0.6693	39800 8960	0.42	1.44	10300 2320	7360 1650	1.40	55000 12400	JL69349	JL69310
38.000 1.4961	63.000 2.4803	17.000 0.6693	39800 8960	0.42	1.44	10300 2320	7360 1650	1.40	55000 12400	JL69349X	JL69310
38.000 1.4961	68.000 2.6772	16.020 0.6307	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19149X	19267X
38.100 1.5000	63.500 2.5000	12.700 0.5000	25100 5650	0.35	1.73	6520 1470	3860 869	1.69	33000 7430	13889	13830

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	42.5 1.67	49.0 1.93	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.51 1.13
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	42.5 1.67	44.5 1.75	3.3 0.13	72.0 2.83	67.0 2.64	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.57 1.27
16.520 0.6504	11.908 0.4688	-1.5 -0.06	1.5 0.06	41.5 1.63	44.0 1.73	1.5 0.06	65.0 2.56	61.0 2.40	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.25 0.55
19.050 0.7500	15.083 0.5938	-3.0 -0.12	3.5 0.14	41.5 1.63	48.0 1.89	2.3 0.09	65.0 2.56	61.0 2.40	0.90 0.04	0.60 0.02	20.7	12.2	0.0713	0.30 0.65
16.520 0.6504	14.288 0.5625	-1.5 -0.06	1.5 0.06	41.5 1.63	44.0 1.73	1.5 0.06	66.0 2.60	63.0 2.48	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.31 0.68
16.520 0.6504	14.288 0.5625	-1.5 -0.06	1.5 0.06	41.5 1.63	44.0 1.73	2.0 0.08	66.0 2.60	62.0 2.44	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.31 0.68
20.638 0.8125	14.237 0.5605	-4.1 -0.16	3.5 0.14	42.0 1.65	48.5 1.91	1.5 0.06	67.0 2.64	63.0 2.48	1.20 0.05	1.10 0.04	20.3	10.6	0.0707	0.35 0.76
20.638 0.8125	15.875 0.6250	-4.1 -0.16	3.5 0.14	42.0 1.65	48.5 1.91	1.3 0.05	67.0 2.64	63.0 2.48	1.20 0.05	1.10 0.04	20.3	10.6	0.0707	0.37 0.81
28.575 1.1250	23.812 0.9375	-7.6 -0.30	3.5 0.14	44.5 1.75	51.0 2.01	3.3 0.13	72.0 2.83	64.0 2.52	1.60 0.06	1.20 0.05	26.3	9.08	0.0773	0.59 1.31
28.575 1.1250	23.812 0.9375	-7.6 -0.30	3.5 0.14	44.5 1.75	51.0 2.01	1.3 0.05	72.0 2.83	66.0 2.60	1.60 0.06	1.20 0.05	26.3	9.08	0.0773	0.60 1.33
28.575 1.1250	23.020 0.9063	-5.6 -0.22	0.8 0.03	44.5 1.75	48.5 1.91	3.3 0.13	73.0 2.87	62.0 2.44	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.62 1.38
28.575 1.1250	23.020 0.9063	-5.6 -0.22	3.5 0.14	44.5 1.75	57.0 2.24	3.3 0.13	73.0 2.87	62.0 2.44	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.62 1.37
28.575 1.1250	23.020 0.9063	-5.6 -0.22	3.5 0.14	44.5 1.75	57.0 2.24	0.8 0.03	73.0 2.87	65.0 2.56	2.00 0.08	1.40 0.05	28.9	13.1	0.0883	0.63 1.39
29.771 1.1721	23.812 0.9375	-8.6 -0.34	0.8 0.03	44.5 1.75	45.5 1.79	3.3 0.13	74.0 2.91	67.0 2.64	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.68 1.51
28.829 1.1350	22.664 0.8923	-5.8 -0.23	3.5 0.14	44.0 1.73	55.0 2.17	3.3 0.13	75.0 2.95	66.0 2.60	2.40 0.09	2.50 0.10	27	11.1	0.0861	0.69 1.53
25.400 1.0000	19.050 0.7500	-7.4 -0.29	0.8 0.03	43.0 1.69	44.0 1.73	1.3 0.05	74.0 2.91	70.0 2.76	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.60 1.32
25.400 1.0000	20.638 0.8125	-7.4 -0.29	0.8 0.03	43.0 1.69	44.0 1.73	3.3 0.13	74.0 2.91	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.61 1.36
29.771 1.1721	23.812 0.9375	-8.6 -0.34	0.8 0.03	44.5 1.75	45.5 1.79	3.3 0.13	74.0 2.91	68.0 2.68	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.70 1.55
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	45.0 1.77	51.0 2.01	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.66 1.45
30.162 1.1875	23.812 0.9375	-8.1 -0.32	0.8 0.03	47.0 1.85	48.0 1.89	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.87 1.92
23.698 0.9330	17.462 0.6875	2.3 0.09	2.3 0.09	50.0 1.97	54.0 2.13	1.5 0.06	84.0 3.31	75.0 2.95	3.90 0.15	2.60 0.10	22.9	8.71	0.0899	0.73 1.60
31.750 1.2500	26.195 1.0313	-7.9 -0.31	1.5 0.06	48.0 1.89	50.0 1.97	3.3 0.13	87.0 3.43	79.0 3.11	2.20 0.08	1.10 0.04	44.4	13.4	0.0920	1.15 2.53
17.000 0.6693	13.500 0.5315	-2.3 -0.09	3.3 0.13	42.5 1.67	46.5 1.83	1.3 0.05	60.0 2.36	56.0 2.20	0.50 0.02	1.30 0.05	18.4	14.5	0.0692	0.20 0.45
17.000 0.6693	13.500 0.5315	-2.3 -0.09	1.3 0.05	42.5 1.67	44.5 1.75	1.3 0.05	60.0 2.36	56.0 2.20	0.60 0.02	1.30 0.05	18.4	14.5	0.0692	0.20 0.45
17.000 0.6693	13.500 0.5315	-2.3 -0.09	0.0 0.00	42.5 1.67	46.5 1.83	1.3 0.05	60.0 2.36	56.0 2.20	0.50 0.02	1.30 0.05	18.4	14.5	0.0692	0.20 0.45
17.000 0.6693	13.500 0.5315	-2.3 -0.09	2.3 0.09	43.0 1.69	47.0 1.85	1.3 0.05	60.0 2.36	56.0 2.20	0.60 0.02	1.30 0.05	18.4	15	0.0692	0.20 0.45
16.520 0.6504	12.000 0.4724	-1.5 -0.06	2.0 0.08	43.0 1.69	46.0 1.81	1.5 0.06	64.0 2.52	61.0 2.40	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.23 0.52
11.908 0.4688	9.525 0.3750	-0.8 -0.03	1.5 0.06	42.5 1.67	45.0 1.77	0.8 0.03	60.0 2.36	59.0 2.32	0.20 0.01	1.40 0.05	14.8	23.3	0.0601	0.15 0.33

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

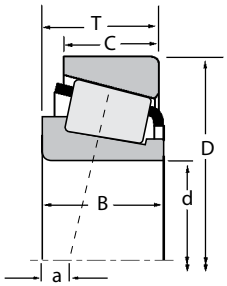
[7] Compound radius on inner race. Details on drawing for bearing.

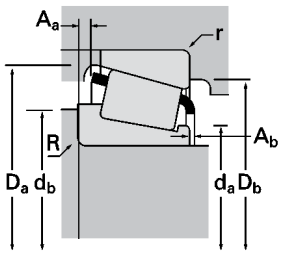
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
38.100 1.5000	65.088 2.5625	12.700 0.5000	25100 5650	0.35	1.73	6520 1470	3860 869	1.69	33000 7430	13889	13836
38.100 1.5000	65.088 2.5625	18.034 0.7100	45000 10100	0.33	1.80	11700 2620	6640 1490	1.76	60300 13600	LM29748	LM29710
38.100 1.5000	65.088 2.5625	18.034 0.7100	45000 10100	0.33	1.80	11700 2620	6640 1490	1.76	60300 13600	LM29749	LM29710
38.100 1.5000	65.088 2.5625	19.812 0.7800	45000 10100	0.33	1.80	11700 2620	6640 1490	1.76	60300 13600	LM29749	LM29711
38.100 1.5000	68.262 2.6875	15.875 0.6250	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19150	19268
38.100 1.5000	68.262 2.6875	19.997 0.7873	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19150	19269
38.100 1.5000	69.012 2.7170	19.050 0.7500	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13685	13620
38.100 1.5000	69.012 2.7170	19.050 0.7500	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13685	13621
38.100 1.5000	69.012 2.7170	19.050 0.7500	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13687	13620
38.100 1.5000	69.012 2.7170	19.050 0.7500	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13687	13621
38.100 1.5000	69.012 2.7170	19.050 0.7500	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13685A	13620
38.100 1.5000	69.012 2.7170	19.050 0.7500	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13685A	13621
38.100 1.5000	69.012 2.7170	26.195 1.0313	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13686	13620
38.100 1.5000	69.012 2.7170	26.195 1.0313	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13686	13621
38.100 1.5000	69.969 2.7547	21.996 0.8660	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13685	13624
38.100 1.5000	69.969 2.7547	21.996 0.8660	52500 11800	0.40	1.49	13600 3060	9370 2110	1.45	67900 15300	13687	13624
38.100 1.5000	71.438 2.8125	15.875 0.6250	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19150	19281
38.100 1.5000	72.000 2.8346	17.018 0.6700	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19150	19283
38.100 1.5000	72.000 2.8346	19.000 0.7480	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16150	16282
38.100 1.5000	72.238 2.8440	20.638 0.8125	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16150	16284
38.100 1.5000	72.238 2.8440	23.812 0.9375	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16150	16283
38.100 1.5000	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2776	2735X
38.100 1.5000	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788	2735X
38.100 1.5000	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788A	2735X
38.100 1.5000	74.612 2.9375	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788A	2736
38.100 1.5000	76.200 3.0000	20.625 0.8120	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28150	28300X
38.100 1.5000	76.200 3.0000	20.638 0.8125	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28150	28300
38.100 1.5000	76.200 3.0000	20.638 0.8125	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28151	28300

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
11.908 0.4688	9.525 0.3750	-0.8 -0.03	1.5 0.06	42.5 1.67	45.0 1.77	0.8 0.03	61.0 2.40	59.0 2.32	0.20 0.01	1.40 0.05	14.8	23.3	0.0601	0.16 0.35
18.288 0.7200	13.970 0.5500	-4.1 -0.16	3.5 0.14	42.5 1.67	49.0 1.93	1.3 0.05	62.0 2.44	59.0 2.32	0.70 0.03	1.10 0.04	20.4	15	0.0666	0.22 0.50
18.288 0.7200	13.970 0.5500	-4.1 -0.16	2.3 0.09	42.5 1.67	46.5 1.83	1.3 0.05	62.0 2.44	59.0 2.32	0.70 0.03	1.10 0.04	20.4	15	0.0666	0.23 0.51
18.288 0.7200	15.748 0.6200	-4.1 -0.16	2.3 0.09	42.5 1.67	46.5 1.83	1.3 0.05	62.0 2.44	58.0 2.28	0.70 0.03	1.10 0.04	20.4	15	0.0666	0.25 0.55
16.520 0.6504	11.908 0.4688	-1.5 -0.06	1.5 0.06	43.0 1.69	45.0 1.77	1.5 0.06	65.0 2.56	61.0 2.40	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.24 0.53
16.520 0.6504	16.030 0.6311	-1.5 -0.06	1.5 0.06	43.0 1.69	45.0 1.77	1.5 0.06	65.0 2.56	60.0 2.36	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.28 0.61
19.050 0.7500	15.083 0.5938	-3.0 -0.12	3.5 0.14	43.0 1.69	49.5 1.95	0.8 0.03	65.0 2.56	62.0 2.44	0.90 0.04	0.60 0.02	20.7	10.9	0.0713	0.29 0.63
19.050 0.7500	15.083 0.5938	-3.0 -0.12	3.5 0.14	43.0 1.69	49.5 1.95	2.3 0.09	65.0 2.56	61.0 2.40	0.90 0.04	0.60 0.02	20.7	10.9	0.0713	0.28 0.62
19.050 0.7500	15.083 0.5938	-3.0 -0.12	2.0 0.08	43.0 1.69	46.5 1.83	0.8 0.03	65.0 2.56	62.0 2.44	0.90 0.04	0.60 0.02	20.7	10.9	0.0713	0.29 0.64
19.050 0.7500	15.083 0.5938	-3.0 -0.12	2.0 0.08	43.0 1.69	46.5 1.83	2.3 0.09	65.0 2.56	61.0 2.40	0.90 0.04	0.60 0.02	20.7	10.9	0.0713	0.29 0.63
19.050 0.7500	15.083 0.5938	-3.0 -0.12	0.8 0.03	43.0 1.69	44.0 1.73	0.8 0.03	65.0 2.56	62.0 2.44	0.90 0.04	0.60 0.02	20.7	12.2	0.0713	0.29 0.64
19.050 0.7500	15.083 0.5938	-3.0 -0.12	0.8 0.03	43.0 1.69	44.0 1.73	2.3 0.09	65.0 2.56	61.0 2.40	0.90 0.04	0.60 0.02	20.7	12.2	0.0713	0.29 0.63
26.195 1.0313	15.083 0.5938	-10.2 -0.40	1.5 0.06	43.0 1.69	45.5 1.79	0.8 0.03	65.0 2.56	62.0 2.44	8.00 0.32	0.60 0.02	20.7	12.2	0.0713	0.35 0.77
26.195 1.0313	15.083 0.5938	-10.2 -0.40	1.5 0.06	43.0 1.69	45.5 1.79	2.3 0.09	65.0 2.56	61.0 2.40	8.00 0.32	0.60 0.02	20.7	12.2	0.0713	0.35 0.76
19.050 0.7500	18.029 0.7098	-3.0 -0.12	3.5 0.14	43.0 1.69	49.5 1.95	1.5 0.06	65.0 2.56	61.0 2.40	0.90 0.04	0.60 0.02	20.7	10.9	0.0713	0.33 0.73
19.050 0.7500	18.029 0.7098	-3.0 -0.12	2.0 0.08	43.0 1.69	46.5 1.83	1.5 0.06	65.0 2.56	61.0 2.40	0.90 0.04	0.60 0.02	20.7	10.9	0.0713	0.33 0.73
16.520 0.6504	11.908 0.4688	-1.5 -0.06	1.5 0.06	43.0 1.69	45.0 1.77	1.0 0.04	66.0 2.60	63.0 2.48	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.27 0.60
16.520 0.6504	14.288 0.5625	-1.5 -0.06	1.5 0.06	43.0 1.69	45.0 1.77	1.5 0.06	66.0 2.60	63.0 2.48	1.20 0.05	1.50 0.06	17.5	11.5	0.0694	0.30 0.66
20.638 0.8125	14.237 0.5605	-4.1 -0.16	3.5 0.14	43.0 1.69	49.5 1.95	1.5 0.06	67.0 2.64	63.0 2.48	1.20 0.05	1.10 0.04	20.3	10.6	0.0707	0.33 0.73
20.638 0.8125	15.875 0.6250	-4.1 -0.16	3.5 0.14	43.0 1.69	49.5 1.95	1.3 0.05	67.0 2.64	63.0 2.48	1.20 0.05	1.10 0.04	20.3	10.6	0.0707	0.35 0.78
20.638 0.8125	19.050 0.7500	-4.1 -0.16	3.5 0.14	43.0 1.69	49.5 1.95	2.3 0.09	67.0 2.64	61.0 2.40	1.20 0.05	1.10 0.04	20.3	10.6	0.0707	0.39 0.86
25.654 1.0100	19.050 0.7500	-8.1 -0.32	4.3 0.17	43.5 1.71	52.0 2.05	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.44 0.98
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	43.5 1.71	50.0 1.97	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.45 0.98
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	43.5 1.71	46.0 1.81	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.45 1.00
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	43.5 1.71	46.0 1.81	0.8 0.03	70.0 2.76	67.0 2.64	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.48 1.06
20.940 0.8244	15.494 0.6100	-4.8 -0.19	1.5 0.06	43.5 1.71	45.5 1.79	1.5 0.06	71.0 2.80	68.0 2.68	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.40 0.89
20.940 0.8244	15.507 0.6105	-4.8 -0.19	1.5 0.06	43.5 1.71	45.5 1.79	1.3 0.05	71.0 2.80	68.0 2.68	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.40 0.88
20.940 0.8244	15.507 0.6105	-4.8 -0.19	3.5 0.14	43.5 1.71	50.0 1.97	1.3 0.05	71.0 2.80	68.0 2.68	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.39 0.87

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

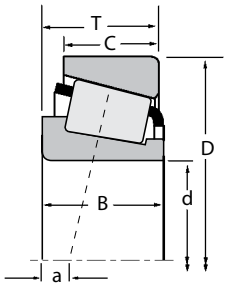
[7] Compound radius on inner race. Details on drawing for bearing.

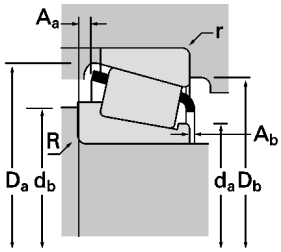
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
38.100 1.5000	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2776	2720
38.100 1.5000	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2777	2720
38.100 1.5000	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788	2720
38.100 1.5000	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788	2729
38.100 1.5000	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788	2729X
38.100 1.5000	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788A	2720
38.100 1.5000	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788A	2729
38.100 1.5000	76.200 3.0000	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26878	26823
38.100 1.5000	79.375 3.1250	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26878	26822
38.100 1.5000	79.375 3.1250	25.400 1.0000	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2776	2734
38.100 1.5000	79.375 3.1250	25.400 1.0000	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788	2734
38.100 1.5000	79.375 3.1250	29.370 1.1563	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3490	3420
38.100 1.5000	79.974 3.1486	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3387	3325
38.100 1.5000	80.000 3.1496	21.006 0.8270	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28150	28315A
38.100 1.5000	80.000 3.1496	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26878	26824
38.100 1.5000	80.035 3.1510	24.608 0.9688	72200 16200	0.56	1.07	18700 4210	18000 4040	1.04	91100 20500	27880	27820
38.100 1.5000	80.035 3.1510	24.608 0.9688	72200 16200	0.56	1.07	18700 4210	18000 4040	1.04	91100 20500	27881	27820
38.100 1.5000	80.035 3.1510	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3387	3339
38.100 1.5000	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26878	26820
38.100 1.5000	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26878	26830
38.100 1.5000	80.167 3.1562	26.988 1.0625	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	347	3320
38.100 1.5000	80.167 3.1562	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3381	3320
38.100 1.5000	80.167 3.1562	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3381	3331
38.100 1.5000	80.167 3.1562	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3387	3320
38.100 1.5000	81.755 3.2187	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3381	3329
38.100 1.5000	81.755 3.2187	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3387	3329
38.100 1.5000	82.550 3.2500	29.370 1.1563	95100 21400	0.55	1.10	24600 5540	23000 5180	1.07	130000 29300	HM801346	HM801310
38.100 1.5000	82.550 3.2500	29.370 1.1563	95100 21400	0.55	1.10	24600 5540	23000 5180	1.07	130000 29300	HM801346	HM801311

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.654 1.0100	19.050 0.7500	-8.1 -0.32	4.3 0.17	43.5 1.71	52.0 2.05	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.49 1.08
25.654 1.0100	19.050 0.7500	-8.1 -0.32	5.5 0.22	43.5 1.71	54.0 2.13	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.48 1.07
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	43.5 1.71	50.0 1.97	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.49 1.09
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	43.5 1.71	50.0 1.97	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.50 1.11
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	43.5 1.71	50.0 1.97	1.5 0.06	70.0 2.76	67.0 2.64	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.50 1.10
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	43.5 1.71	46.0 1.81	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.50 1.10
25.654 1.0100	19.050 0.7500	-8.1 -0.32	1.5 0.06	43.5 1.71	46.0 1.81	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.51 1.12
25.400 1.0000	20.638 0.8125	-7.4 -0.29	0.8 0.03	44.5 1.75	45.0 1.77	1.5 0.06	73.0 2.87	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.53 1.16
25.400 1.0000	19.050 0.7500	-7.4 -0.29	0.8 0.03	44.5 1.75	45.0 1.77	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.57 1.26
25.654 1.0100	20.638 0.8125	-8.1 -0.32	4.3 0.17	43.5 1.71	52.0 2.05	3.3 0.13	72.0 2.83	67.0 2.64	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.57 1.26
25.654 1.0100	20.638 0.8125	-8.1 -0.32	3.5 0.14	43.5 1.71	50.0 1.97	3.3 0.13	72.0 2.83	67.0 2.64	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.58 1.27
29.771 1.1721	23.812 0.9375	-8.6 -0.34	3.5 0.14	45.5 1.80	52.0 2.05	3.3 0.13	74.0 2.91	67.0 2.64	1.40 0.06	0.90 0.04	29.9	11.2	0.0781	0.66 1.45
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	44.5 1.75	45.0 1.77	3.3 0.13	74.5 2.94	70.0 2.76	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.67 1.48
20.940 0.8244	15.875 0.6250	-4.8 -0.19	1.5 0.06	43.5 1.71	45.5 1.79	2.0 0.08	73.0 2.87	69.0 2.72	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.46 1.01
25.400 1.0000	19.050 0.7500	-7.4 -0.29	0.8 0.03	44.5 1.75	45.0 1.77	1.3 0.05	74.0 2.91	70.0 2.76	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.58 1.28
23.698 0.9330	18.512 0.7288	-2.5 -0.10	0.8 0.03	47.0 1.85	48.0 1.89	1.5 0.06	75.0 2.95	68.0 2.68	3.20 0.13	1.50 0.06	24.6	12.6	0.0839	0.56 1.23
23.698 0.9330	18.512 0.7288	-2.5 -0.10	3.5 0.14	47.0 1.85	53.0 2.09	1.5 0.06	75.0 2.95	68.0 2.68	3.20 0.13	1.50 0.06	24.6	12.6	0.0839	0.55 1.22
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	44.5 1.75	45.0 1.77	1.5 0.06	74.5 2.94	71.0 2.80	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.68 1.50
25.400 1.0000	20.638 0.8125	-7.4 -0.29	0.8 0.03	44.5 1.75	45.0 1.77	3.3 0.13	74.0 2.91	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.60 1.32
25.400 1.0000	20.638 0.8125	-7.4 -0.29	0.8 0.03	44.5 1.75	45.0 1.77	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.61 1.34
22.403 0.8820	23.812 0.9375	-6.4 -0.25	3.5 0.14	44.0 1.73	50.0 1.97	3.3 0.13	75.0 2.95	70.0 2.76	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.56 1.23
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	44.5 1.75	51.0 2.01	3.3 0.13	75.0 2.95	70.0 2.76	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.67 1.48
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	44.5 1.75	51.0 2.01	0.8 0.03	74.5 2.94	72.0 2.83	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.68 1.50
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	44.5 1.75	45.0 1.77	3.3 0.13	75.0 2.95	70.0 2.76	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.68 1.49
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	44.5 1.75	51.0 2.01	3.3 0.13	75.0 2.95	71.0 2.80	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.71 1.56
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	44.5 1.75	45.0 1.77	3.3 0.13	75.0 2.95	71.0 2.80	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.71 1.57
28.575 1.1250	23.020 0.9063	-4.8 -0.19	0.8 0.03	49.0 1.93	51.0 2.01	3.3 0.13	78.0 3.07	68.0 2.68	2.10 0.08	1.80 0.07	33.7	14	0.0928	0.76 1.68
28.575 1.1250	23.020 0.9063	-4.8 -0.19	0.8 0.03	49.0 1.93	51.0 2.01	0.8 0.03	78.0 3.07	70.0 2.76	2.10 0.08	1.80 0.07	33.7	14	0.0928	0.77 1.71

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

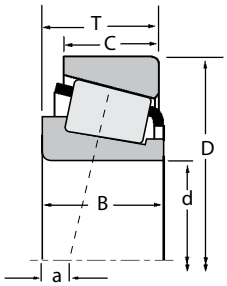
[7] Compound radius on inner race. Details on drawing for bearing.

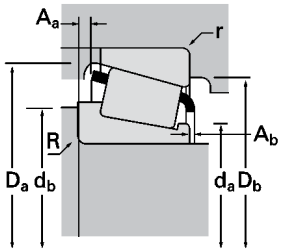
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
38.100 1.5000	82.550 3.2500	29.370 1.1563	95100 21400	0.55	1.10	24600 5540	23000 5180	1.07	130000 29300	HM801346X	HM801310
38.100 1.5000	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25572	25520
38.100 1.5000	85.000 3.3465	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25572	25526
38.100 1.5000	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3875	3820
38.100 1.5000	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3876	3820
38.100 1.5000	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3876	3821
38.100 1.5000	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3580	3525
38.100 1.5000	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3583	3525
38.100 1.5000	88.500 3.4843	25.400 1.0000	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44150	44348
38.100 1.5000	88.500 3.4843	26.988 1.0625	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	418	414
38.100 1.5000	88.500 3.4843	26.988 1.0625	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	418	414A
38.100 1.5000	88.900 3.5000	26.988 1.0625	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	418	414X
38.100 1.5000	90.488 3.5625	39.688 1.5625	155000 34900	0.28	2.11	40200 9040	19600 4400	2.05	204000 45900	4375	4335
38.100 1.5000	93.662 3.6875	31.750 1.2500	126000 28200	0.36	1.67	32600 7320	20100 4510	1.62	156000 35000	49151	49368
38.100 1.5000	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	440	432
38.100 1.5000	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	444	432
38.100 1.5000	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33880	33821
38.100 1.5000	95.250 3.7500	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53150	53375
38.100 1.5000	95.250 3.7500	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903241	HM903210
38.100 1.5000	98.425 3.8750	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53150	53387
38.100 1.5000	98.425 3.8750	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903241	HM903216
38.100 1.5000	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	525	522
38.100 1.5000	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	525X	522
38.100 1.5000	103.188 4.0625	38.100 1.5000	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	542	533A
38.100 1.5000	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455A	453A
38.100 1.5000	111.125 4.3750	38.100 1.5000	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	542	532A
38.481 1.5150	63.500 2.5000	12.700 0.5000	25100 5650	0.35	1.73	6520 1470	3860 869	1.69	33000 7430	13890	13830
38.481 1.5150	65.088 2.5625	12.700 0.5000	25100 5650	0.35	1.73	6520 1470	3860 869	1.69	33000 7430	13890	13836

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
28.575 1.1250	23.020 0.9063	-4.8 -0.19	2.3 0.09	49.0 1.93	54.0 2.13	3.3 0.13	78.0 3.07	68.0 2.68	2.10 0.08	1.80 0.07	33.7	14	0.0928	0.76 1.68
25.400 1.0000	19.050 0.7500	-6.4 -0.25	0.8 0.03	46.0 1.81	46.0 1.81	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.64 1.42
25.400 1.0000	19.050 0.7500	-6.4 -0.25	0.8 0.03	46.0 1.81	46.0 1.81	2.3 0.09	78.0 3.07	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.68 1.50
30.162 1.1875	23.812 0.9375	-8.1 -0.32	0.8 0.03	48.5 1.91	49.5 1.95	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.85 1.87
30.162 1.1875	23.812 0.9375	-8.1 -0.32	3.5 0.14	48.5 1.91	55.0 2.17	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.84 1.86
30.162 1.1875	23.812 0.9375	-8.1 -0.32	3.5 0.14	48.5 1.91	55.0 2.17	1.3 0.05	81.0 3.19	75.0 2.95	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.85 1.88
30.886 1.2160	23.812 0.9375	-10.2 -0.40	1.5 0.06	45.5 1.79	48.0 1.89	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.87 1.91
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	45.5 1.79	52.0 2.05	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.86 1.90
23.698 0.9330	17.462 0.6875	2.3 0.09	2.3 0.09	51.0 2.00	55.0 2.17	1.5 0.06	84.0 3.31	75.0 2.95	3.90 0.15	2.60 0.10	22.9	8.71	0.0899	0.71 1.56
29.083 1.1450	22.225 0.8750	-9.7 -0.38	3.5 0.14	44.5 1.75	51.0 2.01	1.5 0.06	80.0 3.15	77.0 3.03	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.82 1.81
29.083 1.1450	22.225 0.8750	-9.7 -0.38	3.5 0.14	44.5 1.75	51.0 2.01	3.3 0.13	80.0 3.15	76.0 2.99	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.81 1.80
29.083 1.1450	22.225 0.8750	-9.7 -0.38	3.5 0.14	44.5 1.75	51.0 2.01	0.8 0.03	80.0 3.15	78.0 3.07	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.84 1.84
40.386 1.5900	33.338 1.3125	-15.0 -0.59	1.5 0.06	51.0 2.01	53.0 2.09	3.3 0.13	85.0 3.35	77.0 3.03	2.30 0.09	0.60 0.02	52.9	16.7	0.0872	1.31 2.89
31.750 1.2500	25.400 1.0000	-9.1 -0.36	0.8 0.03	48.0 1.89	48.5 1.91	3.3 0.13	87.0 3.43	82.0 3.23	3.00 0.12	0.80 0.03	42.4	13.6	0.0872	1.08 2.39
29.900 1.1772	22.225 0.8750	-9.1 -0.36	0.8 0.03	45.5 1.79	46.5 1.83	2.3 0.09	87.0 3.43	83.0 3.27	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	1.04 2.29
29.900 1.1772	22.225 0.8750	-9.1 -0.36	3.5 0.14	45.5 1.79	52.0 2.05	2.3 0.09	87.0 3.43	83.0 3.27	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	1.03 2.27
28.575 1.1250	22.225 0.8750	-7.6 -0.30	3.5 0.14	48.0 1.89	54.0 2.13	2.3 0.09	90.0 3.54	85.0 3.35	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	1.05 2.31
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.5 0.06	52.5 2.07	55.0 2.17	0.8 0.03	89.0 3.50	81.0 3.19	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.02 2.25
28.575 1.1250	22.225 0.8750	0.5 0.02	3.5 0.14	54.0 2.13	61.0 2.40	0.8 0.03	91.0 3.58	81.0 3.19	3.90 0.16	2.00 0.08	33.7	9.91	0.1010	1.09 2.40
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.5 0.06	52.5 2.07	55.0 2.17	0.8 0.03	91.0 3.58	82.0 3.23	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.10 2.42
28.575 1.1250	22.225 0.8750	0.5 0.02	3.5 0.14	54.0 2.13	61.0 2.40	0.8 0.03	92.0 3.62	82.0 3.23	3.90 0.16	2.00 0.08	33.7	9.91	0.1010	1.17 2.58
36.068 1.4200	26.988 1.0625	-12.7 -0.50	3.5 0.14	48.0 1.89	54.0 2.13	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.48 3.26
36.068 1.4200	26.988 1.0625	-12.7 -0.50	0.8 0.03	48.0 1.89	49.0 1.93	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.49 3.28
36.957 1.4550	30.162 1.1875	-12.2 -0.48	3.5 0.14	49.0 1.93	55.0 2.17	1.5 0.06	98.0 3.86	93.0 3.66	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.65 3.63
29.317 1.1542	22.225 0.8750	-7.1 -0.28	3.5 0.14	49.5 1.95	56.0 2.20	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.43 3.15
36.957 1.4550	30.162 1.1875	-12.2 -0.48	3.5 0.14	49.0 1.93	55.0 2.17	3.3 0.13	100.0 3.94	95.0 3.74	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.95 4.30
11.908 0.4688	9.525 0.3750	-0.8 -0.03	0.4 0.02	43.0 1.69	43.0 1.69	0.8 0.03	60.0 2.36	59.0 2.32	0.20 0.01	1.40 0.05	14.8	23.3	0.0601	0.15 0.32
11.908 0.4688	9.525 0.3750	-0.8 -0.03	0.4 0.02	43.0 1.69	43.0 1.69	0.8 0.03	61.0 2.40	59.0 2.32	0.20 0.01	1.40 0.05	14.8	23.3	0.0601	0.16 0.35

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

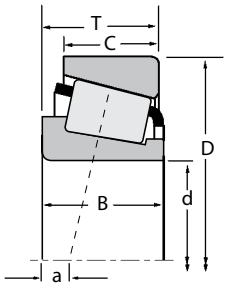
[7] Compound radius on inner race. Details on drawing for bearing.

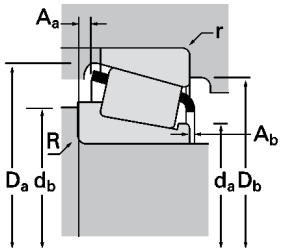
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
39.000 1.5354	72.014 2.8352	21.400 0.8425	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	J16154	J16285
39.688 1.5625	73.025 2.8750	16.667 0.6562	47000 10600	0.35	1.71	12200 2740	7310 1640	1.67	58100 13100	18587	18520
39.688 1.5625	73.025 2.8750	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2789	2735X
39.688 1.5625	73.025 2.8750	25.654 1.0100	68000 15300	0.33	1.80	17600 3960	10000 2260	1.76	89100 20000	M201047	M201011
39.688 1.5625	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2789	2720
39.688 1.5625	76.200 3.0000	23.812 0.9375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2789	2729
39.688 1.5625	76.200 3.0000	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26881	26823
39.688 1.5625	79.375 3.1250	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26880	26822
39.688 1.5625	79.375 3.1250	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26881	26822
39.688 1.5625	79.375 3.1250	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26880	26822A
39.688 1.5625	79.974 3.1486	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3382	3325
39.688 1.5625	79.974 3.1486	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3386	3325
39.688 1.5625	80.000 3.1496	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26881	26824
39.688 1.5625	80.035 3.1510	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3386	3339
39.688 1.5625	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26880	26820
39.688 1.5625	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26880	26830
39.688 1.5625	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26881	26820
39.688 1.5625	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26881	26830
39.688 1.5625	80.167 3.1562	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3382	3320
39.688 1.5625	80.167 3.1562	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3382	3331
39.688 1.5625	80.167 3.1562	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3386	3320
39.688 1.5625	80.167 3.1562	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3386	3331
39.688 1.5625	80.167 3.1562	29.370 1.1563	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26880	26821
39.688 1.5625	84.138 3.3125	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3382	3328
39.688 1.5625	84.138 3.3125	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3386	3328
39.688 1.5625	88.500 3.4843	25.400 1.0000	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44156	44348
39.688 1.5625	88.500 3.4843	25.400 1.0000	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44158	44348
39.688 1.5625	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	620	612

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
20.638 0.8125	16.637 0.6550	-4.1 -0.16	3.5 0.14	44.5 1.75	51.0 2.01	0.4 0.02	67.0 2.64	63.0 2.48	1.20 0.05	1.10 0.04	20.3	10.6	0.0707	0.36 0.79
17.462 0.6875	12.700 0.5000	-2.8 -0.11	0.8 0.03	45.0 1.77	45.5 1.79	1.5 0.06	69.0 2.72	66.0 2.60	0.50 0.02	1.20 0.05	21	15.4	0.0681	0.30 0.65
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	45.0 1.77	52.0 2.05	0.8 0.03	69.0 2.72	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.43 0.94
22.098 0.8700	21.336 0.8400	-5.8 -0.23	0.8 0.03	48.0 1.89	45.5 1.79	2.3 0.09	69.0 2.72	64.0 2.52	0.50 0.02	2.00 0.08	27.5	15	0.0736	0.43 0.94
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	45.0 1.77	52.0 2.05	3.3 0.13	70.0 2.76	66.0 2.60	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.47 1.04
25.654 1.0100	19.050 0.7500	-8.1 -0.32	3.5 0.14	45.0 1.77	52.0 2.05	0.8 0.03	70.0 2.76	68.0 2.68	1.40 0.06	0.90 0.04	28.7	12.2	0.0725	0.48 1.06
25.400 1.0000	20.638 0.8125	-7.4 -0.29	3.5 0.14	45.5 1.79	52.0 2.05	1.5 0.06	73.0 2.87	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.50 1.10
25.400 1.0000	19.050 0.7500	-7.4 -0.29	1.5 0.06	45.5 1.79	48.0 1.89	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.55 1.21
25.400 1.0000	19.050 0.7500	-7.4 -0.29	3.5 0.14	45.5 1.79	52.0 2.05	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.54 1.20
25.400 1.0000	19.050 0.7500	-7.4 -0.29	1.5 0.06	45.5 1.79	48.0 1.89	2.3 0.09	74.0 2.91	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.54 1.20
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	45.5 1.79	52.0 2.05	3.3 0.13	74.5 2.94	70.0 2.76	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.64 1.42
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	45.5 1.79	46.5 1.83	3.3 0.13	74.5 2.94	70.0 2.76	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.65 1.43
25.400 1.0000	19.050 0.7500	-7.4 -0.29	3.5 0.14	45.5 1.79	52.0 2.05	1.3 0.05	74.0 2.91	70.0 2.76	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.55 1.22
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	45.5 1.79	46.5 1.83	1.5 0.06	74.5 2.94	71.0 2.80	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.66 1.45
25.400 1.0000	20.638 0.8125	-7.4 -0.29	1.5 0.06	45.5 1.79	48.0 1.89	3.3 0.13	74.0 2.91	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.58 1.27
25.400 1.0000	20.638 0.8125	-7.4 -0.29	1.5 0.06	45.5 1.79	48.0 1.89	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.59 1.29
25.400 1.0000	20.638 0.8125	-7.4 -0.29	3.5 0.14	45.5 1.79	52.0 2.05	3.3 0.13	74.0 2.91	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.57 1.26
25.400 1.0000	20.638 0.8125	-7.4 -0.29	3.5 0.14	45.5 1.79	52.0 2.05	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.58 1.28
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	45.5 1.79	52.0 2.05	3.3 0.13	75.0 2.95	70.0 2.76	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.65 1.43
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	45.5 1.79	52.0 2.05	0.8 0.03	74.5 2.94	72.0 2.83	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.66 1.45
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	45.5 1.79	46.5 1.83	3.3 0.13	75.0 2.95	70.0 2.76	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.65 1.44
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	45.5 1.79	46.5 1.83	0.8 0.03	74.5 2.94	72.0 2.83	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.66 1.46
25.400 1.0000	24.608 0.9688	-7.4 -0.29	1.5 0.06	45.5 1.79	48.0 1.89	3.3 0.13	74.0 2.91	68.0 2.68	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.64 1.40
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	45.5 1.79	52.0 2.05	3.3 0.13	76.0 2.99	72.0 2.83	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.74 1.64
30.391 1.1965	23.812 0.9375	-10.9 -0.43	0.8 0.03	45.5 1.79	46.5 1.83	3.3 0.13	76.0 2.99	72.0 2.83	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.75 1.65
23.698 0.9330	17.462 0.6875	2.3 0.09	2.3 0.09	51.0 2.00	56.0 2.20	1.5 0.06	84.0 3.31	75.0 2.95	3.90 0.15	2.60 0.10	22.9	8.71	0.0899	0.69 1.52
23.698 0.9330	17.462 0.6875	2.3 0.09	3.5 0.14	51.0 2.00	58.0 2.28	1.5 0.06	84.0 3.31	75.0 2.95	3.90 0.15	2.60 0.10	22.9	8.71	0.0899	0.69 1.51
41.275 1.6250	31.750 1.2500	-14.0 -0.55	0.8 0.03	52.0 2.05	53.0 2.09	3.3 0.13	110.0 4.33	105.0 4.13	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.53 5.58

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

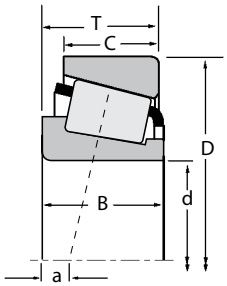
(7) Compound radius on inner race. Details on drawing for bearing.

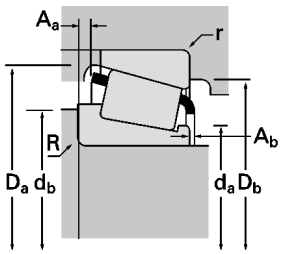
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
39.980 1.5740	76.200 3.0000	19.347 0.7617	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28156	28300
39.980 1.5740	76.200 3.0000	20.638 0.8125	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28159	28300
39.980 1.5740	80.035 3.1510	20.142 0.7930	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28156	28317
39.987 1.5743	90.975 3.5817	32.000 1.2598	133000 29900	0.33	1.80	34500 7760	19700 4420	1.76	172000 38600	HM204043	HM204010
40.000 1.5748	68.000 2.6772	19.000 0.7480	51400 11600	0.38	1.58	13300 3000	8640 1940	1.54	71600 16100	XAA32008X	Y32008X
40.000 1.5748	75.000 2.9528	26.000 1.0236	81500 18300	0.36	1.69	21100 4750	12900 2890	1.64	105000 23600	XAA33108	Y33108
40.000 1.5748	76.200 3.0000	20.625 0.8120	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28158	28300X
40.000 1.5748	80.000 3.1496	21.000 0.8268	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	344A	332
40.000 1.5748	80.000 3.1496	21.006 0.8270	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28158	28315
40.000 1.5748	80.000 3.1496	21.006 0.8270	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28158	28315A
40.000 1.5748	84.138 3.3125	26.988 1.0625	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	350	3520
40.000 1.5748	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	350	354A
40.000 1.5748	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	350	354X
40.000 1.5748	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	357	354A
40.000 1.5748	85.000 3.3465	33.000 1.2992	127000 28500	0.34	1.74	32900 7400	19400 4360	1.70	160000 35900	JF4049	JF4010
40.000 1.5748	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3879	3820
40.000 1.5748	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3582	3525
40.000 1.5748	88.500 3.4843	24.765 0.9750	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44157X	44348
40.000 1.5748	88.500 3.4843	26.988 1.0625	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	420	414
40.000 1.5748	88.900 3.5000	26.988 1.0625	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	420	414X
40.000 1.5748	90.000 3.5433	23.000 0.9055	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	350	352X
40.000 1.5748	90.000 3.5433	35.250 1.3878	123000 27500	0.55	1.10	31800 7140	29700 6670	1.07	160000 36100	XBA32308-B	Y32308-B
40.000 1.5748	90.119 3.5480	23.000 0.9055	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	350	352
40.000 1.5748	90.119 3.5480	23.000 0.9055	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	357	352
40.000 1.5748	90.119 3.5480	23.000 0.9055	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	350A	352
40.000 1.5748	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	442-S	432
40.000 1.5748	107.950 4.2500	36.512 1.4375	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	543	532X
40.000 1.5748	107.950 4.2500	36.512 1.4375	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	543X	532X

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
19.650 0.7736	15.507 0.6105	-3.6 -0.14	2.3 0.09	45.0 1.77	49.0 1.93	1.3 0.05	71.0 2.80	68.0 2.68	1.10 0.04	1.10 0.04	20.7	12.5	0.0709	0.37 0.81
20.940 0.8244	15.507 0.6105	-4.8 -0.19	3.5 0.14	45.0 1.77	52.0 2.05	1.3 0.05	71.0 2.80	68.0 2.68	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.38 0.83
19.650 0.7736	15.875 0.6250	-3.6 -0.14	2.3 0.09	45.0 1.77	49.0 1.93	1.5 0.06	73.0 2.87	69.0 2.72	1.10 0.04	1.10 0.04	20.7	12.5	0.0709	0.43 0.95
32.000 1.2598	26.500 1.0433	-9.7 -0.38	1.0 0.04	53.0 2.09	54.0 2.13	3.5 0.14	86.0 3.39	79.0 3.11	1.50 0.06	1.80 0.07	47.7	13.4	0.0885	1.03 2.26
19.000 0.7480	14.500 0.5709	-3.8 -0.15	3.5 0.14	45.5 1.79	52.0 2.05	1.0 0.04	65.0 2.56	61.0 2.40	0.90 0.04	1.70 0.07	23.8	16.1	0.0732	0.27 0.61
26.000 1.0236	20.500 0.8071	-7.6 -0.30	3.5 0.14	47.0 1.85	55.0 2.17	1.5 0.06	71.0 2.80	67.0 2.64	1.80 0.07	1.70 0.07	29.4	14.9	0.0771	0.50 1.09
20.940 0.8244	15.494 0.6100	-4.8 -0.19	1.5 0.06	45.0 1.77	47.5 1.87	1.5 0.06	71.0 2.80	68.0 2.68	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.38 0.85
22.403 0.8820	17.826 0.7018	-6.4 -0.25	0.8 0.03	45.5 1.79	46.0 1.81	1.3 0.05	75.0 2.95	73.0 2.87	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.48 1.05
20.940 0.8244	15.875 0.6250	-4.8 -0.19	1.5 0.06	45.0 1.77	47.5 1.87	1.5 0.06	73.0 2.87	69.0 2.72	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.44 0.98
20.940 0.8244	15.875 0.6250	-4.8 -0.19	1.5 0.06	45.0 1.77	47.5 1.87	2.0 0.08	73.0 2.87	69.0 2.72	2.40 0.09	1.10 0.04	20.7	12.5	0.0709	0.44 0.97
21.692 0.8540	23.812 0.9375	-4.8 -0.19	4.0 0.16	46.5 1.83	54.0 2.13	3.3 0.13	79.5 3.13	74.0 2.91	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.61 1.36
21.692 0.8540	17.462 0.6875	-4.8 -0.19	4.0 0.16	46.5 1.83	54.0 2.13	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.56 1.23
21.692 0.8540	17.462 0.6875	-4.8 -0.19	4.0 0.16	46.5 1.83	54.0 2.13	1.5 0.06	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.56 1.23
21.692 0.8540	17.462 0.6875	-4.8 -0.19	2.3 0.09	46.5 1.83	51.0 2.01	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.56 1.24
32.500 1.2795	28.000 1.1024	-10.2 -0.40	2.5 0.10	49.0 1.93	55.0 2.17	2.0 0.08	80.0 3.15	75.0 2.95	1.10 0.04	2.00 0.08	39.5	13.5	0.0841	0.90 1.99
30.162 1.1875	23.812 0.9375	-8.1 -0.32	0.8 0.03	50.0 1.97	51.0 2.01	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.82 1.81
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	47.0 1.85	53.0 2.09	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.83 1.84
23.063 0.9080	17.462 0.6875	3.0 0.12	2.3 0.09	51.0 2.00	56.0 2.20	1.5 0.06	84.0 3.31	75.0 2.95	3.30 0.13	3.00 0.12	22.9	8.71	0.0899	0.68 1.50
29.083 1.1450	22.225 0.8750	-9.7 -0.38	3.5 0.14	46.0 1.81	52.0 2.05	1.5 0.06	80.0 3.15	77.0 3.03	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.80 1.76
29.083 1.1450	22.225 0.8750	-9.7 -0.38	3.5 0.14	46.0 1.81	52.0 2.05	0.8 0.03	80.0 3.15	78.0 3.07	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.81 1.78
21.692 0.8540	21.808 0.8586	-4.8 -0.19	4.0 0.16	46.5 1.83	54.0 2.13	2.3 0.09	82.0 3.23	78.0 3.07	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.71 1.57
33.500 1.3189	27.000 1.0630	-7.4 -0.29	2.0 0.08	49.0 1.93	58.0 2.28	1.5 0.06	84.0 3.31	76.0 2.99	3.50 0.14	2.90 0.11	38.1	14	0.0966	1.10 2.43
21.692 0.8540	21.808 0.8586	-4.8 -0.19	4.0 0.16	46.5 1.83	54.0 2.13	2.3 0.09	82.0 3.23	78.0 3.07	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.72 1.58
21.692 0.8540	21.808 0.8586	-4.8 -0.19	2.3 0.09	46.5 1.83	51.0 2.01	2.3 0.09	82.0 3.23	78.0 3.07	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.72 1.59
21.692 0.8540	21.808 0.8586	-4.8 -0.19	0.8 0.03	46.5 1.83	47.5 1.87	2.3 0.09	82.0 3.23	78.0 3.07	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.72 1.59
29.900 1.1772	22.225 0.8750	-9.1 -0.36	3.5 0.14	47.0 1.85	54.0 2.13	2.3 0.09	87.0 3.43	83.0 3.27	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	1.00 2.21
36.957 1.4550	28.575 1.1250	-12.2 -0.48	3.5 0.14	50.0 1.97	57.0 2.24	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.75 3.85
36.957 1.4550	28.575 1.1250	-12.2 -0.48	3.0 0.12	50.0 1.97	56.0 2.20	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.75 3.85

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

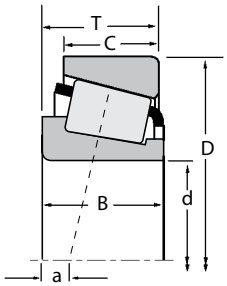
[7] Compound radius on inner race. Details on drawing for bearing.

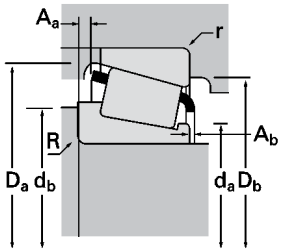
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
40.483 1.5938	82.550 3.2500	29.370 1.1563	95100 21400	0.55	1.10	24600 5540	23000 5180	1.07	130000 29300	HM801349	HM801310
40.987 1.6137	67.975 2.6762	17.500 0.6890	46100 10400	0.35	1.72	12000 2690	7140 1600	1.68	63500 14300	LM300849	LM300811
41.000 1.6142	68.000 2.6772	19.000 0.7480	53100 11900	0.38	1.58	13800 3090	8920 2010	1.54	74900 16800	XKA32008XF	Y32008XZ
41.275 1.6250	67.975 2.6762	17.500 0.6890	46100 10400	0.35	1.72	12000 2690	7140 1600	1.68	63500 14300	LM300848	LM300811
41.275 1.6250	73.025 2.8750	16.667 0.6562	47000 10600	0.35	1.71	12200 2740	7310 1640	1.67	58100 13100	18590	18520
41.275 1.6250	73.431 2.8910	19.558 0.7700	58400 13100	0.40	1.50	15100 3410	10400 2330	1.46	74200 16700	LM501349A	LM501310
41.275 1.6250	73.431 2.8910	19.558 0.7700	58400 13100	0.40	1.50	15100 3410	10400 2330	1.46	74200 16700	LM501349	LM501310
41.275 1.6250	73.431 2.8910	21.430 0.8437	58400 13100	0.40	1.50	15100 3410	10400 2330	1.46	74200 16700	LM501349	LM501314
41.275 1.6250	73.431 2.8910	23.012 0.9060	58400 13100	0.40	1.50	15100 3410	10400 2330	1.46	74200 16700	LM501349	LM501311
41.275 1.6250	76.200 3.0000	18.009 0.7090	44500 10000	0.49	1.23	11500 2600	9630 2170	1.20	55100 12400	11162	11300
41.275 1.6250	76.200 3.0000	18.009 0.7090	44500 10000	0.49	1.23	11500 2600	9630 2170	1.20	55100 12400	11163	11300
41.275 1.6250	76.200 3.0000	22.225 0.8750	69900 15700	0.39	1.53	18100 4080	12200 2740	1.49	89200 20100	24780	24720
41.275 1.6250	76.200 3.0000	22.225 0.8750	69900 15700	0.39	1.53	18100 4080	12200 2740	1.49	89200 20100	24780	24722
41.275 1.6250	76.200 3.0000	22.225 0.8750	69900 15700	0.39	1.53	18100 4080	12200 2740	1.49	89200 20100	24781	24720
41.275 1.6250	76.200 3.0000	25.400 1.0000	69900 15700	0.39	1.53	18100 4080	12200 2740	1.49	89200 20100	24780	24721
41.275 1.6250	76.200 3.0000	25.400 1.0000	69900 15700	0.39	1.53	18100 4080	12200 2740	1.49	89200 20100	24781	24721
41.275 1.6250	79.375 3.1250	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26882	26822
41.275 1.6250	79.375 3.1250	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26885	26822
41.275 1.6250	80.000 3.1496	18.009 0.7090	44500 10000	0.49	1.23	11500 2600	9630 2170	1.20	55100 12400	11162	11315
41.275 1.6250	80.000 3.1496	21.000 0.8268	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	336	332
41.275 1.6250	80.000 3.1496	21.000 0.8268	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	342	332
41.275 1.6250	80.035 3.1510	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3383	3339
41.275 1.6250	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26882	26820
41.275 1.6250	80.167 3.1562	26.988 1.0625	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	336	3320
41.275 1.6250	80.167 3.1562	26.988 1.0625	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	342	3320
41.275 1.6250	80.167 3.1562	29.370 1.1563	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26882	26821
41.275 1.6250	81.755 3.2187	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3383	3329
41.275 1.6250	82.550 3.2500	26.195 1.0313	86000 19300	0.40	1.49	22300 5010	15300 3450	1.45	115000 25800	22778	22721

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
28.575 1.1250	23.020 0.9063	-4.8 -0.19	3.5 0.14	49.0 1.93	58.0 2.28	3.3 0.13	78.0 3.07	68.0 2.68	2.10 0.08	1.80 0.07	33.7	14	0.0928	0.72 1.60
18.000 0.7087	13.500 0.5315	-3.6 -0.14	3.5 0.14	45.5 1.79	52.0 2.05	1.5 0.06	65.0 2.56	61.0 2.40	0.60 0.02	1.30 0.05	22.5	18.1	0.0698	0.24 0.53
21.000 0.8268	14.500 0.5709	-3.8 -0.15	2.0 0.08	46.0 1.81	50.0 1.97	1.0 0.04	65.0 2.56	61.0 2.40	* *	* *	24.5	20.5	0.0740	0.27 0.59
18.000 0.7087	13.500 0.5315	-3.6 -0.14	3.5 0.14	45.5 1.79	52.0 2.05	1.5 0.06	65.0 2.56	61.0 2.40	0.60 0.02	1.30 0.05	22.5	16.6	0.0698	0.24 0.53
17.462 0.6875	12.700 0.5000	-2.8 -0.11	3.5 0.14	46.0 1.81	53.0 2.09	1.5 0.06	69.0 2.72	66.0 2.60	0.50 0.02	1.20 0.05	21	15.4	0.0681	0.28 0.61
19.812 0.7800	14.732 0.5800	-3.3 -0.13	0.8 0.03	46.5 1.83	47.0 1.85	0.8 0.03	70.0 2.76	67.0 2.64	1.00 0.04	0.90 0.04	23.3	13.3	0.0739	0.33 0.73
19.812 0.7800	14.732 0.5800	-3.3 -0.13	3.5 0.14	48.0 1.89	54.0 2.13	0.8 0.03	70.0 2.76	67.0 2.64	1.00 0.04	1.00 0.04	23.3	13.3	0.0739	0.33 0.74
19.812 0.7800	16.604 0.6537	-3.3 -0.13	3.5 0.14	48.0 1.89	54.0 2.13	0.8 0.03	70.0 2.76	65.0 2.56	1.00 0.04	1.00 0.04	23.3	13.3	0.0739	0.36 0.78
19.812 0.7800	18.186 0.7160	-3.3 -0.13	3.5 0.14	48.0 1.89	54.0 2.13	2.3 0.09	70.0 2.76	64.0 2.52	1.00 0.04	1.00 0.04	23.3	13.3	0.0739	0.37 0.81
17.384 0.6844	14.288 0.5625	-0.8 -0.03	1.5 0.06	46.5 1.83	49.0 1.93	1.5 0.06	71.0 2.80	67.0 2.64	1.70 0.06	1.50 0.06	19.2	12.8	0.0735	0.34 0.75
17.384 0.6844	14.288 0.5625	-0.8 -0.03	0.8 0.03	46.5 1.83	47.0 1.85	1.5 0.06	71.0 2.80	67.0 2.64	* *	* *	19.2	12.8	0.0735	0.34 0.75
23.020 0.9063	17.462 0.6875	-4.8 -0.19	3.5 0.14	47.0 1.85	54.0 2.13	0.8 0.03	72.0 2.83	68.0 2.68	1.20 0.05	1.10 0.04	26.4	12.5	0.0767	0.42 0.94
23.020 0.9063	17.462 0.6875	-4.8 -0.19	3.5 0.14	47.0 1.85	54.0 2.13	3.3 0.13	72.0 2.83	66.0 2.60	1.20 0.05	1.10 0.04	26.4	12.5	0.0767	0.42 0.92
23.020 0.9063	17.462 0.6875	-4.8 -0.19	0.8 0.03	47.0 1.85	48.0 1.89	0.8 0.03	72.0 2.83	68.0 2.68	1.20 0.05	1.10 0.04	26.4	12.5	0.0767	0.43 0.95
23.020 0.9063	20.638 0.8125	-4.8 -0.19	3.5 0.14	47.0 1.85	54.0 2.13	2.3 0.09	72.0 2.83	66.0 2.60	1.20 0.05	1.10 0.04	26.4	12.5	0.0767	0.46 1.02
23.020 0.9063	20.638 0.8125	-4.8 -0.19	0.8 0.03	47.0 1.85	48.0 1.89	2.3 0.09	72.0 2.83	66.0 2.60	1.20 0.05	1.10 0.04	26.4	12.5	0.0767	0.47 1.03
25.400 1.0000	19.050 0.7500	-7.4 -0.29	3.5 0.14	47.0 1.85	54.0 2.13	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.52 1.15
25.400 1.0000	19.050 0.7500	-7.4 -0.29	0.8 0.03	47.0 1.85	48.0 1.89	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.53 1.17
17.384 0.6844	14.288 0.5625	-0.8 -0.03	1.5 0.06	46.5 1.83	49.0 1.93	1.5 0.06	73.0 2.87	69.0 2.72	1.70 0.06	1.50 0.06	19.2	12.8	0.0735	0.39 0.86
22.403 0.8820	17.826 0.7018	-6.4 -0.25	0.8 0.03	46.0 1.81	47.0 1.85	1.3 0.05	75.0 2.95	73.0 2.87	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.46 1.02
22.403 0.8820	17.826 0.7018	-6.4 -0.25	3.5 0.14	46.0 1.81	53.0 2.09	1.3 0.05	75.0 2.95	73.0 2.87	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.46 1.01
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	47.0 1.85	54.0 2.13	1.5 0.06	74.5 2.94	71.0 2.80	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.63 1.39
25.400 1.0000	20.638 0.8125	-7.4 -0.29	3.5 0.14	47.0 1.85	54.0 2.13	3.3 0.13	74.0 2.91	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.55 1.21
22.403 0.8820	23.812 0.9375	-6.4 -0.25	0.8 0.03	46.0 1.81	47.0 1.85	3.3 0.13	75.0 2.95	70.0 2.76	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.53 1.17
22.403 0.8820	23.812 0.9375	-6.4 -0.25	3.5 0.14	46.0 1.81	53.0 2.09	3.3 0.13	75.0 2.95	70.0 2.76	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.52 1.15
25.400 1.0000	24.608 0.9688	-7.4 -0.29	3.5 0.14	47.0 1.85	54.0 2.13	3.3 0.13	74.0 2.91	68.0 2.68	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.61 1.35
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	47.0 1.85	54.0 2.13	3.3 0.13	75.0 2.95	71.0 2.80	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.66 1.46
26.988 1.0625	20.638 0.8125	-6.4 -0.25	3.5 0.14	49.0 1.93	55.0 2.17	0.8 0.03	77.0 3.03	73.0 2.87	1.90 0.07	1.10 0.04	33.9	15.3	0.0841	0.63 1.40

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

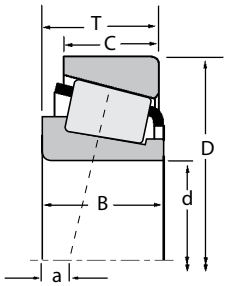
(7) Compound radius on inner race. Details on drawing for bearing.

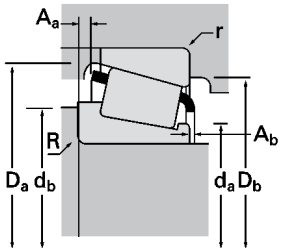
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
41.275 1.6250	82.550 3.2500	26.543 1.0450	84900 19100	0.55	1.10	22000 4950	20600 4620	1.07	112000 25300	M802047	M802011
41.275 1.6250	82.550 3.2500	26.543 1.0450	84900 19100	0.55	1.10	22000 4950	20600 4620	1.07	112000 25300	M802048	M802011
41.275 1.6250	84.138 3.3125	29.370 1.1563	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3383	3328
41.275 1.6250	84.138 3.3125	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3576	3520
41.275 1.6250	84.138 3.3125	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3576	3530
41.275 1.6250	84.138 3.3125	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3577	3530
41.275 1.6250	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3877	3820
41.275 1.6250	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3877	3821
41.275 1.6250	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3880	3820
41.275 1.6250	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3880	3821
41.275 1.6250	85.725 3.3750	30.162 1.1875	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3877A	3820
41.275 1.6250	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3576	3525
41.275 1.6250	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3577	3525
41.275 1.6250	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3585	3525
41.275 1.6250	88.500 3.4843	25.400 1.0000	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44162	44348
41.275 1.6250	88.500 3.4843	26.988 1.0625	107000 24100	0.26	2.28	27800 6240	12500 2820	2.22	124000 28000	419	414
41.275 1.6250	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365A	362A
41.275 1.6250	88.900 3.5000	30.162 1.1875	105000 23700	0.55	1.10	27300 6140	25500 5740	1.07	144000 32400	HM803145	HM803110
41.275 1.6250	88.900 3.5000	30.162 1.1875	105000 23700	0.55	1.10	27300 6140	25500 5740	1.07	144000 32400	HM803146	HM803110
41.275 1.6250	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365A	362
41.275 1.6250	90.488 3.5625	39.688 1.5625	155000 34900	0.28	2.11	40200 9040	19600 4400	2.05	204000 45900	4388	4335
41.275 1.6250	92.075 3.6250	26.195 1.0313	79200 17800	0.83	0.72	20500 4620	29200 6570	0.70	92500 20800	M903345	M903310
41.275 1.6250	92.075 3.6250	30.162 1.1875	105000 23700	0.55	1.10	27300 6140	25500 5740	1.07	144000 32400	HM803145	HM803112
41.275 1.6250	92.075 3.6250	30.162 1.1875	105000 23700	0.55	1.10	27300 6140	25500 5740	1.07	144000 32400	HM803146	HM803112
41.275 1.6250	93.662 3.6875	31.750 1.2500	126000 28200	0.36	1.67	32600 7320	20100 4510	1.62	156000 35000	49162	49368
41.275 1.6250	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	447	432
41.275 1.6250	95.250 3.7500	30.162 1.1875	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804840	HM804810
41.275 1.6250	95.250 3.7500	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53162	53375

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.654 1.0100	20.193 0.7950	-3.0 -0.12	0.8 0.03	50.5 1.99	52.0 2.05	3.3 0.13	79.0 3.11	70.0 2.76	2.30 0.09	1.70 0.07	30.9	11.9	0.0899	0.63 1.39
25.654 1.0100	20.193 0.7950	-3.0 -0.12	3.5 0.14	50.5 1.99	57.0 2.24	3.3 0.13	79.0 3.11	70.0 2.76	2.30 0.09	1.70 0.07	30.9	11.9	0.0899	0.62 1.37
30.391 1.1965	23.812 0.9375	-10.9 -0.43	3.5 0.14	47.0 1.85	54.0 2.13	3.3 0.13	76.0 2.99	72.0 2.83	1.80 0.07	1.10 0.04	34.6	12.1	0.0744	0.72 1.58
30.886 1.2160	23.812 0.9375	-10.2 -0.40	0.8 0.03	48.0 1.89	49.0 1.93	3.3 0.13	79.5 3.13	74.0 2.91	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.74 1.64
30.886 1.2160	23.812 0.9375	-10.2 -0.40	0.8 0.03	48.0 1.89	49.0 1.93	0.8 0.03	79.5 3.13	76.0 2.99	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.75 1.66
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	48.0 1.89	54.0 2.13	0.8 0.03	79.5 3.13	76.0 2.99	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.75 1.65
30.162 1.1875	23.812 0.9375	-8.1 -0.32	3.5 0.14	50.5 1.98	57.0 2.24	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.79 1.75
30.162 1.1875	23.812 0.9375	-8.1 -0.32	3.5 0.14	50.5 1.98	57.0 2.24	1.3 0.05	81.0 3.19	75.0 2.95	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.80 1.77
30.162 1.1875	23.812 0.9375	-8.1 -0.32	0.8 0.03	50.5 1.98	52.0 2.05	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.80 1.77
30.162 1.1875	23.812 0.9375	-8.1 -0.32	0.8 0.03	50.5 1.98	52.0 2.05	1.3 0.05	81.0 3.19	75.0 2.95	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.81 1.79
30.162 1.1875	23.812 0.9375	-8.1 -0.32	2.3 0.09	50.5 1.98	55.0 2.17	3.3 0.13	81.0 3.19	73.0 2.87	1.50 0.06	2.10 0.08	37.8	13.5	0.0873	0.80 1.76
30.886 1.2160	23.812 0.9375	-10.2 -0.40	0.8 0.03	48.0 1.89	49.0 1.93	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.82 1.81
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	48.0 1.89	54.0 2.13	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.82 1.80
30.886 1.2160	23.812 0.9375	-10.2 -0.40	1.5 0.06	48.0 1.89	50.0 1.97	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.82 1.81
23.698 0.9330	17.462 0.6875	2.3 0.09	2.3 0.09	51.0 2.00	57.0 2.24	1.5 0.06	84.0 3.31	75.0 2.95	3.90 0.15	2.60 0.10	22.9	8.71	0.0899	0.67 1.48
29.083 1.1450	22.225 0.8750	-9.7 -0.38	3.5 0.14	47.0 1.85	54.0 2.13	1.5 0.06	80.0 3.15	77.0 3.03	1.20 0.05	0.80 0.03	34.4	9.87	0.0731	0.78 1.71
22.225 0.8750	16.513 0.6501	-4.3 -0.17	3.5 0.14	48.5 1.91	55.0 2.17	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.63 1.38
29.370 1.1563	23.020 0.9063	-4.3 -0.17	0.8 0.03	53.0 2.09	54.0 2.13	3.3 0.13	85.0 3.35	74.0 2.91	1.50 0.06	2.10 0.08	39.2	13.7	0.0974	0.90 1.98
29.370 1.1563	23.020 0.9063	-4.3 -0.17	3.5 0.14	53.0 2.09	60.0 2.36	3.3 0.13	85.0 3.35	74.0 2.91	1.50 0.06	2.10 0.08	39.2	13.7	0.0974	0.89 1.96
22.225 0.8750	15.875 0.6250	-4.3 -0.17	3.5 0.14	48.5 1.91	55.0 2.17	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.63 1.40
40.386 1.5900	33.338 1.3125	-15.0 -0.59	3.5 0.14	52.0 2.05	60.0 2.36	3.3 0.13	85.0 3.35	77.0 3.03	2.30 0.09	0.60 0.02	52.9	16.7	0.0872	1.24 2.74
23.812 0.9375	16.670 0.6563	3.6 0.14	3.5 0.14	54.0 2.13	60.0 2.36	1.5 0.06	88.0 3.46	78.0 3.07	4.80 0.19	3.40 0.13	25.6	13.1	0.0948	0.77 1.69
29.370 1.1563	23.020 0.9063	-4.3 -0.17	0.8 0.03	53.0 2.09	54.0 2.13	3.3 0.13	86.0 3.39	76.0 2.99	1.50 0.06	2.10 0.08	39.2	13.7	0.0974	0.98 2.15
29.370 1.1563	23.020 0.9063	-4.3 -0.17	3.5 0.14	53.0 2.09	60.0 2.36	3.3 0.13	86.0 3.39	76.0 2.99	1.50 0.06	2.10 0.08	39.2	13.7	0.0974	0.97 2.14
31.750 1.2500	25.400 1.0000	-9.1 -0.36	3.5 0.14	50.0 1.97	57.0 2.24	3.3 0.13	87.0 3.43	82.0 3.23	3.00 0.12	0.80 0.03	42.4	13.6	0.0872	1.03 2.27
29.900 1.1772	22.225 0.8750	-9.1 -0.36	3.5 0.14	48.5 1.91	55.0 2.17	2.3 0.09	87.0 3.43	83.0 3.27	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	0.98 2.17
29.370 1.1563	23.020 0.9063	-3.8 -0.15	3.5 0.14	54.0 2.13	61.0 2.40	3.3 0.13	91.0 3.58	81.0 3.19	2.30 0.09	2.80 0.11	44.8	13.8	0.1017	1.06 2.35
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.5 0.06	52.5 2.07	57.0 2.24	0.8 0.03	89.0 3.50	81.0 3.19	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	0.98 2.15

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

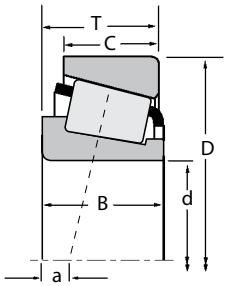
[7] Compound radius on inner race. Details on drawing for bearing.

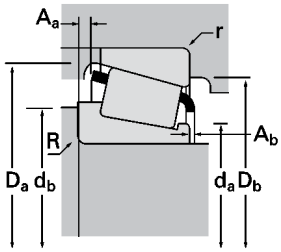
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
41.275 1.6250	95.250 3.7500	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903244	HM903210
41.275 1.6250	95.250 3.7500	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903245	HM903210
41.275 1.6250	95.250 3.7500	31.753 1.2501	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	447	432X
41.275 1.6250	98.425 3.8750	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53162	53387
41.275 1.6250	98.425 3.8750	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903244	HM903216
41.275 1.6250	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	526	522
41.275 1.6250	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807035	HM807010
41.275 1.6250	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	464	453A
41.275 1.6250	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	464A	453A
41.275 1.6250	107.950 4.2500	36.512 1.4375	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	541	532X
42.000 1.6535	80.000 3.1496	18.009 0.7090	44500 10000	0.49	1.23	11500 2600	9630 2170	1.20	55100 12400	11165X	11315
42.850 1.6870	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	461	453X
42.850 1.6870	107.950 4.2500	27.795 1.0943	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	461	453
42.850 1.6870	110.000 4.3307	27.795 1.0943	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	461	454
42.862 1.6875	76.992 3.0312	17.462 0.6875	45900 10300	0.51	1.19	11900 2670	10300 2320	1.15	58100 13100	12168	12303
42.862 1.6875	82.550 3.2500	19.842 0.7812	60500 13600	0.43	1.39	15700 3530	11500 2600	1.36	73200 16500	22168	22325
42.862 1.6875	82.550 3.2500	26.195 1.0313	86000 19300	0.40	1.49	22300 5010	15300 3450	1.45	115000 25800	22780	22720
42.862 1.6875	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25578	25520
42.862 1.6875	82.931 3.2650	26.988 1.0625	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25578	25523
42.862 1.6875	83.058 3.2700	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25576	25521
42.862 1.6875	83.058 3.2700	23.876 0.9400	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25578	25522
42.862 1.6875	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3579	3525
42.862 1.6875	114.300 4.5000	44.450 1.7500	207000 46500	0.43	1.39	53700 12100	39500 8880	1.36	256000 57500	65383	65320
42.875 1.6880	76.200 3.0000	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26884	26823
42.875 1.6880	79.375 3.1250	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26884	26822
42.875 1.6880	80.000 3.1496	21.000 0.8268	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	342-S	332
42.875 1.6880	80.000 3.1496	23.812 0.9375	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26884	26824
42.875 1.6880	80.000 3.1496	24.176 0.9518	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	342-S	332A

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
28.300 1.1142	22.225 0.8750	0.5 0.02	1.5 0.06	54.0 2.13	59.0 2.32	0.8 0.03	91.0 3.58	81.0 3.19	3.90 0.16	2.30 0.09	33.7	9.91	0.1010	1.04 2.30
28.575 1.1250	22.225 0.8750	0.5 0.02	3.5 0.14	54.0 2.13	63.0 2.48	0.8 0.03	91.0 3.58	81.0 3.19	3.90 0.16	2.00 0.08	33.7	9.91	0.1010	1.04 2.30
29.900 1.1772	26.195 1.0313	-9.1 -0.36	3.5 0.14	48.5 1.91	55.0 2.17	3.3 0.13	87.0 3.43	81.0 3.19	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	1.07 2.35
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.5 0.06	52.5 2.07	57.0 2.24	0.8 0.03	91.0 3.58	82.0 3.23	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.05 2.33
28.300 1.1142	22.225 0.8750	0.5 0.02	1.5 0.06	54.0 2.13	59.0 2.32	0.8 0.03	92.0 3.62	82.0 3.23	3.90 0.16	2.30 0.09	33.7	9.91	0.1010	1.13 2.48
36.068 1.4200	26.988 1.0625	-12.7 -0.50	3.5 0.14	50.0 1.97	57.0 2.24	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.42 3.14
36.512 1.4375	28.575 1.1250	-7.4 -0.29	1.5 0.06	57.0 2.24	60.0 2.36	3.3 0.13	100.0 3.94	89.0 3.50	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.66 3.66
29.317 1.1542	22.225 0.8750	-7.1 -0.28	2.3 0.09	52.0 2.05	56.0 2.20	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.39 3.06
29.317 1.1542	22.225 0.8750	-7.1 -0.28	1.5 0.06	52.0 2.05	54.0 2.13	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.39 3.06
36.957 1.4550	28.575 1.1250	-12.2 -0.48	3.5 0.14	51.0 2.01	58.0 2.28	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.72 3.80
17.384 0.6844	14.288 0.5625	-0.8 -0.03	1.8 0.07	47.0 1.85	50.0 1.97	1.5 0.06	73.0 2.87	69.0 2.72	* *	* *	19.2	12.8	0.0735	0.38 0.84
29.317 1.1542	24.605 0.9687	-7.1 -0.28	0.8 0.03	53.0 2.09	54.0 2.13	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.31 2.89
29.317 1.1542	27.000 1.0630	-7.1 -0.28	0.8 0.03	53.0 2.09	54.0 2.13	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.42 3.13
29.317 1.1542	27.000 1.0630	-7.1 -0.28	0.8 0.03	53.0 2.09	54.0 2.13	2.0 0.08	100.0 3.94	96.0 3.78	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.49 3.29
17.145 0.6750	11.908 0.4688	0.0 0.00	1.5 0.06	48.5 1.91	51.0 2.01	1.5 0.06	73.0 2.87	68.0 2.68	1.40 0.06	2.20 0.09	21	15.8	0.0766	0.32 0.71
19.837 0.7810	15.080 0.5937	-2.5 -0.10	2.3 0.09	48.5 1.91	52.0 2.05	1.5 0.06	76.0 2.99	73.0 2.87	1.20 0.05	1.70 0.07	23.7	14.4	0.0758	0.44 0.98
26.988 1.0625	20.638 0.8125	-6.4 -0.25	3.5 0.14	50.0 1.97	56.0 2.20	3.3 0.13	77.0 3.03	71.0 2.80	1.90 0.07	1.10 0.04	33.9	15.3	0.0841	0.60 1.32
25.400 1.0000	19.050 0.7500	-6.4 -0.25	2.3 0.09	49.5 1.95	53.0 2.09	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.58 1.28
25.400 1.0000	22.225 0.8750	-6.4 -0.25	2.3 0.09	49.5 1.95	53.0 2.09	2.3 0.09	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.62 1.37
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	49.0 1.93	55.0 2.17	3.3 0.13	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.57 1.26
25.400 1.0000	19.114 0.7525	-6.4 -0.25	2.3 0.09	49.5 1.95	53.0 2.09	2.0 0.08	77.0 3.03	73.0 2.87	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.58 1.28
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	49.5 1.95	56.0 2.20	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.79 1.74
44.450 1.7500	34.925 1.3750	-12.4 -0.49	2.0 0.08	60.0 2.36	63.0 2.48	3.3 0.13	107.0 4.21	97.0 3.82	3.70 0.14	1.00 0.04	63.1	13	0.1053	2.35 5.17
25.400 1.0000	20.638 0.8125	-7.4 -0.29	3.5 0.14	48.5 1.91	55.0 2.17	1.5 0.06	73.0 2.87	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.46 1.01
25.400 1.0000	19.050 0.7500	-7.4 -0.29	3.5 0.14	48.5 1.91	55.0 2.17	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.50 1.11
22.403 0.8820	17.826 0.7018	-6.4 -0.25	3.5 0.14	47.5 1.87	54.0 2.13	1.3 0.05	75.0 2.95	73.0 2.87	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.44 0.97
25.400 1.0000	19.050 0.7500	-7.4 -0.29	3.5 0.14	48.5 1.91	55.0 2.17	1.3 0.05	74.0 2.91	70.0 2.76	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.51 1.13
22.403 0.8820	21.000 0.8268	-6.4 -0.25	3.5 0.14	47.5 1.87	54.0 2.13	2.3 0.09	75.0 2.95	71.0 2.80	0.70 0.03	1.10 0.04	26.5	13	0.0676	0.47 1.04

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

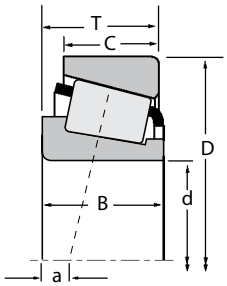
[7] Compound radius on inner race. Details on drawing for bearing.

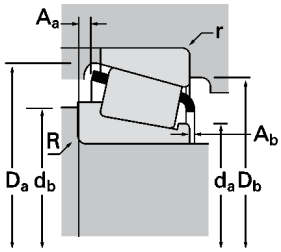
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
42.875 1.6880	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26886	26820
42.875 1.6880	80.167 3.1562	25.400 1.0000	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26886	26830
42.875 1.6880	81.973 3.2273	23.876 0.9400	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25577	25518
42.875 1.6880	82.550 3.2500	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25577	25519
42.875 1.6880	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25577	25520
42.875 1.6880	82.931 3.2650	26.988 1.0625	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25577	25523
42.875 1.6880	83.058 3.2700	23.876 0.9400	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25577	25522
42.987 1.6924	74.988 2.9523	19.368 0.7625	55100 12400	0.44	1.35	14300 3210	10900 2440	1.31	73500 16500	16986	16929
42.987 1.6924	79.375 3.1250	20.638 0.8125	63800 14300	0.37	1.64	16500 3720	10400 2330	1.60	83300 18700	17886	17830
42.987 1.6924	79.985 3.1490	19.842 0.7812	63800 14300	0.37	1.64	16500 3720	10400 2330	1.60	83300 18700	17886	17831
44.450 1.7500	71.438 2.8125	12.700 0.5000	33400 7510	0.31	1.97	8660 1950	4530 1020	1.91	43600 9790	LL103049	LL103010
44.450 1.7500	73.025 2.8750	18.258 0.7188	52800 11900	0.32	1.88	13700 3080	7460 1680	1.83	78300 17600	L102849	L102810
44.450 1.7500	76.992 3.0312	17.462 0.6875	45900 10300	0.51	1.19	11900 2670	10300 2320	1.15	58100 13100	12175	12303
44.450 1.7500	79.375 3.1250	17.462 0.6875	48200 10800	0.37	1.60	12500 2810	7990 1800	1.56	61300 13800	18685	18620
44.450 1.7500	80.962 3.1875	19.050 0.7500	47000 10600	0.53	1.14	12200 2740	11000 2480	1.11	61100 13700	13175	13318
44.450 1.7500	82.550 3.2500	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25580	25519
44.450 1.7500	82.550 3.2500	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25582	25519
44.450 1.7500	82.550 3.2500	34.290 1.3500	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25583	25519
44.450 1.7500	82.931 3.2650	22.225 0.8750	76600 17200	0.30	2.02	19900 4470	10100 2270	1.96	89200 20100	35175	35326
44.450 1.7500	82.931 3.2650	22.225 0.8750	76600 17200	0.30	2.02	19900 4470	10100 2270	1.96	89200 20100	35176	35326
44.450 1.7500	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25580	25520
44.450 1.7500	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25580	25524
44.450 1.7500	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25581	25520
44.450 1.7500	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25582	25520
44.450 1.7500	82.931 3.2650	26.988 1.0625	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25580	25523
44.450 1.7500	82.931 3.2650	34.290 1.3500	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25583	25520
44.450 1.7500	82.931 3.2650	34.290 1.3500	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25583	25524
44.450 1.7500	83.058 3.2700	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25580	25521

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.400 1.0000	20.638 0.8125	-7.4 -0.29	1.5 0.06	48.5 1.91	51.0 2.01	3.3 0.13	74.0 2.91	69.0 2.72	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.54 1.18
25.400 1.0000	20.638 0.8125	-7.4 -0.29	1.5 0.06	48.5 1.91	51.0 2.01	0.8 0.03	74.0 2.91	71.0 2.80	1.40 0.06	1.20 0.05	32.8	13.3	0.0770	0.54 1.20
25.400 1.0000	19.114 0.7525	-6.4 -0.25	3.5 0.14	49.0 1.93	55.0 2.17	1.0 0.04	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.56 1.23
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	49.0 1.93	55.0 2.17	2.0 0.08	77.0 3.03	73.0 2.87	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.57 1.25
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	49.0 1.93	55.0 2.17	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.58 1.27
25.400 1.0000	22.225 0.8750	-6.4 -0.25	3.5 0.14	49.0 1.93	55.0 2.17	2.3 0.09	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.62 1.37
25.400 1.0000	19.114 0.7525	-6.4 -0.25	3.5 0.14	49.0 1.93	55.0 2.17	2.0 0.08	77.0 3.03	73.0 2.87	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.58 1.27
19.837 0.7810	14.288 0.5625	-2.0 -0.08	1.5 0.06	48.5 1.91	51.0 2.01	1.3 0.05	71.0 2.80	68.0 2.68	* *	* *	25.1	17.4	0.0783	0.36 0.79
20.638 0.8125	15.875 0.6250	-3.8 -0.15	1.5 0.06	49.0 1.93	51.0 2.01	2.0 0.08	75.0 2.95	71.0 2.80	1.10 0.04	1.30 0.05	28.9	17.9	0.0770	0.42 0.94
20.638 0.8125	15.080 0.5937	-3.8 -0.15	1.5 0.06	49.0 1.93	51.0 2.01	1.3 0.05	75.0 2.95	72.0 2.83	1.10 0.04	1.30 0.05	28.9	17.9	0.0770	0.43 0.94
12.700 0.5000	9.525 0.3750	-1.3 -0.05	1.5 0.06	48.5 1.91	51.0 2.01	1.5 0.06	68.0 2.68	65.0 2.56	0.10 0.00	1.50 0.06	20	23.6	0.0637	0.18 0.40
18.258 0.7188	15.083 0.5938	-3.8 -0.15	1.5 0.06	49.0 1.93	51.0 2.01	1.5 0.06	69.0 2.72	66.0 2.60	0.00 0.00	1.70 0.07	30.6	23.7	0.0751	0.30 0.65
17.145 0.6750	11.908 0.4688	0.0 0.00	1.5 0.06	49.5 1.95	52.0 2.05	1.5 0.06	73.0 2.87	68.0 2.68	1.40 0.06	2.20 0.09	21	15.8	0.0766	0.31 0.68
17.462 0.6875	13.495 0.5313	-2.0 -0.08	2.8 0.11	49.5 1.95	54.0 2.13	1.5 0.06	74.0 2.91	71.0 2.80	0.70 0.03	1.50 0.06	23.9	17.7	0.0725	0.35 0.76
17.462 0.6875	14.288 0.5625	0.8 0.03	0.1 0.01	50.0 1.97	50.0 1.97	1.5 0.06	76.0 2.99	72.0 2.83	1.60 0.06	1.90 0.08	23	15.4	0.0799	0.39 0.86
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	50.0 1.97	57.0 2.24	2.0 0.08	77.0 3.03	73.0 2.87	1.00 0.04	0.70 0.03	35.2	14.3	0.0801	0.54 1.20
25.400 1.0000	19.050 0.7500	-6.4 -0.25	5.0 0.20	50.0 1.97	60.0 2.36	2.0 0.08	77.0 3.03	73.0 2.87	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.54 1.18
35.878 1.4125	19.050 0.7500	-16.8 -0.66	3.8 0.15	50.0 1.97	65.0 2.56	2.0 0.08	77.0 3.03	73.0 2.87	11.50 0.45	0.60 0.03	35.2	14.3	0.0801	0.66 1.46
23.012 0.9060	17.462 0.6875	-6.1 -0.24	3.5 0.14	49.5 1.95	56.0 2.20	0.8 0.03	78.0 3.07	76.0 2.99	1.20 0.05	1.10 0.04	29.1	12	0.0718	0.49 1.07
23.012 0.9060	17.462 0.6875	-6.1 -0.24	0.8 0.03	49.5 1.95	50.0 1.97	0.8 0.03	78.0 3.07	76.0 2.99	1.20 0.05	1.10 0.04	29.1	12	0.0718	0.49 1.09
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	50.0 1.97	57.0 2.24	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.70 0.03	35.2	14.3	0.0801	0.55 1.22
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	50.0 1.97	57.0 2.24	2.3 0.09	77.0 3.03	73.0 2.87	1.00 0.04	0.70 0.03	35.2	14.3	0.0801	0.55 1.21
25.400 1.0000	19.050 0.7500	-6.4 -0.25	0.5 0.02	50.0 1.97	51.0 2.01	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.56 1.24
25.400 1.0000	19.050 0.7500	-6.4 -0.25	5.0 0.20	50.0 1.97	60.0 2.36	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.55 1.21
25.400 1.0000	22.225 0.8750	-6.4 -0.25	3.5 0.14	50.0 1.97	57.0 2.24	2.3 0.09	77.0 3.03	72.0 2.83	1.00 0.04	0.70 0.03	35.2	14.3	0.0801	0.60 1.32
35.878 1.4125	19.050 0.7500	-16.8 -0.66	3.8 0.15	50.0 1.97	65.0 2.56	0.8 0.03	77.0 3.03	74.0 2.91	11.50 0.45	0.60 0.03	35.2	14.3	0.0801	0.67 1.49
35.878 1.4125	19.050 0.7500	-16.8 -0.66	3.8 0.15	50.0 1.97	65.0 2.56	2.3 0.09	77.0 3.03	73.0 2.87	11.50 0.45	0.60 0.03	35.2	14.3	0.0801	0.67 1.48
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	50.0 1.97	57.0 2.24	3.3 0.13	77.0 3.03	72.0 2.83	1.00 0.04	0.70 0.03	35.2	14.3	0.0801	0.55 1.21

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

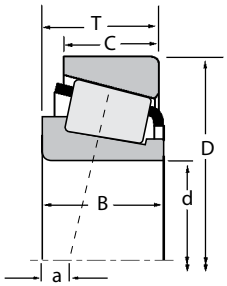
(7) Compound radius on inner race. Details on drawing for bearing.

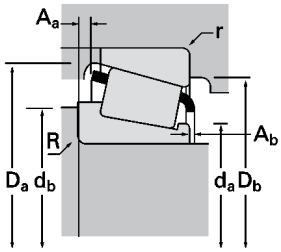
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
44.450 1.7500	83.058 3.2700	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25581	25521
44.450 1.7500	83.058 3.2700	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25582	25521
44.450 1.7500	83.058 3.2700	23.876 0.9400	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25580	25522
44.450 1.7500	84.138 3.3125	26.988 1.0625	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	355	3520
44.450 1.7500	84.138 3.3125	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3578	3520
44.450 1.7500	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	355	354A
44.450 1.7500	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	355A	354A
44.450 1.7500	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	355X	354A
44.450 1.7500	85.000 3.3465	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25580	25526
44.450 1.7500	85.000 3.3465	25.400 1.0000	86400 19400	0.35	1.73	22400 5040	13300 2980	1.69	117000 26200	2975	2924
44.450 1.7500	87.312 3.4375	26.988 1.0625	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	355	3525
44.450 1.7500	87.312 3.4375	26.988 1.0625	86400 19400	0.35	1.73	22400 5040	13300 2980	1.69	117000 26200	2975	2925
44.450 1.7500	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3578	3525
44.450 1.7500	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3578	3526
44.450 1.7500	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3578A	3525
44.450 1.7500	88.900 3.5000	30.162 1.1875	105000 23700	0.55	1.10	27300 6140	25500 5740	1.07	144000 32400	HM803149	HM803110
44.450 1.7500	88.900 3.5000	30.162 1.1875	105000 23700	0.55	1.10	27300 6140	25500 5740	1.07	144000 32400	HM803149	HM803111
44.450 1.7500	90.119 3.5480	23.000 0.9055	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	355X	352
44.450 1.7500	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3782	3720
44.450 1.7500	93.662 3.6875	31.750 1.2500	120000 26900	0.40	1.49	31000 6980	21400 4800	1.45	158000 35500	46175	46368
44.450 1.7500	93.662 3.6875	31.750 1.2500	120000 26900	0.40	1.49	31000 6980	21400 4800	1.45	158000 35500	46176	46368
44.450 1.7500	93.662 3.6875	31.750 1.2500	126000 28200	0.36	1.67	32600 7320	20100 4510	1.62	156000 35000	49175	49368
44.450 1.7500	93.662 3.6875	31.750 1.2500	126000 28200	0.36	1.67	32600 7320	20100 4510	1.62	156000 35000	49176	49368
44.450 1.7500	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	435	432
44.450 1.7500	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	438	432
44.450 1.7500	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33885	33821
44.450 1.7500	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33885	33822
44.450 1.7500	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	438	432A

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.400 1.0000	19.050 0.7500	-6.4 -0.25	0.5 0.02	50.0 1.97	51.0 2.01	3.3 0.13	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.55 1.22
25.400 1.0000	19.050 0.7500	-6.4 -0.25	5.0 0.20	50.0 1.97	60.0 2.36	3.3 0.13	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.54 1.19
25.400 1.0000	19.114 0.7525	-6.4 -0.25	3.5 0.14	50.0 1.97	57.0 2.24	2.0 0.08	77.0 3.03	73.0 2.87	1.00 0.04	0.70 0.03	35.2	14.3	0.0801	0.55 1.22
21.692 0.8540	23.812 0.9375	-4.8 -0.19	2.3 0.09	50.0 1.97	54.0 2.13	3.3 0.13	79.5 3.13	74.0 2.91	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.57 1.26
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	51.0 2.01	57.0 2.24	3.3 0.13	79.5 3.13	74.0 2.91	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.68 1.51
21.692 0.8540	17.462 0.6875	-4.8 -0.19	2.3 0.09	50.0 1.97	54.0 2.13	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.51 1.13
21.692 0.8540	17.462 0.6875	-4.8 -0.19	0.8 0.03	50.0 1.97	51.0 2.01	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.52 1.14
21.692 0.8540	17.462 0.6875	-4.8 -0.19	3.5 0.14	50.0 1.97	56.0 2.20	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.51 1.12
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	50.0 1.97	57.0 2.24	2.3 0.09	78.0 3.07	74.0 2.91	1.00 0.04	0.70 0.03	35.2	14.3	0.0801	0.59 1.30
25.608 1.0082	20.638 0.8125	-6.4 -0.25	3.5 0.14	51.0 2.01	57.0 2.24	1.3 0.05	80.0 3.15	76.0 2.99	1.80 0.07	1.10 0.04	38.2	15.7	0.0832	0.63 1.39
21.692 0.8540	23.812 0.9375	-4.8 -0.19	2.3 0.09	50.0 1.97	54.0 2.13	3.3 0.13	81.0 3.19	75.0 2.95	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.65 1.43
25.608 1.0082	22.225 0.8750	-6.4 -0.25	3.5 0.14	51.0 2.01	57.0 2.24	2.3 0.09	81.0 3.19	75.0 2.95	1.80 0.07	1.10 0.04	38.2	15.7	0.0832	0.70 1.55
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	51.0 2.01	57.0 2.24	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.76 1.68
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	51.0 2.01	57.0 2.24	0.8 0.03	81.0 3.19	77.0 3.03	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.77 1.71
30.886 1.2160	23.812 0.9375	-10.2 -0.40	5.5 0.22	51.0 2.01	61.0 2.40	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.75 1.66
29.370 1.1563	23.020 0.9063	-4.3 -0.17	3.5 0.14	53.5 2.10	62.0 2.44	3.3 0.13	85.0 3.35	74.0 2.91	1.50 0.06	2.10 0.08	39.2	13.7	0.0974	0.84 1.85
29.370 1.1563	23.020 0.9063	-4.3 -0.17	3.5 0.14	53.5 2.10	62.0 2.44	0.8 0.03	85.0 3.35	76.0 2.99	1.50 0.06	2.10 0.08	39.2	13.7	0.0974	0.85 1.88
21.692 0.8540	21.808 0.8586	-4.8 -0.19	3.5 0.14	50.0 1.97	56.0 2.20	2.3 0.09	82.0 3.23	78.0 3.07	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.67 1.47
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	52.0 2.05	58.0 2.28	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.96 2.11
31.750 1.2500	26.195 1.0313	-7.9 -0.31	0.8 0.03	54.0 2.13	55.0 2.17	3.3 0.13	87.0 3.43	79.0 3.11	2.20 0.08	1.10 0.04	44.4	13.4	0.0920	1.02 2.25
31.750 1.2500	26.195 1.0313	-7.9 -0.31	3.5 0.14	54.0 2.13	60.0 2.36	3.3 0.13	87.0 3.43	79.0 3.11	2.20 0.08	1.10 0.04	44.4	13.4	0.0920	1.02 2.24
31.750 1.2500	25.400 1.0000	-9.1 -0.36	3.5 0.14	53.0 2.09	59.0 2.32	3.3 0.13	87.0 3.43	82.0 3.23	3.00 0.12	0.80 0.03	42.4	13.6	0.0872	0.97 2.15
31.750 1.2500	25.400 1.0000	-9.1 -0.36	0.8 0.03	53.0 2.09	54.0 2.13	3.3 0.13	87.0 3.43	82.0 3.23	3.00 0.12	0.80 0.03	42.4	13.6	0.0872	0.98 2.16
29.900 1.1772	22.225 0.8750	-9.1 -0.36	0.8 0.03	51.0 2.01	52.0 2.05	2.3 0.09	87.0 3.43	83.0 3.27	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	0.94 2.07
29.900 1.1772	22.225 0.8750	-9.1 -0.36	3.5 0.14	51.0 2.01	57.0 2.24	2.3 0.09	87.0 3.43	83.0 3.27	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	0.93 2.06
28.575 1.1250	22.225 0.8750	-7.6 -0.30	0.8 0.03	53.0 2.09	53.0 2.09	2.3 0.09	90.0 3.54	85.0 3.35	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	0.96 2.12
28.575 1.1250	22.225 0.8750	-7.6 -0.30	0.8 0.03	53.0 2.09	53.0 2.09	0.8 0.03	90.0 3.54	86.0 3.39	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	0.97 2.13
29.900 1.1772	22.225 0.8750	-9.1 -0.36	3.5 0.14	51.0 2.01	57.0 2.24	0.8 0.03	87.0 3.43	84.0 3.31	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	0.94 2.07

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

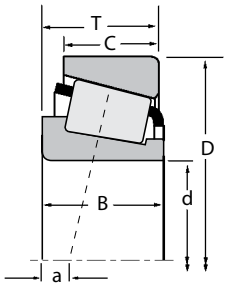
[7] Compound radius on inner race. Details on drawing for bearing.

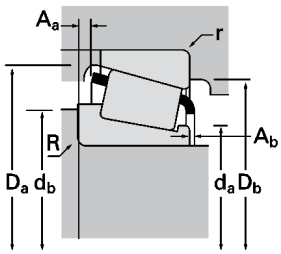
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)	Factors (5)		Dynamic (2)	Factors (5)		Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
44.450 1.7500	95.250 3.7500	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3782	3726
44.450 1.7500	95.250 3.7500	30.162 1.1875	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804842	HM804810
44.450 1.7500	95.250 3.7500	30.162 1.1875	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804842	HM804811
44.450 1.7500	95.250 3.7500	30.162 1.1875	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804843	HM804810
44.450 1.7500	95.250 3.7500	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53176	53375
44.450 1.7500	95.250 3.7500	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53176	53377
44.450 1.7500	95.250 3.7500	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53177	53375
44.450 1.7500	95.250 3.7500	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53178	53375
44.450 1.7500	95.250 3.7500	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903247	HM903210
44.450 1.7500	95.250 3.7500	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903249A	HM903210
44.450 1.7500	95.250 3.7500	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903249	HM903210
44.450 1.7500	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	386AS	382A
44.450 1.7500	98.425 3.8750	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3782	3732
44.450 1.7500	98.425 3.8750	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53176	53387
44.450 1.7500	98.425 3.8750	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53177	53387
44.450 1.7500	98.425 3.8750	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53176	53387X
44.450 1.7500	98.425 3.8750	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53177	53387X
44.450 1.7500	98.425 3.8750	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903247	HM903216
44.450 1.7500	98.425 3.8750	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903249A	HM903216
44.450 1.7500	98.425 3.8750	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903249	HM903216
44.450 1.7500	101.600 4.0000	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53176	53398
44.450 1.7500	101.600 4.0000	30.958 1.2188	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53177	53398
44.450 1.7500	101.600 4.0000	31.750 1.2500	123000 27600	0.40	1.50	31900 7160	21900 4910	1.46	155000 35000	49576	49520
44.450 1.7500	101.600 4.0000	31.750 1.2500	123000 27600	0.40	1.50	31900 7160	21900 4910	1.46	155000 35000	49577	49520
44.450 1.7500	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	527	522
44.450 1.7500	103.188 4.0625	43.658 1.7188	197000 44200	0.30	2.02	51000 11500	25900 5820	1.97	267000 60100	5356	5335
44.450 1.7500	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45280	45220
44.450 1.7500	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	460	453X

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	52.0 2.05	58.0 2.28	3.3 0.13	89.0 3.50	83.0 3.27	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	1.01 2.23
29.370 1.1563	23.020 0.9063	-3.8 -0.15	0.8 0.03	57.0 2.24	57.0 2.24	3.3 0.13	91.0 3.58	81.0 3.19	2.30 0.09	2.80 0.11	44.8	13.8	0.1017	1.02 2.25
29.370 1.1563	23.020 0.9063	-3.8 -0.15	0.8 0.03	57.0 2.24	57.0 2.24	0.8 0.03	91.0 3.58	83.0 3.27	2.30 0.09	2.80 0.11	44.8	13.8	0.1017	1.03 2.28
29.370 1.1563	23.020 0.9063	-3.8 -0.15	3.5 0.14	57.0 2.24	63.0 2.48	3.3 0.13	91.0 3.58	81.0 3.19	2.30 0.09	2.80 0.11	44.8	13.8	0.1017	1.01 2.24
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.3 0.05	52.5 2.07	59.0 2.32	0.8 0.03	89.0 3.50	81.0 3.19	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	0.93 2.05
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.3 0.05	52.5 2.07	59.0 2.32	2.3 0.09	89.0 3.50	80.0 3.15	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	0.93 2.04
28.301 1.1142	20.638 0.8125	-0.3 -0.01	3.5 0.14	52.5 2.07	63.0 2.48	0.8 0.03	89.0 3.50	81.0 3.19	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	0.92 2.04
28.301 1.1142	20.638 0.8125	-0.3 -0.01	2.0 0.08	52.5 2.07	60.0 2.36	0.8 0.03	89.0 3.50	81.0 3.19	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	0.93 2.05
28.300 1.1142	22.225 0.8750	0.5 0.02	1.3 0.05	54.0 2.13	61.0 2.40	0.8 0.03	91.0 3.58	81.0 3.19	3.90 0.16	2.30 0.09	33.7	9.91	0.1010	1.00 2.20
28.300 1.1142	22.225 0.8750	0.5 0.02	3.5 0.14	54.0 2.13	65.0 2.56	0.8 0.03	91.0 3.58	81.0 3.19	3.90 0.16	2.30 0.09	33.7	9.91	0.1010	0.99 2.19
28.575 1.1250	22.225 0.8750	0.5 0.02	3.5 0.14	54.0 2.13	65.0 2.56	0.8 0.03	91.0 3.58	81.0 3.19	3.90 0.16	2.00 0.08	33.7	9.91	0.1010	1.00 2.19
21.946 0.8640	15.875 0.6250	-3.0 -0.12	3.5 0.14	53.0 2.09	59.0 2.32	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.76 1.67
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	52.0 2.05	58.0 2.28	3.3 0.13	90.0 3.54	84.0 3.31	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	1.10 2.42
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.3 0.05	52.5 2.07	59.0 2.32	0.8 0.03	91.0 3.58	82.0 3.23	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.01 2.22
28.301 1.1142	20.638 0.8125	-0.3 -0.01	3.5 0.14	52.5 2.07	63.0 2.48	0.8 0.03	91.0 3.58	82.0 3.23	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.00 2.21
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.3 0.05	52.5 2.07	59.0 2.32	1.5 0.06	91.0 3.58	82.0 3.23	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.01 2.22
28.301 1.1142	20.638 0.8125	-0.3 -0.01	3.5 0.14	52.5 2.07	63.0 2.48	1.5 0.06	91.0 3.58	82.0 3.23	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.00 2.20
28.300 1.1142	22.225 0.8750	0.5 0.02	1.3 0.05	54.0 2.13	61.0 2.40	0.8 0.03	92.0 3.62	82.0 3.23	3.90 0.16	2.30 0.09	33.7	9.91	0.1010	1.08 2.38
28.300 1.1142	22.225 0.8750	0.5 0.02	3.5 0.14	54.0 2.13	65.0 2.56	0.8 0.03	92.0 3.62	82.0 3.23	3.90 0.16	2.30 0.09	33.7	9.91	0.1010	1.08 2.37
28.575 1.1250	22.225 0.8750	0.5 0.02	3.5 0.14	54.0 2.13	65.0 2.56	0.8 0.03	92.0 3.62	82.0 3.23	3.90 0.16	2.00 0.08	33.7	9.91	0.1010	1.08 2.38
28.301 1.1142	20.638 0.8125	-0.3 -0.01	1.3 0.05	52.5 2.07	59.0 2.32	0.8 0.03	92.0 3.62	84.0 3.31	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.09 2.40
28.301 1.1142	20.638 0.8125	-0.3 -0.01	3.5 0.14	52.5 2.07	63.0 2.48	0.8 0.03	92.0 3.62	84.0 3.31	5.70 0.22	2.20 0.08	26.7	9.63	0.0930	1.08 2.39
31.750 1.2500	25.400 1.0000	-7.1 -0.28	0.8 0.03	54.0 2.13	55.0 2.17	3.3 0.13	96.0 3.78	88.0 3.46	2.30 0.09	1.30 0.05	49.1	14.2	0.0946	1.24 2.74
31.750 1.2500	25.400 1.0000	-7.1 -0.28	3.5 0.14	54.0 2.13	60.0 2.36	3.3 0.13	96.0 3.78	88.0 3.46	2.30 0.09	1.30 0.05	49.1	16.8	0.0946	1.24 2.73
36.068 1.4200	26.988 1.0625	-12.7 -0.50	3.5 0.14	53.0 2.09	59.0 2.32	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.36 3.01
44.475 1.7510	36.512 1.4375	-16.0 -0.63	1.3 0.05	56.0 2.20	58.0 2.28	3.3 0.13	97.0 3.82	89.0 3.50	2.60 0.10	0.90 0.04	73.4	15.5	0.0985	1.85 4.07
30.958 1.2188	23.812 0.9375	-8.1 -0.32	0.8 0.03	54.0 2.13	55.0 2.17	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.33 2.93
29.317 1.1542	24.605 0.9687	-7.1 -0.28	3.5 0.14	54.0 2.13	60.0 2.36	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.28 2.82

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

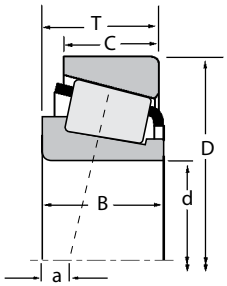
[7] Compound radius on inner race. Details on drawing for bearing.

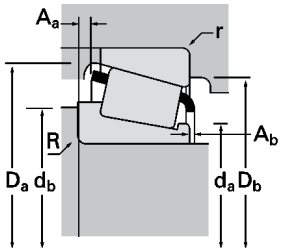
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
44.450 1.7500	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59175	59412
44.450 1.7500	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59175	59413
44.450 1.7500	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59176	59412
44.450 1.7500	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59176	59413
44.450 1.7500	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807040	HM807010
44.450 1.7500	105.000 4.1339	36.873 1.4517	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807040	JHM807012
44.450 1.7500	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	460	453A
44.450 1.7500	107.950 4.2500	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59176	59425
44.450 1.7500	111.125 4.3750	30.162 1.1875	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55175	55437
44.450 1.7500	111.125 4.3750	30.162 1.1875	118000 26500	0.88	0.68	30600 6880	46300 10400	0.66	161000 36200	55175C	55437
44.450 1.7500	111.125 4.3750	30.162 1.1875	118000 26500	0.88	0.68	30600 6880	46300 10400	0.66	161000 36200	55176C	55437
44.450 1.7500	111.125 4.3750	30.162 1.1875	114000 25600	0.88	0.68	29500 6640	44700 10000	0.66	153000 34400	HM907635	HM907614
44.450 1.7500	111.125 4.3750	38.100 1.5000	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	535	532A
44.450 1.7500	112.712 4.4375	30.162 1.1875	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55175	55443
44.450 1.7500	112.712 4.4375	30.162 1.1875	118000 26500	0.88	0.68	30600 6880	46300 10400	0.66	161000 36200	55176C	55443
44.450 1.7500	112.712 4.4375	30.162 1.1875	114000 25600	0.88	0.68	29500 6640	44700 10000	0.66	153000 34400	HM907635	HM907616
44.450 1.7500	114.300 4.5000	44.450 1.7500	207000 46500	0.43	1.39	53700 12100	39500 8880	1.36	256000 57500	65384	65320
44.450 1.7500	114.300 4.5000	44.450 1.7500	207000 46500	0.43	1.39	53700 12100	39500 8880	1.36	256000 57500	65385	65320
44.450 1.7500	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	615	612
44.450 1.7500	127.000 5.0000	50.800 2.0000	283000 63700	0.30	2.01	73500 16500	37500 8440	1.96	370000 83300	6277	6220
44.983 1.7710	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25584	25520
44.983 1.7710	82.931 3.2650	26.988 1.0625	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25584	25523
44.983 1.7710	83.058 3.2700	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25584	25521
44.983 1.7710	84.988 3.3460	19.000 0.7480	57800 13000	0.44	1.35	15000 3370	11400 2560	1.31	69200 15600	29177	29334
44.983 1.7710	85.000 3.3465	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25584	25526
44.983 1.7710	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3776	3720
44.987 1.7712	81.973 3.2273	23.876 0.9400	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25584A	25518
44.987 1.7712	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25584A	25520

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.512 1.4375	28.575 1.1250	-9.7 -0.38	3.5 0.14	56.0 2.20	63.0 2.48	3.3 0.13	99.0 3.90	92.0 3.62	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.54 3.39
36.512 1.4375	28.575 1.1250	-9.7 -0.38	3.5 0.14	56.0 2.20	63.0 2.48	0.8 0.03	102.0 4.02	87.0 3.43	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.55 3.42
36.512 1.4375	28.575 1.1250	-9.7 -0.38	0.8 0.03	56.0 2.20	57.0 2.24	3.3 0.13	99.0 3.90	92.0 3.62	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.55 3.41
36.512 1.4375	28.575 1.1250	-9.7 -0.38	0.8 0.03	56.0 2.20	57.0 2.24	0.8 0.03	102.0 4.02	87.0 3.43	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.56 3.44
36.512 1.4375	28.575 1.1250	-7.4 -0.29	3.5 0.14	59.0 2.32	66.0 2.60	3.3 0.13	100.0 3.94	89.0 3.50	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.59 3.52
36.512 1.4375	29.000 1.1417	-7.4 -0.29	3.5 0.14	59.0 2.32	66.0 2.60	2.5 0.10	100.0 3.94	90.0 3.54	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.61 3.55
29.317 1.1542	22.225 0.8750	-7.1 -0.28	3.5 0.14	54.0 2.13	60.0 2.36	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.33 2.94
36.512 1.4375	28.575 1.1250	-9.7 -0.38	0.8 0.03	56.0 2.20	57.0 2.24	3.3 0.13	101.0 3.98	93.0 3.66	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.66 3.67
26.909 1.0594	20.638 0.8125	7.1 0.28	3.5 0.14	60.0 2.36	67.0 2.64	3.3 0.13	105.0 4.13	92.0 3.62	4.80 0.19	3.20 0.13	36.8	13.2	0.1085	1.36 2.99
26.909 1.0594	20.638 0.8125	7.6 0.30	3.5 0.14	64.0 2.52	70.0 2.76	3.3 0.13	105.0 4.13	92.0 3.62	5.00 0.20	3.60 0.14	48.7	15.4	0.1198	1.44 3.18
26.909 1.0594	20.638 0.8125	7.6 0.30	0.8 0.03	65.0 2.56	71.0 2.80	3.3 0.13	105.0 4.13	92.0 3.62	5.00 0.20	3.60 0.14	48.7	15.4	0.1198	1.44 3.18
28.575 1.1250	20.638 0.8125	7.6 0.30	0.8 0.03	65.0 2.56	64.0 2.52	3.3 0.13	105.0 4.13	91.0 3.58	4.60 0.18	2.00 0.08	46.9	13.7	0.1183	1.46 3.21
36.957 1.4550	30.162 1.1875	-12.2 -0.48	3.5 0.14	54.0 2.13	60.0 2.36	3.3 0.13	100.0 3.94	95.0 3.74	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.83 4.04
26.909 1.0594	20.638 0.8125	7.1 0.28	3.5 0.14	60.0 2.36	67.0 2.64	3.3 0.13	106.0 4.17	92.0 3.62	4.80 0.19	3.20 0.13	36.8	13.2	0.1085	1.40 3.09
26.909 1.0594	20.638 0.8125	7.6 0.30	0.8 0.03	65.0 2.56	71.0 2.80	3.3 0.13	106.0 4.17	92.0 3.62	5.00 0.20	3.60 0.14	48.7	15.4	0.1198	1.49 3.28
28.575 1.1250	20.638 0.8125	7.6 0.30	0.8 0.03	65.0 2.56	64.0 2.52	3.3 0.13	106.0 4.17	91.0 3.58	4.60 0.18	2.00 0.08	46.9	13.7	0.1183	1.52 3.35
44.450 1.7500	34.925 1.3750	-12.4 -0.49	2.0 0.08	60.0 2.36	64.0 2.52	3.3 0.13	107.0 4.21	97.0 3.82	3.70 0.14	1.00 0.04	63.1	13	0.1053	2.31 5.09
44.450 1.7500	34.925 1.3750	-12.4 -0.49	3.5 0.14	60.0 2.36	67.0 2.64	3.3 0.13	107.0 4.21	97.0 3.82	3.70 0.14	1.00 0.04	63.1	13	0.1053	2.30 5.08
41.275 1.6250	31.750 1.2500	-14.0 -0.55	3.5 0.14	56.0 2.20	62.0 2.44	3.3 0.13	110.0 4.33	105.0 4.13	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.42 5.34
52.388 2.0625	41.275 1.6250	-19.6 -0.77	3.5 0.14	60.0 2.36	67.0 2.64	3.3 0.13	117.0 4.61	108.0 4.25	2.40 0.09	2.60 0.10	103	18.7	0.0757	3.55 7.82
25.400 1.0000	19.050 0.7500	-6.4 -0.25	1.5 0.06	51.0 2.01	53.0 2.09	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.55 1.22
25.400 1.0000	22.225 0.8750	-6.4 -0.25	1.5 0.06	51.0 2.01	53.0 2.09	2.3 0.09	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.60 1.31
25.400 1.0000	19.050 0.7500	-6.4 -0.25	1.5 0.06	51.0 2.01	53.0 2.09	3.3 0.13	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.55 1.20
19.164 0.7545	15.875 0.6250	-1.3 -0.05	2.0 0.08	50.0 1.97	54.0 2.13	1.5 0.06	78.0 3.07	74.0 2.91	* *	* *	23.8	15.3	0.0766	0.46 1.01
25.400 1.0000	19.050 0.7500	-6.4 -0.25	1.5 0.06	51.0 2.01	53.0 2.09	2.3 0.09	78.0 3.07	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.59 1.30
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	53.0 2.09	59.0 2.32	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.95 2.09
25.400 1.0000	19.114 0.7525	-6.4 -0.25	3.5 0.14	51.0 2.01	57.0 2.24	1.0 0.04	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.53 1.17
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	51.0 2.01	57.0 2.24	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.55 1.21

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

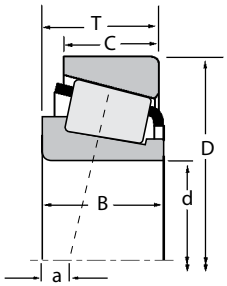
[7] Compound radius on inner race. Details on drawing for bearing.

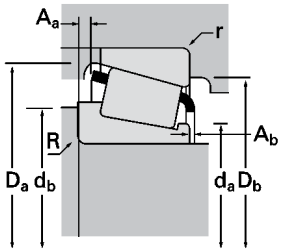
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
44.987 1.7712	90.000 3.5433	25.000 0.9843	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	367X	362X
44.987 1.7712	95.250 3.7500	30.958 1.2188	107000 24000	0.74	0.81	27600 6210	35000 7870	0.79	132000 29700	HM903248	HM903210
45.000 1.7717	75.000 2.9528	20.000 0.7874	61500 13800	0.39	1.53	15900 3580	10700 2410	1.49	84300 19000	XAA32009X	Y32009X
45.000 1.7717	75.000 2.9528	20.000 0.7874	61500 13800	0.39	1.53	15900 3580	10700 2410	1.49	84300 19000	XAB-32009X	Y32009X
45.000 1.7717	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	358	354A
45.000 1.7717	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	358	354X
45.000 1.7717	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	358A	354A
45.000 1.7717	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	358X	354X
45.000 1.7717	87.312 3.4375	26.988 1.0625	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	358	3525
45.000 1.7717	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	367	362A
45.000 1.7717	89.980 3.5425	24.750 0.9744	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	J28577	28520
45.000 1.7717	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	367	362
45.000 1.7717	90.000 3.5433	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	435-S	430X
45.000 1.7717	90.119 3.5480	23.000 0.9055	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	358	352
45.000 1.7717	93.264 3.6718	20.638 0.8125	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	376	374
45.000 1.7717	95.000 3.7402	29.000 1.1417	92500 20800	0.87	0.69	24000 5390	35500 7990	0.67	114000 25600	JW4549	JW4510
45.000 1.7717	96.838 3.8125	22.225 0.8750	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	376	372A
45.000 1.7717	96.838 3.8125	22.225 0.8750	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	376X	372A
45.000 1.7717	100.000 3.9370	25.000 0.9842	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	376	372
45.000 1.7717	104.775 4.1250	39.688 1.5625	167000 37500	0.34	1.79	43300 9730	24900 5590	1.74	237000 53200	4559	4535
45.000 1.7717	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	458-S	453A
45.230 1.7807	79.985 3.1490	19.842 0.7812	63800 14300	0.37	1.64	16500 3720	10400 2330	1.60	83300 18700	17887	17831
45.237 1.7810	84.138 3.3125	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3586	3520
45.237 1.7810	87.312 3.4375	30.162 1.1875	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3586	3525
45.242 1.7812	73.431 2.8910	19.558 0.7700	56900 12800	0.31	1.97	14800 3320	7710 1730	1.91	81800 18400	LM102949	LM102910
45.242 1.7812	73.431 2.8910	21.430 0.8437	56900 12800	0.31	1.97	14800 3320	7710 1730	1.91	81800 18400	LM102949	LM102911
45.242 1.7812	77.788 3.0625	19.842 0.7812	59600 13400	0.43	1.41	15500 3470	11300 2540	1.37	77900 17500	LM603049AS	LM603011
45.242 1.7812	77.788 3.0625	19.842 0.7812	59600 13400	0.43	1.41	15500 3470	11300 2540	1.37	77900 17500	LM603049	LM603011

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
22.225 0.8750	20.000 0.7874	-4.3 -0.17	1.5 0.06	51.0 2.01	54.0 2.13	2.0 0.08	84.0 3.31	80.0 3.15	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.67 1.47
28.575 1.1250	22.225 0.8750	0.5 0.02	3.5 0.14	54.0 2.13	66.0 2.60	0.8 0.03	91.0 3.58	81.0 3.19	* *	* *	33.7	9.91	0.1010	0.99 2.18
20.000 0.7874	15.500 0.6102	-3.3 -0.13	3.0 0.12	51.0 2.01	57.0 2.24	1.0 0.04	72.0 2.83	68.0 2.68	0.60 0.02	2.10 0.08	28.7	16.2	0.0788	0.34 0.76
20.000 0.7874	15.500 0.6102	-3.3 -0.13	0.0 0.00	51.0 2.01	58.0 2.28	1.0 0.04	72.0 2.83	68.0 2.68	0.60 0.02	2.10 0.08	28.7	16.2	0.0788	0.34 0.75
21.692 0.8540	17.462 0.6875	-4.8 -0.19	1.5 0.06	50.0 1.97	53.0 2.09	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.51 1.12
21.692 0.8540	17.462 0.6875	-4.8 -0.19	1.5 0.06	50.0 1.97	53.0 2.09	1.5 0.06	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.51 1.12
21.692 0.8540	17.462 0.6875	-4.8 -0.19	3.5 0.14	50.0 1.97	57.0 2.24	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.50 1.11
21.692 0.8540	17.462 0.6875	-4.8 -0.19	2.0 0.08	50.0 1.97	54.0 2.13	1.5 0.06	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.51 1.12
21.692 0.8540	23.812 0.9375	-4.8 -0.19	1.5 0.06	50.0 1.97	53.0 2.09	3.3 0.13	81.0 3.19	75.0 2.95	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.64 1.42
22.225 0.8750	16.513 0.6501	-4.3 -0.17	2.0 0.08	51.0 2.01	55.0 2.17	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.58 1.29
25.400 1.0000	19.987 0.7869	-4.8 -0.19	0.8 0.03	57.0 2.24	55.0 2.17	2.3 0.09	86.0 3.39	81.0 3.19	1.40 0.06	1.00 0.04	46.4	22.6	0.0912	0.75 1.65
22.225 0.8750	15.875 0.6250	-4.3 -0.17	2.0 0.08	51.0 2.01	55.0 2.17	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.59 1.31
29.900 1.1772	22.225 0.8750	-9.1 -0.36	2.0 0.08	51.0 2.01	55.0 2.17	2.0 0.08	84.0 3.31	81.0 3.19	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	0.80 1.76
21.692 0.8540	21.808 0.8586	-4.8 -0.19	1.5 0.06	50.0 1.97	53.0 2.09	2.3 0.09	82.0 3.23	78.0 3.07	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.67 1.47
22.225 0.8750	15.083 0.5938	-3.8 -0.15	0.8 0.03	52.0 2.05	53.0 2.09	1.3 0.05	88.0 3.46	85.0 3.35	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.67 1.48
26.500 1.0433	20.000 0.7874	4.1 0.16	2.5 0.10	54.0 2.13	64.0 2.52	2.5 0.10	90.5 3.56	78.0 3.07	4.60 0.18	3.00 0.12	30.7	12.9	0.1021	0.91 2.00
22.225 0.8750	19.050 0.7500	-3.8 -0.15	0.8 0.03	52.0 2.05	53.0 2.09	1.5 0.06	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.79 1.75
22.225 0.8750	19.050 0.7500	-3.8 -0.15	2.0 0.08	52.0 2.05	56.0 2.20	1.5 0.06	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.79 1.74
22.225 0.8750	21.824 0.8592	-3.8 -0.15	0.8 0.03	52.0 2.05	53.0 2.09	2.0 0.08	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.93 2.05
40.157 1.5810	33.338 1.3125	-12.4 -0.49	3.5 0.14	56.0 2.20	62.0 2.44	3.3 0.13	99.0 3.90	90.0 3.54	1.70 0.07	1.30 0.05	73.6	18.5	0.1027	1.76 3.88
29.317 1.1542	22.225 0.8750	-7.1 -0.28	2.3 0.09	55.0 2.17	58.0 2.28	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.33 2.93
20.638 0.8125	15.080 0.5937	-3.8 -0.15	2.0 0.08	50.0 1.97	54.0 2.13	1.3 0.05	75.0 2.95	72.0 2.83	1.10 0.04	1.30 0.05	28.9	17.9	0.0770	0.40 0.88
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	52.0 2.05	58.0 2.28	3.3 0.13	79.5 3.13	74.0 2.91	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.67 1.48
30.886 1.2160	23.812 0.9375	-10.2 -0.40	3.5 0.14	52.0 2.05	58.0 2.28	3.3 0.13	81.0 3.19	75.0 2.95	2.30 0.09	0.70 0.03	39.5	10.5	0.0808	0.75 1.65
19.812 0.7800	15.748 0.6200	-4.6 -0.18	3.5 0.14	50.0 1.97	56.0 2.20	0.8 0.03	70.0 2.76	68.0 2.68	0.70 0.03	1.10 0.04	31.1	18	0.0744	0.32 0.70
19.812 0.7800	17.620 0.6937	-4.6 -0.18	3.5 0.14	50.0 1.97	56.0 2.20	0.8 0.03	70.0 2.76	67.0 2.64	0.70 0.03	1.10 0.04	31.1	18	0.0744	0.33 0.74
19.842 0.7812	15.080 0.5937	-2.3 -0.09	0.8 0.03	52.0 2.05	53.0 2.09	0.8 0.03	74.0 2.91	71.0 2.80	1.30 0.05	1.50 0.06	26.4	14.4	0.0785	0.37 0.81
19.842 0.7812	15.080 0.5937	-2.3 -0.09	3.5 0.14	52.0 2.05	58.0 2.28	0.8 0.03	74.0 2.91	71.0 2.80	1.30 0.05	1.40 0.06	26.4	14.4	0.0785	0.37 0.81

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

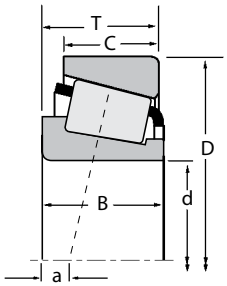
(7) Compound radius on inner race. Details on drawing for bearing.

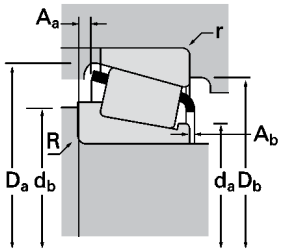
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
45.242 1.7812	77.788 3.0625	21.430 0.8437	59600 13400	0.43	1.41	15500 3470	11300 2540	1.37	77900 17500	LM603049	LM603012
45.242 1.7812	79.974 3.1486	19.842 0.7812	59600 13400	0.43	1.41	15500 3470	11300 2540	1.37	77900 17500	LM603049	LM603014
45.242 1.7812	79.974 3.1486	21.430 0.8437	59600 13400	0.43	1.41	15500 3470	11300 2540	1.37	77900 17500	LM603049	LM603015
45.618 1.7960	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25590	25520
45.618 1.7960	82.931 3.2650	26.988 1.0625	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25590	25523
45.618 1.7960	83.058 3.2700	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25590	25521
45.618 1.7960	83.058 3.2700	23.876 0.9400	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25590	25522
45.618 1.7960	85.000 3.3465	26.988 1.0625	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25590	25527
45.618 1.7960	92.075 3.6250	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25590	25528
45.987 1.8105	74.976 2.9518	18.000 0.7087	52600 11800	0.40	1.49	13600 3070	9390 2110	1.45	75400 17000	LM503349A	LM503310
45.987 1.8105	74.976 2.9518	18.000 0.7087	52600 11800	0.40	1.49	13600 3070	9390 2110	1.45	75400 17000	LM503349	LM503310
45.987 1.8105	90.975 3.5817	32.000 1.2598	133000 29900	0.33	1.80	34500 7760	19700 4420	1.76	172000 38600	HM204049	HM204010
46.038 1.8125	77.788 3.0625	12.700 0.5000	34600 7770	0.34	1.78	8960 2010	5160 1160	1.74	47200 10600	LL205442	LL205410
46.038 1.8125	79.375 3.1250	17.462 0.6875	48200 10800	0.37	1.60	12500 2810	7990 1800	1.56	61300 13800	18690	18620
46.038 1.8125	80.962 3.1875	19.050 0.7500	47000 10600	0.53	1.14	12200 2740	11000 2480	1.11	61100 13700	13181	13318
46.038 1.8125	82.931 3.2650	23.812 0.9375	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25592	25520
46.038 1.8125	84.138 3.3125	26.995 1.0628	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	359-S	3520
46.038 1.8125	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	359A	354A
46.038 1.8125	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	359-S	354A
46.038 1.8125	85.000 3.3465	20.638 0.8125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	359-S	354X
46.038 1.8125	85.000 3.3465	25.400 1.0000	86400 19400	0.35	1.73	22400 5040	13300 2980	1.69	117000 26200	2984	2924
46.038 1.8125	85.000 3.3465	25.400 1.0000	86400 19400	0.35	1.73	22400 5040	13300 2980	1.69	117000 26200	2984A	2924
46.038 1.8125	87.312 3.4375	26.988 1.0625	86400 19400	0.35	1.73	22400 5040	13300 2980	1.69	117000 26200	2984	2925
46.038 1.8125	87.312 3.4375	26.988 1.0625	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	359-S	3525
46.038 1.8125	88.875 3.4990	23.000 0.9055	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	359-S	352A
46.038 1.8125	90.119 3.5480	23.000 0.9055	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	359-S	352
46.038 1.8125	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3777	3720
46.038 1.8125	95.250 3.7500	27.783 1.0938	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	436	432

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
19.842 0.7812	16.667 0.6562	-2.3 -0.09	3.5 0.14	52.0 2.05	58.0 2.28	0.8 0.03	74.0 2.91	70.0 2.76	1.30 0.05	1.40 0.06	26.4	14.4	0.0785	0.38 0.85
19.842 0.7812	15.080 0.5937	-2.3 -0.09	3.5 0.14	52.0 2.05	58.0 2.28	0.8 0.03	75.0 2.95	71.0 2.80	1.30 0.05	1.40 0.06	26.4	14.4	0.0785	0.40 0.88
19.842 0.7812	16.667 0.6562	-2.3 -0.09	3.5 0.14	52.0 2.05	58.0 2.28	0.8 0.03	75.0 2.95	71.0 2.80	1.30 0.05	1.40 0.06	26.4	14.4	0.0785	0.42 0.92
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	51.0 2.01	58.0 2.28	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.54 1.19
25.400 1.0000	22.225 0.8750	-6.4 -0.25	3.5 0.14	51.0 2.01	58.0 2.28	2.3 0.09	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.58 1.28
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	51.0 2.01	58.0 2.28	3.3 0.13	77.0 3.03	72.0 2.83	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.53 1.17
25.400 1.0000	19.114 0.7525	-6.4 -0.25	3.5 0.14	51.0 2.01	58.0 2.28	2.0 0.08	77.0 3.03	73.0 2.87	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.54 1.19
25.400 1.0000	22.225 0.8750	-6.4 -0.25	3.5 0.14	51.0 2.01	58.0 2.28	2.3 0.09	78.0 3.07	73.0 2.87	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.63 1.39
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	51.0 2.01	58.0 2.28	0.8 0.03	80.0 3.15	78.0 3.07	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.73 1.60
18.000 0.7087	14.000 0.5512	-2.0 -0.08	0.0 0.00	51.0 2.01	57.0 2.24	1.5 0.06	71.0 2.80	67.0 2.64	0.90 0.04	1.50 0.06	28.3	18.2	0.0789	0.30 0.65
18.000 0.7087	14.000 0.5512	-2.0 -0.08	2.3 0.09	51.0 2.01	55.0 2.17	1.5 0.06	71.0 2.80	67.0 2.64	0.90 0.04	1.50 0.06	28.3	18.2	0.0789	0.30 0.67
32.000 1.2598	26.500 1.0433	-9.7 -0.38	3.5 0.14	55.0 2.17	63.0 2.48	3.5 0.14	86.0 3.39	79.0 3.11	1.50 0.06	1.80 0.07	47.7	13.4	0.0885	0.92 2.02
12.700 0.5000	9.525 0.3750	0.0 0.00	1.5 0.06	52.0 2.05	54.0 2.13	1.5 0.06	74.0 2.91	71.0 2.80	0.20 0.01	1.70 0.07	24.2	29.1	0.0699	0.24 0.52
17.462 0.6875	13.495 0.5313	-2.0 -0.08	2.8 0.11	51.0 2.01	56.0 2.20	1.5 0.06	74.0 2.91	71.0 2.80	0.70 0.03	1.60 0.06	23.9	17.7	0.0725	0.33 0.73
17.462 0.6875	14.288 0.5625	0.8 0.03	0.8 0.03	52.0 2.05	52.0 2.05	1.5 0.06	76.0 2.99	72.0 2.83	1.60 0.06	1.90 0.08	23	15.4	0.0799	0.37 0.83
25.400 1.0000	19.050 0.7500	-6.4 -0.25	3.5 0.14	52.0 2.05	58.0 2.28	0.8 0.03	77.0 3.03	74.0 2.91	1.00 0.04	0.60 0.03	35.2	14.3	0.0801	0.53 1.17
21.692 0.8540	23.812 0.9375	-4.8 -0.19	2.3 0.09	51.0 2.01	55.0 2.17	3.3 0.13	79.5 3.13	74.0 2.91	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.55 1.21
21.692 0.8540	17.462 0.6875	-4.8 -0.19	3.5 0.14	51.0 2.01	57.0 2.24	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.49 1.08
21.692 0.8540	17.462 0.6875	-4.8 -0.19	2.3 0.09	51.0 2.01	55.0 2.17	1.3 0.05	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.49 1.09
21.692 0.8540	17.462 0.6875	-4.8 -0.19	2.3 0.09	51.0 2.01	55.0 2.17	1.5 0.06	80.0 3.15	77.0 3.03	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.49 1.09
25.608 1.0082	20.638 0.8125	-6.4 -0.25	3.5 0.14	52.0 2.05	58.0 2.28	1.3 0.05	80.0 3.15	76.0 2.99	1.80 0.07	1.10 0.04	38.2	15.7	0.0832	0.61 1.34
25.608 1.0082	20.638 0.8125	-6.4 -0.25	0.8 0.03	52.0 2.05	53.0 2.09	1.3 0.05	80.0 3.15	76.0 2.99	1.80 0.07	1.10 0.04	38.2	15.7	0.0832	0.61 1.35
25.608 1.0082	22.225 0.8750	-6.4 -0.25	3.5 0.14	52.0 2.05	58.0 2.28	2.3 0.09	81.0 3.19	75.0 2.95	1.80 0.07	1.10 0.04	38.2	15.7	0.0832	0.68 1.50
21.692 0.8540	23.812 0.9375	-4.8 -0.19	2.3 0.09	51.0 2.01	55.0 2.17	3.3 0.13	81.0 3.19	75.0 2.95	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.63 1.39
21.692 0.8540	21.808 0.8586	-4.8 -0.19	2.3 0.09	51.0 2.01	55.0 2.17	2.3 0.09	81.0 3.19	78.0 3.07	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.62 1.37
21.692 0.8540	21.808 0.8586	-4.8 -0.19	2.3 0.09	51.0 2.01	55.0 2.17	2.3 0.09	82.0 3.23	78.0 3.07	0.50 0.02	1.70 0.07	30	12.2	0.0732	0.65 1.44
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	53.0 2.09	60.0 2.36	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.93 2.05
29.900 1.1772	22.225 0.8750	-9.1 -0.36	3.5 0.14	52.0 2.05	59.0 2.32	2.3 0.09	87.0 3.43	83.0 3.27	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	0.91 2.00

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

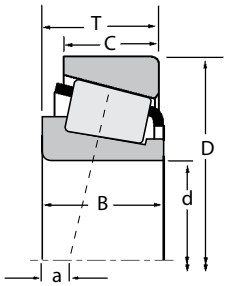
[7] Compound radius on inner race. Details on drawing for bearing.

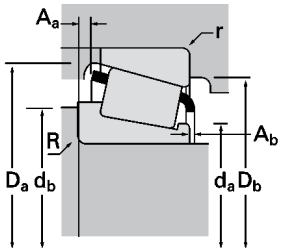
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
46.038 1.8125	95.250 3.7500	31.753 1.2501	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	436	432X
47.625 1.8750	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	369A	362A
47.625 1.8750	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	369-S	362A
47.625 1.8750	88.900 3.5000	25.400 1.0000	91300 20500	0.55	1.10	23700 5320	22100 4970	1.07	116000 26100	M804048	M804010
47.625 1.8750	88.900 3.5000	25.400 1.0000	91300 20500	0.55	1.10	23700 5320	22100 4970	1.07	116000 26100	M804049	M804010
47.625 1.8750	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	369A	362
47.625 1.8750	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	369-S	362
47.625 1.8750	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3778	3720
47.625 1.8750	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3779	3720
47.625 1.8750	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3779	3730
47.625 1.8750	95.250 3.7500	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3779	3726
47.625 1.8750	95.250 3.7500	30.162 1.1875	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804846	HM804810
47.625 1.8750	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	386A	382A
47.625 1.8750	98.425 3.8750	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3779	3732
47.625 1.8750	100.000 3.9370	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	528	520X
47.625 1.8750	101.600 4.0000	31.750 1.2500	123000 27600	0.40	1.50	31900 7160	21900 4910	1.46	155000 35000	49580	49520
47.625 1.8750	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	528	522
47.625 1.8750	101.600 4.0000	34.925 1.3750	123000 27600	0.40	1.50	31900 7160	21900 4910	1.46	155000 35000	49580	49521
47.625 1.8750	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	528A	522
47.625 1.8750	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	528R	522
47.625 1.8750	103.188 4.0625	43.658 1.7188	197000 44200	0.30	2.02	51000 11500	25900 5820	1.97	267000 60100	5358	5335
47.625 1.8750	103.188 4.0625	43.658 1.7188	197000 44200	0.30	2.02	51000 11500	25900 5820	1.97	267000 60100	5361	5335
47.625 1.8750	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45282	45220
47.625 1.8750	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45282	45221
47.625 1.8750	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59187	59412
47.625 1.8750	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59188	59412
47.625 1.8750	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	467	453A
47.625 1.8750	107.950 4.2500	36.512 1.4375	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	536	532X

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
29.900 1.1772	26.195 1.0313	-9.1 -0.36	3.5 0.14	52.0 2.05	59.0 2.32	3.3 0.13	87.0 3.43	81.0 3.19	1.60 0.06	0.40 0.02	42.5	11.3	0.0805	0.99 2.18
22.225 0.8750	16.513 0.6501	-4.3 -0.17	3.5 0.14	53.0 2.09	60.0 2.36	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.55 1.21
22.225 0.8750	16.513 0.6501	-4.3 -0.17	2.3 0.09	53.0 2.09	57.0 2.24	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.55 1.21
25.400 1.0000	19.050 0.7500	-1.8 -0.07	0.8 0.03	56.0 2.20	59.0 2.32	3.3 0.13	85.0 3.35	77.0 3.03	1.70 0.07	2.00 0.08	33.9	12.5	0.0924	0.66 1.46
25.400 1.0000	19.050 0.7500	-1.8 -0.07	3.5 0.14	56.0 2.20	65.0 2.56	3.3 0.13	85.0 3.35	77.0 3.03	1.70 0.07	2.00 0.08	33.9	12.5	0.0924	0.66 1.45
22.225 0.8750	15.875 0.6250	-4.3 -0.17	3.5 0.14	53.0 2.09	60.0 2.36	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.56 1.23
22.225 0.8750	15.875 0.6250	-4.3 -0.17	2.3 0.09	53.0 2.09	57.0 2.24	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.56 1.23
30.302 1.1930	23.812 0.9375	-8.1 -0.32	6.4 0.25	55.0 2.17	67.0 2.64	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.88 1.95
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	55.0 2.17	61.0 2.40	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.90 1.98
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	55.0 2.17	61.0 2.40	0.8 0.03	88.0 3.46	84.0 3.31	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.91 2.01
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	55.0 2.17	61.0 2.40	3.3 0.13	89.0 3.50	83.0 3.27	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.95 2.10
29.370 1.1563	23.020 0.9063	-3.8 -0.15	3.5 0.14	57.5 2.26	66.0 2.60	3.3 0.13	91.0 3.58	81.0 3.19	2.30 0.09	2.80 0.11	44.8	14.6	0.1017	0.96 2.12
21.946 0.8640	15.875 0.6250	-3.0 -0.12	0.8 0.03	55.0 2.17	56.0 2.20	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.73 1.60
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	55.0 2.17	61.0 2.40	3.3 0.13	90.0 3.54	84.0 3.31	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	1.04 2.30
36.068 1.4200	26.988 1.0625	-12.7 -0.50	3.5 0.14	55.0 2.17	62.0 2.44	3.3 0.13	94.0 3.70	88.0 3.46	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.25 2.75
31.750 1.2500	25.400 1.0000	-7.1 -0.28	3.5 0.14	56.0 2.20	63.0 2.48	3.3 0.13	96.0 3.78	88.0 3.46	2.30 0.09	1.30 0.05	49.1	16.8	0.0946	1.18 2.60
36.068 1.4200	26.988 1.0625	-12.7 -0.50	3.5 0.14	55.0 2.17	62.0 2.44	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.30 2.86
31.750 1.2500	28.575 1.1250	-7.1 -0.28	3.5 0.14	56.0 2.20	63.0 2.48	3.3 0.13	96.0 3.78	87.0 3.43	2.30 0.09	1.30 0.05	49.1	16.8	0.0946	1.25 2.76
36.068 1.4200	26.988 1.0625	-12.7 -0.50	1.5 0.06	55.0 2.17	58.0 2.28	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.30 2.88
36.068 1.4200	26.988 1.0625	-12.7 -0.50	8.0 0.31	55.0 2.17	70.0 2.76	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.27 2.79
44.475 1.7510	36.512 1.4375	-16.0 -0.63	1.3 0.05	58.0 2.28	60.0 2.36	3.3 0.13	97.0 3.82	89.0 3.50	2.60 0.10	0.90 0.04	73.4	15.5	0.0985	1.77 3.89
44.475 1.7510	36.512 1.4375	-16.0 -0.63	3.5 0.14	58.0 2.28	65.0 2.56	3.3 0.13	97.0 3.82	89.0 3.50	2.60 0.10	0.90 0.04	73.4	15.5	0.0985	1.76 3.88
30.958 1.2188	23.812 0.9375	-8.1 -0.32	3.5 0.14	57.0 2.24	63.0 2.48	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.27 2.79
30.958 1.2188	23.812 0.9375	-8.1 -0.32	3.5 0.14	57.0 2.24	63.0 2.48	0.8 0.03	99.0 3.90	95.0 3.74	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.27 2.80
36.512 1.4375	28.575 1.1250	-9.7 -0.38	3.5 0.14	59.0 2.32	65.0 2.56	3.3 0.13	99.0 3.90	92.0 3.62	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.47 3.25
36.512 1.4375	28.575 1.1250	-9.7 -0.38	1.5 0.06	59.0 2.32	61.0 2.40	3.3 0.13	99.0 3.90	92.0 3.62	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.48 3.26
29.317 1.1542	22.225 0.8750	-7.1 -0.28	0.8 0.03	56.0 2.20	57.0 2.24	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.29 2.84
36.957 1.4550	28.575 1.1250	-12.2 -0.48	3.5 0.14	56.0 2.20	62.0 2.44	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.59 3.51

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

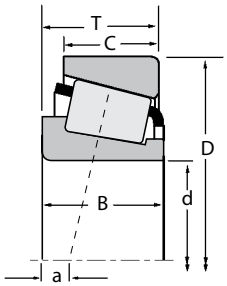
(7) Compound radius on inner race. Details on drawing for bearing.

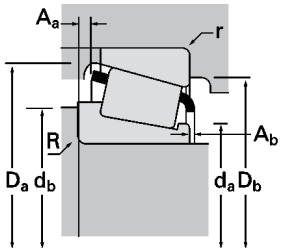
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
47.625 1.8750	108.966 4.2900	34.925 1.3750	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59187	59429
47.625 1.8750	108.966 4.2900	34.925 1.3750	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59188	59429
47.625 1.8750	111.125 4.3750	30.162 1.1875	118000 26500	0.88	0.68	30600 6880	46300 10400	0.66	161000 36200	55187C	55437
47.625 1.8750	111.125 4.3750	30.162 1.1875	114000 25600	0.88	0.68	29500 6640	44700 10000	0.66	153000 34400	HM907639	HM907614
47.625 1.8750	111.125 4.3750	38.100 1.5000	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	536	532
47.625 1.8750	112.712 4.4375	30.162 1.1875	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55187	55443
47.625 1.8750	112.712 4.4375	30.162 1.1875	118000 26500	0.88	0.68	30600 6880	46300 10400	0.66	161000 36200	55187C	55443
47.625 1.8750	112.712 4.4375	30.162 1.1875	114000 25600	0.88	0.68	29500 6640	44700 10000	0.66	153000 34400	HM907639	HM907616
47.625 1.8750	117.475 4.6250	33.338 1.3125	138000 31000	0.63	0.96	35800 8040	38300 8620	0.93	166000 37300	66187	66462
47.625 1.8750	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	617	612
47.625 1.8750	123.825 4.8750	36.512 1.4375	153000 34400	0.74	0.81	39600 8910	50000 11200	0.79	175000 39400	72187	72487
47.625 1.8750	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72187C	72487
47.625 1.8750	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72188C	72487
48.412 1.9060	95.250 3.7500	30.162 1.1875	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804848A	HM804810
48.412 1.9060	95.250 3.7500	30.162 1.1875	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804848	HM804810
48.412 1.9060	95.250 3.7500	30.162 1.1875	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804849	HM804810
48.600 1.9134	88.000 3.4646	21.500 0.8465	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	JLM104942A	JLM104914
49.212 1.9375	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365-S	362A
49.212 1.9375	90.000 3.5433	25.000 0.9843	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365-S	362X
49.212 1.9375	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3781	3720
49.212 1.9375	103.188 4.0625	43.658 1.7188	197000 44200	0.30	2.02	51000 11500	25900 5820	1.97	267000 60100	5395	5335
49.212 1.9375	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807044	HM807010
49.212 1.9375	114.300 4.5000	44.450 1.7500	207000 46500	0.43	1.39	53700 12100	39500 8880	1.36	256000 57500	65390	65320
49.212 1.9375	114.300 4.5000	44.450 1.7500	228000 51200	0.40	1.49	59000 13300	40600 9130	1.45	290000 65100	HH506348	HH506310
49.212 1.9375	114.300 4.5000	44.450 1.7500	228000 51200	0.40	1.49	59000 13300	40600 9130	1.45	290000 65100	HH506348	HH506311
49.213 1.9375	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5562	5535
49.975 1.9675	111.125 4.3750	30.162 1.1875	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55196	55437
49.982 1.9678	107.950 4.2500	36.512 1.4375	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	546	532X

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.512 1.4375	26.988 1.0625	-9.7 -0.38	3.5 0.14	59.0 2.32	65.0 2.56	3.3 0.13	101.0 3.98	93.0 3.66	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.58 3.49
36.512 1.4375	26.988 1.0625	-9.7 -0.38	1.5 0.06	59.0 2.32	61.0 2.40	3.3 0.13	101.0 3.98	93.0 3.66	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.59 3.51
26.909 1.0594	20.638 0.8125	7.6 0.30	3.5 0.14	62.0 2.44	69.0 2.72	3.3 0.13	105.0 4.13	92.0 3.62	5.00 0.20	3.60 0.14	48.7	15.4	0.1198	1.39 3.07
28.575 1.1250	20.638 0.8125	7.6 0.30	3.5 0.14	65.0 2.56	72.0 2.83	3.3 0.13	105.0 4.13	91.0 3.58	4.60 0.18	2.00 0.08	46.9	13.7	0.1183	1.40 3.08
36.957 1.4550	33.338 1.3125	-12.2 -0.48	3.5 0.14	56.0 2.20	62.0 2.44	3.3 0.13	100.0 3.94	95.0 3.74	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.82 4.01
26.909 1.0594	20.638 0.8125	7.1 0.28	3.5 0.14	62.0 2.44	69.0 2.72	3.3 0.13	106.0 4.17	92.0 3.62	4.80 0.19	3.20 0.13	36.8	13.2	0.1085	1.35 2.98
26.909 1.0594	20.638 0.8125	7.6 0.30	3.5 0.14	62.0 2.44	69.0 2.72	3.3 0.13	106.0 4.17	92.0 3.62	5.00 0.20	3.60 0.14	48.7	15.4	0.1198	1.44 3.17
28.575 1.1250	20.638 0.8125	7.6 0.30	3.5 0.14	65.0 2.56	72.0 2.83	3.3 0.13	106.0 4.17	91.0 3.58	4.60 0.18	2.00 0.08	46.9	13.7	0.1183	1.46 3.22
31.750 1.2500	23.812 0.9375	-0.3 -0.01	3.5 0.14	62.0 2.44	69.0 2.72	3.3 0.13	111.0 4.37	100.0 3.94	5.00 0.20	2.00 0.08	50.2	16.4	0.0751	1.70 3.74
41.275 1.6250	31.750 1.2500	-14.0 -0.55	3.5 0.14	58.0 2.28	65.0 2.56	3.3 0.13	110.0 4.33	105.0 4.13	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.35 5.18
32.791 1.2910	25.400 1.0000	1.3 0.05	3.5 0.14	66.0 2.59	72.0 2.83	3.3 0.13	116.0 4.57	102.0 4.02	5.40 0.21	4.00 0.16	47.7	14.1	0.0772	2.05 4.52
32.791 1.2910	25.400 1.0000	2.0 0.08	3.5 0.14	66.0 2.60	75.0 2.95	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.15 4.74
32.791 1.2910	25.400 1.0000	2.0 0.08	0.8 0.03	67.0 2.64	69.0 2.72	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.18 4.80
29.370 1.1563	23.020 0.9063	-3.8 -0.15	2.3 0.09	57.5 2.26	63.0 2.48	3.3 0.13	91.0 3.58	81.0 3.19	2.30 0.09	2.80 0.11	44.8	13.8	0.1017	0.95 2.10
29.370 1.1563	23.020 0.9063	-3.8 -0.15	2.3 0.09	57.5 2.26	63.0 2.48	3.3 0.13	91.0 3.58	81.0 3.19	2.30 0.09	2.80 0.11	44.8	13.8	0.1017	0.95 2.10
29.370 1.1563	23.020 0.9063	-3.8 -0.15	3.5 0.14	57.5 2.26	66.0 2.60	3.3 0.13	91.0 3.58	81.0 3.19	2.30 0.09	2.80 0.11	44.8	13.8	0.1017	0.95 2.09
21.500 0.8465	17.000 0.6693	-5.3 -0.21	0.4 0.02	55.0 2.17	54.0 2.13	0.8 0.03	81.0 3.19	78.0 3.07	0.80 0.03	2.10 0.08	38.8	23.2	0.0801	0.56 1.23
22.225 0.8750	16.513 0.6501	-4.3 -0.17	0.8 0.03	54.0 2.13	55.0 2.17	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.53 1.17
22.225 0.8750	20.000 0.7874	-4.3 -0.17	0.8 0.03	54.0 2.13	55.0 2.17	2.0 0.08	84.0 3.31	80.0 3.15	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.62 1.36
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	56.0 2.20	62.0 2.44	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.87 1.92
44.475 1.7510	36.512 1.4375	-16.0 -0.63	3.5 0.14	60.0 2.36	66.0 2.60	3.3 0.13	97.0 3.82	89.0 3.50	2.60 0.10	0.90 0.04	73.4	15.5	0.0985	1.72 3.78
36.512 1.4375	28.575 1.1250	-7.4 -0.29	3.5 0.14	63.0 2.48	69.0 2.72	3.3 0.13	100.0 3.94	89.0 3.50	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.49 3.29
44.450 1.7500	34.925 1.3750	-12.4 -0.49	3.5 0.14	60.0 2.36	70.0 2.76	3.3 0.13	107.0 4.21	97.0 3.82	3.70 0.14	1.00 0.04	63.1	13	0.1053	2.18 4.81
44.450 1.7500	36.068 1.4200	-13.5 -0.53	3.5 0.14	61.0 2.40	71.0 2.80	3.3 0.13	107.0 4.21	97.0 3.82	2.70 0.11	3.20 0.13	72	15.6	0.1078	2.26 4.97
44.450 1.7500	36.068 1.4200	-13.5 -0.53	3.5 0.14	61.0 2.40	71.0 2.80	0.8 0.03	107.0 4.21	99.0 3.90	2.70 0.11	3.20 0.13	72	15.6	0.1078	2.27 5.00
43.764 1.7230	36.512 1.4375	-12.2 -0.48	1.3 0.05	63.0 2.48	65.0 2.56	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.73 6.02
26.909 1.0594	20.638 0.8125	7.1 0.28	3.5 0.14	64.0 2.51	71.0 2.80	3.3 0.13	105.0 4.13	92.0 3.62	4.80 0.19	3.20 0.13	36.8	13.2	0.1085	1.27 2.80
36.957 1.4550	28.575 1.1250	-12.2 -0.48	3.5 0.14	58.0 2.28	65.0 2.56	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.54 3.40

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

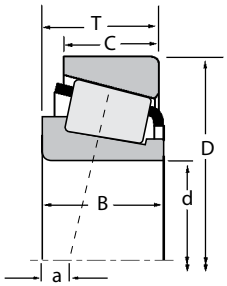
[7] Compound radius on inner race. Details on drawing for bearing.

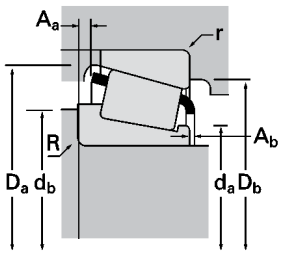
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
49.987 1.9680	79.974 3.1486	18.258 0.7188	56300 12700	0.36	1.69	14600 3280	8880 2000	1.64	88800 20000	L305648	L305611
49.987 1.9680	80.962 3.1875	18.258 0.7188	56300 12700	0.36	1.69	14600 3280	8880 2000	1.64	88800 20000	L305648	L305610
49.987 1.9680	82.000 3.2283	21.976 0.8652	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	LM104947A	JLM104910
49.987 1.9680	89.980 3.5425	24.750 0.9744	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28579	28520
49.987 1.9680	92.075 3.6250	24.608 0.9688	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28579	28521
49.987 1.9680	96.838 3.8125	22.225 0.8750	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	378A	372A
49.987 1.9680	114.300 4.5000	44.450 1.7500	228000 51200	0.40	1.49	59000 13300	40600 9130	1.45	290000 65100	HH506349	HH506311
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAA32010X	Y32010X
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAB-32010X	Y32010X
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAD32010X	Y32010X
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAE32010X	Y32010X
50.000 1.9685	82.000 3.2283	21.500 0.8465	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	JLM104948	JLM104910
50.000 1.9685	82.000 3.2283	21.500 0.8465	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAB-32010X	YKB-32010X
50.000 1.9685	82.550 3.2500	21.120 0.8313	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	JLM104948	LM104911
50.000 1.9685	82.550 3.2500	23.150 0.9113	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	JLM104948	LM104911A
50.000 1.9685	82.931 3.2650	21.120 0.8313	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	JLM104948	LM104912
50.000 1.9685	84.000 3.3071	22.000 0.8661	75400 16900	0.44	1.37	19500 4390	14600 3290	1.34	104000 23500	JLM704649	JLM704610
50.000 1.9685	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365	362A
50.000 1.9685	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	366	362A
50.000 1.9685	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365	362
50.000 1.9685	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365	363
50.000 1.9685	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	366	362
50.000 1.9685	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	366	363
50.000 1.9685	90.000 3.5433	28.000 1.1024	115000 25700	0.33	1.82	29700 6670	16700 3760	1.78	154000 34600	JM205149A	JM205110
50.000 1.9685	90.000 3.5433	28.000 1.1024	115000 25700	0.33	1.82	29700 6670	16700 3760	1.78	154000 34600	JM205149AS	JM205110
50.000 1.9685	90.000 3.5433	28.000 1.1024	115000 25700	0.33	1.82	29700 6670	16700 3760	1.78	154000 34600	JM205149	JM205110
50.000 1.9685	90.000 3.5433	28.000 1.1024	115000 25700	0.33	1.82	29700 6670	16700 3760	1.78	154000 34600	JM205149	JM205110A
50.000 1.9685	100.000 3.9370	33.500 1.3189	150000 33700	0.40	1.50	38900 8750	26600 5980	1.46	202000 45300	XLA33211	Y33211

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
18.258 0.7188	14.288 0.5625	-2.5 -0.10	1.5 0.06	55.0 2.17	57.0 2.24	1.5 0.06	76.0 2.99	73.0 2.87	0.20 0.01	1.90 0.08	38.8	27.8	0.0841	0.34 0.76
18.258 0.7188	14.288 0.5625	-2.5 -0.10	1.5 0.06	55.0 2.17	57.0 2.24	1.5 0.06	77.0 3.03	73.0 2.87	0.20 0.01	1.90 0.08	38.8	27.8	0.0841	0.36 0.79
22.225 0.8750	17.000 0.6693	-5.8 -0.23	0.5 0.02	55.0 2.17	55.0 2.17	0.5 0.02	78.0 3.07	76.0 2.99	1.20 0.05	2.00 0.08	38.8	23.2	0.0801	0.44 0.97
25.400 1.0000	19.987 0.7869	-4.8 -0.19	2.3 0.09	56.0 2.20	60.0 2.36	2.3 0.09	86.0 3.39	81.0 3.19	1.40 0.06	1.00 0.04	46.4	18.9	0.0912	0.66 1.47
25.400 1.0000	19.845 0.7813	-4.8 -0.19	2.3 0.09	56.0 2.20	60.0 2.36	0.8 0.03	87.0 3.43	83.0 3.27	1.40 0.06	1.00 0.04	46.4	18.9	0.0912	0.71 1.57
22.225 0.8750	19.050 0.7500	-3.8 -0.15	2.3 0.09	56.0 2.20	60.0 2.36	1.5 0.06	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.72 1.60
44.450 1.7500	36.068 1.4200	-13.5 -0.53	3.5 0.14	61.0 2.40	72.0 2.83	0.8 0.03	107.0 4.21	99.0 3.90	2.70 0.11	3.20 0.13	72	15.6	0.1078	2.25 4.96
20.000 0.7874	15.500 0.6102	-2.0 -0.08	2.3 0.09	56.0 2.20	60.0 2.36	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
20.000 0.7874	15.500 0.6102	-2.0 -0.08	3.0 0.12	55.0 2.17	62.0 2.44	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
20.000 0.7874	15.500 0.6102	-2.0 -0.08	1.5 0.06	56.0 2.20	59.0 2.32	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
20.000 0.7874	15.500 0.6102	-2.0 -0.08	0.3 0.01	55.0 2.17	56.0 2.20	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
21.500 0.8465	17.000 0.6693	-5.3 -0.21	3.0 0.12	55.0 2.17	60.0 2.36	0.5 0.02	78.0 3.07	76.0 2.99	0.80 0.03	2.10 0.08	38.8	19.3	0.0801	0.43 0.94
20.000 0.7874	17.000 0.6693	-2.0 -0.08	3.0 0.12	55.0 2.17	62.0 2.44	0.5 0.02	77.0 3.03	76.0 2.99	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.42 0.93
21.500 0.8465	16.510 0.6500	-5.3 -0.21	3.0 0.12	55.0 2.17	60.0 2.36	1.3 0.05	78.0 3.07	75.0 2.95	0.80 0.03	2.10 0.08	38.8	19.3	0.0801	0.43 0.95
21.500 0.8465	18.542 0.7300	-5.3 -0.21	3.0 0.12	55.0 2.17	60.0 2.36	0.8 0.03	78.0 3.07	75.0 2.95	0.80 0.03	2.10 0.08	38.8	19.3	0.0801	0.45 1.00
21.500 0.8465	16.510 0.6500	-5.3 -0.21	3.0 0.12	55.0 2.17	60.0 2.36	1.3 0.05	77.5 3.06	75.0 2.95	0.80 0.03	2.10 0.08	38.8	19.3	0.0801	0.44 0.96
22.000 0.8661	17.500 0.6890	-2.3 -0.09	3.5 0.14	56.0 2.20	64.0 2.52	1.5 0.06	80.0 3.15	76.0 2.99	1.10 0.04	1.60 0.06	35.6	16.7	0.0876	0.47 1.03
22.225 0.8750	16.513 0.6501	-4.3 -0.17	2.0 0.08	55.0 2.17	58.0 2.28	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.52 1.14
22.225 0.8750	16.513 0.6501	-4.3 -0.17	2.3 0.09	55.0 2.17	59.0 2.32	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.52 1.14
22.225 0.8750	15.875 0.6250	-4.3 -0.17	2.0 0.08	55.0 2.17	58.0 2.28	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.53 1.16
22.225 0.8750	20.000 0.7874	-4.3 -0.17	2.0 0.08	55.0 2.17	58.0 2.28	0.8 0.03	85.0 3.34	82.0 3.23	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.56 1.24
22.225 0.8750	15.875 0.6250	-4.3 -0.17	2.3 0.09	55.0 2.17	59.0 2.32	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.53 1.16
22.225 0.8750	20.000 0.7874	-4.3 -0.17	2.3 0.09	55.0 2.17	59.0 2.32	0.8 0.03	85.0 3.34	82.0 3.23	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.56 1.24
28.000 1.1024	23.000 0.9055	-7.6 -0.30	5.0 0.20	57.0 2.24	67.0 2.64	2.5 0.10	85.0 3.35	80.0 3.15	0.80 0.03	2.30 0.09	48.2	14.1	0.0885	0.74 1.63
28.000 1.1024	23.000 0.9055	-7.6 -0.30	2.5 0.10	57.0 2.24	63.0 2.48	2.5 0.10	85.0 3.35	80.0 3.15	0.80 0.03	2.30 0.09	48.2	14.1	0.0885	0.74 1.64
28.000 1.1024	23.000 0.9055	-7.6 -0.30	3.0 0.12	57.0 2.24	63.0 2.48	2.5 0.10	85.0 3.35	80.0 3.15	0.80 0.03	2.30 0.09	48.2	14.1	0.0885	0.74 1.64
28.000 1.1024	23.000 0.9055	-7.6 -0.30	3.0 0.12	57.0 2.24	63.0 2.48	0.8 0.03	85.0 3.35	81.0 3.19	0.80 0.03	2.30 0.09	48.2	14.1	0.0885	0.74 1.64
33.500 1.3189	27.000 1.0630	-8.1 -0.32	2.0 0.08	62.0 2.44	67.0 2.64	1.5 0.06	96.0 3.78	89.0 3.50	1.40 0.05	2.80 0.11	59.3	15.3	0.1010	1.24 2.73

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

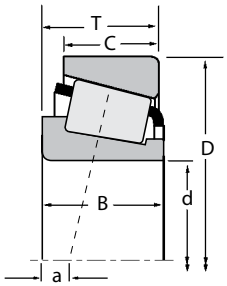
[7] Compound radius on inner race. Details on drawing for bearing.

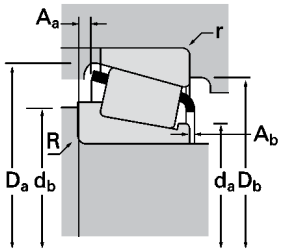
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
50.000 1.9685	105.000 4.1339	32.000 1.2598	111000 24900	0.87	0.69	28700 6440	42500 9560	0.67	138000 31000	JW5049	JW5010
50.000 1.9685	105.000 4.1339	37.000 1.4567	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	JHM807045	JHM807012
50.800 2.0000	77.788 3.0625	12.700 0.5000	34600 7770	0.34	1.78	8960 2010	5160 1160	1.74	47200 10600	LL205449	LL205410
50.800 2.0000	80.962 3.1875	18.258 0.7188	56300 12700	0.36	1.69	14600 3280	8880 2000	1.64	88800 20000	L305649	L305610
50.800 2.0000	82.000 3.2283	21.976 0.8652	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	LM104949	JLM104910
50.800 2.0000	82.550 3.2500	21.590 0.8500	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	LM104949	LM104911
50.800 2.0000	82.550 3.2500	23.622 0.9300	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	LM104949	LM104911A
50.800 2.0000	82.931 3.2650	21.590 0.8500	75200 16900	0.31	1.97	19500 4390	10200 2290	1.91	104000 23400	LM104949	LM104912
50.800 2.0000	83.312 3.2800	17.462 0.6875	50600 11400	0.41	1.48	13100 2950	9110 2050	1.44	67500 15200	18790	18721
50.800 2.0000	85.000 3.3465	17.462 0.6875	50600 11400	0.41	1.48	13100 2950	9110 2050	1.44	67500 15200	18790	18720
50.800 2.0000	85.725 3.3750	19.050 0.7500	47800 10700	0.57	1.06	12400 2780	12000 2710	1.03	63900 14400	18200	18337
50.800 2.0000	88.900 3.5000	17.462 0.6875	50600 11400	0.41	1.48	13100 2950	9110 2050	1.44	67500 15200	18790	18724
50.800 2.0000	88.900 3.5000	20.638 0.8125	50600 11400	0.41	1.48	13100 2950	9110 2050	1.44	67500 15200	18790	18723
50.800 2.0000	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368	362A
50.800 2.0000	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368A	362A
50.800 2.0000	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	370A	362A
50.800 2.0000	88.900 3.5000	23.812 0.9375	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368A	362AX
50.800 2.0000	89.980 3.5425	24.750 0.9744	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28580	28520
50.800 2.0000	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368	362
50.800 2.0000	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368	363
50.800 2.0000	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368A	362
50.800 2.0000	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	370A	362
50.800 2.0000	92.075 3.6250	24.608 0.9688	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28580	28521
50.800 2.0000	92.075 3.6250	27.780 1.0937	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28580	28523
50.800 2.0000	93.264 3.6718	20.638 0.8125	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	375	374
50.400 2.0000	93.264 3.6718	20.638 0.8125	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	375-S	374
50.800 2.0000	93.264 3.6718	26.988 1.0625	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	375	3720
50.800 2.0000	93.264 3.6718	26.988 1.0625	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	375	3730

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
29.000 1.1417	22.000 0.8661	4.3 0.17	3.0 0.12	60.0 2.36	76.0 2.99	3.0 0.12	100.0 3.94	86.0 3.39	4.90 0.19	3.60 0.14	39	14.6	0.1105	1.23 2.72
36.000 1.4173	29.000 1.1417	-7.6 -0.30	3.0 0.12	63.0 2.48	69.0 2.72	2.5 0.10	100.0 3.94	90.0 3.54	3.60 0.14	2.60 0.10	63.9	17.1	0.0760	1.49 3.28
12.700 0.5000	9.525 0.3750	0.0 0.00	1.5 0.06	55.0 2.17	57.0 2.24	1.5 0.06	74.0 2.91	71.0 2.80	0.20 0.01	1.70 0.07	24.2	29.1	0.0699	0.20 0.45
18.258 0.7188	14.288 0.5625	-2.5 -0.10	1.5 0.06	56.0 2.20	58.0 2.28	1.5 0.06	77.0 3.03	73.0 2.87	0.30 0.01	1.90 0.08	38.8	27.8	0.0841	0.35 0.77
22.225 0.8750	17.000 0.6693	-5.8 -0.23	3.5 0.14	56.0 2.20	63.0 2.48	0.5 0.02	78.0 3.07	76.0 2.99	1.20 0.05	2.00 0.08	38.8	19.3	0.0801	0.42 0.93
22.225 0.8750	16.510 0.6500	-5.8 -0.23	3.5 0.14	56.0 2.20	63.0 2.48	1.3 0.05	78.0 3.07	75.0 2.95	1.20 0.05	2.00 0.08	38.8	19.3	0.0801	0.42 0.93
22.225 0.8750	18.542 0.7300	-5.8 -0.23	3.5 0.14	56.0 2.20	63.0 2.48	0.8 0.03	78.0 3.07	75.0 2.95	1.20 0.05	2.00 0.08	38.8	19.3	0.0801	0.45 0.99
22.225 0.8750	16.510 0.6500	-5.8 -0.23	3.5 0.14	56.0 2.20	63.0 2.48	1.3 0.05	77.5 3.06	75.0 2.95	1.20 0.05	2.00 0.08	38.8	19.3	0.0801	0.43 0.95
17.462 0.6875	13.495 0.5313	-0.8 -0.03	3.5 0.14	56.0 2.20	62.0 2.44	0.8 0.03	79.0 3.11	77.0 3.03	0.80 0.03	1.50 0.06	28.6	21.5	0.0789	0.34 0.76
17.462 0.6875	13.495 0.5313	-0.8 -0.03	3.5 0.14	56.0 2.20	62.0 2.44	1.5 0.06	80.0 3.15	77.0 3.03	0.80 0.03	1.50 0.06	28.6	21.5	0.0789	0.37 0.81
18.263 0.7190	12.700 0.5000	2.0 0.08	1.5 0.06	56.0 2.20	59.0 2.32	1.5 0.06	81.0 3.19	76.0 2.99	* *	* *	26.1	20.3	0.0852	0.40 0.88
17.462 0.6875	13.495 0.5313	-0.8 -0.03	3.5 0.14	56.0 2.20	62.0 2.44	1.3 0.05	82.0 3.23	78.0 3.07	0.80 0.03	1.50 0.06	28.6	21.5	0.0789	0.42 0.93
17.462 0.6875	16.670 0.6563	-0.8 -0.03	3.5 0.14	56.0 2.20	62.0 2.44	1.3 0.05	82.0 3.23	78.0 3.07	0.80 0.03	1.50 0.06	28.6	21.5	0.0789	0.48 1.06
22.225 0.8750	16.513 0.6501	-4.3 -0.17	1.5 0.06	56.0 2.20	58.0 2.28	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.51 1.12
22.225 0.8750	16.513 0.6501	-4.3 -0.17	3.5 0.14	56.0 2.20	62.0 2.44	1.3 0.05	84.0 3.31	81.0 3.19	0.40 0.02	1.10 0.04	33.8	12.7	0.0773	0.50 1.10
22.225 0.8750	16.513 0.6501	-4.3 -0.17	5.0 0.20	56.0 2.20	65.0 2.56	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.49 1.08
22.225 0.8750	19.688 0.7751	-4.3 -0.17	3.5 0.14	56.0 2.20	62.0 2.44	1.3 0.05	84.0 3.31	80.0 3.15	0.40 0.02	1.10 0.04	33.8	12.7	0.0773	0.55 1.21
25.400 1.0000	19.987 0.7869	-4.8 -0.19	3.5 0.14	57.0 2.24	63.0 2.48	2.3 0.09	86.0 3.39	81.0 3.19	1.40 0.06	1.00 0.04	46.4	22.6	0.0912	0.66 1.45
22.225 0.8750	15.875 0.6250	-4.3 -0.17	1.5 0.06	56.0 2.20	58.0 2.28	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.52 1.14
22.225 0.8750	20.000 0.7874	-4.3 -0.17	1.5 0.06	56.0 2.20	58.0 2.28	0.8 0.03	85.0 3.34	82.0 3.23	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.55 1.21
22.225 0.8750	15.875 0.6250	-4.3 -0.17	3.5 0.14	56.0 2.20	62.0 2.44	2.0 0.08	84.0 3.31	81.0 3.19	0.40 0.02	1.10 0.04	33.8	12.7	0.0773	0.51 1.12
22.225 0.8750	15.875 0.6250	-4.3 -0.17	5.0 0.20	56.0 2.20	65.0 2.56	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.50 1.10
25.400 1.0000	19.845 0.7813	-4.8 -0.19	3.5 0.14	57.0 2.24	63.0 2.48	0.8 0.03	87.0 3.43	83.0 3.27	1.40 0.06	1.00 0.04	46.4	22.6	0.0912	0.71 1.56
25.400 1.0000	23.017 0.9062	-4.8 -0.19	3.5 0.14	57.0 2.24	63.0 2.48	2.3 0.09	87.0 3.43	81.0 3.19	1.40 0.06	1.00 0.04	46.4	22.6	0.0912	0.76 1.67
22.225 0.8750	15.083 0.5938	-3.8 -0.15	2.3 0.09	57.0 2.24	60.0 2.36	1.3 0.05	88.0 3.46	85.0 3.35	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.59 1.31
22.225 0.8750	15.083 0.5938	-3.8 -0.15	3.5 0.14	57.0 2.24	63.0 2.48	1.3 0.05	88.0 3.46	85.0 3.35	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.59 1.30
22.225 0.8750	23.812 0.9375	-3.8 -0.15	2.3 0.09	57.0 2.24	60.0 2.36	3.3 0.13	88.0 3.46	82.0 3.23	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.70 1.55
22.225 0.8750	23.812 0.9375	-3.8 -0.15	2.3 0.09	57.0 2.24	60.0 2.36	0.8 0.03	88.0 3.46	84.0 3.31	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.72 1.58

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

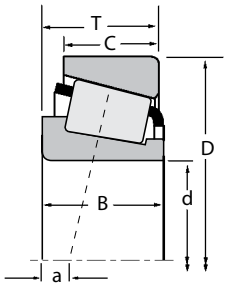
[7] Compound radius on inner race. Details on drawing for bearing.

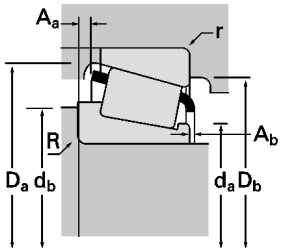
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
50.800 2.0000	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3775	3720
50.800 2.0000	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3780	3720
50.800 2.0000	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3780	3730
50.800 2.0000	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3784	3720
50.800 2.0000	93.662 3.6875	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3784	3727
50.800 2.0000	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33889	33821
50.800 2.0000	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33889	33822
50.800 2.0000	95.250 3.7500	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3780	3726
50.800 2.0000	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385A	382A
50.800 2.0000	96.838 3.8125	22.225 0.8750	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	375	372A
50.400 2.0000	96.838 3.8125	22.225 0.8750	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	375-S	372A
50.800 2.0000	96.838 3.8125	25.400 1.0000	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385A	382-S
50.800 2.0000	98.425 3.8750	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385A	382
50.800 2.0000	98.425 3.8750	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3780	3732
50.800 2.0000	100.000 3.9370	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385A	383A
50.800 2.0000	100.000 3.9370	25.000 0.9842	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	375	372
50.800 2.0000	100.000 3.9370	25.400 1.0000	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385A	383X
50.800 2.0000	100.000 3.9370	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	529	520X
50.800 2.0000	100.000 3.9370	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	529X	520X
50.800 2.0000	100.000 3.9370	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	529X	J520
50.800 2.0000	101.600 4.0000	31.750 1.2500	123000 27600	0.40	1.50	31900 7160	21900 4910	1.46	155000 35000	49585	49520
50.800 2.0000	101.600 4.0000	31.750 1.2500	123000 27600	0.40	1.50	31900 7160	21900 4910	1.46	155000 35000	49585	49522
50.800 2.0000	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	529	522
50.800 2.0000	101.600 4.0000	34.925 1.3750	152000 34300	0.29	2.10	39500 8880	19300 4340	2.05	191000 43000	529X	522
50.800 2.0000	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45284	45220
50.800 2.0000	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45284	45221
50.800 2.0000	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45285	45220
50.800 2.0000	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45285	45221

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
30.302 1.1930	23.812 0.9375	-8.1 -0.32	0.8 0.03	58.0 2.28	58.0 2.28	3.3 0.13	88.0 3.46	82.0 3.23	1.90 0.07	0.90 0.04	49.9	14.5	0.0903	0.85 1.87
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	58.0 2.28	64.0 2.52	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.84 1.86
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	58.0 2.28	64.0 2.52	0.8 0.03	88.0 3.46	84.0 3.31	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.85 1.88
30.302 1.1930	23.812 0.9375	-8.1 -0.32	6.4 0.25	58.0 2.28	70.0 2.76	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.82 1.81
30.302 1.1930	23.812 0.9375	-8.1 -0.32	6.4 0.25	58.0 2.28	70.0 2.76	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.83 1.84
28.575 1.1250	22.225 0.8750	-7.6 -0.30	3.5 0.14	58.0 2.28	64.0 2.52	2.3 0.09	90.0 3.54	85.0 3.35	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	0.85 1.87
28.575 1.1250	22.225 0.8750	-7.6 -0.30	3.5 0.14	58.0 2.28	64.0 2.52	0.8 0.03	90.0 3.54	86.0 3.39	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	0.85 1.88
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	58.0 2.28	64.0 2.52	3.3 0.13	89.0 3.50	83.0 3.27	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.90 1.98
21.946 0.8640	15.875 0.6250	-3.0 -0.12	2.3 0.09	60.0 2.36	61.0 2.40	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.68 1.50
22.225 0.8750	19.050 0.7500	-3.8 -0.15	2.3 0.09	57.0 2.24	60.0 2.36	1.5 0.06	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.71 1.57
22.225 0.8750	19.050 0.7500	-3.8 -0.15	3.5 0.14	57.0 2.24	63.0 2.48	1.5 0.06	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.71 1.56
21.946 0.8640	20.274 0.7982	-3.0 -0.12	2.3 0.09	60.0 2.36	61.0 2.40	2.3 0.09	91.0 3.58	87.0 3.43	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.74 1.64
21.946 0.8640	17.826 0.7018	-3.0 -0.12	2.3 0.09	60.0 2.36	61.0 2.40	0.8 0.03	92.0 3.62	90.0 3.54	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.73 1.60
30.302 1.1930	23.812 0.9375	-8.1 -0.32	3.5 0.14	58.0 2.28	64.0 2.52	3.3 0.13	90.0 3.54	84.0 3.31	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.99 2.17
21.946 0.8640	17.826 0.7018	-3.0 -0.12	2.3 0.09	60.0 2.36	61.0 2.40	2.0 0.08	93.0 3.66	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.76 1.67
22.225 0.8750	21.824 0.8592	-3.8 -0.15	2.3 0.09	57.0 2.24	60.0 2.36	2.0 0.08	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.85 1.88
21.946 0.8640	22.225 0.8750	-3.0 -0.12	2.3 0.09	60.0 2.36	61.0 2.40	1.3 0.05	93.0 3.66	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.85 1.87
36.068 1.4200	26.988 1.0625	-12.7 -0.50	0.8 0.03	58.0 2.28	59.0 2.32	3.3 0.13	94.0 3.70	88.0 3.46	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.18 2.61
36.068 1.4200	26.988 1.0625	-12.7 -0.50	3.5 0.14	58.0 2.28	65.0 2.56	3.3 0.13	94.0 3.70	88.0 3.46	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.18 2.59
36.068 1.4200	26.988 1.0625	-12.7 -0.50	3.5 0.14	58.0 2.28	65.0 2.56	3.3 0.13	94.0 3.70	88.0 3.46	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.19 2.63
31.750 1.2500	25.400 1.0000	-7.1 -0.28	3.5 0.14	59.0 2.32	66.0 2.60	3.3 0.13	96.0 3.78	88.0 3.46	2.30 0.09	1.30 0.05	49.1	14.2	0.0946	1.12 2.46
31.750 1.2500	25.400 1.0000	-7.1 -0.28	3.5 0.14	59.0 2.32	66.0 2.60	0.8 0.03	96.0 3.78	90.0 3.54	2.30 0.09	1.30 0.05	49.1	14.2	0.0946	1.13 2.49
36.068 1.4200	26.988 1.0625	-12.7 -0.50	0.8 0.03	58.0 2.28	59.0 2.32	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.24 2.73
36.068 1.4200	26.988 1.0625	-12.7 -0.50	3.5 0.14	58.0 2.28	65.0 2.56	3.3 0.13	95.0 3.74	89.0 3.50	2.70 0.11	1.80 0.07	57.9	13.4	0.0894	1.23 2.71
30.958 1.2188	23.812 0.9375	-8.1 -0.32	6.4 0.25	59.0 2.32	71.0 2.80	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.19 2.62
30.958 1.2188	23.812 0.9375	-8.1 -0.32	6.4 0.25	59.0 2.32	71.0 2.80	0.8 0.03	99.0 3.90	95.0 3.74	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.19 2.62
30.958 1.2188	23.812 0.9375	-8.1 -0.32	2.3 0.09	59.0 2.32	63.0 2.48	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.21 2.68
30.958 1.2188	23.812 0.9375	-8.1 -0.32	2.3 0.09	59.0 2.32	63.0 2.48	0.8 0.03	99.0 3.90	95.0 3.74	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.22 2.69

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

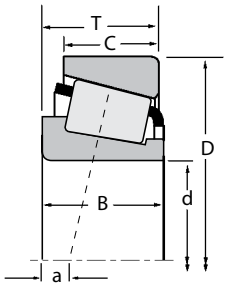
[7] Compound radius on inner race. Details on drawing for bearing.

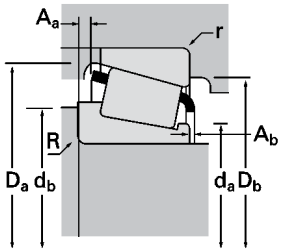
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)			Static	Part Number	
				Factors (5)			Factors (5)				
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
50.800 2.0000	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45285A	45220
50.800 2.0000	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45285A	45221
50.800 2.0000	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455	453X
50.800 2.0000	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455-S	453X
50.800 2.0000	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59200	59412
50.800 2.0000	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59200	59413
50.800 2.0000	104.775 4.1250	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59201	59412
50.800 2.0000	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807046	HM807010
50.800 2.0000	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807046	HM807011
50.800 2.0000	104.775 4.1250	39.688 1.5625	167000 37500	0.34	1.79	43300 9730	24900 5590	1.74	237000 53200	4580	4535
50.800 2.0000	105.000 4.1339	36.873 1.4517	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807046	JHM807012
50.800 2.0000	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455	453A
50.800 2.0000	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455-S	453A
50.800 2.0000	107.950 4.2500	27.795 1.0943	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455	453
50.800 2.0000	107.950 4.2500	36.512 1.4375	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59200	59425
50.800 2.0000	110.000 4.3307	27.795 1.0943	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455	454
50.800 2.0000	111.125 4.3750	30.162 1.1875	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55200	55437
50.800 2.0000	111.125 4.3750	30.162 1.1875	118000 26500	0.88	0.68	30600 6880	46300 10400	0.66	161000 36200	55200C	55437
50.800 2.0000	111.125 4.3750	30.162 1.1875	114000 25600	0.88	0.68	29500 6640	44700 10000	0.66	153000 34400	HM907643	HM907614
50.800 2.0000	111.125 4.3750	38.108 1.5003	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455	4536
50.800 2.0000	111.125 4.3750	38.108 1.5003	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455-S	4536
50.800 2.0000	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39573	39520
50.800 2.0000	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39573	39521
50.800 2.0000	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39575	39520
50.800 2.0000	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39575	39521
50.800 2.0000	112.712 4.4375	30.162 1.1875	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55200	55443
50.800 2.0000	114.300 4.5000	44.450 1.7500	207000 46500	0.43	1.39	53700 12100	39500 8880	1.36	256000 57500	65395	65320
50.800 2.0000	117.475 4.6250	33.338 1.3125	138000 31000	0.63	0.96	35800 8040	38300 8620	0.93	166000 37300	66200	66462

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
30.958 1.2188	23.812 0.9375	-8.1 -0.32	0.8 0.03	59.0 2.32	60.0 2.36	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.21 2.68
30.958 1.2188	23.812 0.9375	-8.1 -0.32	0.8 0.03	59.0 2.32	60.0 2.36	0.8 0.03	99.0 3.90	95.0 3.74	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.22 2.68
29.317 1.1542	24.605 0.9687	-7.1 -0.28	0.8 0.03	59.0 2.32	60.0 2.36	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.18 2.59
29.317 1.1542	24.605 0.9687	-7.1 -0.28	3.5 0.14	59.0 2.32	65.0 2.56	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.17 2.57
36.512 1.4375	28.575 1.1250	-9.7 -0.38	3.5 0.14	61.0 2.40	68.0 2.68	3.3 0.13	99.0 3.90	92.0 3.62	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.40 3.09
36.512 1.4375	28.575 1.1250	-9.7 -0.38	3.5 0.14	61.0 2.40	68.0 2.68	0.8 0.03	102.0 4.02	87.0 3.43	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.42 3.12
36.512 1.4375	28.575 1.1250	-9.7 -0.38	0.8 0.03	61.0 2.40	62.0 2.44	3.3 0.13	99.0 3.90	92.0 3.62	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.41 3.11
36.512 1.4375	28.575 1.1250	-7.4 -0.29	3.5 0.14	63.0 2.48	70.0 2.76	3.3 0.13	100.0 3.94	89.0 3.50	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.47 3.24
36.512 1.4375	28.575 1.1250	-7.4 -0.29	3.5 0.14	63.0 2.48	70.0 2.76	0.8 0.03	100.0 3.94	91.0 3.58	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.47 3.25
40.157 1.5810	33.338 1.3125	-12.4 -0.49	3.5 0.14	61.0 2.40	67.0 2.64	3.3 0.13	99.0 3.90	90.0 3.54	1.70 0.07	1.30 0.05	73.6	18.5	0.1027	1.62 3.58
36.512 1.4375	29.000 1.1417	-7.4 -0.29	3.5 0.14	63.0 2.48	70.0 2.76	2.5 0.10	100.0 3.94	90.0 3.54	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.49 3.28
29.317 1.1542	22.225 0.8750	-7.1 -0.28	0.8 0.03	59.0 2.32	60.0 2.36	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.23 2.71
29.317 1.1542	22.225 0.8750	-7.1 -0.28	3.5 0.14	59.0 2.32	65.0 2.56	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.22 2.70
29.317 1.1542	27.000 1.0630	-7.1 -0.28	0.8 0.03	59.0 2.32	60.0 2.36	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.29 2.84
36.512 1.4375	28.575 1.1250	-9.7 -0.38	3.5 0.14	61.0 2.40	68.0 2.68	3.3 0.13	101.0 3.98	93.0 3.66	3.40 0.14	1.30 0.05	57.3	14.7	0.0999	1.52 3.35
29.317 1.1542	27.000 1.0630	-7.1 -0.28	0.8 0.03	59.0 2.32	60.0 2.36	2.0 0.08	100.0 3.94	96.0 3.78	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.36 2.99
26.909 1.0594	20.638 0.8125	7.1 0.28	3.5 0.14	64.0 2.51	71.0 2.80	3.3 0.13	105.0 4.13	92.0 3.62	4.80 0.19	3.20 0.13	36.8	13.2	0.1085	1.26 2.77
26.909 1.0594	20.638 0.8125	7.6 0.30	3.5 0.14	64.5 2.54	71.0 2.80	3.3 0.13	105.0 4.13	92.0 3.62	5.00 0.20	3.60 0.14	48.7	15.4	0.1198	1.34 2.96
28.575 1.1250	20.638 0.8125	7.6 0.30	3.5 0.14	65.0 2.56	74.0 2.91	3.3 0.13	105.0 4.13	91.0 3.58	4.60 0.18	2.00 0.08	46.9	13.7	0.1183	1.34 2.96
29.317 1.1542	32.545 1.2813	-7.1 -0.28	0.8 0.03	59.0 2.32	60.0 2.36	3.3 0.13	100.0 3.94	93.0 3.66	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.63 3.60
29.317 1.1542	32.545 1.2813	-7.1 -0.28	3.5 0.14	59.0 2.32	65.0 2.56	3.3 0.13	100.0 3.94	93.0 3.66	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.63 3.59
30.162 1.1875	23.812 0.9375	-6.6 -0.26	0.8 0.03	61.0 2.40	62.0 2.44	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.51 3.33
30.162 1.1875	23.812 0.9375	-6.6 -0.26	0.8 0.03	61.0 2.40	62.0 2.44	0.8 0.03	107.0 4.21	103.0 4.06	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.52 3.34
30.162 1.1875	23.812 0.9375	-6.6 -0.26	3.5 0.14	61.0 2.40	68.0 2.68	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.50 3.32
30.162 1.1875	23.812 0.9375	-6.6 -0.26	3.5 0.14	61.0 2.40	68.0 2.68	0.8 0.03	107.0 4.21	103.0 4.06	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.51 3.32
26.909 1.0594	20.638 0.8125	7.1 0.28	3.5 0.14	64.0 2.51	71.0 2.80	3.3 0.13	106.0 4.17	92.0 3.62	4.80 0.19	3.20 0.13	36.8	13.2	0.1085	1.30 2.87
44.450 1.7500	34.925 1.3750	-12.4 -0.49	3.5 0.14	60.0 2.36	72.0 2.83	3.3 0.13	107.0 4.21	97.0 3.82	3.70 0.14	1.00 0.04	63.1	13	0.1053	2.14 4.71
31.750 1.2500	23.812 0.9375	-0.3 -0.01	3.5 0.14	65.0 2.56	71.0 2.80	3.3 0.13	111.0 4.37	100.0 3.94	5.00 0.20	2.00 0.08	50.2	16.4	0.0751	1.64 3.61

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

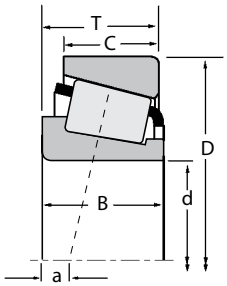
[7] Compound radius on inner race. Details on drawing for bearing.

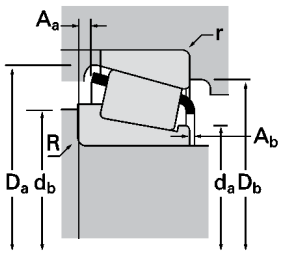
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
50.800 2.0000	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	619	612
50.800 2.0000	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5565	5535
50.800 2.0000	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72200C	72487
50.800 2.0000	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72201C	72487
50.800 2.0000	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	555	552
50.800 2.0000	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	555	552A
50.800 2.0000	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813836	HM813810
50.800 2.0000	127.000 5.0000	44.450 1.7500	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65200	65500
50.800 2.0000	127.000 5.0000	50.800 2.0000	283000 63700	0.30	2.01	73500 16500	37500 8440	1.96	370000 83300	6279	6220
50.815 2.0006	100.000 3.9370	35.000 1.3780	150000 33700	0.40	1.50	38900 8750	26600 5980	1.46	202000 45300	XGA33211	Y33211
51.592 2.0312	88.900 3.5000	20.638 0.8125	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368-S	362A
51.592 2.0312	90.000 3.5433	20.000 0.7874	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368-S	362
52.000 2.0472	85.000 3.3465	19.050 0.7500	47800 10700	0.57	1.06	12400 2780	12000 2710	1.03	63900 14400	18204X	18335X
52.000 2.0472	90.000 3.5433	21.750 0.8563	73600 16500	0.42	1.43	19100 4290	13700 3080	1.39	87400 19700	XGA30210	Y30210
52.388 2.0625	89.980 3.5425	24.750 0.9744	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28584	28520
52.388 2.0625	92.075 3.6250	24.608 0.9688	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28584	28521
52.388 2.0625	93.264 3.6718	20.638 0.8125	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	377	374
52.388 2.0625	93.264 3.6718	20.638 0.8125	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	377A	374
52.388 2.0625	93.264 3.6718	26.988 1.0625	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	377	3720
52.388 2.0625	93.264 3.6718	26.988 1.0625	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	377	3730
52.388 2.0625	93.264 3.6718	26.988 1.0625	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	377A	3720
52.388 2.0625	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3767	3720
52.388 2.0625	93.264 3.6718	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3767	3730
52.388 2.0625	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33890	33821
52.388 2.0625	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33891	33821
52.388 2.0625	96.838 3.8125	22.225 0.8750	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	377	372A
52.388 2.0625	98.425 3.8750	30.162 1.1875	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3767	3732
52.388 2.0625	100.000 3.9370	25.000 0.9842	81400 18300	0.34	1.77	21100 4750	12200 2750	1.73	101000 22700	377	372

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
41.275 1.6250	31.750 1.2500	-14.0 -0.55	3.5 0.14	61.0 2.40	67.0 2.64	3.3 0.13	110.0 4.33	105.0 4.13	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.27 5.00
43.764 1.7230	36.512 1.4375	-12.2 -0.48	1.3 0.05	65.0 2.56	67.0 2.64	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.69 5.92
32.791 1.2910	25.400 1.0000	2.0 0.08	3.5 0.14	67.0 2.64	77.0 3.03	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.11 4.66
32.791 1.2910	25.400 1.0000	2.0 0.08	0.8 0.03	67.0 2.64	77.0 3.03	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.11 4.66
36.678 1.4440	33.338 1.3125	-9.4 -0.37	2.3 0.09	62.0 2.44	66.0 2.60	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.36 5.20
36.678 1.4440	30.162 1.1875	-9.4 -0.37	2.3 0.09	62.0 2.44	66.0 2.60	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.31 5.09
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	69.0 2.72	75.0 2.95	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.42 5.33
44.450 1.7500	34.925 1.3750	-9.4 -0.37	3.5 0.14	69.0 2.72	75.0 2.95	3.3 0.13	119.0 4.69	107.0 4.21	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	2.88 6.34
52.388 2.0625	41.275 1.6250	-19.6 -0.77	3.5 0.14	65.0 2.56	71.0 2.80	3.3 0.13	117.0 4.61	108.0 4.25	2.40 0.09	2.60 0.10	103	18.7	0.0757	3.35 7.39
35.000 1.3780	27.000 1.0630	-9.7 -0.38	2.0 0.08	62.0 2.44	67.0 2.64	1.5 0.06	96.0 3.78	89.0 3.50	2.90 0.11	2.80 0.11	59.3	15.3	0.1010	1.25 2.76
22.225 0.8750	16.513 0.6501	-4.3 -0.17	2.0 0.08	56.0 2.20	59.0 2.32	1.3 0.05	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.50 1.10
22.225 0.8750	15.875 0.6250	-4.3 -0.17	2.0 0.08	56.0 2.20	59.0 2.32	2.0 0.08	84.0 3.31	81.0 3.19	0.50 0.02	1.00 0.04	33.8	14	0.0773	0.51 1.11
18.263 0.7190	12.500 0.4921	2.0 0.08	2.0 0.08	57.0 2.24	60.0 2.36	1.5 0.06	81.0 3.19	76.0 2.99	2.50 0.10	1.60 0.06	26.1	20.3	0.0852	0.37 0.82
20.000 0.7874	17.000 0.6693	-2.0 -0.08	4.0 0.16	59.0 2.32	66.0 2.60	1.5 0.06	85.0 3.35	81.0 3.19	1.40 0.05	3.10 0.12	30.3	15.9	0.0814	0.51 1.13
25.400 1.0000	19.987 0.7869	-4.8 -0.19	3.5 0.14	58.0 2.28	65.0 2.56	2.3 0.09	86.0 3.39	81.0 3.19	1.40 0.06	1.00 0.04	46.4	22.6	0.0912	0.62 1.37
25.400 1.0000	19.845 0.7813	-4.8 -0.19	3.5 0.14	58.0 2.28	65.0 2.56	0.8 0.03	87.0 3.43	83.0 3.27	1.40 0.06	1.00 0.04	46.4	22.6	0.0912	0.67 1.48
22.225 0.8750	15.083 0.5938	-3.8 -0.15	2.3 0.09	58.0 2.28	62.0 2.44	1.3 0.05	88.0 3.46	85.0 3.35	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.57 1.26
22.225 0.8750	15.083 0.5938	-3.8 -0.15	4.8 0.19	58.0 2.28	67.0 2.64	1.3 0.05	88.0 3.46	85.0 3.35	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.56 1.23
22.225 0.8750	23.812 0.9375	-3.8 -0.15	2.3 0.09	58.0 2.28	62.0 2.44	3.3 0.13	88.0 3.46	82.0 3.23	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.68 1.50
22.225 0.8750	23.812 0.9375	-3.8 -0.15	2.3 0.09	58.0 2.28	62.0 2.44	0.8 0.03	88.0 3.46	84.0 3.31	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.69 1.53
22.225 0.8750	23.812 0.9375	-3.8 -0.15	4.8 0.19	58.0 2.28	67.0 2.64	3.3 0.13	88.0 3.46	82.0 3.23	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.67 1.48
30.302 1.1930	23.812 0.9375	-8.1 -0.32	2.3 0.09	59.0 2.32	63.0 2.48	3.3 0.13	88.0 3.46	82.0 3.23	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.82 1.80
30.302 1.1930	23.812 0.9375	-8.1 -0.32	2.3 0.09	59.0 2.32	63.0 2.48	0.8 0.03	88.0 3.46	84.0 3.31	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.83 1.82
28.575 1.1250	22.225 0.8750	-7.6 -0.30	1.5 0.06	59.0 2.32	61.0 2.40	2.3 0.09	90.0 3.54	85.0 3.35	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	0.82 1.82
28.575 1.1250	22.225 0.8750	-7.6 -0.30	3.5 0.14	59.0 2.32	66.0 2.60	2.3 0.09	90.0 3.54	85.0 3.35	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	0.82 1.80
22.225 0.8750	19.050 0.7500	-3.8 -0.15	2.3 0.09	58.0 2.28	62.0 2.44	1.5 0.06	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.69 1.52
30.302 1.1930	23.812 0.9375	-8.1 -0.32	2.3 0.09	59.0 2.32	63.0 2.48	3.3 0.13	90.0 3.54	84.0 3.31	1.80 0.07	0.90 0.04	49.9	14.5	0.0903	0.96 2.12
22.225 0.8750	21.824 0.8592	-3.8 -0.15	2.3 0.09	58.0 2.28	62.0 2.44	2.0 0.08	90.0 3.54	86.0 3.39	0.80 0.03	1.40 0.06	37.6	15.4	0.0816	0.83 1.83

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

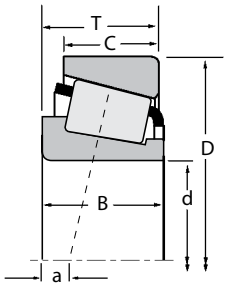
(7) Compound radius on inner race. Details on drawing for bearing.

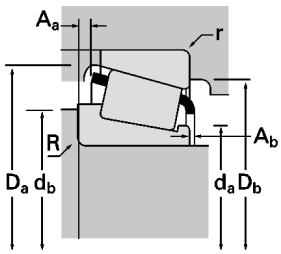
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
52.388 2.0625	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	468	453X
52.388 2.0625	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	468	453A
52.388 2.0625	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	468	453AS
52.388 2.0625	107.950 4.2500	36.512 1.4375	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	540	532X
52.388 2.0625	110.000 4.3307	34.130 1.3437	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	540	534
52.388 2.0625	111.125 4.3750	30.162 1.1875	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55206	55437
52.388 2.0625	111.125 4.3750	30.162 1.1875	118000 26500	0.88	0.68	30600 6880	46300 10400	0.66	161000 36200	55206C	55437
52.388 2.0625	111.125 4.3750	38.100 1.5000	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	540	532A
52.388 2.0625	112.712 4.4375	30.162 1.1875	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55206	55443
53.975 2.1250	87.312 3.4375	18.258 0.7188	58100 13100	0.39	1.54	15100 3380	10000 2250	1.50	95600 21500	L507945	L507910
53.975 2.1250	88.900 3.5000	19.050 0.7500	60600 13600	0.55	1.10	15700 3530	14700 3300	1.07	81800 18400	LM806649	LM806610
53.975 2.1250	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33895	33821
53.975 2.1250	95.250 3.7500	27.783 1.0938	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33895	33822
53.975 2.1250	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	389A	382A
53.975 2.1250	98.425 3.8750	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	389A	382
53.975 2.1250	100.000 3.9370	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	389A	383A
53.975 2.1250	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45287	45220
53.975 2.1250	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45287	45221
53.975 2.1250	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	456	453X
53.975 2.1250	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807049A	HM807011
53.975 2.1250	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807049	HM807010
53.975 2.1250	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807049	HM807011
53.975 2.1250	104.775 4.1250	39.688 1.5625	167000 37500	0.34	1.79	43300 9730	24900 5590	1.74	237000 53200	4595	4535
53.975 2.1250	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	456	453A
53.975 2.1250	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	456	453AS
53.975 2.1250	107.950 4.2500	27.795 1.0943	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	456	453
53.975 2.1250	107.950 4.2500	32.558 1.2818	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	456	452A
53.975 2.1250	107.950 4.2500	36.512 1.4375	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	539	532X

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
29.317 1.1542	24.605 0.9687	-7.1 -0.28	1.5 0.06	60.0 2.36	62.0 2.44	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.13 2.49
29.317 1.1542	22.225 0.8750	-7.1 -0.28	1.5 0.06	60.0 2.36	62.0 2.44	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.19 2.61
29.317 1.1542	22.225 0.8750	-7.1 -0.28	1.5 0.06	60.0 2.36	62.0 2.44	2.3 0.09	100.0 3.94	95.0 3.74	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.18 2.61
36.957 1.4550	28.575 1.1250	-12.2 -0.48	3.5 0.14	60.0 2.36	67.0 2.64	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.48 3.27
36.957 1.4550	26.988 1.0625	-12.2 -0.48	3.5 0.14	60.0 2.36	67.0 2.64	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.51 3.33
26.909 1.0594	20.638 0.8125	7.1 0.28	3.5 0.14	64.0 2.51	72.0 2.83	3.3 0.13	105.0 4.13	92.0 3.62	4.80 0.19	3.20 0.13	36.8	13.2	0.1085	1.23 2.71
26.909 1.0594	20.638 0.8125	7.6 0.30	3.5 0.14	64.5 2.54	72.0 2.83	3.3 0.13	105.0 4.13	92.0 3.62	5.00 0.20	3.60 0.14	48.7	15.4	0.1198	1.32 2.90
36.957 1.4550	30.162 1.1875	-12.2 -0.48	3.5 0.14	60.0 2.36	67.0 2.64	3.3 0.13	100.0 3.94	95.0 3.74	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.65 3.65
26.909 1.0594	20.638 0.8125	7.1 0.28	3.5 0.14	64.0 2.51	72.0 2.83	3.3 0.13	106.0 4.17	92.0 3.62	4.80 0.19	3.20 0.13	36.8	13.2	0.1085	1.27 2.81
18.258 0.7188	14.288 0.5625	-0.8 -0.03	1.5 0.06	60.0 2.36	62.0 2.44	1.5 0.06	83.0 3.27	79.0 3.11	0.30 0.01	2.00 0.08	46.1	36.9	0.0914	0.43 0.94
19.050 0.7500	13.492 0.5312	2.3 0.09	2.3 0.09	61.0 2.40	65.0 2.56	2.0 0.08	85.0 3.35	80.0 3.15	1.50 0.06	1.60 0.06	31.8	22.1	0.0900	0.42 0.94
28.575 1.1250	22.225 0.8750	-7.6 -0.30	1.5 0.06	60.0 2.36	63.0 2.48	2.3 0.09	90.0 3.54	85.0 3.35	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	0.80 1.75
28.575 1.1250	22.225 0.8750	-7.6 -0.30	1.5 0.06	60.0 2.36	63.0 2.48	0.8 0.03	90.0 3.54	86.0 3.39	1.30 0.05	2.20 0.09	52.5	18.5	0.0910	0.80 1.77
21.946 0.8640	15.875 0.6250	-3.0 -0.12	0.8 0.03	60.0 2.36	61.0 2.40	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.64 1.41
21.946 0.8640	17.826 0.7018	-3.0 -0.12	0.8 0.03	60.0 2.36	61.0 2.40	0.8 0.03	92.0 3.62	90.0 3.54	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.69 1.51
21.946 0.8640	17.826 0.7018	-3.0 -0.12	0.8 0.03	60.0 2.36	61.0 2.40	2.0 0.08	93.0 3.66	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.72 1.58
30.958 1.2188	23.812 0.9375	-8.1 -0.32	0.8 0.03	62.0 2.44	62.0 2.44	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.15 2.54
30.958 1.2188	23.812 0.9375	-8.1 -0.32	0.8 0.03	62.0 2.44	62.0 2.44	0.8 0.03	99.0 3.90	95.0 3.74	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.15 2.54
29.317 1.1542	24.605 0.9687	-7.1 -0.28	3.5 0.14	61.0 2.40	68.0 2.68	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.11 2.44
36.512 1.4375	28.575 1.1250	-7.4 -0.29	1.5 0.06	63.0 2.48	69.0 2.72	0.8 0.03	100.0 3.94	91.0 3.58	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.39 3.07
36.512 1.4375	28.575 1.1250	-7.4 -0.29	3.5 0.14	63.0 2.48	73.0 2.87	3.3 0.13	100.0 3.94	89.0 3.50	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.40 3.08
36.512 1.4375	28.575 1.1250	-7.4 -0.29	3.5 0.14	63.0 2.48	73.0 2.87	0.8 0.03	100.0 3.94	91.0 3.58	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.40 3.08
40.157 1.5810	33.338 1.3125	-12.4 -0.49	3.5 0.14	63.0 2.48	70.0 2.76	3.3 0.13	99.0 3.90	90.0 3.54	1.70 0.07	1.30 0.05	73.6	18.5	0.1027	1.54 3.39
29.317 1.1542	22.225 0.8750	-7.1 -0.28	3.5 0.14	61.0 2.40	68.0 2.68	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.16 2.56
29.317 1.1542	22.225 0.8750	-7.1 -0.28	3.5 0.14	61.0 2.40	68.0 2.68	2.3 0.09	100.0 3.94	95.0 3.74	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.16 2.56
29.317 1.1542	27.000 1.0630	-7.1 -0.28	3.5 0.14	61.0 2.40	68.0 2.68	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.22 2.69
29.317 1.1542	27.000 1.0630	-7.1 -0.28	3.5 0.14	61.0 2.40	68.0 2.68	3.3 0.13	100.0 3.94	93.0 3.66	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.27 2.80
36.957 1.4550	28.575 1.1250	-12.2 -0.48	3.5 0.14	61.0 2.40	68.0 2.68	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.45 3.19

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

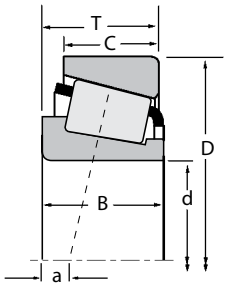
[7] Compound radius on inner race. Details on drawing for bearing.

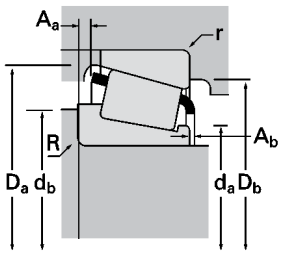
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
53.975 2.1250	107.950 4.2500	36.512 1.4375	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	539A	532X
53.975 2.1250	110.000 4.3307	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	456	454
53.975 2.1250	110.000 4.3307	34.130 1.3437	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	539	534
53.975 2.1250	111.125 4.3750	38.100 1.5000	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	539A	532A
53.975 2.1250	111.125 4.3750	38.895 1.5313	167000 37500	0.34	1.79	43300 9730	24900 5590	1.74	237000 53200	4595	4536
53.975 2.1250	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39578	39520
53.975 2.1250	117.475 4.6250	33.338 1.3125	138000 31000	0.63	0.96	35800 8040	38300 8620	0.93	166000 37300	66212	66461
53.975 2.1250	117.475 4.6250	33.338 1.3125	138000 31000	0.63	0.96	35800 8040	38300 8620	0.93	166000 37300	66212	66462
53.975 2.1250	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	621	612
53.975 2.1250	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	624	612
53.975 2.1250	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	621	612-S
53.975 2.1250	122.238 4.8125	33.338 1.3125	143000 32200	0.67	0.90	37100 8340	42300 9500	0.88	178000 39900	66584	66520
53.975 2.1250	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5577	5535
53.975 2.1250	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5578	5535
53.975 2.1250	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72212C	72487
53.975 2.1250	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72213C	72487
53.975 2.1250	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	557-S	552A
53.975 2.1250	127.000 5.0000	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72213C	72500
53.975 2.1250	127.000 5.0000	44.450 1.7500	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65212	65500
53.975 2.1250	127.000 5.0000	50.800 2.0000	283000 63700	0.30	2.01	73500 16500	37500 8440	1.96	370000 83300	6280	6220
53.975 2.1250	130.175 5.1250	34.100 1.3425	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911243	HM911210
53.975 2.1250	130.175 5.1250	36.512 1.4375	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911242	HM911210
53.975 2.1250	134.983 5.3143	33.449 1.3169	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911243	HM911216
53.975 2.1250	136.525 5.3750	36.512 1.4375	185000 41500	0.87	0.69	47900 10800	71000 16000	0.67	234000 52600	78215C	78537
53.975 2.1250	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	636	632
53.975 2.1250	140.030 5.5130	36.512 1.4375	185000 41500	0.87	0.69	47900 10800	71000 16000	0.67	234000 52600	78214C	78551
53.975 2.1250	140.030 5.5130	36.512 1.4375	185000 41500	0.87	0.69	47900 10800	71000 16000	0.67	234000 52600	78215C	78551
54.487 2.1452	104.775 4.1250	36.512 1.4375	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807048	HM807010

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.957 1.4550	28.575 1.1250	-12.2 -0.48	5.5 0.22	61.0 2.40	72.0 2.83	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.43 3.16
29.317 1.1542	27.000 1.0630	-7.1 -0.28	3.5 0.14	61.0 2.40	68.0 2.68	2.0 0.08	100.0 3.94	96.0 3.78	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.29 2.84
36.957 1.4550	26.988 1.0625	-12.2 -0.48	3.5 0.14	61.0 2.40	68.0 2.68	3.3 0.13	100.0 3.94	94.0 3.70	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.47 3.24
36.957 1.4550	30.162 1.1875	-12.2 -0.48	5.5 0.22	61.0 2.40	72.0 2.83	3.3 0.13	100.0 3.94	95.0 3.74	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.60 3.53
40.157 1.5810	32.545 1.2813	-12.4 -0.49	3.5 0.14	63.0 2.48	70.0 2.76	3.3 0.13	100.0 3.94	93.0 3.66	1.70 0.07	1.30 0.05	73.6	18.5	0.1027	1.79 3.95
30.162 1.1875	23.812 0.9375	-6.6 -0.26	3.5 0.14	64.0 2.52	70.0 2.76	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.44 3.18
31.750 1.2500	23.812 0.9375	-0.3 -0.01	3.5 0.14	67.0 2.64	73.0 2.87	0.8 0.03	111.0 4.37	102.0 4.02	5.00 0.20	2.00 0.08	50.2	16.4	0.0751	1.59 3.50
31.750 1.2500	23.812 0.9375	-0.3 -0.01	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	111.0 4.37	100.0 3.94	5.00 0.20	2.00 0.08	50.2	16.4	0.0751	1.57 3.46
41.275 1.6250	31.750 1.2500	-14.0 -0.55	3.5 0.14	63.0 2.48	70.0 2.76	3.3 0.13	110.0 4.33	105.0 4.13	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.18 4.82
41.275 1.6250	31.750 1.2500	-14.0 -0.55	0.8 0.03	63.0 2.48	64.0 2.52	3.3 0.13	110.0 4.33	105.0 4.13	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.19 4.84
41.275 1.6250	31.750 1.2500	-14.0 -0.55	3.5 0.14	63.0 2.48	70.0 2.76	0.8 0.03	110.0 4.33	107.0 4.21	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.20 4.85
31.750 1.2500	23.812 0.9375	2.0 0.08	3.5 0.14	68.0 2.68	75.0 2.95	3.3 0.13	116.0 4.57	105.0 4.13	5.20 0.21	2.00 0.08	57	18.3	0.0797	1.76 3.89
43.764 1.7230	36.512 1.4375	-12.2 -0.48	1.3 0.05	67.0 2.64	69.0 2.72	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.60 5.72
43.764 1.7230	36.512 1.4375	-12.2 -0.48	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.59 5.71
32.791 1.2910	25.400 1.0000	2.0 0.08	3.5 0.14	67.0 2.64	79.0 3.11	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.05 4.51
32.791 1.2910	25.400 1.0000	2.0 0.08	3.5 0.14	67.0 2.64	79.0 3.11	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.05 4.51
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	65.0 2.56	71.0 2.80	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.23 4.92
32.791 1.2910	25.400 1.0000	2.0 0.08	3.5 0.14	67.0 2.64	79.0 3.11	3.3 0.13	116.0 4.57	103.0 4.06	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.17 4.79
44.450 1.7500	34.925 1.3750	-9.4 -0.37	3.5 0.14	71.0 2.80	77.0 3.03	3.3 0.13	119.0 4.69	107.0 4.21	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	2.79 6.14
52.388 2.0625	41.275 1.6250	-19.6 -0.77	3.5 0.14	67.0 2.64	74.0 2.91	3.3 0.13	117.0 4.61	108.0 4.25	2.40 0.09	2.60 0.10	103	18.7	0.0757	3.25 7.16
30.924 1.2175	23.812 0.9375	7.9 0.31	3.5 0.14	74.0 2.91	79.0 3.11	3.3 0.13	123.5 4.87	109.0 4.29	5.00 0.20	4.20 0.17	56.4	16.5	0.0842	2.13 4.69
33.338 1.3125	23.812 0.9375	5.3 0.21	3.5 0.14	74.0 2.91	79.0 3.11	3.3 0.13	123.5 4.87	109.0 4.29	7.40 0.29	4.20 0.17	56.4	16.5	0.0842	2.22 4.90
30.924 1.2175	21.948 0.8641	7.9 0.31	3.5 0.14	74.0 2.91	79.0 3.11	3.5 0.14	123.0 4.84	112.0 4.41	5.00 0.20	4.20 0.17	56.4	16.5	0.0842	2.25 4.96
33.236 1.3085	23.520 0.9260	8.4 0.33	3.5 0.14	77.5 3.05	84.0 3.31	3.3 0.13	130.0 5.12	115.0 4.53	6.40 0.25	4.90 0.19	71.3	17.6	0.0926	2.59 5.72
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	3.12 6.88
33.236 1.3085	23.520 0.9260	8.4 0.33	0.8 0.03	77.5 3.05	79.0 3.11	2.3 0.09	132.0 5.20	117.0 4.61	6.40 0.25	4.90 0.19	71.3	17.6	0.0926	2.75 6.07
33.236 1.3085	23.520 0.9260	8.4 0.33	3.5 0.14	77.5 3.05	84.0 3.31	2.3 0.09	132.0 5.20	117.0 4.61	6.40 0.25	4.90 0.19	71.3	17.6	0.0926	2.75 6.06
36.512 1.4375	28.575 1.1250	-7.4 -0.29	3.5 0.14	63.0 2.48	73.0 2.87	3.3 0.13	100.0 3.94	89.0 3.50	3.40 0.14	1.90 0.08	63.9	17.1	0.0760	1.37 3.02

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

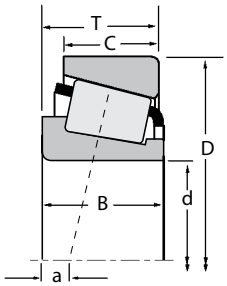
[7] Compound radius on inner race. Details on drawing for bearing.

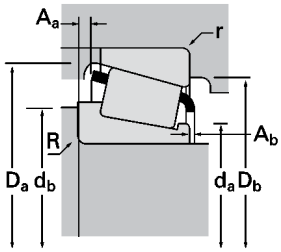
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
54.987 2.1649	103.188 4.0625	38.100 1.5000	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	538	533A
54.987 2.1649	110.000 4.3307	38.100 1.5000	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	538	533X
54.987 2.1649	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6381	6320
55.000 2.1654	90.000 3.5433	23.000 0.9055	85000 19100	0.40	1.49	22000 4960	15200 3410	1.45	123000 27600	JLM506849A	JLM506810
55.000 2.1654	90.000 3.5433	23.000 0.9055	85000 19100	0.40	1.49	22000 4960	15200 3410	1.45	123000 27600	JLM506849	JLM506810
55.000 2.1654	90.000 3.5433	25.000 0.9843	85000 19100	0.40	1.49	22000 4960	15200 3410	1.45	123000 27600	JLM506849A	JLM506811
55.000 2.1654	95.000 3.7402	29.000 1.1417	121000 27200	0.33	1.79	31300 7040	18000 4040	1.74	168000 37700	JM207049A	JM207010
55.000 2.1654	95.000 3.7402	29.000 1.1417	121000 27200	0.33	1.79	31300 7040	18000 4040	1.74	168000 37700	JM207049	JM207010
55.000 2.1654	95.000 3.7402	30.000 1.1811	121000 27200	0.33	1.79	31300 7040	18000 4040	1.74	168000 37700	JM207049	JM207010A
55.000 2.1654	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385	382A
55.000 2.1654	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385X	382A
55.000 2.1654	98.425 3.8750	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385	382
55.000 2.1654	100.000 3.9370	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385	383A
55.000 2.1654	110.000 4.3307	39.000 1.5354	194000 43700	0.35	1.73	50400 11300	29900 6720	1.69	251000 56500	JH307749	JH307710
55.000 2.1654	115.000 4.5276	34.000 1.3386	135000 30200	0.87	0.69	34900 7840	51700 11600	0.67	175000 39200	JW5549	JW5510
55.000 2.1654	115.000 4.5276	41.021 1.6150	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	622X	614X
55.000 2.1654	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	475	472A
55.000 2.1654	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	475	472
55.000 2.1654	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	475	473
55.000 2.1654	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	557	552A
55.006 2.1656	120.040 4.7260	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	622A	612A
55.562 2.1875	97.630 3.8437	24.608 0.9688	96300 21600	0.40	1.49	25000 5610	17200 3870	1.45	142000 32000	28680	28622
55.562 2.1875	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	466-S	453A
55.562 2.1875	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	466-S	453AS
55.562 2.1875	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5566	5535
55.562 2.1875	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72218C	72487
55.562 2.1875	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72219C	72487
55.562 2.1875	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813840	HM813810

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.957 1.4550	30.162 1.1875	-12.2 -0.48	0.8 0.03	62.0 2.44	63.0 2.48	1.5 0.06	98.0 3.86	93.0 3.66	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.30 2.86
36.957 1.4550	30.162 1.1875	-12.2 -0.48	0.8 0.03	62.0 2.44	63.0 2.48	3.3 0.13	100.0 3.94	95.0 3.74	2.80 0.11	0.90 0.04	64.3	16.1	0.0938	1.55 3.43
56.007 2.2050	44.450 1.7500	-19.3 -0.76	3.5 0.14	70.0 2.76	76.0 2.99	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	4.04 8.90
23.000 0.9055	18.500 0.7283	-2.8 -0.11	3.5 0.14	60.0 2.36	67.0 2.64	0.5 0.02	86.0 3.39	82.0 3.23	1.10 0.04	1.50 0.06	45.6	20.4	0.0925	0.54 1.20
23.000 0.9055	18.500 0.7283	-2.8 -0.11	1.5 0.06	61.0 2.40	63.0 2.48	0.5 0.02	86.0 3.39	82.0 3.23	1.10 0.04	1.50 0.06	45.6	20.4	0.0925	0.55 1.21
23.000 0.9055	20.500 0.8071	-2.8 -0.11	3.5 0.14	60.0 2.36	67.0 2.64	0.5 0.02	86.0 3.39	82.0 3.23	1.10 0.04	1.50 0.06	45.6	20.4	0.0925	0.58 1.27
29.000 1.1417	23.500 0.9252	-7.6 -0.30	6.0 0.24	62.0 2.44	73.0 2.87	2.5 0.10	91.0 3.58	85.0 3.35	1.30 0.05	2.40 0.09	56.4	19.9	0.0937	0.81 1.79
29.000 1.1417	23.500 0.9252	-7.6 -0.30	1.5 0.06	62.0 2.44	64.0 2.52	2.5 0.10	91.0 3.58	85.0 3.35	1.30 0.05	2.40 0.09	56.4	19.9	0.0937	0.84 1.84
29.000 1.1417	24.500 0.9646	-7.6 -0.30	1.5 0.06	62.0 2.44	64.0 2.52	2.0 0.08	91.0 3.58	87.0 3.43	1.30 0.05	2.40 0.09	56.4	19.9	0.0937	0.86 1.90
21.946 0.8640	15.875 0.6250	-3.0 -0.12	2.3 0.09	61.0 2.40	65.0 2.56	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.62 1.37
21.946 0.8640	15.875 0.6250	-3.0 -0.12	3.5 0.14	61.0 2.40	67.0 2.64	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.62 1.36
21.946 0.8640	17.826 0.7018	-3.0 -0.12	2.3 0.09	61.0 2.40	65.0 2.56	0.8 0.03	92.0 3.62	90.0 3.54	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.67 1.47
21.946 0.8640	17.826 0.7018	-3.0 -0.12	2.3 0.09	61.0 2.40	65.0 2.56	2.0 0.08	93.0 3.66	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.70 1.54
39.000 1.5354	32.000 1.2598	-11.7 -0.46	3.0 0.12	64.0 2.52	71.0 2.80	2.5 0.10	104.0 4.09	97.0 3.82	0.80 0.03	3.10 0.12	72	16.9	0.0706	1.68 3.71
31.000 1.2205	23.500 0.9252	5.8 0.23	3.0 0.12	66.0 2.59	78.0 3.07	3.0 0.12	109.0 4.29	95.0 3.74	5.30 0.21	3.80 0.15	51.1	17.8	0.0831	1.57 3.46
41.275 1.6250	31.496 1.2400	-14.0 -0.55	3.0 0.12	64.0 2.52	70.0 2.76	3.0 0.12	108.0 4.25	101.0 3.98	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	1.90 4.18
29.007 1.1420	23.444 0.9230	-4.1 -0.16	0.8 0.03	66.0 2.60	67.0 2.64	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.62 3.57
29.007 1.1420	24.237 0.9542	-4.1 -0.16	0.8 0.03	66.0 2.60	67.0 2.64	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.65 3.64
29.007 1.1420	29.000 1.1417	-4.1 -0.16	0.8 0.03	66.0 2.60	67.0 2.64	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.70 3.75
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	66.0 2.60	72.0 2.83	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.20 4.86
41.275 1.6250	31.750 1.2500	-14.0 -0.55	0.8 0.03	64.0 2.52	65.0 2.56	3.3 0.13	110.0 4.33	103.0 4.06	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.14 4.72
24.608 0.9688	19.446 0.7656	-3.3 -0.13	3.5 0.14	62.0 2.44	68.0 2.68	0.8 0.03	92.0 3.62	88.0 3.46	1.60 0.06	1.80 0.07	54	20.2	0.0979	0.76 1.67
29.317 1.1542	22.225 0.8750	-7.1 -0.28	2.3 0.09	62.0 2.44	66.0 2.60	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.14 2.51
29.317 1.1542	22.225 0.8750	-7.1 -0.28	2.3 0.09	62.0 2.44	66.0 2.60	2.3 0.09	100.0 3.94	95.0 3.74	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.13 2.50
43.764 1.7230	36.512 1.4375	-12.2 -0.48	1.3 0.05	68.0 2.68	70.0 2.76	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.55 5.62
32.791 1.2910	25.400 1.0000	2.0 0.08	3.5 0.14	67.0 2.64	80.0 3.15	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.01 4.43
32.791 1.2910	25.400 1.0000	2.0 0.08	3.5 0.14	67.0 2.64	80.0 3.15	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	2.01 4.43
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.30 5.08

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

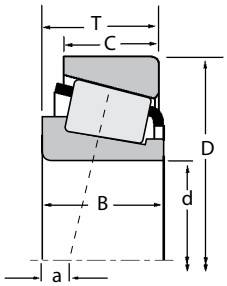
[7] Compound radius on inner race. Details on drawing for bearing.

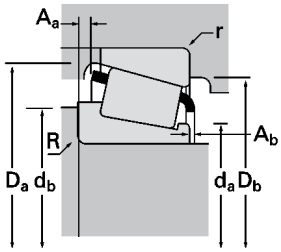
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
55.562 2.1875	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813840	HM813811
55.575 2.1880	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	389	382A
55.575 2.1880	100.000 3.9370	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	389	383A
57.150 2.2500	87.312 3.4375	18.258 0.7188	58100 13100	0.39	1.54	15100 3380	10000 2250	1.50	95600 21500	L507949	L507910
57.150 2.2500	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387	382A
57.150 2.2500	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387A	382A
57.150 2.2500	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387AS	382A
57.150 2.2500	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387-S	382A
57.150 2.2500	96.838 3.8125	24.608 0.9688	96300 21600	0.40	1.49	25000 5610	17200 3870	1.45	142000 32000	28682	28621
57.150 2.2500	96.838 3.8125	25.400 1.0000	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387A	382-S
57.150 2.2500	97.630 3.8437	24.608 0.9688	96300 21600	0.40	1.49	25000 5610	17200 3870	1.45	142000 32000	28682	28622
57.150 2.2500	98.425 3.8750	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387	382
57.150 2.2500	98.425 3.8750	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387A	382
57.150 2.2500	98.425 3.8750	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387AS	382
57.150 2.2500	98.425 3.8750	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387-S	382
57.150 2.2500	98.425 3.8750	24.608 0.9688	96300 21600	0.40	1.49	25000 5610	17200 3870	1.45	142000 32000	28682	28623
57.150 2.2500	100.000 3.9370	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387A	383A
57.150 2.2500	100.000 3.9370	25.400 1.0000	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387	383X
57.150 2.2500	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45289	45220
57.150 2.2500	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45289	45221
57.150 2.2500	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45290	45220
57.150 2.2500	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45290	45221
57.150 2.2500	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45291	45220
57.150 2.2500	104.775 4.1250	30.162 1.1875	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45291	45221
57.150 2.2500	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	462	453X
57.150 2.2500	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	462A	453X
57.150 2.2500	104.775 4.1250	30.162 1.1875	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	469	453X
57.150 2.2500	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	462	453A

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	72.0 2.83	78.0 3.07	1.5 0.06	121.0 4.76	113.0 4.45	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.30 5.08
21.946 0.8640	15.875 0.6250	-3.0 -0.12	2.3 0.09	61.0 2.40	65.0 2.56	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.61 1.35
21.946 0.8640	17.826 0.7018	-3.0 -0.12	2.3 0.09	61.0 2.40	65.0 2.56	2.0 0.08	93.0 3.66	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.69 1.52
18.258 0.7188	14.288 0.5625	-0.8 -0.03	1.5 0.06	62.0 2.44	65.0 2.56	1.5 0.06	83.0 3.27	79.0 3.11	0.30 0.01	2.00 0.08	46.1	36.9	0.0914	0.39 0.85
21.946 0.8640	15.875 0.6250	-3.0 -0.12	2.3 0.09	62.0 2.44	66.0 2.60	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.59 1.30
21.946 0.8640	15.875 0.6250	-3.0 -0.12	3.5 0.14	62.0 2.44	69.0 2.72	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.58 1.29
21.946 0.8640	15.875 0.6250	-3.0 -0.12	5.0 0.20	62.0 2.44	72.0 2.83	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.57 1.26
21.946 0.8640	15.875 0.6250	-3.0 -0.12	0.8 0.03	62.0 2.44	63.0 2.48	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.59 1.31
24.608 0.9688	19.446 0.7656	-3.3 -0.13	3.5 0.14	63.0 2.48	70.0 2.76	0.8 0.03	92.0 3.62	88.0 3.46	1.60 0.06	1.80 0.07	54	20.2	0.0979	0.71 1.57
21.946 0.8640	20.274 0.7982	-3.0 -0.12	3.5 0.14	62.0 2.44	69.0 2.72	2.3 0.09	91.0 3.58	87.0 3.43	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.65 1.43
24.608 0.9688	19.446 0.7656	-3.3 -0.13	3.5 0.14	63.0 2.48	70.0 2.76	0.8 0.03	92.0 3.62	88.0 3.46	1.60 0.06	1.80 0.07	54	20.2	0.0979	0.73 1.61
21.946 0.8640	17.826 0.7018	-3.0 -0.12	2.3 0.09	62.0 2.44	66.0 2.60	0.8 0.03	92.0 3.62	90.0 3.54	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.63 1.40
21.946 0.8640	17.826 0.7018	-3.0 -0.12	3.5 0.14	62.0 2.44	69.0 2.72	0.8 0.03	92.0 3.62	90.0 3.54	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.63 1.39
21.946 0.8640	17.826 0.7018	-3.0 -0.12	5.0 0.20	62.0 2.44	72.0 2.83	0.8 0.03	92.0 3.62	90.0 3.54	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.62 1.36
21.946 0.8640	17.826 0.7018	-3.0 -0.12	0.8 0.03	62.0 2.44	63.0 2.48	0.8 0.03	92.0 3.62	90.0 3.54	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.64 1.41
24.608 0.9688	19.446 0.7656	-3.3 -0.13	3.5 0.14	63.0 2.48	70.0 2.76	0.8 0.03	93.0 3.66	88.0 3.46	1.60 0.06	1.80 0.07	54	20.2	0.0979	0.75 1.65
21.946 0.8640	17.826 0.7018	-3.0 -0.12	3.5 0.14	62.0 2.44	69.0 2.72	2.0 0.08	93.0 3.66	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.66 1.45
21.946 0.8640	22.225 0.8750	-3.0 -0.12	2.3 0.09	62.0 2.44	66.0 2.60	1.3 0.05	93.0 3.66	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.76 1.67
30.958 1.2188	23.812 0.9375	-8.1 -0.32	0.8 0.03	65.0 2.56	65.0 2.56	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.08 2.39
30.958 1.2188	23.812 0.9375	-8.1 -0.32	0.8 0.03	65.0 2.56	65.0 2.56	0.8 0.03	99.0 3.90	95.0 3.74	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.09 2.40
30.958 1.2188	23.812 0.9375	-8.1 -0.32	2.3 0.09	65.0 2.56	68.0 2.68	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.08 2.39
30.958 1.2188	23.812 0.9375	-8.1 -0.32	2.3 0.09	65.0 2.56	68.0 2.68	0.8 0.03	99.0 3.90	95.0 3.74	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.09 2.40
30.958 1.2188	23.812 0.9375	-8.1 -0.32	6.4 0.25	65.0 2.56	76.0 2.99	3.3 0.13	99.0 3.90	93.0 3.66	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.05 2.32
30.958 1.2188	23.812 0.9375	-8.1 -0.32	6.4 0.25	65.0 2.56	76.0 2.99	0.8 0.03	99.0 3.90	95.0 3.74	2.10 0.08	1.80 0.07	63.5	16.9	0.0971	1.06 2.33
29.317 1.1542	24.605 0.9687	-7.1 -0.28	2.3 0.09	63.0 2.48	67.0 2.64	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.05 2.31
29.317 1.1542	24.605 0.9687	-7.1 -0.28	2.3 0.09	68.0 2.68	67.0 2.64	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.04 2.29
29.317 1.1542	24.605 0.9687	-7.1 -0.28	3.5 0.14	63.0 2.48	70.0 2.76	3.3 0.13	98.0 3.86	92.0 3.62	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.04 2.30
29.317 1.1542	22.225 0.8750	-7.1 -0.28	2.3 0.09	63.0 2.48	67.0 2.64	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.10 2.43

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

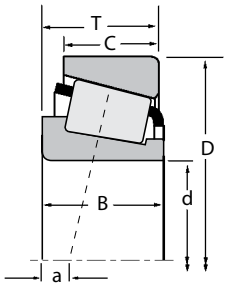
[7] Compound radius on inner race. Details on drawing for bearing.

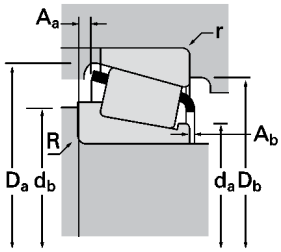
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
57.150 2.2500	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	462	453AS
57.150 2.2500	107.950 4.2500	27.783 1.0938	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	469	453A
57.150 2.2500	107.950 4.2500	32.558 1.2818	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	462	452A
57.150 2.2500	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	390	394A
57.150 2.2500	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	390	394AS
57.150 2.2500	110.000 4.3307	27.795 1.0943	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	462	454
57.150 2.2500	112.712 4.4375	25.400 1.0000	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29665	29620
57.150 2.2500	112.712 4.4375	26.967 1.0617	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	390	3920
57.150 2.2500	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3979	3920
57.150 2.2500	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39580	39520
57.150 2.2500	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39580	39521
57.150 2.2500	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39581	39520
57.150 2.2500	117.475 4.6250	33.338 1.3125	138000 31000	0.63	0.96	35800 8040	38300 8620	0.93	166000 37300	66225	66462
57.150 2.2500	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	623	612
57.150 2.2500	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	623	612-S
57.150 2.2500	120.650 4.7500	41.275 1.6250	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	623A	612
57.150 2.2500	122.238 4.8125	33.338 1.3125	143000 32200	0.67	0.90	37100 8340	42300 9500	0.88	178000 39900	66587	66520
57.150 2.2500	123.825 4.8750	36.512 1.4375	167000 37600	0.74	0.81	43400 9760	54800 12300	0.79	208000 46800	72225C	72487
57.150 2.2500	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	555-S	552
57.150 2.2500	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	555-S	552A
57.150 2.2500	125.000 4.9213	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	555-S	553A
57.150 2.2500	127.000 5.0000	44.450 1.7500	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65225	65500
57.150 2.2500	129.944 5.1159	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	555-S	553-SA
57.150 2.2500	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6375	6320
57.150 2.2500	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6387	6320
57.150 2.2500	136.525 5.3750	36.512 1.4375	185000 41500	0.87	0.69	47900 10800	71000 16000	0.67	234000 52600	78225C	78537
57.150 2.2500	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	635	632
57.150 2.2500	140.030 5.5130	36.512 1.4375	158000 35600	0.87	0.69	41100 9230	60900 13700	0.67	193000 43400	78225	78551

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
29.317 1.1542	22.225 0.8750	-7.1 -0.28	2.3 0.09	63.0 2.48	67.0 2.64	2.3 0.09	100.0 3.94	95.0 3.74	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.10 2.43
29.317 1.1542	22.225 0.8750	-7.1 -0.28	3.5 0.14	63.0 2.48	70.0 2.76	0.8 0.03	100.0 3.94	97.0 3.82	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.10 2.42
29.317 1.1542	27.000 1.0630	-7.1 -0.28	2.3 0.09	63.0 2.48	67.0 2.64	3.3 0.13	100.0 3.94	93.0 3.66	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.21 2.67
21.996 0.8660	18.825 0.7411	-0.8 -0.03	2.3 0.09	66.0 2.60	70.0 2.76	1.3 0.05	105.0 4.13	101.0 3.98	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.94 2.07
21.996 0.8660	18.825 0.7411	-0.8 -0.03	2.3 0.09	66.0 2.60	70.0 2.76	3.3 0.13	104.5 4.11	99.0 3.90	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.92 2.04
29.317 1.1542	27.000 1.0630	-7.1 -0.28	2.3 0.09	63.0 2.48	67.0 2.64	2.0 0.08	100.0 3.94	96.0 3.78	2.20 0.09	1.40 0.05	58.6	17.1	0.0946	1.23 2.71
25.400 1.0000	19.050 0.7500	1.0 0.04	3.5 0.14	69.0 2.72	75.0 2.95	3.3 0.13	109.0 4.29	101.0 3.98	2.30 0.09	1.50 0.06	77.7	43.3	0.1170	1.21 2.67
21.996 0.8660	23.812 0.9375	-0.8 -0.03	2.3 0.09	66.0 2.60	70.0 2.76	3.3 0.13	106.0 4.17	99.0 3.90	1.70 0.07	2.30 0.09	56	21.4	0.0984	1.12 2.47
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	66.0 2.60	72.0 2.83	3.3 0.13	106.0 4.17	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.37 3.01
30.162 1.1875	23.812 0.9375	-6.6 -0.26	3.5 0.14	66.0 2.60	72.0 2.83	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.38 3.03
30.162 1.1875	23.812 0.9375	-6.6 -0.26	3.5 0.14	66.0 2.60	72.0 2.83	0.8 0.03	107.0 4.21	103.0 4.06	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.38 3.04
30.162 1.1875	23.812 0.9375	-6.6 -0.26	8.0 0.31	66.0 2.60	81.0 3.19	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.34 2.95
31.750 1.2500	23.812 0.9375	-0.3 -0.01	3.5 0.14	69.0 2.71	76.0 2.99	3.3 0.13	111.0 4.37	100.0 3.94	5.00 0.20	2.00 0.08	50.2	16.4	0.0751	1.50 3.31
41.275 1.6250	31.750 1.2500	-14.0 -0.55	3.5 0.14	66.0 2.60	72.0 2.83	3.3 0.13	110.0 4.33	105.0 4.13	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.10 4.62
41.275 1.6250	31.750 1.2500	-14.0 -0.55	3.5 0.14	66.0 2.60	72.0 2.83	0.8 0.03	110.0 4.33	107.0 4.21	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.11 4.65
41.275 1.6250	31.750 1.2500	-14.0 -0.55	6.4 0.25	66.0 2.60	78.0 3.07	3.3 0.13	110.0 4.33	105.0 4.13	3.90 0.15	1.90 0.07	75.9	16.2	0.0694	2.07 4.57
31.750 1.2500	23.812 0.9375	2.0 0.08	3.5 0.14	71.0 2.80	77.0 3.03	3.3 0.13	116.0 4.57	105.0 4.13	5.20 0.21	2.00 0.08	57	18.3	0.0797	1.69 3.74
32.791 1.2910	25.400 1.0000	2.0 0.08	3.5 0.14	67.0 2.64	81.0 3.19	3.3 0.13	116.0 4.57	102.0 4.02	4.70 0.19	4.40 0.17	57.4	13.5	0.0825	1.98 4.36
36.678 1.4440	33.338 1.3125	-9.4 -0.37	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.20 4.84
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.15 4.74
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.20 4.85
44.450 1.7500	34.925 1.3750	-9.4 -0.37	3.5 0.14	71.0 2.79	80.0 3.15	3.3 0.13	119.0 4.69	107.0 4.21	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	2.69 5.93
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	116.0 4.57	111.0 4.37	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.43 5.37
56.007 2.2050	44.450 1.7500	-19.3 -0.76	4.3 0.17	72.0 2.83	80.0 3.15	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.95 8.71
56.007 2.2050	44.450 1.7500	-19.3 -0.76	0.8 0.03	72.0 2.83	72.0 2.83	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.96 8.74
33.236 1.3085	23.520 0.9260	8.4 0.33	3.5 0.14	77.5 3.05	86.0 3.39	3.3 0.13	130.0 5.12	115.0 4.53	6.40 0.25	4.80 0.19	71.3	17.6	0.0926	2.52 5.56
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	69.0 2.72	75.0 2.95	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	3.03 6.68
33.236 1.3085	23.520 0.9260	7.9 0.31	3.5 0.14	77.0 3.03	83.0 3.27	2.3 0.09	132.0 5.20	117.0 4.61	6.90 0.27	4.10 0.16	62.6	19.1	0.0884	2.57 5.66

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

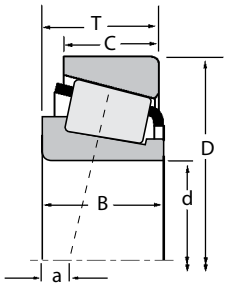
[7] Compound radius on inner race. Details on drawing for bearing.

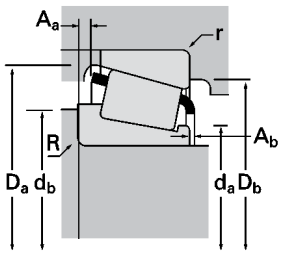
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
57.150 2.2500	140.030 5.5130	36.512 1.4375	185000 41500	0.87	0.69	47900 10800	71000 16000	0.67	234000 52600	78225C	78551
57.150 2.2500	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6455	6420
57.150 2.2500	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6465	6420
57.150 2.2500	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6465	6420A
57.150 2.2500	152.400 6.0000	53.975 2.1250	313000 70500	0.49	1.23	81300 18300	67800 15200	1.20	423000 95000	HH814540	HH814510
57.531 2.2650	96.838 3.8125	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	388A	382A
57.531 2.2650	98.425 3.8750	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	388A	382
57.531 2.2650	100.000 3.9370	21.000 0.8268	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	388A	383A
58.738 2.3125	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3981	3920
58.738 2.3125	127.000 5.0000	44.450 1.7500	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65231	65500
59.530 2.3437	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3978	3920
59.880 2.3575	127.000 5.0000	44.450 1.7500	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65235	65500
59.931 2.3595	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	745	742
59.977 2.3613	100.000 3.9370	25.400 1.0000	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28980	28921
59.977 2.3613	122.238 4.8125	33.338 1.3125	143000 32200	0.67	0.90	37100 8340	42300 9500	0.88	178000 39900	66586	66520
59.987 2.3617	104.775 4.1250	21.433 0.8438	89600 20100	0.39	1.55	23200 5220	15400 3470	1.51	120000 27000	39236	39412
59.987 2.3617	109.985 4.3301	29.751 1.1713	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3977X	3921XA
59.987 2.3617	110.058 4.3330	22.000 0.8661	89600 20100	0.39	1.55	23200 5220	15400 3470	1.51	120000 27000	39236	39433
59.987 2.3617	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3977X	3920
59.987 2.3617	125.000 4.9213	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	558-S	553A
59.987 2.3617	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813839	HM813810
59.987 2.3617	129.944 5.1159	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	558-S	553-SA
59.987 2.3617	130.175 5.1250	34.100 1.3425	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911244	HM911210
59.987 2.3617	134.983 5.3143	33.449 1.3169	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911244	HM911216
59.987 2.3617	146.050 5.7500	41.275 1.6250	213000 47900	0.78	0.77	55200 12400	74000 16600	0.75	256000 57500	H913840	H913810
60.000 2.3622	95.000 3.7402	24.000 0.9449	90400 20300	0.40	1.49	23400 5270	16100 3620	1.45	135000 30400	JLM508748	JLM508710
60.000 2.3622	100.000 3.9370	21.000 0.8268	80900 18200	0.47	1.27	21000 4710	17000 3820	1.24	101000 22800	JP6049	JP6010
60.000 2.3622	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29580	29520

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
33.236 1.3085	23.520 0.9260	8.4 0.33	3.5 0.14	77.5 3.05	86.0 3.39	2.3 0.09	132.0 5.20	117.0 4.61	6.40 0.25	4.80 0.19	71.3	17.6	0.0926	2.68 5.90
54.229 2.1350	44.450 1.7500	-15.0 -0.59	3.5 0.14	75.0 2.95	81.0 3.19	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	5.08 11.20
54.229 2.1350	44.450 1.7500	-15.0 -0.59	6.8 0.27	75.0 2.95	88.0 3.46	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	5.05 11.14
54.229 2.1350	44.450 1.7500	-15.0 -0.59	6.8 0.27	75.0 2.95	88.0 3.46	0.8 0.03	140.0 5.51	131.0 5.16	2.70 0.11	0.70 0.03	158	29.1	0.0931	5.07 11.18
57.150 2.2500	41.275 1.6250	-12.2 -0.48	3.5 0.14	81.0 3.19	87.0 3.43	3.3 0.13	143.0 5.63	130.0 5.12	5.30 0.21	0.20 0.01	130	23.5	0.0957	5.28 11.65
21.946 0.8640	15.875 0.6250	-3.0 -0.12	3.5 0.14	63.0 2.48	69.0 2.72	0.8 0.03	92.0 3.62	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.58 1.27
21.946 0.8640	17.826 0.7018	-3.0 -0.12	3.5 0.14	63.0 2.48	69.0 2.72	0.8 0.03	92.0 3.62	90.0 3.54	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.62 1.37
21.946 0.8640	17.826 0.7018	-3.0 -0.12	3.5 0.14	63.0 2.48	69.0 2.72	2.0 0.08	93.0 3.66	89.0 3.50	1.10 0.04	2.00 0.08	42	15.7	0.0859	0.65 1.44
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	106.0 4.17	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.33 2.94
44.450 1.7500	34.925 1.3750	-9.4 -0.37	3.5 0.14	71.0 2.79	81.0 3.19	3.3 0.13	119.0 4.69	107.0 4.21	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	2.64 5.82
30.048 1.1830	23.812 0.9375	-4.6 -0.18	1.5 0.06	68.0 2.68	70.0 2.76	3.3 0.13	106.0 4.17	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.32 2.92
44.450 1.7500	34.925 1.3750	-9.4 -0.37	3.5 0.14	71.0 2.79	82.0 3.23	3.3 0.13	119.0 4.69	107.0 4.21	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	2.60 5.74
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.5 0.14	75.0 2.95	81.0 3.19	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	4.28 9.44
25.400 1.0000	19.845 0.7813	-2.5 -0.10	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	96.0 3.78	89.0 3.50	2.00 0.08	1.40 0.05	60.1	24.5	0.1032	0.76 1.67
31.750 1.2500	23.812 0.9375	2.0 0.08	1.5 0.06	73.0 2.87	75.0 2.95	3.3 0.13	116.0 4.57	105.0 4.13	5.20 0.21	2.00 0.08	57	18.3	0.0797	1.64 3.61
22.000 0.8661	15.875 0.6250	-1.5 -0.06	2.3 0.09	67.0 2.64	71.0 2.80	2.0 0.08	100.0 3.94	96.0 3.78	1.70 0.07	2.30 0.09	51.7	19.5	0.0947	0.74 1.63
28.000 1.1024	23.812 0.9375	-4.6 -0.18	2.3 0.09	68.0 2.68	72.0 2.83	0.5 0.02	104.5 4.12	100.0 3.94	2.20 0.09	3.10 0.12	75.2	21.3	0.1092	1.20 2.65
22.000 0.8661	17.236 0.6786	-1.5 -0.06	2.3 0.09	67.0 2.64	71.0 2.80	2.3 0.09	103.0 4.06	98.0 3.86	1.70 0.07	2.30 0.09	51.7	19.5	0.0947	0.87 1.92
28.000 1.1024	23.812 0.9375	-4.6 -0.18	2.3 0.09	68.0 2.68	72.0 2.83	3.3 0.13	106.0 4.17	99.0 3.90	2.20 0.09	3.10 0.12	75.2	21.3	0.1092	1.28 2.83
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	69.0 2.72	75.0 2.95	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.13 4.69
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	75.0 2.95	82.0 3.23	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.19 4.82
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	69.0 2.72	75.0 2.95	3.3 0.13	116.0 4.57	111.0 4.37	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.36 5.20
30.924 1.2175	23.812 0.9375	7.9 0.31	3.5 0.14	74.5 2.93	84.0 3.31	3.3 0.13	123.5 4.87	109.0 4.29	5.00 0.20	4.20 0.17	56.4	16.5	0.0842	2.00 4.40
30.924 1.2175	21.948 0.8641	7.9 0.31	3.5 0.14	74.5 2.93	84.0 3.31	3.5 0.14	123.0 4.84	112.0 4.41	5.00 0.20	4.20 0.17	56.4	16.5	0.0842	2.12 4.67
39.688 1.5625	25.400 1.0000	4.3 0.17	3.5 0.14	82.5 3.24	88.0 3.46	3.3 0.13	138.0 5.43	124.0 4.88	8.20 0.32	3.60 0.14	78.5	17.3	0.0927	3.17 6.99
24.000 0.9449	19.000 0.7480	-2.8 -0.11	5.0 0.20	66.0 2.60	75.0 2.95	2.5 0.10	91.0 3.58	85.0 3.35	1.50 0.06	1.60 0.06	54.2	25.3	0.0979	0.59 1.30
20.000 0.7874	15.500 0.6102	1.3 0.05	2.0 0.08	66.0 2.60	69.0 2.72	2.0 0.08	95.5 3.76	91.0 3.58	1.40 0.06	2.80 0.11	39.5	22.5	0.0922	0.60 1.32
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	68.0 2.68	75.0 2.95	3.3 0.13	103.0 4.06	96.0 3.78	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.98 2.16

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

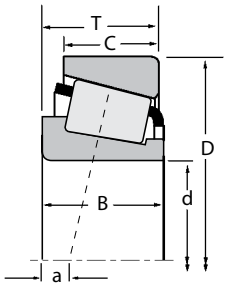
[7] Compound radius on inner race. Details on drawing for bearing.

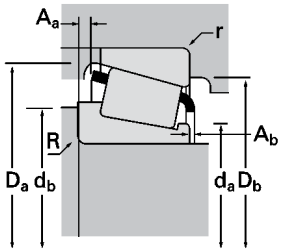
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
60.000 2.3622	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29582	29520
60.000 2.3622	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29582	29522
60.000 2.3622	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	397	394A
60.000 2.3622	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	397	394AS
60.000 2.3622	110.000 4.3307	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29580	29521
60.000 2.3622	110.000 4.3307	38.000 1.4961	183000 41200	0.40	1.48	47500 10700	32800 7380	1.44	253000 56800	XAA33212	Y33212
60.000 2.3622	110.000 4.3307	38.000 1.4961	183000 41200	0.40	1.48	47500 10700	32800 7380	1.44	253000 56800	XAB-33212	Y33212
60.000 2.3622	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3977	3920
60.000 2.3622	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3977	3925
60.000 2.3622	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	476	472
60.000 2.3622	122.238 4.8125	33.338 1.3125	143000 32200	0.67	0.90	37100 8340	42300 9500	0.88	178000 39900	66585	66520
60.000 2.3622	125.000 4.9213	37.000 1.4567	159000 35800	0.82	0.73	41200 9270	57900 13000	0.71	210000 47100	JW6049	JW6010
60.325 2.3750	100.000 3.9370	25.400 1.0000	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28985	28921
60.325 2.3750	100.000 3.9370	25.400 1.0000	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28985	28921A
60.325 2.3750	101.600 4.0000	25.400 1.0000	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28985	28920
60.325 2.3750	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3980	3920
60.325 2.3750	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3980	3925
60.325 2.3750	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212044	HM212010
60.325 2.3750	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212044	HM212011
60.325 2.3750	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5582	5535
60.325 2.3750	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5583	5535
60.325 2.3750	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	558	552
60.325 2.3750	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	558	552A
60.325 2.3750	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	558A	552A
60.325 2.3750	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813841A	HM813811
60.325 2.3750	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813841	HM813810
60.325 2.3750	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813841	HM813811
60.325 2.3750	127.000 5.0000	44.450 1.7500	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65237	65500

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.400 1.0000	19.050 0.7500	-0.8 -0.03	0.8 0.03	68.0 2.68	69.0 2.72	3.3 0.13	103.0 4.06	96.0 3.78	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.99 2.19
25.400 1.0000	19.050 0.7500	-0.8 -0.03	0.8 0.03	68.0 2.68	69.0 2.72	0.8 0.03	103.0 4.06	98.0 3.86	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	1.00 2.21
21.996 0.8660	18.825 0.7411	-0.8 -0.03	0.8 0.03	68.0 2.68	69.0 2.72	1.3 0.05	105.0 4.13	101.0 3.98	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.90 1.98
21.996 0.8660	18.825 0.7411	-0.8 -0.03	0.8 0.03	68.0 2.68	69.0 2.72	3.3 0.13	104.5 4.11	99.0 3.90	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.88 1.95
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	68.0 2.68	75.0 2.95	1.3 0.05	104.0 4.09	99.0 3.90	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	1.05 2.31
38.000 1.4961	29.000 1.1417	-9.9 -0.39	6.0 0.24	68.0 2.68	85.0 3.35	1.5 0.06	105.0 4.13	98.0 3.86	4.00 0.16	2.50 0.10	76.2	18.1	0.0758	1.53 3.37
38.000 1.4961	29.000 1.1417	-9.9 -0.39	5.0 0.20	68.0 2.68	83.0 3.27	1.5 0.06	105.0 4.13	98.0 3.86	4.00 0.16	2.50 0.10	76.2	18.1	0.0758	1.53 3.37
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	68.0 2.68	74.0 2.91	3.3 0.13	106.0 4.17	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.30 2.88
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	68.0 2.68	74.0 2.91	0.8 0.03	106.0 4.17	101.0 3.98	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.32 2.91
29.007 1.1420	24.237 0.9542	-4.1 -0.16	2.0 0.08	69.0 2.72	73.0 2.87	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.54 3.40
31.750 1.2500	23.812 0.9375	2.0 0.08	3.5 0.14	73.0 2.87	79.0 3.11	3.3 0.13	116.0 4.57	105.0 4.13	5.20 0.21	2.00 0.08	57	18.3	0.0797	1.63 3.59
33.500 1.3189	26.000 1.0236	4.8 0.19	3.0 0.12	72.0 2.83	89.0 3.50	3.0 0.12	119.0 4.69	104.0 4.09	6.00 0.24	4.00 0.16	64.1	18.5	0.0883	2.02 4.46
25.400 1.0000	19.845 0.7813	-2.5 -0.10	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	96.0 3.78	89.0 3.50	2.00 0.08	1.40 0.05	60.1	24.5	0.1032	0.75 1.65
25.400 1.0000	19.845 0.7813	-2.5 -0.10	3.5 0.14	67.0 2.64	73.0 2.87	0.8 0.03	96.0 3.78	91.0 3.58	2.00 0.08	1.40 0.05	60.1	24.5	0.1032	0.76 1.68
25.400 1.0000	19.845 0.7813	-2.5 -0.10	3.5 0.14	67.0 2.64	73.0 2.87	3.3 0.13	97.0 3.82	90.0 3.54	2.00 0.08	1.40 0.05	60.1	24.5	0.1032	0.79 1.74
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	68.0 2.68	75.0 2.95	3.3 0.13	106.0 4.17	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.30 2.86
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	68.0 2.68	75.0 2.95	0.8 0.03	106.0 4.17	101.0 3.98	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.31 2.89
38.354 1.5100	29.718 1.1700	-10.9 -0.43	8.0 0.31	70.0 2.76	85.0 3.35	1.5 0.06	116.0 4.57	110.0 4.33	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	2.02 4.46
38.354 1.5100	29.718 1.1700	-10.9 -0.43	8.0 0.31	70.0 2.76	85.0 3.35	3.3 0.13	116.0 4.57	108.0 4.25	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	2.02 4.45
43.764 1.7230	36.512 1.4375	-12.2 -0.48	0.8 0.03	72.0 2.83	73.0 2.87	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.40 5.30
43.764 1.7230	36.512 1.4375	-12.2 -0.48	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.39 5.28
36.678 1.4440	33.338 1.3125	-9.4 -0.37	2.3 0.09	69.0 2.72	73.0 2.87	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.12 4.67
36.678 1.4440	30.162 1.1875	-9.4 -0.37	2.3 0.09	69.0 2.72	73.0 2.87	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.07 4.57
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	69.0 2.72	76.0 2.99	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.07 4.55
36.512 1.4375	26.988 1.0625	-3.8 -0.15	1.5 0.06	76.0 2.99	78.0 3.07	1.5 0.06	121.0 4.76	113.0 4.45	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.18 4.81
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	76.5 3.02	83.0 3.27	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.18 4.80
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	76.5 3.02	83.0 3.27	1.5 0.06	121.0 4.76	113.0 4.45	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.18 4.80
44.450 1.7500	34.925 1.3750	-9.4 -0.37	3.5 0.14	71.0 2.80	82.0 3.23	3.3 0.13	119.0 4.69	107.0 4.21	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	2.59 5.70

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

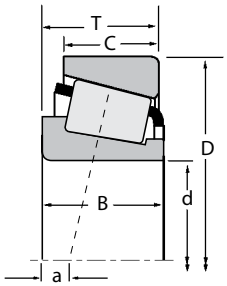
[7] Compound radius on inner race. Details on drawing for bearing.

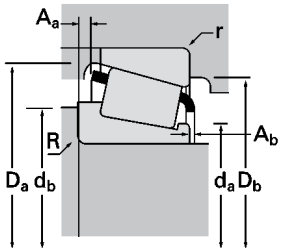
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic [1]			Factors [5]			Static	Part Number	
d	D	T	C_1	e	Y	Dynamic [2] C_{90}	C_{a90}	K	C_0	Inner	Outer
60.325 2.3750	127.000 5.0000	44.450 1.7500	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65237	65501
60.325 2.3750	127.000 5.0000	44.450 1.7500	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65237A	65500
60.325 2.3750	130.175 5.1250	36.512 1.4375	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911245	HM911210
60.325 2.3750	130.175 5.1250	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	637	633
60.325 2.3750	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6376	6320
60.325 2.3750	136.525 5.3750	36.512 1.4375	185000 41500	0.87	0.69	47900 10800	71000 16000	0.67	234000 52600	78238C	78537
60.325 2.3750	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	637	632
60.325 2.3750	136.525 5.3750	46.038 1.8125	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65237	65537
60.325 2.3750	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715332	H715311
60.325 2.3750	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715332	H715310
60.325 2.3750	140.030 5.5130	36.512 1.4375	185000 41500	0.87	0.69	47900 10800	71000 16000	0.67	234000 52600	78238C	78551
60.325 2.3750	152.400 6.0000	52.705 2.0750	328000 73700	0.49	1.23	85000 19100	70900 15900	1.20	451000 101000	HH814542	HH814510
61.912 2.4375	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	392	394A
61.912 2.4375	112.712 4.4375	26.967 1.0617	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	392	3920
61.912 2.4375	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	554	552A
61.912 2.4375	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813843	HM813810
61.912 2.4375	130.175 5.1250	36.512 1.4375	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911249	HM911210
61.912 2.4375	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715334	H715311
61.912 2.4375	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715334	H715310
61.912 2.4375	146.050 5.7500	41.275 1.6250	213000 47900	0.78	0.77	55200 12400	74000 16600	0.75	256000 57500	H913842	H913810
61.912 2.4375	146.050 5.7500	41.275 1.6250	213000 47900	0.78	0.77	55200 12400	74000 16600	0.75	256000 57500	H913843	H913810
61.912 2.4375	152.400 6.0000	47.625 1.8750	264000 59400	0.66	0.91	68500 15400	76900 17300	0.89	306000 68700	9180	9121
61.912 2.4375	152.400 6.0000	47.625 1.8750	264000 59400	0.66	0.91	68500 15400	76900 17300	0.89	306000 68700	9181	9121
61.912 2.4375	158.750 6.2500	50.800 2.0000	264000 59400	0.66	0.91	68500 15400	76900 17300	0.89	306000 68700	9180	9120
61.912 2.4375	158.750 6.2500	50.800 2.0000	264000 59400	0.66	0.91	68500 15400	76900 17300	0.89	306000 68700	9181	9120
61.912 2.4375	158.750 6.2500	55.562 2.1875	264000 59400	0.66	0.91	68500 15400	76900 17300	0.89	306000 68700	9178	9120
61.976 2.4400	99.979 3.9362	23.812 0.9375	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28990	28919
62.738 2.4700	100.000 3.9370	25.400 1.0000	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28995	28921

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
44.450 1.7500	34.925 1.3750	-9.4 -0.37	3.5 0.14	71.0 2.80	82.0 3.23	1.3 0.05	119.0 4.69	108.0 4.25	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	2.60 5.73
44.450 1.7500	34.925 1.3750	-9.4 -0.37	1.5 0.06	71.0 2.80	78.0 3.07	3.3 0.13	119.0 4.69	107.0 4.21	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	2.59 5.72
33.338 1.3125	23.812 0.9375	5.3 0.21	5.0 0.20	74.5 2.93	87.0 3.43	3.3 0.13	123.5 4.87	109.0 4.29	7.40 0.29	4.20 0.17	56.4	16.5	0.0842	2.06 4.55
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	124.0 4.88	116.0 4.57	4.20 0.16	1.90 0.08	106	21	0.0814	2.59 5.71
56.007 2.2050	44.450 1.7500	-19.3 -0.76	3.5 0.14	74.0 2.91	81.0 3.19	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.82 8.43
33.236 1.3085	23.520 0.9260	8.4 0.33	5.0 0.20	77.5 3.05	91.0 3.58	3.3 0.13	130.0 5.12	115.0 4.53	6.40 0.25	4.90 0.19	71.3	17.6	0.0926	2.44 5.37
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	2.93 6.47
44.450 1.7500	36.512 1.4375	-9.4 -0.37	3.5 0.14	71.0 2.80	82.0 3.23	3.0 0.12	120.0 4.72	112.0 4.41	4.10 0.16	1.00 0.04	83.2	17.2	0.0827	3.22 7.10
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	80.0 3.15	86.0 3.39	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.52 7.77
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	80.0 3.15	86.0 3.39	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.71 8.17
33.236 1.3085	23.520 0.9260	8.4 0.33	5.0 0.20	77.5 3.05	91.0 3.58	2.3 0.09	132.0 5.20	117.0 4.61	6.40 0.25	4.90 0.19	71.3	17.6	0.0926	2.59 5.71
52.705 2.0750	41.275 1.6250	-10.9 -0.43	3.5 0.14	83.0 3.27	89.0 3.50	3.3 0.13	143.0 5.63	130.0 5.12	4.10 0.16	2.40 0.10	136	24.6	0.0973	5.02 11.06
21.996 0.8660	18.825 0.7411	-0.8 -0.03	0.8 0.03	69.0 2.72	70.0 2.76	1.3 0.05	105.0 4.13	101.0 3.98	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.87 1.91
21.996 0.8660	23.812 0.9375	-0.8 -0.03	0.8 0.03	69.0 2.72	70.0 2.76	3.3 0.13	106.0 4.17	99.0 3.90	1.80 0.07	2.00 0.08	56	21.4	0.0984	1.05 2.31
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	71.0 2.80	77.0 3.03	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.02 4.46
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	78.0 3.07	85.0 3.35	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.13 4.71
33.338 1.3125	23.812 0.9375	5.3 0.21	3.5 0.14	74.0 2.91	91.0 3.58	3.3 0.13	123.5 4.87	109.0 4.29	7.40 0.29	4.20 0.17	56.4	16.5	0.0842	2.03 4.48
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	81.0 3.19	87.0 3.43	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.47 7.65
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	81.0 3.19	87.0 3.43	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.65 8.05
39.688 1.5625	25.400 1.0000	4.3 0.17	3.5 0.14	82.5 3.24	90.0 3.54	3.3 0.13	138.0 5.43	124.0 4.88	8.20 0.32	3.60 0.14	78.5	17.3	0.0927	3.12 6.87
39.688 1.5625	25.400 1.0000	4.3 0.17	7.0 0.28	82.5 3.24	97.0 3.82	3.3 0.13	138.0 5.43	124.0 4.88	8.20 0.32	3.60 0.14	78.5	17.3	0.0927	3.08 6.80
46.038 1.8125	31.750 1.2500	-3.8 -0.15	3.5 0.14	81.5 3.20	90.0 3.54	3.3 0.13	145.0 5.71	130.0 5.12	8.10 0.32	4.00 0.16	87.6	13.7	0.0912	3.98 8.78
46.038 1.8125	31.750 1.2500	-3.8 -0.15	0.8 0.03	81.5 3.20	85.0 3.35	3.3 0.13	145.0 5.71	130.0 5.12	8.10 0.32	4.00 0.16	87.6	13.7	0.0912	3.99 8.80
46.038 1.8125	34.925 1.3750	-3.8 -0.15	3.5 0.14	81.5 3.20	90.0 3.54	3.3 0.13	146.0 5.75	131.0 5.16	8.10 0.32	4.00 0.16	87.6	13.7	0.0912	4.60 10.14
46.038 1.8125	34.925 1.3750	-3.8 -0.15	0.8 0.03	81.5 3.20	85.0 3.35	3.3 0.13	146.0 5.75	131.0 5.16	8.10 0.32	4.00 0.16	87.6	13.7	0.0912	4.61 10.17
52.388 2.0625	34.925 1.3750	-8.4 -0.33	3.5 0.14	81.5 3.20	90.0 3.54	3.3 0.13	146.0 5.75	131.0 5.16	12.90 0.51	2.40 0.10	87.6	13.7	0.0912	4.86 10.71
24.608 0.9688	19.050 0.7500	-1.8 -0.07	2.0 0.08	68.0 2.68	72.0 2.83	1.5 0.06	96.0 3.78	90.0 3.54	1.20 0.05	1.40 0.05	60.1	24.5	0.1032	0.71 1.56
25.400 1.0000	19.845 0.7813	-2.5 -0.10	3.5 0.14	69.0 2.72	75.0 2.95	3.3 0.13	96.0 3.78	89.0 3.50	2.00 0.08	1.40 0.05	60.1	24.5	0.1032	0.70 1.55

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

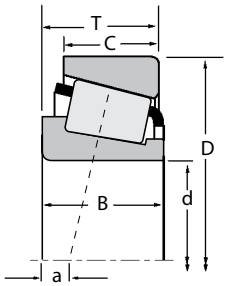
[7] Compound radius on inner race. Details on drawing for bearing.

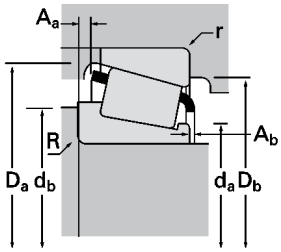
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic [1]			Dynamic [2]		Factors [5]	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
62.738 2.4700	101.600 4.0000	25.400 1.0000	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28995	28920
63.500 2.5000	92.075 3.6250	13.495 0.5313	35800 8060	0.41	1.48	9290 2090	6450 1450	1.44	53300 12000	LL510749	LL510710
63.500 2.5000	94.458 3.7188	19.050 0.7500	62000 13900	0.42	1.41	16100 3620	11700 2630	1.38	108000 24300	L610549	L610510
63.500 2.5000	104.775 4.1250	21.433 0.8438	89600 20100	0.39	1.55	23200 5220	15400 3470	1.51	120000 27000	39250	39412
63.500 2.5000	107.158 4.2188	22.000 0.8661	89600 20100	0.39	1.55	23200 5220	15400 3470	1.51	120000 27000	39250	39422
63.500 2.5000	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29585	29520
63.500 2.5000	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29585	29522
63.500 2.5000	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29586	29520
63.500 2.5000	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29586	29522
63.500 2.5000	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395	394
63.500 2.5000	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	390A	394A
63.500 2.5000	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	390A	394AS
63.500 2.5000	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395	394A
63.500 2.5000	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395	394AS
63.500 2.5000	110.000 4.3307	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29585	29521
63.500 2.5000	110.000 4.3307	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29586	29521
63.500 2.5000	110.000 4.3307	29.370 1.1563	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3982X	3927AS
63.500 2.5000	110.000 4.3307	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3982	3927X
63.500 2.5000	110.058 4.3330	22.000 0.8661	89600 20100	0.39	1.55	23200 5220	15400 3470	1.51	120000 27000	39250	39433
63.500 2.5000	112.712 4.4375	26.967 1.0617	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395	3920
63.500 2.5000	112.712 4.4375	26.967 1.0617	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	390A	3920
63.500 2.5000	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3982	3920
63.500 2.5000	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3982	3925
63.500 2.5000	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39585	39520
63.500 2.5000	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39585A	39520
63.500 2.5000	112.712 4.4375	33.338 1.3125	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3982	3926
63.500 2.5000	117.475 4.6250	30.162 1.1875	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33251	33462
63.500 2.5000	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	477	472A

[1] Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
[2] Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
[3] Negative value indicates effective center inside cone backface.
[4] These maximum fillet radii will be cleared by the bearing corners.
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.400 1.0000	19.845 0.7813	-2.5 -0.10	3.5 0.14	69.0 2.72	75.0 2.95	3.3 0.13	97.0 3.82	90.0 3.54	2.00 0.08	1.40 0.05	60.1	24.5	0.1032	0.74 1.64
12.700 0.5000	9.525 0.3750	3.0 0.12	1.5 0.06	68.0 2.68	70.0 2.76	1.5 0.06	88.0 3.46	86.0 3.39	0.60 0.02	1.80 0.07	33.9	45.9	0.0827	0.26 0.58
19.050 0.7500	15.083 0.5938	0.5 0.02	1.5 0.06	69.0 2.72	71.0 2.80	1.5 0.06	91.0 3.58	86.0 3.39	0.90 0.04	1.40 0.06	56.7	43.6	0.1006	0.45 0.99
22.000 0.8661	15.875 0.6250	-1.5 -0.06	2.0 0.08	69.0 2.72	73.0 2.87	2.0 0.08	100.0 3.94	96.0 3.78	1.70 0.07	2.30 0.09	51.7	19.5	0.0947	0.68 1.51
22.000 0.8661	21.204 0.8348	-1.5 -0.06	2.0 0.08	69.0 2.72	73.0 2.87	2.3 0.09	102.0 4.02	97.0 3.82	1.70 0.07	2.30 0.09	51.7	19.5	0.0947	0.78 1.72
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	71.0 2.80	77.0 3.03	3.3 0.13	103.0 4.06	96.0 3.78	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.91 2.02
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	71.0 2.80	77.0 3.03	0.8 0.03	103.0 4.06	98.0 3.86	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.93 2.04
25.400 1.0000	19.050 0.7500	-0.8 -0.03	1.5 0.06	71.0 2.80	73.0 2.87	3.3 0.13	103.0 4.06	96.0 3.78	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.92 2.03
25.400 1.0000	19.050 0.7500	-0.8 -0.03	1.5 0.06	71.0 2.80	73.0 2.87	0.8 0.03	103.0 4.06	98.0 3.86	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.94 2.06
21.996 0.8660	22.000 0.8661	-0.8 -0.03	3.5 0.14	70.0 2.76	77.0 3.03	0.8 0.03	106.0 4.18	101.0 3.98	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.85 1.87
21.996 0.8660	18.825 0.7411	-0.8 -0.03	1.5 0.06	70.0 2.76	73.0 2.87	1.3 0.05	105.0 4.13	101.0 3.98	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.84 1.85
21.996 0.8660	18.825 0.7411	-0.8 -0.03	1.5 0.06	70.0 2.76	73.0 2.87	3.3 0.13	104.5 4.11	99.0 3.90	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.82 1.81
21.996 0.8660	18.825 0.7411	-0.8 -0.03	3.5 0.14	70.0 2.76	77.0 3.03	1.3 0.05	105.0 4.13	101.0 3.98	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.83 1.83
21.996 0.8660	18.825 0.7411	-0.8 -0.03	3.5 0.14	70.0 2.76	77.0 3.03	3.3 0.13	104.5 4.11	99.0 3.90	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.81 1.80
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	71.0 2.80	77.0 3.03	1.3 0.05	104.0 4.09	99.0 3.90	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.98 2.16
25.400 1.0000	19.050 0.7500	-0.8 -0.03	1.5 0.06	71.0 2.80	73.0 2.87	1.3 0.05	104.0 4.09	99.0 3.90	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.99 2.17
30.048 1.1830	23.020 0.9063	-4.6 -0.18	7.0 0.28	71.0 2.80	84.0 3.31	0.5 0.02	105.0 4.13	100.0 3.94	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.10 2.42
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	71.0 2.80	77.0 3.03	3.3 0.13	105.0 4.13	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.13 2.50
22.000 0.8661	17.236 0.6786	-1.5 -0.06	2.0 0.08	69.0 2.72	73.0 2.87	2.3 0.09	103.0 4.06	98.0 3.86	1.70 0.07	2.30 0.09	51.7	19.5	0.0947	0.81 1.80
21.996 0.8660	23.812 0.9375	-0.8 -0.03	3.5 0.14	70.0 2.76	77.0 3.03	3.3 0.13	106.0 4.17	99.0 3.90	1.80 0.07	2.00 0.08	56	21.4	0.0984	1.01 2.23
21.996 0.8660	23.812 0.9375	-0.8 -0.03	1.5 0.06	70.0 2.76	73.0 2.87	3.3 0.13	106.0 4.17	99.0 3.90	1.70 0.07	2.30 0.09	56	21.4	0.0984	1.02 2.24
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	71.0 2.80	77.0 3.03	3.3 0.13	106.0 4.17	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.22 2.70
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	71.0 2.80	77.0 3.03	0.8 0.03	106.0 4.17	101.0 3.98	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.24 2.73
30.162 1.1875	23.812 0.9375	-6.6 -0.26	3.5 0.14	71.0 2.80	77.0 3.03	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.23 2.72
30.162 1.1875	23.812 0.9375	-6.6 -0.26	0.8 0.03	71.0 2.80	72.0 2.83	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.24 2.74
30.048 1.1830	26.988 1.0625	-4.6 -0.18	3.5 0.14	71.0 2.80	77.0 3.03	3.3 0.13	106.0 4.17	98.0 3.86	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.31 2.89
30.162 1.1875	23.812 0.9375	-2.8 -0.11	0.8 0.03	72.0 2.83	73.0 2.87	3.3 0.13	112.0 4.41	104.0 4.09	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.42 3.13
29.007 1.1420	23.444 0.9230	-4.1 -0.16	0.8 0.03	72.0 2.83	73.0 2.87	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.44 3.17

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

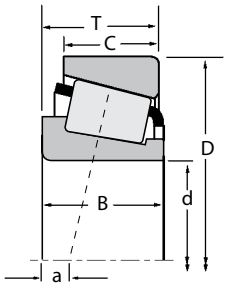
(7) Compound radius on inner race. Details on drawing for bearing.

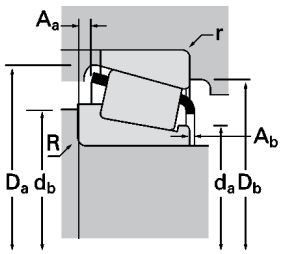
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
63.500 2.5000	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	483	472A
63.500 2.5000	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	477	472
63.500 2.5000	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	477	473
63.500 2.5000	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	483	472
63.500 2.5000	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212046	HM212010
63.500 2.5000	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212046	HM212011
63.500 2.5000	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212047	HM212010
63.500 2.5000	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212047	HM212011
63.500 2.5000	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5564	5535
63.500 2.5000	122.238 4.8125	43.658 1.7188	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5584	5535
63.500 2.5000	123.825 4.8750	30.162 1.1875	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	483	472X
63.500 2.5000	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	559	552
63.500 2.5000	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	559	552A
63.500 2.5000	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	565	563
63.500 2.5000	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813842A	HM813810
63.500 2.5000	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813842	HM813810
63.500 2.5000	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813842	HM813811
63.500 2.5000	130.000 5.1181	36.937 1.4542	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	565	562X
63.500 2.5000	130.000 5.1181	36.937 1.4542	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	565-S	562X
63.500 2.5000	130.000 5.1181	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	639	633X
63.500 2.5000	130.175 5.1250	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	639	633
63.500 2.5000	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6382	6320
63.500 2.5000	136.525 5.3750	36.512 1.4375	158000 35600	0.87	0.69	41100 9230	60900 13700	0.67	193000 43400	78250	78537
63.500 2.5000	136.525 5.3750	36.512 1.4375	185000 41500	0.87	0.69	47900 10800	71000 16000	0.67	234000 52600	78248C	78537
63.500 2.5000	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	639	632
63.500 2.5000	136.525 5.3750	41.275 1.6250	252000 56700	0.36	1.67	65400 14700	40300 9060	1.62	335000 75400	H414235	H414210
63.500 2.5000	136.525 5.3750	41.275 1.6250	252000 56700	0.36	1.67	65400 14700	40300 9060	1.62	335000 75400	H414236	H414210
63.500 2.5000	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715336	H715311

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
29.007 1.1420	23.444 0.9230	-4.1 -0.16	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.43 3.15
29.007 1.1420	24.237 0.9542	-4.1 -0.16	0.8 0.03	72.0 2.83	73.0 2.87	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.47 3.24
29.007 1.1420	29.000 1.1417	-4.1 -0.16	0.8 0.03	72.0 2.83	73.0 2.87	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.52 3.35
29.007 1.1420	24.237 0.9542	-4.1 -0.16	3.5 0.14	72.0 2.83	78.0 3.07	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.46 3.22
38.354 1.5100	29.718 1.1700	-10.9 -0.43	3.5 0.14	73.0 2.87	80.0 3.15	1.5 0.06	116.0 4.57	110.0 4.33	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	1.95 4.29
38.354 1.5100	29.718 1.1700	-10.9 -0.43	3.5 0.14	73.0 2.87	80.0 3.15	3.3 0.13	116.0 4.57	108.0 4.25	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	1.94 4.29
38.354 1.5100	29.718 1.1700	-10.9 -0.43	7.0 0.28	73.0 2.87	87.0 3.43	1.5 0.06	116.0 4.57	110.0 4.33	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	1.93 4.26
38.354 1.5100	29.718 1.1700	-10.9 -0.43	7.0 0.28	73.0 2.87	87.0 3.43	3.3 0.13	116.0 4.57	108.0 4.25	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	1.93 4.26
43.764 1.7230	36.512 1.4375	-12.2 -0.48	5.0 0.20	75.0 2.95	84.0 3.31	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.28 5.02
43.764 1.7230	36.512 1.4375	-12.2 -0.48	3.5 0.14	75.0 2.95	81.0 3.19	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.29 5.04
29.007 1.1420	24.605 0.9687	-4.1 -0.16	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	115.0 4.53	109.0 4.29	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.60 3.52
36.678 1.4440	33.338 1.3125	-9.4 -0.37	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.02 4.46
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	1.98 4.36
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	73.0 2.87	80.0 3.15	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	2.08 4.59
36.512 1.4375	26.988 1.0625	-3.8 -0.15	0.8 0.03	78.0 3.07	78.0 3.07	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.09 4.62
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	78.0 3.07	84.0 3.31	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.09 4.61
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	78.0 3.07	84.0 3.31	1.5 0.06	121.0 4.76	113.0 4.45	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.09 4.61
36.170 1.4240	29.000 1.1417	-8.1 -0.32	3.5 0.14	73.0 2.87	80.0 3.15	3.0 0.12	121.0 4.76	114.0 4.49	3.20 0.13	1.80 0.07	101	24	0.1167	2.24 4.93
36.170 1.4240	29.000 1.1417	-8.1 -0.32	6.4 0.25	73.0 2.87	85.0 3.35	3.0 0.12	121.0 4.76	114.0 4.49	3.20 0.13	1.80 0.07	101	24	0.1167	2.21 4.88
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	74.0 2.91	81.0 3.19	3.0 0.12	123.0 4.84	117.0 4.61	4.20 0.16	1.90 0.08	106	21	0.0814	2.49 5.48
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	74.0 2.91	81.0 3.19	3.3 0.13	124.0 4.88	116.0 4.57	4.20 0.16	1.90 0.08	106	21	0.0814	2.49 5.49
56.007 2.2050	44.450 1.7500	-19.3 -0.76	4.3 0.17	77.0 3.03	84.0 3.31	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.68 8.12
33.236 1.3085	23.520 0.9260	7.9 0.31	2.3 0.09	78.5 3.10	85.0 3.35	3.3 0.13	130.0 5.12	115.0 4.53	6.90 0.27	4.10 0.16	62.6	19.1	0.0884	2.26 4.99
33.236 1.3085	23.520 0.9260	8.4 0.33	0.8 0.03	77.0 3.03	92.0 3.62	3.3 0.13	130.0 5.12	115.0 4.53	6.40 0.25	4.90 0.19	71.3	17.6	0.0926	2.38 5.24
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	74.0 2.91	81.0 3.19	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	2.83 6.25
41.275 1.6250	31.750 1.2500	-10.9 -0.43	3.5 0.14	78.0 3.07	82.0 3.23	3.3 0.13	129.0 5.08	121.0 4.76	3.70 0.15	3.00 0.12	113	22.8	0.0827	2.84 6.25
41.275 1.6250	31.750 1.2500	-10.9 -0.43	7.0 0.28	78.0 3.07	89.0 3.50	3.3 0.13	129.0 5.08	121.0 4.76	3.70 0.15	3.00 0.12	113	22.8	0.0827	2.80 6.18
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	82.0 3.23	88.0 3.46	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.41 7.52

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

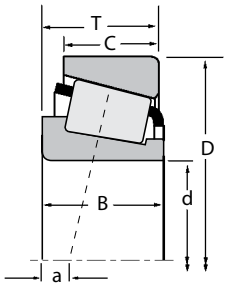
[7] Compound radius on inner race. Details on drawing for bearing.

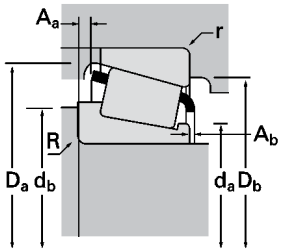
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
63.500 2.5000	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715336	H715310
63.500 2.5000	140.030 5.5130	36.512 1.4375	158000 35600	0.87	0.69	41100 9230	60900 13700	0.67	193000 43400	78250	78551
63.500 2.5000	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6475	6420
63.500 2.5000	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	745-S	742
63.500 2.5000	177.800 7.0000	56.642 2.2300	352000 79200	0.80	0.75	91300 20500	125000 28000	0.73	413000 92900	HH914447	HH914412
64.960 2.5575	149.225 5.8750	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	656	652A
64.960 2.5575	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6464	6420
64.963 2.5576	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	569	563
64.987 2.5586	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29588	29520
64.987 2.5586	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39586	39520
64.987 2.5586	119.985 4.7238	32.751 1.2894	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39586	39528
64.987 2.5586	140.030 5.5130	36.512 1.4375	158000 35600	0.87	0.69	41100 9230	60900 13700	0.67	193000 43400	78255X	78551
64.987 2.5586	144.983 5.7080	36.000 1.4173	158000 35600	0.87	0.69	41100 9230	60900 13700	0.67	193000 43400	78255X	78571
65.000 2.5591	105.000 4.1339	24.000 0.9449	100000 22500	0.45	1.32	26000 5840	20200 4540	1.29	139000 31300	JLM710949C	JLM710910
65.000 2.5591	110.000 4.3307	28.000 1.1024	131000 29400	0.40	1.49	33900 7610	23300 5240	1.45	195000 43900	JM511946	JM511910
65.000 2.5591	112.712 4.4375	22.225 0.8750	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	399	393A
65.000 2.5591	112.712 4.4375	29.020 1.1425	131000 29400	0.40	1.49	33900 7610	23300 5240	1.45	195000 43900	JM511945	3920
65.000 2.5591	112.712 4.4375	29.020 1.1425	131000 29400	0.40	1.49	33900 7610	23300 5240	1.45	195000 43900	JM511946	3920
65.000 2.5591	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	478	472A
65.000 2.5591	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	478	472
65.000 2.5591	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	478	473
65.000 2.5591	120.000 4.7244	39.000 1.5354	207000 46400	0.34	1.78	53500 12000	30900 6950	1.73	283000 63600	JH211749A	JH211710
65.000 2.5591	120.000 4.7244	39.000 1.5354	207000 46400	0.34	1.78	53500 12000	30900 6950	1.73	283000 63600	JH211749	JH211710
65.000 2.5591	123.825 4.8750	30.162 1.1875	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	478	472X
65.000 2.5591	140.000 5.5118	53.980 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	J6392	J6327
65.088 2.5625	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6379	6320
65.088 2.5625	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715340	H715311
65.088 2.5625	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715340	H715310

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	82.0 3.23	88.0 3.46	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.59 7.93
33.236 1.3085	23.520 0.9260	7.9 0.31	2.3 0.09	78.5 3.10	85.0 3.35	2.3 0.09	132.0 5.20	117.0 4.61	6.90 0.27	4.10 0.16	62.6	19.1	0.0884	2.42 5.32
54.229 2.1350	44.450 1.7500	-15.0 -0.59	3.5 0.14	80.0 3.15	86.0 3.39	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.82 10.63
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.5 0.14	77.0 3.03	84.0 3.31	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	4.16 9.16
53.975 2.1250	37.308 1.4688	-0.3 -0.01	3.5 0.14	85.5 3.36	105.0 4.13	3.3 0.13	165.0 6.50	146.0 5.75	9.90 0.39	4.70 0.18	111	17.7	0.1044	6.79 14.97
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	78.0 3.07	85.0 3.35	3.3 0.13	141.0 5.55	132.0 5.20	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.58 7.88
54.229 2.1350	44.450 1.7500	-15.0 -0.59	3.5 0.14	81.0 3.19	87.0 3.43	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.76 10.49
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	74.0 2.91	81.0 3.19	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	2.04 4.50
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	72.0 2.83	78.0 3.07	3.3 0.13	103.0 4.06	96.0 3.78	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.88 1.95
30.925 1.2175	23.812 0.9375	-6.6 -0.26	2.3 0.09	72.0 2.83	76.0 2.99	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	1.80 0.07	84.3	23.7	0.1074	1.21 2.67
30.925 1.2175	26.950 1.0610	-6.6 -0.26	2.3 0.09	72.0 2.83	76.0 2.99	0.8 0.03	110.0 4.33	107.0 4.21	1.60 0.06	1.80 0.07	84.3	23.7	0.1074	1.56 3.43
32.923 1.2962	23.520 0.9260	7.9 0.31	3.5 0.14	79.0 3.11	89.0 3.50	2.3 0.09	132.0 5.20	117.0 4.61	6.90 0.27	4.40 0.18	62.6	19.1	0.0884	2.37 5.22
32.923 1.2962	23.007 0.9058	7.9 0.31	3.5 0.14	79.0 3.11	89.0 3.50	3.5 0.14	132.0 5.20	118.0 4.65	6.90 0.27	4.40 0.18	62.6	19.1	0.0884	2.52 5.56
23.000 0.9055	18.500 0.7283	-0.3 -0.01	3.0 0.12	72.0 2.83	78.0 3.07	1.0 0.04	100.5 3.96	96.0 3.78	1.50 0.06	2.90 0.12	55.5	22.4	0.1023	0.75 1.65
28.000 1.1024	22.500 0.8858	-3.3 -0.13	3.0 0.12	72.0 2.83	78.0 3.07	2.5 0.10	105.0 4.13	99.0 3.90	1.20 0.05	1.90 0.08	76.3	23.5	0.1098	1.05 2.32
21.996 0.8660	15.875 0.6250	-0.8 -0.03	2.0 0.08	71.0 2.80	75.0 2.95	3.3 0.13	105.0 4.13	100.0 3.94	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.84 1.85
30.000 1.1811	23.812 0.9375	-3.3 -0.13	3.0 0.12	74.0 2.91	80.0 3.15	3.3 0.13	106.0 4.17	99.0 3.90	1.20 0.05	0.10 0.00	76.3	23.5	0.1098	1.18 2.61
28.000 1.1024	23.812 0.9375	-3.3 -0.13	3.0 0.12	72.0 2.83	78.0 3.07	3.3 0.13	106.0 4.17	99.0 3.90	1.20 0.05	1.90 0.08	76.3	23.5	0.1098	1.16 2.56
29.007 1.1420	23.444 0.9230	-4.1 -0.16	2.3 0.09	73.0 2.87	77.0 3.03	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.40 3.08
29.007 1.1420	24.237 0.9542	-4.1 -0.16	2.3 0.09	73.0 2.87	77.0 3.03	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.43 3.15
29.007 1.1420	29.000 1.1417	-4.1 -0.16	2.3 0.09	73.0 2.87	77.0 3.03	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.48 3.27
38.500 1.5157	32.000 1.2598	-10.7 -0.42	7.0 0.28	74.0 2.91	88.0 3.46	2.5 0.10	114.0 4.49	107.0 4.21	1.20 0.05	3.40 0.13	94	22.5	0.0764	1.83 4.04
38.500 1.5157	32.000 1.2598	-10.7 -0.42	3.0 0.12	74.0 2.91	80.0 3.15	2.5 0.10	114.0 4.49	107.0 4.21	1.20 0.05	3.40 0.13	94	22.5	0.0764	1.87 4.12
29.007 1.1420	24.605 0.9687	-4.1 -0.16	2.3 0.09	73.0 2.87	77.0 3.03	3.3 0.13	115.0 4.53	109.0 4.29	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.57 3.46
56.000 2.2050	44.450 1.7500	-19.3 -0.76	3.0 0.12	77.0 3.04	83.0 3.27	3.3 0.13	136.0 5.35	119.0 4.69	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.94 8.70
56.007 2.2050	44.450 1.7500	-19.3 -0.76	3.5 0.14	77.0 3.04	84.0 3.31	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.62 7.98
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	83.0 3.27	89.0 3.50	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.36 7.40
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	83.0 3.27	89.0 3.50	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.54 7.80

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

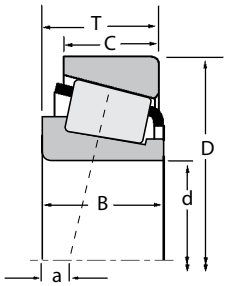
[7] Compound radius on inner race. Details on drawing for bearing.

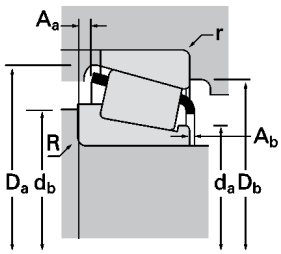
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
65.883 2.5938	122.238 4.8125	43.655 1.7187	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5595	5535
66.675 2.6250	103.213 4.0635	17.247 0.6790	64800 14600	0.49	1.23	16800 3780	14000 3150	1.20	89100 20000	L812147	L812111
66.675 2.6250	103.213 4.0635	17.602 0.6930	64800 14600	0.49	1.23	16800 3780	14000 3150	1.20	89100 20000	L812148	L812111
66.675 2.6250	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29590	29520
66.675 2.6250	107.950 4.2500	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29590	29522
66.675 2.6250	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395A	394
66.675 2.6250	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395A	394A
66.675 2.6250	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395-S	394
66.675 2.6250	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395-S	394A
66.675 2.6250	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395-S	394AS
66.675 2.6250	110.000 4.3307	25.400 1.0000	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29590	29521
66.675 2.6250	110.000 4.3307	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3984	3927X
66.675 2.6250	110.000 4.3307	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3994	3927X
66.675 2.6250	112.712 4.4375	22.225 0.8750	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395A	393A
66.675 2.6250	112.712 4.4375	26.967 1.0617	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395A	3920
66.675 2.6250	112.712 4.4375	26.967 1.0617	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395-S	3920
66.675 2.6250	112.712 4.4375	29.337 1.1550	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3992	3920
66.675 2.6250	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3984	3920
66.675 2.6250	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3984	3925
66.675 2.6250	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3994	3920
66.675 2.6250	112.712 4.4375	30.162 1.1875	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3994	3925
66.675 2.6250	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39589	39520
66.675 2.6250	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39590	39520
66.675 2.6250	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39590	39521
66.675 2.6250	112.712 4.4375	30.162 1.1875	155000 34700	0.34	1.77	40100 9010	23300 5230	1.72	224000 50300	39591	39520
66.675 2.6250	112.712 4.4375	33.338 1.3125	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3984	3926
66.675 2.6250	112.712 4.4375	33.338 1.3125	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3994	3926
66.675 2.6250	117.475 4.6250	30.162 1.1875	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33261	33462

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
43.764 1.7230	36.512 1.4375	-12.2 -0.48	3.5 0.14	77.0 3.03	83.0 3.27	3.3 0.13	116.0 4.57	106.0 4.17	2.50 0.10	1.20 0.05	110	24.2	0.0825	2.20 4.86
17.247 0.6790	11.989 0.4720	4.1 0.16	1.5 0.06	72.0 2.83	75.0 2.95	0.8 0.03	99.0 3.90	96.0 3.78	1.20 0.05	1.40 0.06	43.5	26.8	0.0958	0.50 1.10
17.602 0.6930	11.989 0.4720	3.6 0.14	1.5 0.06	72.0 2.83	75.0 2.95	0.8 0.03	99.0 3.90	96.0 3.78	1.60 0.06	1.40 0.06	43.5	26.8	0.0958	0.51 1.11
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	73.0 2.87	80.0 3.15	3.3 0.13	103.0 4.06	96.0 3.78	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.85 1.87
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	73.0 2.87	80.0 3.15	0.8 0.03	103.0 4.06	98.0 3.86	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.86 1.90
21.996 0.8660	22.000 0.8661	-0.8 -0.03	0.8 0.03	73.0 2.87	73.0 2.87	0.8 0.03	106.0 4.18	101.0 3.98	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.81 1.77
21.996 0.8660	18.825 0.7411	-0.8 -0.03	0.8 0.03	73.0 2.87	73.0 2.87	1.3 0.05	105.0 4.13	101.0 3.98	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.78 1.73
21.996 0.8660	22.000 0.8661	-0.8 -0.03	3.5 0.14	73.0 2.87	79.0 3.11	0.8 0.03	106.0 4.18	101.0 3.98	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.80 1.77
21.996 0.8660	18.825 0.7411	-0.8 -0.03	3.5 0.14	73.0 2.87	79.0 3.11	1.3 0.05	105.0 4.13	101.0 3.98	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.78 1.72
21.996 0.8660	18.825 0.7411	-0.8 -0.03	3.5 0.14	73.0 2.87	79.0 3.11	3.3 0.13	104.5 4.11	99.0 3.90	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.77 1.69
25.400 1.0000	19.050 0.7500	-0.8 -0.03	3.5 0.14	73.0 2.87	80.0 3.15	1.3 0.05	104.0 4.09	99.0 3.90	2.20 0.08	1.40 0.05	70.3	25.8	0.1112	0.91 2.01
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	74.0 2.91	80.0 3.15	3.3 0.13	105.0 4.13	99.0 3.90	2.40 0.09	0.90 0.04	75.2	21.3	0.1092	1.06 2.33
30.048 1.1830	23.812 0.9375	-4.6 -0.18	5.5 0.22	74.0 2.91	84.0 3.31	3.3 0.13	105.0 4.13	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.06 2.33
21.996 0.8660	15.875 0.6250	-0.8 -0.03	0.8 0.03	73.0 2.87	73.0 2.87	3.3 0.13	105.0 4.13	100.0 3.94	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.81 1.79
21.996 0.8660	23.812 0.9375	-0.8 -0.03	0.8 0.03	73.0 2.87	73.0 2.87	3.3 0.13	106.0 4.17	99.0 3.90	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.97 2.13
21.996 0.8660	23.812 0.9375	-0.8 -0.03	3.5 0.14	73.0 2.87	79.0 3.11	3.3 0.13	106.0 4.17	99.0 3.90	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.96 2.12
29.223 1.1505	23.812 0.9375	-3.8 -0.15	5.5 0.22	75.0 2.95	86.0 3.39	3.3 0.13	106.0 4.17	99.0 3.90	1.40 0.05	1.10 0.04	75.2	21.3	0.1092	1.13 2.50
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	74.0 2.91	80.0 3.15	3.3 0.13	106.0 4.17	99.0 3.90	2.40 0.09	0.90 0.04	75.2	21.3	0.1092	1.15 2.53
30.048 1.1830	23.812 0.9375	-4.6 -0.18	3.5 0.14	74.0 2.91	80.0 3.15	0.8 0.03	106.0 4.17	101.0 3.98	2.40 0.09	0.90 0.04	75.2	21.3	0.1092	1.16 2.56
30.048 1.1830	23.812 0.9375	-4.6 -0.18	5.5 0.22	74.0 2.91	84.0 3.31	3.3 0.13	106.0 4.17	99.0 3.90	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.15 2.53
30.048 1.1830	23.812 0.9375	-4.6 -0.18	5.5 0.22	74.0 2.91	84.0 3.31	0.8 0.03	106.0 4.17	101.0 3.98	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.16 2.56
30.162 1.1875	23.812 0.9375	-6.6 -0.26	1.5 0.06	75.0 2.95	78.0 3.07	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.16 2.57
30.162 1.1875	23.812 0.9375	-6.6 -0.26	3.5 0.14	75.0 2.95	82.0 3.23	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.16 2.57
30.162 1.1875	23.812 0.9375	-6.6 -0.26	3.5 0.14	75.0 2.95	82.0 3.23	0.8 0.03	107.0 4.21	103.0 4.06	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.17 2.57
30.162 1.1875	23.812 0.9375	-6.6 -0.26	5.5 0.22	74.0 2.91	84.0 3.31	3.3 0.13	107.0 4.21	101.0 3.98	1.60 0.06	2.60 0.10	84.3	23.7	0.1074	1.14 2.51
30.048 1.1830	26.988 1.0625	-4.6 -0.18	3.5 0.14	74.0 2.91	80.0 3.15	3.3 0.13	106.0 4.17	98.0 3.86	2.40 0.09	0.90 0.04	75.2	21.3	0.1092	1.23 2.72
30.048 1.1830	26.988 1.0625	-4.6 -0.18	5.5 0.22	74.0 2.91	84.0 3.31	3.3 0.13	106.0 4.17	98.0 3.86	2.20 0.09	1.10 0.04	75.2	21.3	0.1092	1.24 2.72
30.162 1.1875	23.812 0.9375	-2.8 -0.11	5.5 0.22	75.0 2.95	85.0 3.35	3.3 0.13	112.0 4.41	104.0 4.09	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.32 2.90

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

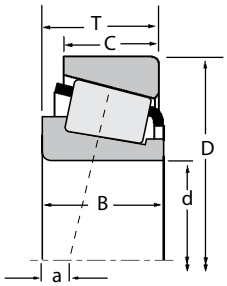
(7) Compound radius on inner race. Details on drawing for bearing.

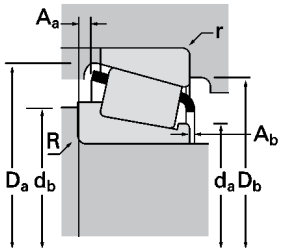
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
66.675 2.6250	117.475 4.6250	30.162 1.1875	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33262	33461
66.675 2.6250	117.475 4.6250	30.162 1.1875	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33262	33462
66.675 2.6250	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	479	472A
66.675 2.6250	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	479	472
66.675 2.6250	120.000 4.7244	29.794 1.1730	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33262	33472
66.675 2.6250	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212049	HM212010
66.675 2.6250	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212049	HM212011
66.675 2.6250	122.238 4.8125	38.100 1.5000	209000 46900	0.34	1.78	54100 12200	31300 7030	1.73	279000 62700	HM212049X	HM212010
66.675 2.6250	123.825 4.8750	30.162 1.1875	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	479	472X
66.675 2.6250	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	560	552
66.675 2.6250	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	560	552A
66.675 2.6250	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813844	HM813810
66.675 2.6250	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813844	HM813811
66.675 2.6250	129.944 5.1159	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	560	553-SA
66.675 2.6250	130.175 5.1250	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	641	633
66.675 2.6250	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6386	6320
66.675 2.6250	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6389	6320
66.675 2.6250	135.755 5.3447	53.975 2.1250	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6386A	6320
66.675 2.6250	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495AA	493
66.675 2.6250	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	641	632
66.675 2.6250	136.525 5.3750	41.275 1.6250	252000 56700	0.36	1.67	65400 14700	40300 9060	1.62	335000 75400	H414242	H414210
66.675 2.6250	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715341A	H715311
66.675 2.6250	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715341	H715311
66.675 2.6250	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715341	H715311A
66.675 2.6250	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715341	H715310
66.675 2.6250	152.400 6.0000	53.975 2.1250	313000 70500	0.49	1.23	81300 18300	67800 15200	1.20	423000 95000	HH814547	HH814510
66.675 2.6250	177.800 7.0000	57.150 2.2500	352000 79200	0.80	0.75	91300 20500	125000 28000	0.73	413000 92900	HH914449	HH914412
68.262 2.6875	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	399A	394A

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
30.162 1.1875	23.812 0.9375	-2.8 -0.11	3.5 0.14	75.0 2.95	81.0 3.19	0.8 0.03	112.0 4.41	106.0 4.17	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.35 2.97
30.162 1.1875	23.812 0.9375	-2.8 -0.11	3.5 0.14	75.0 2.95	81.0 3.19	3.3 0.13	112.0 4.41	104.0 4.09	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.33 2.94
29.007 1.1420	23.444 0.9230	-4.1 -0.16	2.3 0.09	74.0 2.91	78.0 3.07	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.36 3.00
29.007 1.1420	24.237 0.9542	-4.1 -0.16	2.3 0.09	74.0 2.91	78.0 3.07	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.39 3.07
30.162 1.1875	23.444 0.9230	-2.8 -0.11	3.5 0.14	75.0 2.95	81.0 3.19	0.8 0.03	113.0 4.45	107.0 4.21	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.42 3.14
38.354 1.5100	29.718 1.1700	-10.9 -0.43	3.5 0.14	75.5 2.97	82.0 3.23	1.5 0.06	116.0 4.57	110.0 4.33	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	1.85 4.07
38.354 1.5100	29.718 1.1700	-10.9 -0.43	3.5 0.14	75.5 2.97	82.0 3.23	3.3 0.13	116.0 4.57	108.0 4.25	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	1.85 4.07
38.354 1.5100	29.718 1.1700	-10.9 -0.43	7.0 0.28	75.5 2.97	89.0 3.50	1.5 0.06	116.0 4.57	110.0 4.33	2.20 0.09	3.00 0.12	92.2	18.1	0.0759	1.83 4.04
29.007 1.1420	24.605 0.9687	-4.1 -0.16	2.3 0.09	74.0 2.91	78.0 3.07	3.3 0.13	115.0 4.53	109.0 4.29	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.53 3.37
36.678 1.4440	33.338 1.3125	-9.4 -0.37	3.5 0.14	75.0 2.95	81.0 3.19	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	1.93 4.25
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	75.0 2.95	81.0 3.19	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	1.88 4.15
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	82.0 3.23	88.0 3.46	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.00 4.40
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	82.0 3.23	88.0 3.46	1.5 0.06	121.0 4.76	113.0 4.45	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	2.00 4.41
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	75.0 2.95	81.0 3.19	3.3 0.13	116.0 4.57	111.0 4.37	2.30 0.09	1.20 0.05	91	21.1	0.1108	2.17 4.78
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	77.0 3.03	83.0 3.27	3.3 0.13	124.0 4.88	116.0 4.57	4.20 0.16	1.90 0.08	106	21	0.0814	2.39 5.26
56.007 2.2050	44.450 1.7500	-19.3 -0.76	4.3 0.17	77.0 3.04	87.0 3.43	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.54 7.81
56.007 2.2050	44.450 1.7500	-19.3 -0.76	6.4 0.25	77.0 3.04	91.0 3.58	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.52 7.77
56.007 2.2050	44.450 1.7500	-19.3 -0.76	8.7 0.34	77.0 3.04	96.0 3.78	3.3 0.13	126.0 4.96	117.0 4.61	4.00 0.16	0.50 0.02	124	22.4	0.0827	3.49 7.69
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	78.0 3.07	85.0 3.35	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	2.05 4.51
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	77.0 3.03	83.0 3.27	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	2.73 6.02
41.275 1.6250	31.750 1.2500	-10.9 -0.43	3.5 0.14	81.0 3.19	85.0 3.35	3.3 0.13	129.0 5.08	121.0 4.76	3.70 0.15	3.00 0.12	113	22.8	0.0827	2.73 6.02
46.038 1.8125	36.512 1.4375	-8.6 -0.34	7.0 0.28	85.0 3.35	98.0 3.86	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.28 7.23
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.30 7.27
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	85.0 3.35	91.0 3.58	0.8 0.03	132.0 5.20	121.0 4.76	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.30 7.27
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.48 7.67
57.150 2.2500	41.275 1.6250	-12.2 -0.48	3.5 0.14	85.0 3.35	93.0 3.66	3.3 0.13	143.0 5.63	130.0 5.12	5.30 0.21	0.20 0.01	130	23.5	0.0957	4.87 10.73
53.975 2.1250	37.308 1.4688	-0.3 -0.01	3.5 0.14	85.5 3.36	106.0 4.17	3.3 0.13	165.0 6.50	146.0 5.75	9.90 0.39	4.70 0.18	111	17.7	0.1044	6.65 14.66
21.996 0.8660	18.825 0.7411	-0.8 -0.03	2.3 0.09	74.0 2.91	78.0 3.07	1.3 0.05	105.0 4.13	101.0 3.98	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.75 1.65

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

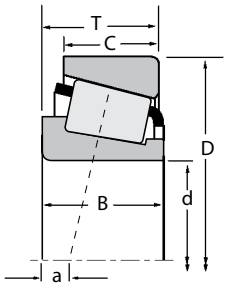
[7] Compound radius on inner race. Details on drawing for bearing.

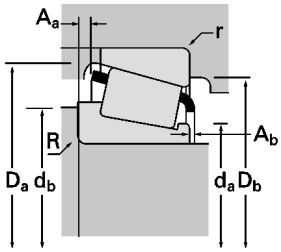
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
68.262 2.6875	110.000 4.3307	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	399AS	394A
68.262 2.6875	111.125 4.3750	22.000 0.8661	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	399A	393AS
68.262 2.6875	112.712 4.4375	26.967 1.0617	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	399A	3920
68.262 2.6875	112.712 4.4375	26.967 1.0617	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	399AS	3920
68.262 2.6875	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	480	472A
68.262 2.6875	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	480	472
68.262 2.6875	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	480	473
68.262 2.6875	120.000 4.7244	29.794 1.1730	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33269	33472
68.262 2.6875	123.825 4.8750	34.912 1.3745	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	560-S	552-S
68.262 2.6875	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	560-S	552
68.262 2.6875	123.825 4.8750	38.100 1.5000	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	560-S	552A
68.262 2.6875	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	570	563
68.262 2.6875	130.048 5.1200	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	570	562
68.262 2.6875	130.175 5.1250	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	642	633
68.262 2.6875	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	642	632
68.262 2.6875	136.525 5.3750	41.275 1.6250	252000 56700	0.36	1.67	65400 14700	40300 9060	1.62	335000 75400	H414245X	H414210
68.262 2.6875	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715343	H715311
68.262 2.6875	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715343	H715310
68.262 2.6875	152.400 6.0000	47.625 1.8750	264000 59400	0.66	0.91	68500 15400	76900 17300	0.89	306000 68700	9185	9121
68.262 2.6875	152.400 6.0000	47.625 1.8750	256000 57600	0.90	0.67	66400 14900	102000 23000	0.65	401000 90100	H914841	H914811
68.262 2.6875	158.750 6.2500	50.800 2.0000	264000 59400	0.66	0.91	68500 15400	76900 17300	0.89	306000 68700	9185	9120
68.262 2.6875	161.925 6.3750	49.212 1.9375	275000 61900	0.71	0.85	71400 16100	86700 19500	0.82	330000 74200	9278	9220
69.850 2.7500	98.425 3.8750	13.495 0.5313	37400 8400	0.44	1.37	9690 2180	7260 1630	1.33	58100 13100	LL713049	LL713010
69.850 2.7500	99.217 3.9062	17.000 0.6693	45200 10200	0.46	1.29	11700 2630	9330 2100	1.26	75000 16900	LL713149	LL713110
69.850 2.7500	101.600 4.0000	19.050 0.7500	61900 13900	0.46	1.30	16000 3610	12700 2850	1.27	111000 25000	L713049	L713010
69.850 2.7500	112.712 4.4375	22.225 0.8750	93400 21000	0.42	1.44	24200 5450	17300 3880	1.40	130000 29300	LM613449	LM613410
69.850 2.7500	112.712 4.4375	25.400 1.0000	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29675	29620
69.850 2.7500	114.300 4.5000	27.780 1.0937	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29675	29624

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
21.996 0.8660	18.825 0.7411	-0.8 -0.03	5.0 0.20	74.0 2.91	83.0 3.27	1.3 0.05	105.0 4.13	101.0 3.98	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.73 1.61
21.996 0.8660	18.825 0.7411	-0.8 -0.03	2.3 0.09	74.0 2.91	78.0 3.07	1.3 0.05	105.0 4.13	101.0 3.98	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.78 1.71
21.996 0.8660	23.812 0.9375	-0.8 -0.03	2.3 0.09	74.0 2.91	78.0 3.07	3.3 0.13	106.0 4.17	99.0 3.90	1.80 0.07	2.00 0.08	56	21.4	0.0984	0.93 2.05
21.996 0.8660	23.812 0.9375	-0.8 -0.03	5.0 0.20	74.0 2.91	83.0 3.27	3.3 0.13	106.0 4.17	99.0 3.90	1.70 0.07	2.30 0.09	56	21.4	0.0984	0.91 2.01
29.007 1.1420	23.444 0.9230	-4.1 -0.16	3.5 0.14	75.0 2.95	82.0 3.23	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.32 2.90
29.007 1.1420	24.237 0.9542	-4.1 -0.16	3.5 0.14	75.0 2.95	82.0 3.23	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.35 2.97
29.007 1.1420	29.000 1.1417	-4.1 -0.16	3.5 0.14	75.0 2.95	82.0 3.23	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.40 3.08
30.162 1.1875	23.444 0.9230	-2.8 -0.11	3.5 0.14	76.0 2.99	82.0 3.23	0.8 0.03	113.0 4.45	107.0 4.21	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.38 3.05
36.678 1.4440	26.975 1.0620	-9.4 -0.37	3.5 0.14	76.0 2.99	83.0 3.27	4.8 0.19	115.0 4.53	107.0 4.21	2.30 0.09	1.20 0.05	91	21.1	0.1108	1.71 3.77
36.678 1.4440	33.338 1.3125	-9.4 -0.37	3.5 0.14	76.0 2.99	83.0 3.27	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	1.88 4.15
36.678 1.4440	30.162 1.1875	-9.4 -0.37	3.5 0.14	76.0 2.99	83.0 3.27	3.3 0.13	116.0 4.57	109.0 4.29	2.30 0.09	1.20 0.05	91	21.1	0.1108	1.83 4.04
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	77.0 3.03	83.0 3.27	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.94 4.29
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	77.0 3.03	83.0 3.27	0.8 0.03	121.0 4.76	116.0 4.57	3.20 0.13	1.80 0.07	101	24	0.1167	2.10 4.62
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	78.0 3.07	85.0 3.35	3.3 0.13	124.0 4.88	116.0 4.57	4.20 0.16	1.90 0.08	106	21	0.0814	2.33 5.14
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	78.0 3.07	85.0 3.35	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	2.67 5.90
41.275 1.6250	31.750 1.2500	-10.9 -0.43	9.7 0.38	82.0 3.23	98.0 3.86	3.3 0.13	129.0 5.08	121.0 4.76	3.70 0.15	3.00 0.12	113	22.8	0.0827	2.60 5.74
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	86.0 3.39	92.0 3.62	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.23 7.13
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	86.0 3.39	92.0 3.62	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.42 7.53
46.038 1.8125	31.750 1.2500	-3.8 -0.15	3.5 0.14	81.5 3.20	94.0 3.70	3.3 0.13	145.0 5.71	130.0 5.12	8.10 0.32	4.00 0.16	87.6	13.7	0.0912	3.75 8.26
46.038 1.8125	35.100 1.3819	7.9 0.31	3.5 0.14	87.0 3.43	108.0 4.25	3.3 0.13	148.0 5.83	123.0 4.84	5.80 0.23	3.20 0.13	135	30.3	0.1165	4.41 9.73
46.038 1.8125	34.925 1.3750	-3.8 -0.15	3.5 0.14	81.5 3.20	94.0 3.70	3.3 0.13	146.0 5.75	131.0 5.16	8.10 0.32	4.00 0.16	87.6	13.7	0.0912	4.37 9.63
46.038 1.8125	31.750 1.2500	0.0 0.00	3.5 0.14	90.5 3.56	97.0 3.82	3.3 0.13	153.0 6.03	138.0 5.43	9.10 0.36	4.00 0.16	102	18.4	0.0984	4.50 9.92
13.495 0.5313	9.525 0.3750	4.6 0.18	1.5 0.06	74.0 2.91	77.0 3.03	1.5 0.06	94.0 3.70	92.0 3.62	1.00 0.04	1.40 0.06	39.9	55	0.0893	0.30 0.65
16.000 0.6299	13.000 0.5118	4.6 0.18	1.5 0.06	75.0 2.95	77.0 3.03	1.5 0.06	95.0 3.74	91.0 3.58	0.70 0.03	0.60 0.02	47.9	56.5	0.0972	0.38 0.84
19.050 0.7500	15.083 0.5938	2.5 0.10	1.5 0.06	75.0 2.95	78.0 3.07	1.5 0.06	98.0 3.86	93.0 3.66	0.80 0.03	1.40 0.05	64.3	52.5	0.1075	0.50 1.10
21.996 0.8660	15.875 0.6250	0.0 0.00	1.5 0.06	76.0 2.99	78.0 3.07	0.8 0.03	107.0 4.21	104.0 4.09	1.70 0.07	2.30 0.09	60.3	23.1	0.1019	0.78 1.72
25.400 1.0000	19.050 0.7500	1.0 0.04	1.5 0.06	77.0 3.03	80.0 3.15	3.3 0.13	109.0 4.29	101.0 3.98	2.30 0.09	1.50 0.06	77.7	43.3	0.1170	0.97 2.13
25.400 1.0000	22.225 0.8750	1.0 0.04	1.5 0.06	77.0 3.03	80.0 3.15	3.3 0.13	109.0 4.29	103.0 4.06	2.30 0.09	1.50 0.06	77.7	43.3	0.1170	1.06 2.33

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

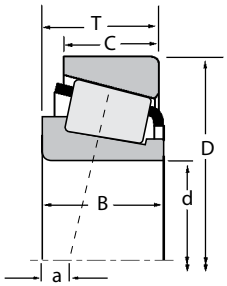
(7) Compound radius on inner race. Details on drawing for bearing.

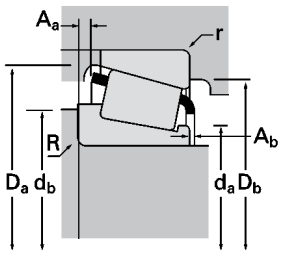
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
69.850 2.7500	117.475 4.6250	30.162 1.1875	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33275	33462
69.850 2.7500	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	482	472A
69.850 2.7500	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	482A	472A
69.850 2.7500	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	482	472
69.850 2.7500	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	482	473
69.850 2.7500	120.000 4.7244	29.794 1.1730	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33275	33472
69.850 2.7500	120.000 4.7244	29.794 1.1730	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	482A	472
69.850 2.7500	120.000 4.7244	32.545 1.2813	166000 37200	0.36	1.67	42900 9650	26500 5950	1.62	249000 56000	47487	47420
69.850 2.7500	120.000 4.7244	32.545 1.2813	166000 37200	0.36	1.67	42900 9650	26500 5950	1.62	249000 56000	47487	47420A
69.850 2.7500	120.000 4.7244	46.751 1.8406	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	482E	472
69.850 2.7500	120.650 4.7500	25.400 1.0000	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29675	29630
69.850 2.7500	123.825 4.8750	30.162 1.1875	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	482	472X
69.850 2.7500	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	566	563
69.850 2.7500	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	566-S	563
69.850 2.7500	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	566X	563
69.850 2.7500	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813846	HM813810
69.850 2.7500	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813846	HM813811
69.850 2.7500	130.175 5.1250	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	643	633
69.850 2.7500	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	643	632
69.850 2.7500	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715344	H715310
69.850 2.7500	146.050 5.7500	36.512 1.4375	161000 36200	0.94	0.64	41700 9380	66900 15000	0.62	202000 45400	HM914545	HM914510
69.850 2.7500	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	655	653
69.850 2.7500	146.050 5.7500	41.275 1.6250	213000 47900	0.78	0.77	55200 12400	74000 16600	0.75	256000 57500	H913849	H913810
69.850 2.7500	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6454	6420
69.850 2.7500	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6484	6420
69.850 2.7500	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	744A	742
69.850 2.7500	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	745A	742
69.850 2.7500	152.400 6.0000	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	655	652

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
30.162 1.1875	23.812 0.9375	-2.8 -0.11	3.5 0.14	77.0 3.03	84.0 3.31	3.3 0.13	112.0 4.41	104.0 4.09	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.25 2.76
29.007 1.1420	23.444 0.9230	-4.1 -0.16	3.5 0.14	77.0 3.03	83.0 3.27	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.28 2.81
29.007 1.1420	23.444 0.9230	-4.1 -0.16	4.8 0.19	77.0 3.03	86.0 3.39	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.27 2.79
29.007 1.1420	24.237 0.9542	-4.1 -0.16	3.5 0.14	77.0 3.03	83.0 3.27	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.31 2.88
29.007 1.1420	29.000 1.1417	-4.1 -0.16	3.5 0.14	77.0 3.03	83.0 3.27	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.36 2.99
30.162 1.1875	23.444 0.9230	-2.8 -0.11	3.5 0.14	77.0 3.03	84.0 3.31	0.8 0.03	113.0 4.45	107.0 4.21	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.34 2.96
29.007 1.1420	24.237 0.9542	-4.1 -0.16	4.8 0.19	77.0 3.03	86.0 3.39	2.0 0.08	114.0 4.49	107.0 4.21	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.30 2.86
32.545 1.2813	26.195 1.0313	-6.4 -0.25	3.5 0.14	78.0 3.07	84.0 3.31	3.3 0.13	114.0 4.49	107.0 4.21	2.20 0.09	1.90 0.08	98.4	26.3	0.1153	1.45 3.20
32.545 1.2813	26.195 1.0313	-6.4 -0.25	3.5 0.14	78.0 3.07	84.0 3.31	0.5 0.02	114.0 4.49	109.0 4.29	2.20 0.09	1.90 0.08	98.4	26.3	0.1153	1.47 3.24
45.963 1.8096	24.237 0.9542	-21.1 -0.83	1.0 0.04	77.0 3.03	87.0 3.43	2.0 0.08	114.0 4.49	107.0 4.21	18.50 0.73	2.20 0.08	77.2	23	0.1083	1.69 3.73
25.400 1.0000	19.050 0.7500	1.0 0.04	1.5 0.06	77.0 3.03	80.0 3.15	3.3 0.13	113.0 4.45	104.0 4.09	2.30 0.09	1.50 0.06	77.7	43.3	0.1170	1.17 2.59
29.007 1.1420	24.605 0.9687	-4.1 -0.16	3.5 0.14	77.0 3.03	83.0 3.27	3.3 0.13	115.0 4.53	109.0 4.29	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.45 3.19
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	78.0 3.07	85.0 3.35	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.89 4.18
36.170 1.4240	28.575 1.1250	-8.1 -0.32	0.8 0.03	78.0 3.07	79.0 3.11	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.91 4.20
36.170 1.4240	28.575 1.1250	-8.1 -0.32	6.8 0.27	78.0 3.07	91.0 3.58	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.87 4.11
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	82.0 3.23	89.0 3.50	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	1.90 4.19
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	82.0 3.23	89.0 3.50	1.5 0.06	121.0 4.76	113.0 4.45	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	1.90 4.19
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	80.0 3.15	86.0 3.39	3.3 0.13	124.0 4.88	116.0 4.57	4.20 0.16	1.90 0.08	106	21	0.0814	2.28 5.02
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	80.0 3.15	86.0 3.39	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	2.62 5.77
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	87.0 3.43	93.0 3.66	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.36 7.40
33.338 1.3125	23.812 0.9375	12.4 0.49	4.0 0.16	86.0 3.38	95.0 3.74	3.3 0.13	139.0 5.47	122.0 4.80	7.20 0.28	4.50 0.18	71.5	21.8	0.0943	2.57 5.66
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	82.0 3.23	88.0 3.46	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.23 7.11
39.688 1.5625	25.400 1.0000	4.3 0.17	3.5 0.14	82.5 3.24	95.0 3.74	3.3 0.13	138.0 5.43	124.0 4.88	8.20 0.32	3.60 0.14	78.5	17.3	0.0927	2.86 6.30
54.229 2.1350	44.450 1.7500	-15.0 -0.59	5.0 0.20	85.0 3.35	94.0 3.70	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.53 9.98
54.229 2.1350	44.450 1.7500	-15.0 -0.59	6.4 0.25	85.0 3.35	97.0 3.82	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.51 9.95
46.672 1.8375	36.512 1.4375	-11.9 -0.47	5.0 0.20	82.0 3.23	91.0 3.58	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.90 8.60
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.5 0.14	82.0 3.23	88.0 3.46	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.91 8.62
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	82.0 3.23	88.0 3.46	3.3 0.13	141.0 5.55	134.0 5.28	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.59 7.92

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

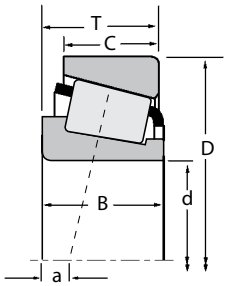
[7] Compound radius on inner race. Details on drawing for bearing.

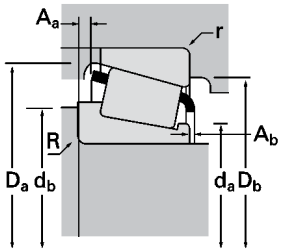
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
69.850 2.7500	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	835	832
69.914 2.7525	171.450 6.7500	49.212 1.9375	284000 63700	0.76	0.79	73500 16500	96200 21600	0.76	351000 78800	9382	9321
69.952 2.7540	121.442 4.7812	24.608 0.9688	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34274	34478
69.987 2.7554	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715347	H715311
69.987 2.7554	176.212 6.9375	54.770 2.1563	339000 76100	0.70	0.86	87800 19700	105000 23600	0.84	431000 96900	H916642	H916610
70.000 2.7559	110.000 4.3307	21.000 0.8268	84800 19100	0.46	1.30	22000 4940	17400 3900	1.27	112000 25200	JP7049	JP7010
70.000 2.7559	110.000 4.3307	26.000 1.0236	106000 23800	0.49	1.23	27500 6180	22900 5160	1.20	168000 37800	JLM813049	JLM813010
70.000 2.7559	115.000 4.5276	29.000 1.1417	139000 31200	0.43	1.39	36000 8100	26500 5960	1.36	198000 44500	JM612949	JM612910
70.000 2.7559	120.000 4.7244	29.002 1.1418	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	484	472A
70.000 2.7559	121.442 4.7812	24.608 0.9688	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34275	34478
70.000 2.7559	123.825 4.8750	30.162 1.1875	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	484	472X
70.000 2.7559	125.095 4.9250	24.000 0.9449	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34275	34492
70.000 2.7559	130.000 5.1181	36.937 1.4542	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	570X	562X
70.000 2.7559	130.000 5.1181	43.000 1.6929	254000 57200	0.33	1.80	65900 14800	37600 8450	1.75	360000 80800	JF7049A	JF7010
70.000 2.7559	130.000 5.1181	43.000 1.6929	254000 57200	0.33	1.80	65900 14800	37600 8450	1.75	360000 80800	JF7049	JF7010
70.000 2.7559	140.000 5.5118	39.000 1.5354	189000 42400	0.87	0.69	48900 11000	72500 16300	0.67	257000 57800	JW7049	JW7010
70.000 2.7559	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6459	6420
70.000 2.7559	150.000 5.9055	54.000 2.1260	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6459	6424
70.637 2.7810	112.712 4.4375	25.400 1.0000	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29680	29620
70.637 2.7810	112.712 4.4375	25.400 1.0000	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29681	29620
71.438 2.8125	117.475 4.6250	30.162 1.1875	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33281	33461
71.438 2.8125	117.475 4.6250	30.162 1.1875	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33281	33462
71.438 2.8125	120.000 4.7244	29.794 1.1730	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33281	33472
71.438 2.8125	120.000 4.7244	32.545 1.2813	166000 37200	0.36	1.67	42900 9650	26500 5950	1.62	249000 56000	47490	47420
71.438 2.8125	120.650 4.7500	32.545 1.2813	166000 37200	0.36	1.67	42900 9650	26500 5950	1.62	249000 56000	47490	47423
71.438 2.8125	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567A	563
71.438 2.8125	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567-S	563
71.438 2.8125	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813849	HM813810

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
56.363 2.2190	41.275 1.6250	-18.5 -0.73	3.5 0.14	84.0 3.31	91.0 3.58	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	6.09 13.43
46.038 1.8125	31.750 1.2500	4.3 0.17	3.5 0.14	95.0 3.74	101.0 3.98	3.3 0.13	164.0 6.46	147.0 5.79	9.00 0.35	3.90 0.15	118	18.6	0.1053	5.37 11.83
23.012 0.9060	17.462 0.6875	1.5 0.06	2.0 0.08	78.0 3.07	81.0 3.19	2.0 0.08	116.0 4.57	110.0 4.33	2.60 0.10	2.10 0.08	69.3	27	0.1093	1.08 2.38
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	87.0 3.43	93.0 3.66	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.17 6.98
53.183 2.0938	36.512 1.4375	-2.0 -0.08	3.3 0.13	95.0 3.74	103.0 4.06	3.3 0.13	164.0 6.46	147.0 5.79	8.60 0.34	3.40 0.13	133	18.7	0.1071	6.32 13.93
20.000 0.7874	15.500 0.6102	2.5 0.10	2.0 0.08	76.0 2.99	80.0 3.15	2.0 0.08	105.5 4.15	101.0 3.98	1.50 0.06	2.80 0.11	51.1	30.9	0.0995	0.68 1.50
25.000 0.9843	20.500 0.8071	0.3 0.01	1.0 0.04	77.0 3.03	78.0 3.07	2.5 0.10	105.0 4.13	98.0 3.86	1.70 0.07	2.70 0.11	73.5	26.3	0.1151	0.88 1.93
29.000 1.1417	23.000 0.9055	-2.5 -0.10	3.0 0.12	77.0 3.03	83.0 3.27	2.5 0.10	110.0 4.33	103.0 4.06	1.00 0.04	2.30 0.09	76.7	25.7	0.1122	1.13 2.49
29.007 1.1420	23.444 0.9230	-4.1 -0.16	2.0 0.08	77.0 3.03	80.0 3.15	3.3 0.13	114.0 4.49	106.0 4.17	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.28 2.82
23.012 0.9060	17.462 0.6875	1.5 0.06	2.0 0.08	78.0 3.07	82.0 3.23	2.0 0.08	116.0 4.57	110.0 4.33	2.60 0.10	2.10 0.08	69.3	27	0.1093	1.08 2.38
29.007 1.1420	24.605 0.9687	-4.1 -0.16	2.0 0.08	77.0 3.03	80.0 3.15	3.3 0.13	115.0 4.53	109.0 4.29	1.50 0.06	2.20 0.08	77.2	23	0.1083	1.45 3.20
23.012 0.9060	16.670 0.6563	1.5 0.06	2.0 0.08	78.0 3.07	82.0 3.23	2.0 0.08	118.0 4.65	112.0 4.41	2.60 0.10	2.10 0.08	69.3	27	0.1093	1.16 2.55
36.170 1.4240	29.000 1.1417	-8.1 -0.32	3.0 0.12	78.0 3.07	84.0 3.31	3.0 0.12	121.0 4.76	114.0 4.49	3.20 0.13	1.80 0.07	101	24	0.1167	2.05 4.51
42.000 1.6535	35.000 1.3780	-12.4 -0.49	7.0 0.28	80.5 3.17	94.0 3.70	2.5 0.10	124.0 4.88	116.0 4.57	2.10 0.08	4.00 0.16	121	24.5	0.0828	2.45 5.40
42.000 1.6535	35.000 1.3780	-12.4 -0.49	3.0 0.12	80.5 3.17	86.0 3.39	2.5 0.10	124.0 4.88	116.0 4.57	2.10 0.08	4.00 0.16	121	24.5	0.0828	2.49 5.49
35.500 1.3976	27.000 1.0630	8.6 0.34	3.0 0.12	82.0 3.23	95.0 3.74	3.0 0.12	133.5 5.25	117.0 4.61	5.80 0.23	4.40 0.18	85.2	23.3	0.0984	2.63 5.79
54.229 2.1350	44.450 1.7500	-15.0 -0.59	3.0 0.12	85.0 3.35	90.0 3.54	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.54 10.00
54.229 2.1350	45.000 1.7717	-15.0 -0.59	3.0 0.12	85.0 3.35	90.0 3.54	3.0 0.12	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.61 10.17
25.400 1.0000	19.050 0.7500	1.0 0.04	1.3 0.05	78.0 3.07	80.0 3.15	3.3 0.13	109.0 4.29	101.0 3.98	2.30 0.09	1.50 0.06	77.7	43.3	0.1170	0.95 2.08
25.400 1.0000	19.050 0.7500	1.0 0.04	3.5 0.14	78.0 3.07	85.0 3.35	3.3 0.13	109.0 4.29	101.0 3.98	2.30 0.09	1.50 0.06	77.7	43.3	0.1170	0.94 2.07
30.162 1.1875	23.812 0.9375	-2.8 -0.11	3.5 0.14	79.0 3.11	85.0 3.35	0.8 0.03	112.0 4.41	106.0 4.17	2.30 0.09	1.10 0.04	84.2	24.4	0.1162	1.22 2.70
30.162 1.1875	23.812 0.9375	-2.8 -0.11	3.5 0.14	79.0 3.11	85.0 3.35	3.3 0.13	112.0 4.41	104.0 4.09	2.30 0.09	1.10 0.04	84.2	24.4	0.1162	1.21 2.67
30.162 1.1875	23.444 0.9230	-2.8 -0.11	3.5 0.14	79.0 3.11	85.0 3.35	0.8 0.03	113.0 4.45	107.0 4.21	2.30 0.09	1.10 0.04	84.2	24.4	0.1162	1.30 2.87
32.545 1.2813	26.195 1.0313	-6.4 -0.25	3.5 0.14	79.0 3.11	86.0 3.39	3.3 0.13	114.0 4.49	107.0 4.21	2.20 0.09	1.90 0.08	98.4	26.3	0.1153	1.41 3.11
32.545 1.2813	26.195 1.0313	-6.4 -0.25	3.5 0.14	79.0 3.11	86.0 3.39	0.8 0.03	115.0 4.53	109.0 4.29	2.20 0.09	1.90 0.08	98.4	26.3	0.1153	1.45 3.19
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	80.0 3.15	86.0 3.39	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.85 4.07
36.170 1.4240	28.575 1.1250	-8.1 -0.32	6.4 0.25	80.0 3.15	92.0 3.62	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.82 4.01
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	82.0 3.23	91.0 3.58	3.3 0.13	121.0 4.76	111.0 4.37	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	1.85 4.08

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

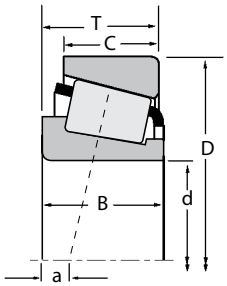
[7] Compound radius on inner race. Details on drawing for bearing.

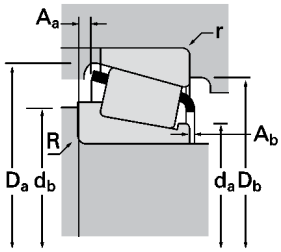
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
71.438 2.8125	127.000 5.0000	36.512 1.4375	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813849	HM813811
71.438 2.8125	130.175 5.1250	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	644	633
71.438 2.8125	130.175 5.1250	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	645	633
71.438 2.8125	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47675	47620
71.438 2.8125	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495-S	493
71.438 2.8125	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	644	632
71.438 2.8125	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	645	632
71.438 2.8125	136.525 5.3750	41.275 1.6250	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	645X	632
71.438 2.8125	136.525 5.3750	41.275 1.6250	252000 56700	0.36	1.67	65400 14700	40300 9060	1.62	335000 75400	H414249	H414210
71.438 2.8125	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715345	H715311
71.438 2.8125	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715345	H715310
73.025 2.8750	112.712 4.4375	25.400 1.0000	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29685	29620
73.025 2.8750	117.475 4.6250	25.400 1.0000	109000 24500	0.51	1.18	28300 6360	24700 5550	1.15	183000 41200	LM814845	LM814810
73.025 2.8750	117.475 4.6250	30.162 1.1875	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33287	33462
73.025 2.8750	120.000 4.7244	29.794 1.1730	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33287	33472
73.025 2.8750	120.000 4.7244	29.794 1.1730	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33287A	33472
73.025 2.8750	125.412 4.9375	25.400 1.0000	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27680	27620
73.025 2.8750	127.000 5.0000	30.162 1.1875	149000 33500	0.42	1.43	38700 8690	27700 6230	1.39	222000 49800	42683	42620
73.025 2.8750	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567	563
73.025 2.8750	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567	563X
73.025 2.8750	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567X	563
73.025 2.8750	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567X	563X
73.025 2.8750	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567XA	563
73.025 2.8750	130.000 5.1181	36.937 1.4542	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567X	562X
73.025 2.8750	130.048 5.1200	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567	562
73.025 2.8750	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	576	572
73.025 2.8750	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	657	653
73.025 2.8750	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6460	6420

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.512 1.4375	26.988 1.0625	-3.8 -0.15	3.5 0.14	82.0 3.23	91.0 3.58	1.5 0.06	121.0 4.76	113.0 4.45	4.00 0.16	1.30 0.05	91.7	24.3	0.1252	1.85 4.08
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	81.0 3.19	87.0 3.43	3.3 0.13	124.0 4.88	116.0 4.57	4.20 0.16	1.90 0.08	106	21	0.0814	2.23 4.91
41.275 1.6250	31.750 1.2500	-11.2 -0.44	6.4 0.25	81.0 3.19	93.0 3.66	3.3 0.13	124.0 4.88	116.0 4.57	4.20 0.16	1.90 0.08	106	21	0.0814	2.19 4.83
33.338 1.3125	26.195 1.0313	-4.3 -0.17	3.5 0.14	82.0 3.23	88.0 3.46	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	2.04 4.50
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	82.0 3.23	88.0 3.46	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.93 4.25
41.275 1.6250	31.750 1.2500	-11.2 -0.44	3.5 0.14	81.0 3.19	87.0 3.43	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	2.57 5.67
41.275 1.6250	31.750 1.2500	-11.2 -0.44	6.4 0.25	81.0 3.19	93.0 3.66	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	2.54 5.59
41.275 1.6250	31.750 1.2500	-11.2 -0.44	6.4 0.25	82.5 3.25	93.0 3.66	3.3 0.13	125.0 4.92	118.0 4.65	4.20 0.16	1.90 0.08	106	21	0.0814	2.53 5.59
41.275 1.6250	31.750 1.2500	-10.9 -0.43	3.5 0.14	83.0 3.27	89.0 3.50	3.3 0.13	129.0 5.08	121.0 4.76	3.70 0.15	3.00 0.12	113	22.8	0.0827	2.56 5.65
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	88.0 3.46	94.0 3.70	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.11 6.86
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	88.0 3.46	94.0 3.70	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.29 7.26
25.400 1.0000	19.050 0.7500	1.0 0.04	3.5 0.14	80.0 3.15	86.0 3.39	3.3 0.13	109.0 4.29	101.0 3.98	2.30 0.09	1.50 0.06	77.7	43.3	0.1170	0.89 1.97
25.400 1.0000	19.050 0.7500	2.3 0.09	3.5 0.14	81.0 3.19	87.0 3.43	3.3 0.13	113.0 4.45	105.0 4.13	2.50 0.10	1.40 0.06	88.6	36.6	0.1239	1.02 2.25
30.162 1.1875	23.812 0.9375	-2.8 -0.11	3.5 0.14	80.0 3.15	87.0 3.43	3.3 0.13	112.0 4.41	104.0 4.09	2.30 0.09	1.10 0.04	84.2	24.4	0.1162	1.17 2.57
30.162 1.1875	23.444 0.9230	-2.8 -0.11	3.5 0.14	80.0 3.15	87.0 3.43	0.8 0.03	113.0 4.45	107.0 4.21	2.30 0.09	1.10 0.04	84.2	24.4	0.1162	1.26 2.77
30.162 1.1875	23.444 0.9230	-2.8 -0.11	0.3 0.01	81.0 3.19	81.0 3.19	0.8 0.03	113.0 4.45	107.0 4.21	2.30 0.09	1.10 0.04	84.2	25.9	0.1162	1.27 2.80
25.400 1.0000	19.845 0.7813	0.5 0.02	3.5 0.14	82.0 3.23	88.0 3.46	1.5 0.06	120.0 4.72	115.0 4.53	1.50 0.06	1.70 0.07	98.2	41.8	0.1198	1.29 2.84
31.000 1.2205	22.225 0.8750	-2.8 -0.11	3.5 0.14	81.0 3.19	88.0 3.46	3.3 0.13	121.0 4.76	114.0 4.49	3.40 0.13	0.90 0.03	96.2	28.6	0.1197	1.52 3.34
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	81.0 3.19	88.0 3.46	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.79 3.95
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	81.0 3.19	88.0 3.46	0.8 0.03	120.0 4.72	114.0 4.49	3.20 0.13	1.80 0.07	101	24	0.1167	1.81 3.99
36.170 1.4240	28.575 1.1250	-8.1 -0.32	4.8 0.19	81.0 3.19	90.0 3.54	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.80 3.96
36.170 1.4240	28.575 1.1250	-8.1 -0.32	4.8 0.19	81.0 3.19	90.0 3.54	0.8 0.03	120.0 4.72	114.0 4.49	3.20 0.13	1.80 0.07	101	24	0.1167	1.81 4.00
36.170 1.4240	28.575 1.1250	-8.1 -0.32	6.4 0.25	81.0 3.19	93.0 3.66	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.79 3.94
36.170 1.4240	29.000 1.1417	-8.1 -0.32	4.8 0.19	81.0 3.19	90.0 3.54	3.0 0.12	121.0 4.76	114.0 4.49	3.20 0.13	1.80 0.07	101	24	0.1167	1.95 4.30
36.170 1.4240	28.575 1.1250	-8.1 -0.32	3.5 0.14	81.0 3.19	88.0 3.46	0.8 0.03	121.0 4.76	116.0 4.57	3.20 0.13	1.80 0.07	101	24	0.1167	1.95 4.29
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	83.0 3.27	90.0 3.54	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.46 5.43
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.11 6.86
54.229 2.1350	44.450 1.7500	-15.0 -0.59	3.5 0.14	87.0 3.43	93.0 3.66	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.39 9.67

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

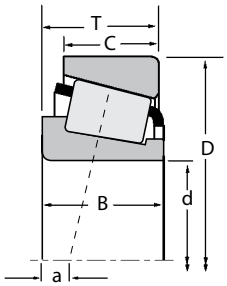
Continued on next page.

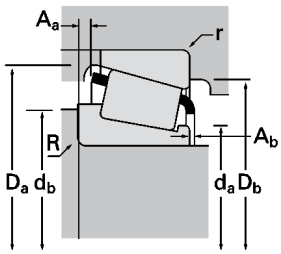
[7] Compound radius on inner race. Details on drawing for bearing.

[8] Pin-type cage. Please consult The Timken Company.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
73.025 2.8750	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6460	6420A
73.025 2.8750	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	744	742
73.025 2.8750	152.400 6.0000	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	657	652
73.817 2.9062	112.712 4.4375	25.400 1.0000	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29688	29620
73.817 2.9062	127.000 5.0000	36.512 1.4375	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	568	563
74.612 2.9375	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	577	572
74.612 2.9375	152.400 6.0000	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	658	652
74.976 2.9518	127.000 5.0000	26.988 1.0625	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34294	34500
74.987 2.9523	129.974 5.1171	33.249 1.3090	149000 33500	0.42	1.43	38700 8690	27700 6230	1.39	222000 49800	42686	42624
75.000 2.9528	115.000 4.5276	25.000 0.9843	110000 24700	0.46	1.31	28400 6390	22300 5020	1.27	167000 37500	JLM714149	JLM714110
75.000 2.9528	120.000 4.7244	31.000 1.2205	148000 33200	0.44	1.35	38300 8600	29100 6540	1.31	229000 51500	JM714249A	JM714210
75.000 2.9528	120.000 4.7244	31.000 1.2205	148000 33200	0.44	1.35	38300 8600	29100 6540	1.31	229000 51500	JM714249	JM714210
75.000 2.9528	145.000 5.7087	51.000 2.0079	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	JH415647	JH415610
75.987 2.9916	131.976 5.1959	39.000 1.5354	222000 49900	0.33	1.80	57600 12900	32800 7370	1.76	324000 72800	HM215249	HM215210
76.000 2.9921	120.000 4.7244	23.000 0.9055	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34299X	34472X
76.200 3.0000	105.570 4.1563	13.495 0.5313	37900 8530	0.47	1.27	9830 2210	7960 1790	1.24	61000 13700	LL714649	LL714610
76.200 3.0000	109.538 4.3125	19.050 0.7500	64100 14400	0.50	1.20	16600 3730	14300 3210	1.16	120000 27000	L814749	L814710
76.200 3.0000	121.442 4.7812	24.608 0.9688	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34300	34478
76.200 3.0000	121.442 4.7812	24.608 0.9688	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34301	34478
76.200 3.0000	125.412 4.9375	25.400 1.0000	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27684	27620
76.200 3.0000	125.412 4.9375	25.400 1.0000	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27684A	27620
76.200 3.0000	127.000 5.0000	26.988 1.0625	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34300	34500
76.200 3.0000	127.000 5.0000	26.988 1.0625	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34301	34500
76.200 3.0000	127.000 5.0000	30.162 1.1875	149000 33500	0.42	1.43	38700 8690	27700 6230	1.39	222000 49800	42687	42620
76.200 3.0000	127.000 5.0000	30.162 1.1875	149000 33500	0.42	1.43	38700 8690	27700 6230	1.39	222000 49800	42688	42620
76.200 3.0000	133.350 5.2500	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495A	492A
76.200 3.0000	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47678	47620
76.200 3.0000	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47679	47620

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
54.229 2.1350	44.450 1.7500	-15.0 -0.59	3.5 0.14	87.0 3.43	93.0 3.66	0.8 0.03	140.0 5.51	131.0 5.16	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.41 9.71
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.78 8.34
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	141.0 5.55	134.0 5.28	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.48 7.67
25.400 1.0000	19.050 0.7500	1.0 0.04	1.5 0.06	80.0 3.15	83.0 3.27	3.3 0.13	109.0 4.29	101.0 3.98	2.30 0.09	1.50 0.06	77.7	43.3	0.1170	0.87 1.93
36.170 1.4240	28.575 1.1250	-8.1 -0.32	0.8 0.03	82.0 3.23	83.0 3.27	3.3 0.13	120.0 4.72	112.0 4.41	3.20 0.13	1.80 0.07	101	24	0.1167	1.78 3.92
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.41 5.32
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	86.0 3.39	92.0 3.62	3.3 0.13	141.0 5.55	134.0 5.28	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.42 7.54
23.012 0.9060	19.842 0.7812	1.5 0.06	2.0 0.08	82.0 3.23	85.0 3.35	3.3 0.13	118.0 4.65	112.0 4.41	2.60 0.10	2.10 0.08	69.3	27	0.1093	1.20 2.64
31.000 1.2205	27.000 1.0630	-2.8 -0.11	6.4 0.25	83.0 3.27	94.0 3.70	2.3 0.09	123.0 4.84	115.0 4.53	3.40 0.13	0.90 0.03	96.2	28.6	0.1197	1.68 3.70
25.000 0.9843	19.000 0.7480	0.5 0.02	3.0 0.12	81.0 3.19	87.0 3.43	2.5 0.10	110.0 4.33	104.0 4.09	2.00 0.08	2.10 0.08	76.3	30.5	0.1140	0.87 1.92
29.500 1.1614	25.000 0.9843	-2.0 -0.08	6.0 0.24	83.0 3.27	94.0 3.70	2.5 0.10	115.0 4.53	108.0 4.25	2.10 0.08	2.70 0.11	95	32.8	0.1218	1.27 2.80
29.500 1.1614	25.000 0.9843	-2.0 -0.08	3.0 0.12	83.0 3.26	88.0 3.46	2.5 0.10	115.0 4.53	108.0 4.25	2.10 0.08	2.70 0.11	95	32.1	0.1218	1.30 2.86
51.000 2.0079	42.000 1.6535	-14.2 -0.56	3.0 0.12	89.0 3.50	94.0 3.70	2.5 0.10	139.0 5.47	129.0 5.08	2.00 0.08	3.20 0.12	158	26.4	0.0931	3.80 8.39
39.000 1.5354	32.000 1.2598	-9.7 -0.38	7.0 0.28	85.0 3.35	98.0 3.86	3.5 0.14	126.0 4.96	118.0 4.65	1.20 0.05	2.80 0.11	126	30.2	0.0837	2.11 4.65
23.012 0.9060	16.000 0.6299	1.5 0.06	2.3 0.09	83.0 3.27	86.0 3.39	2.3 0.09	115.0 4.53	110.0 4.33	2.60 0.10	2.10 0.08	69.3	27	0.1093	0.88 1.94
13.495 0.5313	9.525 0.3750	6.6 0.26	1.5 0.06	81.0 3.19	83.0 3.27	1.5 0.06	102.0 4.02	99.0 3.90	0.90 0.04	1.20 0.05	45.7	64.3	0.0956	0.32 0.71
19.050 0.7500	15.083 0.5938	5.1 0.20	1.5 0.06	82.0 3.23	84.0 3.31	1.5 0.06	105.0 4.13	100.0 3.94	0.90 0.04	1.20 0.05	76	59.6	0.1164	0.58 1.28
23.012 0.9060	17.462 0.6875	1.5 0.06	2.0 0.08	83.0 3.27	86.0 3.39	2.0 0.08	116.0 4.57	110.0 4.33	2.60 0.10	2.10 0.08	69.3	27	0.1093	0.96 2.11
23.012 0.9060	17.462 0.6875	1.5 0.06	3.5 0.14	83.0 3.27	89.0 3.50	2.0 0.08	116.0 4.57	110.0 4.33	2.60 0.10	2.10 0.08	69.3	27	0.1093	0.94 2.08
25.400 1.0000	19.845 0.7813	0.5 0.02	3.5 0.14	84.0 3.31	91.0 3.58	1.5 0.06	120.0 4.72	115.0 4.53	1.50 0.06	1.70 0.07	98.2	41.8	0.1198	1.21 2.67
25.400 1.0000	19.845 0.7813	0.5 0.02	0.8 0.03	84.0 3.31	85.0 3.35	1.5 0.06	120.0 4.72	115.0 4.53	1.50 0.06	1.70 0.07	98.2	41.8	0.1198	1.22 2.70
23.012 0.9060	19.842 0.7812	1.5 0.06	2.0 0.08	83.0 3.27	86.0 3.39	3.3 0.13	118.0 4.65	112.0 4.41	2.60 0.10	2.10 0.08	69.3	27	0.1093	1.17 2.59
23.012 0.9060	19.842 0.7812	1.5 0.06	3.5 0.14	83.0 3.27	89.0 3.50	3.3 0.13	118.0 4.65	112.0 4.41	2.60 0.10	2.10 0.08	69.3	27	0.1093	1.16 2.56
31.000 1.2205	22.225 0.8750	-2.8 -0.11	3.5 0.14	84.0 3.31	90.0 3.54	3.3 0.13	121.0 4.76	114.0 4.49	3.40 0.13	0.90 0.03	96.2	28.6	0.1197	1.43 3.16
31.000 1.2205	22.225 0.8750	-2.8 -0.11	6.4 0.25	84.0 3.31	96.0 3.78	3.3 0.13	121.0 4.76	114.0 4.49	3.40 0.13	0.90 0.03	96.2	28.6	0.1197	1.40 3.08
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	86.0 3.39	92.0 3.62	3.3 0.13	128.0 5.04	120.0 4.72	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.68 3.70
33.338 1.3125	26.195 1.0313	-4.3 -0.17	6.4 0.25	85.0 3.35	97.0 3.82	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.87 4.12
33.338 1.3125	26.195 1.0313	-4.3 -0.17	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.90 4.18

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

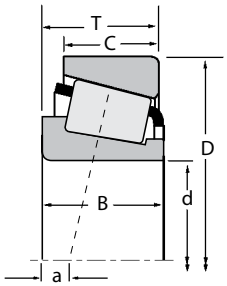
[7] Compound radius on inner race. Details on drawing for bearing.

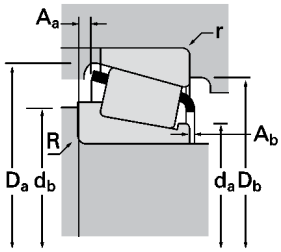
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
76.200 3.0000	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47680	47620
76.200 3.0000	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47679	47620A
76.200 3.0000	133.350 5.2500	39.688 1.5625	202000 45400	0.40	1.49	52400 11800	36100 8110	1.45	353000 79300	HM516442	HM516410
76.200 3.0000	135.733 5.3438	44.450 1.7500	237000 53200	0.41	1.48	61300 13800	42700 9600	1.44	380000 85400	5760	5735
76.200 3.0000	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495A	493
76.200 3.0000	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495AX	493
76.200 3.0000	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715346	H715311
76.200 3.0000	139.700 5.5000	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	575	572X
76.200 3.0000	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715346	H715310
76.200 3.0000	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	575	572
76.200 3.0000	139.992 5.5115	36.512 1.4375	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47679	47621
76.200 3.0000	139.992 5.5115	36.512 1.4375	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47680	47621
76.200 3.0000	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	575-S	572
76.200 3.0000	142.138 5.5960	44.450 1.7500	223000 50200	0.39	1.55	57900 13000	38200 8600	1.51	318000 71400	HM515745	HM515716
76.200 3.0000	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	659	653
76.200 3.0000	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6461	6420
76.200 3.0000	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6466	6420
76.200 3.0000	149.225 5.8750	53.975 2.1250	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6461A	6420
76.200 3.0000	150.000 5.9055	35.966 1.4160	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	590A	JM719113
76.200 3.0000	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	748-S	742
76.200 3.0000	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	590A	592A
76.200 3.0000	152.400 6.0000	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	659	652
76.200 3.0000	160.000 6.2992	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6576	6525X
76.200 3.0000	161.925 6.3750	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	755	752
76.200 3.0000	161.925 6.3750	49.212 1.9375	275000 61900	0.71	0.85	71400 16100	86700 19500	0.82	330000 74200	9285	9220
76.200 3.0000	161.925 6.3750	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6575	6535
76.200 3.0000	161.925 6.3750	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6576	6535
76.200 3.0000	161.925 6.3750	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6576	6536

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
33.338 1.3125	26.195 1.0313	-4.3 -0.17	0.8 0.03	85.0 3.35	86.0 3.39	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.91 4.21
33.338 1.3125	26.195 1.0313	-4.3 -0.17	3.5 0.14	85.0 3.35	91.0 3.58	0.8 0.03	128.0 5.04	121.0 4.76	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.91 4.22
39.688 1.5625	32.545 1.2813	-7.4 -0.29	3.5 0.14	87.0 3.43	93.0 3.66	3.3 0.13	128.0 5.04	118.0 4.65	1.70 0.07	2.50 0.10	154	43	0.0955	2.40 5.30
46.100 1.8150	34.925 1.3750	-11.7 -0.46	3.5 0.14	88.0 3.46	94.0 3.70	3.3 0.13	130.0 5.12	119.0 4.69	5.40 0.21	1.40 0.06	145	31.6	0.0940	2.69 5.94
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	86.0 3.39	92.0 3.62	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.80 3.96
29.769 1.1720	22.225 0.8750	-0.8 -0.03	6.4 0.25	86.0 3.39	98.0 3.86	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.77 3.90
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	88.0 3.46	98.0 3.86	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	2.91 6.42
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	86.0 3.39	92.0 3.62	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.33 5.14
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	88.0 3.46	98.0 3.86	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.10 6.82
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	86.0 3.39	92.0 3.62	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.36 5.20
33.338 1.3125	29.370 1.1563	-4.3 -0.17	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	130.0 5.12	122.0 4.80	2.30 0.09	2.40 0.09	119	29.2	0.1273	2.33 5.13
33.338 1.3125	29.370 1.1563	-4.3 -0.17	0.8 0.03	85.0 3.35	86.0 3.39	3.3 0.13	130.0 5.12	122.0 4.80	2.30 0.09	2.40 0.09	119	29.2	0.1273	2.34 5.15
36.098 1.4212	28.575 1.1250	-5.3 -0.21	6.8 0.27	86.0 3.39	99.0 3.90	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.32 5.12
46.100 1.8150	33.338 1.3125	-10.9 -0.43	3.5 0.14	87.0 3.43	92.0 3.62	3.3 0.13	133.0 5.24	124.0 4.88	6.00 0.24	-1.30 -0.05	122	26.3	0.0869	2.91 6.41
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	87.0 3.43	93.0 3.66	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.99 6.59
54.229 2.1350	44.450 1.7500	-15.0 -0.59	3.5 0.14	89.5 3.52	96.0 3.78	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.23 9.32
54.229 2.1350	44.450 1.7500	-15.0 -0.59	6.4 0.25	89.5 3.52	102.0 4.02	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.20 9.26
54.229 2.1350	44.450 1.7500	-15.0 -0.59	9.7 0.38	89.5 3.52	108.0 4.25	3.3 0.13	140.0 5.51	129.0 5.08	2.70 0.11	0.70 0.03	158	29.1	0.0931	4.15 9.15
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	89.0 3.50	95.0 3.74	2.5 0.10	143.0 5.63	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.94 6.48
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.5 0.14	87.0 3.43	93.0 3.66	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.65 8.04
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	89.0 3.50	95.0 3.74	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	3.22 7.09
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	87.0 3.43	93.0 3.66	3.3 0.13	141.0 5.55	134.0 5.28	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.36 7.40
55.100 2.1693	44.450 1.7500	-13.2 -0.52	3.5 0.14	92.0 3.62	99.0 3.90	3.0 0.12	153.5 6.04	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	5.24 11.54
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	88.0 3.46	95.0 3.74	3.3 0.13	150.0 5.91	144.0 5.67	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.69 10.34
46.038 1.8125	31.750 1.2500	0.0 0.00	3.5 0.14	90.5 3.56	103.0 4.06	3.3 0.13	153.0 6.03	138.0 5.43	9.10 0.36	4.00 0.16	102	18.4	0.0984	4.18 9.20
55.100 2.1693	42.862 1.6875	-13.2 -0.52	6.4 0.25	92.0 3.62	104.0 4.09	3.3 0.13	154.0 6.06	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	5.34 11.78
55.100 2.1693	42.862 1.6875	-13.2 -0.52	3.5 0.14	92.0 3.62	99.0 3.90	3.3 0.13	154.0 6.06	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	5.37 11.84
55.100 2.1693	42.862 1.6875	-13.2 -0.52	3.5 0.14	92.0 3.62	99.0 3.90	0.8 0.03	154.0 6.06	144.0 5.67	4.10 0.16	0.90 0.03	199	33.5	0.1037	5.39 11.89

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

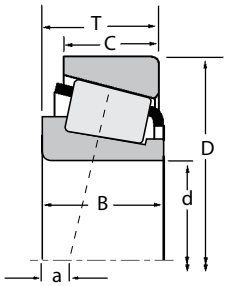
[7] Compound radius on inner race. Details on drawing for bearing.

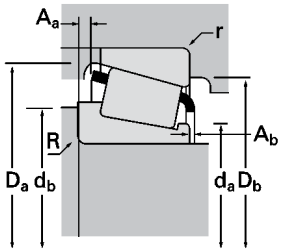
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)	Factors (5)		Dynamic (2)	Factors (5)		Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
76.200 3.0000	161.925 6.3750	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6576C	6535
76.200 3.0000	168.275 6.6250	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	755	753
76.200 3.0000	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	837	832
76.200 3.0000	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	843	832
76.200 3.0000	171.450 6.7500	49.212 1.9375	284000 63700	0.76	0.79	73500 16500	96200 21600	0.76	351000 78800	9380	9321
76.200 3.0000	171.450 6.7500	51.473 2.0265	284000 63700	0.76	0.79	73500 16500	96200 21600	0.76	351000 78800	9378	9321
76.200 3.0000	177.800 7.0000	52.388 2.0625	284000 63700	0.76	0.79	73500 16500	96200 21600	0.76	351000 78800	9380	9320
76.200 3.0000	177.800 7.0000	55.562 2.1875	284000 63700	0.76	0.79	73500 16500	96200 21600	0.76	351000 78800	9378	9320
76.200 3.0000	180.975 7.1250	53.975 2.1250	350000 78700	0.73	0.82	90800 20400	114000 25600	0.80	458000 103000	H917840	H917810
76.200 3.0000	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221430	HH221410
77.788 3.0625	117.475 4.6250	25.400 1.0000	109000 24500	0.51	1.18	28300 6360	24700 5550	1.15	183000 41200	LM814849	LM814810
77.788 3.0625	120.000 4.7244	23.000 0.9055	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34306	34472X
77.788 3.0625	120.650 4.7500	27.783 1.0938	109000 24500	0.51	1.18	28300 6360	24700 5550	1.15	183000 41200	LM814849	LM814814
77.788 3.0625	121.442 4.7812	24.608 0.9688	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34306	34478
77.788 3.0625	121.442 4.7812	24.608 0.9688	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34307	34478
77.788 3.0625	127.000 5.0000	30.162 1.1875	149000 33500	0.42	1.43	38700 8690	27700 6230	1.39	222000 49800	42690	42620
77.788 3.0625	133.350 5.2500	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495AS	492A
77.788 3.0625	135.733 5.3438	44.450 1.7500	237000 53200	0.41	1.48	61300 13800	42700 9600	1.44	380000 85400	5795	5735
77.788 3.0625	136.525 5.3750	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715348	H715311
77.788 3.0625	139.700 5.5000	46.038 1.8125	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715348	H715310
77.788 3.0625	164.976 6.4951	49.500 1.9488	325000 73200	0.51	1.17	84400 19000	73800 16600	1.14	400000 90000	H816249	H816210
79.375 3.1250	140.000 5.5118	44.450 1.7500	223000 50200	0.39	1.55	57900 13000	38200 8600	1.51	318000 71400	HM515749	HM515714
79.375 3.1250	142.138 5.5960	44.450 1.7500	223000 50200	0.39	1.55	57900 13000	38200 8600	1.51	318000 71400	HM515749	HM515716
79.375 3.1250	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	661	653
79.375 3.1250	147.638 5.8125	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595A	592XE
79.375 3.1250	150.000 5.9055	35.992 1.4170	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595A	593X
79.375 3.1250	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	750	742
79.375 3.1250	152.400 6.0000	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595A	592AS

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
55.100 2.1693	42.862 1.6875	-13.2 -0.52	3.5 0.14	94.0 3.70	101.0 3.98	3.3 0.13	154.0 6.06	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	5.37 11.85
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	88.0 3.46	95.0 3.74	3.3 0.13	150.0 5.91	147.0 5.79	3.30 0.13	0.90 0.04	177	29.4	0.0945	5.16 11.38
56.363 2.2190	41.275 1.6250	-18.5 -0.73	0.8 0.03	89.0 3.50	90.0 3.54	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	5.78 12.75
56.363 2.2190	41.275 1.6250	-18.5 -0.73	6.4 0.25	89.0 3.50	101.0 3.98	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	5.76 12.71
46.038 1.8125	31.750 1.2500	4.3 0.17	3.5 0.14	98.5 3.87	105.0 4.13	3.3 0.13	164.0 6.46	147.0 5.79	9.00 0.35	3.90 0.15	118	18.6	0.1053	5.11 11.26
50.800 2.0000	31.750 1.2500	1.3 0.05	3.5 0.14	98.5 3.87	105.0 4.13	3.3 0.13	164.0 6.46	147.0 5.79	12.20 0.48	2.30 0.09	118	18.6	0.1053	5.35 11.80
46.038 1.8125	34.925 1.3750	4.3 0.17	3.5 0.14	98.5 3.87	105.0 4.13	3.3 0.13	164.0 6.46	148.0 5.83	9.00 0.35	3.90 0.15	118	18.6	0.1053	5.81 12.80
50.800 2.0000	34.925 1.3750	1.3 0.05	3.5 0.14	98.5 3.87	105.0 4.13	3.3 0.13	164.0 6.46	148.0 5.83	12.20 0.48	2.30 0.09	118	18.6	0.1053	6.05 13.34
53.183 2.0938	35.720 1.4063	0.5 0.02	3.5 0.14	100.0 3.94	110.0 4.33	3.3 0.13	170.0 6.69	152.0 5.98	9.50 0.38	2.80 0.11	147	20.7	0.1123	6.55 14.45
57.531 2.2650	46.038 1.8125	-15.0 -0.59	3.5 0.14	95.0 3.74	101.0 3.98	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	8.87 19.55
25.400 1.0000	19.050 0.7500	2.3 0.09	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	113.0 4.45	105.0 4.13	2.50 0.10	1.40 0.06	88.6	36.6	0.1239	0.91 2.00
23.012 0.9060	16.000 0.6299	1.5 0.06	3.5 0.14	84.0 3.31	90.0 3.54	2.3 0.09	115.0 4.53	110.0 4.33	2.60 0.10	2.10 0.08	69.3	27	0.1093	0.83 1.84
25.400 1.0000	26.195 1.0313	2.3 0.09	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	116.0 4.56	107.0 4.21	2.50 0.10	1.40 0.06	88.6	36.6	0.1239	1.11 2.45
23.012 0.9060	17.462 0.6875	1.5 0.06	3.5 0.14	84.0 3.31	90.0 3.54	2.0 0.08	116.0 4.57	110.0 4.33	2.60 0.10	2.10 0.08	69.3	27	0.1093	0.91 2.00
23.012 0.9060	17.462 0.6875	1.5 0.06	6.4 0.25	84.0 3.31	96.0 3.78	2.0 0.08	116.0 4.57	110.0 4.33	2.60 0.10	2.10 0.08	69.3	27	0.1093	0.88 1.94
31.000 1.2205	22.225 0.8750	-2.8 -0.11	3.5 0.14	85.0 3.35	91.0 3.58	3.3 0.13	121.0 4.76	114.0 4.49	3.40 0.13	0.90 0.03	96.2	28.6	0.1197	1.38 3.04
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	87.0 3.43	93.0 3.66	3.3 0.13	128.0 5.04	120.0 4.72	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.64 3.61
46.100 1.8150	34.925 1.3750	-11.7 -0.46	3.5 0.14	89.0 3.50	96.0 3.78	3.3 0.13	130.0 5.12	119.0 4.69	5.40 0.21	1.40 0.06	145	31.6	0.0940	2.62 5.78
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	88.0 3.46	99.0 3.90	3.3 0.13	132.0 5.20	118.0 4.65	4.20 0.16	2.00 0.08	147	32.8	0.0993	2.84 6.26
46.038 1.8125	36.512 1.4375	-8.6 -0.34	3.5 0.14	88.0 3.46	99.0 3.90	3.3 0.13	133.0 5.24	120.0 4.72	4.20 0.16	2.00 0.08	147	32.8	0.0993	3.02 6.67
46.248 1.8208	36.251 1.4272	-6.4 -0.25	3.5 0.14	92.5 3.64	102.0 4.02	3.3 0.13	154.5 6.08	144.0 5.67	4.60 0.18	5.90 0.23	127	23.2	0.0959	4.84 10.66
46.100 1.8150	33.338 1.3125	-10.9 -0.43	3.5 0.14	89.5 3.52	95.0 3.74	3.3 0.13	133.0 5.24	123.0 4.84	6.00 0.24	-1.30 -0.05	122	26.3	0.0869	2.64 5.83
46.100 1.8150	33.338 1.3125	-10.9 -0.43	3.5 0.14	89.5 3.52	95.0 3.74	3.3 0.13	133.0 5.24	124.0 4.88	6.00 0.24	-1.30 -0.05	122	26.3	0.0869	2.77 6.10
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	90.0 3.54	96.0 3.78	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.86 6.31
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	91.0 3.58	98.0 3.86	0.8 0.03	142.0 5.59	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.71 5.97
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	91.0 3.58	98.0 3.86	3.0 0.12	142.0 5.59	134.0 5.28	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.82 6.22
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.5 0.14	90.0 3.54	96.0 3.78	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.50 7.72
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	91.0 3.58	98.0 3.86	0.8 0.03	144.0 5.67	137.0 5.39	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.94 6.48

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

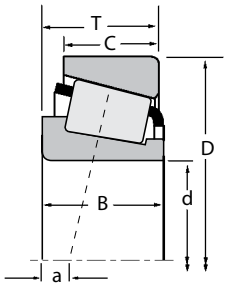
(7) Compound radius on inner race. Details on drawing for bearing.

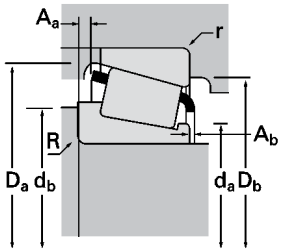
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
79.375 3.1250	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595A	592A
79.375 3.1250	152.400 6.0000	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	661	652
79.375 3.1250	161.925 6.3750	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	756A	752
79.375 3.1250	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221431	HH221410
79.975 3.1486	146.975 5.7864	40.000 1.5748	254000 57000	0.33	1.80	65800 14800	37400 8420	1.76	388000 87300	HM218238	HM218210
79.975 3.1486	152.400 6.0000	40.000 1.5748	254000 57000	0.33	1.80	65800 14800	37400 8420	1.76	388000 87300	HM218238	HM218215
79.985 3.1490	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	578	572
79.985 3.1490	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	578X	572
79.985 3.1490	147.638 5.8125	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	590	592XE
79.985 3.1490	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	590	592A
80.000 3.1496	125.000 4.9213	24.000 0.9449	105000 23600	0.45	1.33	27200 6110	21000 4730	1.29	141000 31800	JP8049	JP8010
80.000 3.1496	130.000 5.1181	35.000 1.3780	184000 41300	0.39	1.54	47700 10700	31700 7130	1.50	283000 63500	JM515649	JM515610
80.000 3.1496	141.000 5.5512	30.250 1.1909	151000 34000	0.42	1.43	39300 8830	28200 6350	1.39	187000 42000	XUB-30216	YFA30216
80.000 3.1496	150.000 5.9055	44.455 1.7502	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	748	743
80.000 3.1496	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	748	742
80.000 3.1496	160.000 6.2992	45.000 1.7717	244000 54900	0.87	0.69	63300 14200	93900 21100	0.67	339000 76100	JW8049	JW8010
80.000 3.1496	200.000 7.8740	52.761 2.0772	376000 84600	0.63	0.95	97500 21900	106000 23700	0.92	519000 117000	98316	98788
80.962 3.1875	133.350 5.2500	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	496	492A
80.962 3.1875	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47681	47620
80.962 3.1875	133.350 5.2500	39.688 1.5625	202000 45400	0.40	1.49	52400 11800	36100 8110	1.45	353000 79300	HM516447	HM516410
80.962 3.1875	133.350 5.2500	39.688 1.5625	202000 45400	0.40	1.49	52400 11800	36100 8110	1.45	353000 79300	HM516447	HM516410A
80.962 3.1875	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	496	493
80.962 3.1875	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	581	572
80.962 3.1875	146.050 5.7500	38.100 1.5000	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	662	653
80.962 3.1875	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	740	742
80.962 3.1875	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	838	832
82.550 3.2500	114.300 4.5000	15.083 0.5938	55400 12400	0.31	1.94	14400 3230	7610 1710	1.89	87000 19600	LL116249	LL116210
82.550 3.2500	115.888 4.5625	20.638 0.8125	83500 18800	0.31	1.95	21700 4870	11400 2570	1.90	147000 33100	L116149	L116110

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	91.0 3.58	98.0 3.86	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	3.11 6.85
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	90.0 3.54	96.0 3.78	3.3 0.13	141.0 5.55	134.0 5.28	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.23 7.13
48.260 1.9000	38.100 1.5000	-11.9 -0.47	8.0 0.31	91.0 3.58	106.0 4.17	3.3 0.13	150.0 5.91	144.0 5.67	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.49 9.90
57.531 2.2650	46.038 1.8125	-15.0 -0.59	3.5 0.14	97.0 3.82	103.0 4.06	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	8.69 19.16
40.000 1.5748	32.500 1.2795	-8.6 -0.34	7.0 0.28	91.0 3.58	104.0 4.09	3.5 0.14	141.0 5.55	133.0 5.24	1.40 0.06	2.90 0.12	168	34.7	0.0921	2.95 6.51
40.000 1.5748	32.500 1.2795	-8.6 -0.34	7.0 0.28	91.0 3.58	104.0 4.09	3.3 0.13	143.0 5.63	135.0 5.31	1.40 0.06	2.90 0.12	168	34.7	0.0921	3.28 7.23
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	89.0 3.50	95.0 3.74	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.23 4.91
36.098 1.4212	28.575 1.1250	-5.3 -0.21	8.0 0.31	89.0 3.50	104.0 4.09	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.17 4.79
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	91.0 3.58	98.0 3.86	0.8 0.03	142.0 5.59	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.68 5.92
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	91.0 3.58	98.0 3.86	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	3.08 6.80
22.500 0.8858	17.500 0.6890	2.3 0.09	2.0 0.08	86.0 3.39	89.0 3.50	2.0 0.08	120.0 4.72	115.0 4.53	1.90 0.08	3.40 0.14	69.7	37.4	0.1095	0.95 2.10
34.000 1.3386	28.500 1.1220	-5.1 -0.20	3.0 0.12	88.0 3.46	94.0 3.70	2.5 0.10	125.0 4.92	117.0 4.61	1.60 0.06	2.70 0.11	118	31.1	0.0863	1.71 3.77
28.000 1.1024	22.000 0.8661	-2.0 -0.08	0.5 0.02	90.0 3.54	90.0 3.54	2.0 0.08	133.0 5.24	128.0 5.04	3.80 0.15	3.50 0.14	80.7	25.6	0.0771	1.80 3.98
46.672 1.8375	35.000 1.3780	-11.9 -0.47	3.0 0.12	90.0 3.54	96.0 3.78	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.43 7.57
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.0 0.12	90.0 3.54	96.0 3.78	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.48 7.67
41.000 1.6142	31.000 1.2205	9.7 0.38	3.0 0.12	93.0 3.67	108.0 4.25	3.0 0.12	152.0 5.98	134.0 5.28	7.10 0.28	4.80 0.19	117	27.2	0.1094	4.04 8.90
49.212 1.9375	34.925 1.3750	1.3 0.05	3.5 0.14	105.0 4.13	111.0 4.37	3.3 0.13	188.0 7.40	174.0 6.85	8.60 0.34	5.40 0.21	203	37.4	0.1197	7.95 17.52
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	89.0 3.50	95.0 3.74	3.3 0.13	128.0 5.04	120.0 4.72	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.54 3.40
33.338 1.3125	26.195 1.0313	-4.3 -0.17	3.5 0.14	89.0 3.50	95.0 3.74	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.74 3.84
39.688 1.5625	32.545 1.2813	-7.4 -0.29	3.5 0.14	91.0 3.58	98.0 3.86	3.3 0.13	128.0 5.04	118.0 4.65	1.70 0.07	2.50 0.10	154	43	0.0955	2.22 4.90
39.688 1.5625	32.545 1.2813	-7.4 -0.29	3.5 0.14	91.0 3.58	98.0 3.86	0.8 0.03	128.0 5.04	120.0 4.72	1.70 0.07	2.50 0.10	154	43	0.0955	2.24 4.93
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	89.0 3.50	95.0 3.74	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.66 3.66
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	90.0 3.54	96.0 3.78	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.19 4.83
38.100 1.5000	31.750 1.2500	-4.8 -0.19	3.5 0.14	91.0 3.58	98.0 3.86	3.3 0.13	139.0 5.47	131.0 5.16	1.40 0.05	2.00 0.08	137	27.3	0.0919	2.67 5.90
46.672 1.8375	36.512 1.4375	-11.9 -0.47	5.0 0.20	91.0 3.58	101.0 3.98	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.42 7.53
56.363 2.2190	41.275 1.6250	-18.5 -0.73	0.8 0.03	93.0 3.66	94.0 3.70	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	5.52 12.18
15.082 0.5938	11.112 0.4375	1.5 0.06	1.5 0.06	87.0 3.43	90.0 3.54	1.5 0.06	110.0 4.33	108.0 4.25	0.30 0.01	2.10 0.08	66.2	68.2	0.0944	0.44 0.96
21.433 0.8438	16.670 0.6563	-1.3 -0.05	1.5 0.06	88.0 3.46	90.0 3.54	1.5 0.06	111.0 4.37	108.0 4.25	0.60 0.02	1.30 0.05	97.2	64.3	0.1079	0.66 1.46

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

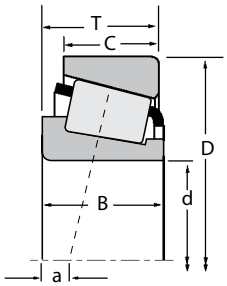
[7] Compound radius on inner race. Details on drawing for bearing.

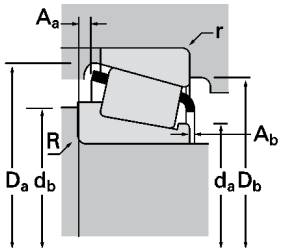
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
82.550 3.2500	125.412 4.9375	25.400 1.0000	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27687	27620
82.550 3.2500	133.350 5.2500	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495	492A
82.550 3.2500	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47685	47620
82.550 3.2500	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47686	47620
82.550 3.2500	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47687	47620
82.550 3.2500	133.350 5.2500	39.688 1.5625	202000 45400	0.40	1.49	52400 11800	36100 8110	1.45	353000 79300	HM516448	HM516410
82.550 3.2500	133.350 5.2500	39.688 1.5625	202000 45400	0.40	1.49	52400 11800	36100 8110	1.45	353000 79300	HM516449A	HM516410
82.550 3.2500	133.350 5.2500	39.688 1.5625	202000 45400	0.40	1.49	52400 11800	36100 8110	1.45	353000 79300	HM516449C	HM516410
82.550 3.2500	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495	493
82.550 3.2500	139.700 5.5000	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	580	572X
82.550 3.2500	139.700 5.5000	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	582	572X
82.550 3.2500	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	580	572
82.550 3.2500	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	580	574
82.550 3.2500	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	582	572
82.550 3.2500	139.992 5.5115	36.512 1.4375	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47685	47621
82.550 3.2500	139.992 5.5115	36.512 1.4375	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47686	47621
82.550 3.2500	139.992 5.5115	36.512 1.4375	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	580X	572
82.550 3.2500	142.138 5.5960	42.862 1.6875	242000 54300	0.43	1.39	62700 14100	46300 10400	1.35	399000 89700	HM617045	HM617010
82.550 3.2500	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	663	653
82.550 3.2500	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	663A	653
82.550 3.2500	147.638 5.8125	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595	592XE
82.550 3.2500	147.638 5.8125	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595	592XS
82.550 3.2500	150.000 5.9055	35.992 1.4170	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595	593X
82.550 3.2500	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	749A	742
82.550 3.2500	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	750A	742
82.550 3.2500	152.400 6.0000	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595	592AS
82.550 3.2500	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595	592A
82.550 3.2500	152.400 6.0000	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	663	652

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.400 1.0000	19.845 0.7813	0.5 0.02	3.5 0.14	89.0 3.50	96.0 3.78	1.5 0.06	120.0 4.72	115.0 4.53	1.50 0.06	1.70 0.07	98.2	41.8	0.1198	1.05 2.33
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	90.0 3.54	97.0 3.82	3.3 0.13	128.0 5.04	120.0 4.72	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.50 3.30
33.338 1.3125	26.195 1.0313	-4.3 -0.17	0.8 0.03	90.0 3.54	91.0 3.58	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.70 3.75
33.338 1.3125	26.195 1.0313	-4.3 -0.17	3.5 0.14	90.0 3.54	97.0 3.82	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.69 3.72
33.338 1.3125	26.195 1.0313	-4.3 -0.17	6.8 0.27	90.0 3.54	103.0 4.06	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.65 3.65
39.688 1.5625	32.545 1.2813	-7.4 -0.29	6.8 0.27	92.0 3.62	106.0 4.17	3.3 0.13	128.0 5.04	118.0 4.65	1.70 0.07	2.50 0.10	154	43	0.0955	2.14 4.72
39.688 1.5625	32.545 1.2813	-7.4 -0.29	6.0 0.24	92.0 3.62	105.0 4.13	3.3 0.13	128.0 5.04	118.0 4.65	1.70 0.07	2.50 0.10	154	43	0.0955	2.10 4.62
39.688 1.5625	32.545 1.2813	-7.4 -0.29	3.5 0.14	92.0 3.62	99.0 3.90	3.3 0.13	128.0 5.04	118.0 4.65	1.70 0.07	2.50 0.10	154	43	0.0955	2.15 4.74
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	90.0 3.54	97.0 3.82	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.61 3.55
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	91.0 3.58	98.0 3.86	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.11 4.65
36.098 1.4212	28.575 1.1250	-5.3 -0.21	6.8 0.27	91.0 3.58	104.0 4.09	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.07 4.56
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	91.0 3.58	98.0 3.86	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.14 4.71
36.098 1.4212	28.575 1.1250	-5.3 -0.21	3.5 0.14	91.0 3.58	98.0 3.86	0.5 0.02	133.0 5.24	128.0 5.04	3.40 0.14	1.90 0.07	126	32	0.1295	2.14 4.72
36.098 1.4212	28.575 1.1250	-5.3 -0.21	6.8 0.27	91.0 3.58	104.0 4.09	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.10 4.62
33.338 1.3125	29.370 1.1563	-4.3 -0.17	0.8 0.03	90.0 3.54	91.0 3.58	3.3 0.13	130.0 5.12	122.0 4.80	2.30 0.09	2.40 0.09	119	29.2	0.1273	2.13 4.70
33.338 1.3125	29.370 1.1563	-4.3 -0.17	3.5 0.14	90.0 3.54	97.0 3.82	3.3 0.13	130.0 5.12	122.0 4.80	2.30 0.09	2.40 0.09	119	29.2	0.1273	2.12 4.67
36.098 1.4212	28.575 1.1250	-5.3 -0.21	4.8 0.19	92.0 3.62	100.0 3.94	3.3 0.13	133.0 5.24	125.0 4.92	3.40 0.14	1.90 0.07	126	32	0.1295	2.12 4.68
42.862 1.6875	34.133 1.3438	-7.4 -0.29	3.5 0.14	95.0 3.74	101.0 3.98	3.3 0.13	137.0 5.39	125.0 4.92	3.30 0.13	2.40 0.09	163	38.9	0.0996	2.77 6.11
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	92.0 3.62	99.0 3.90	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.73 6.02
41.275 1.6250	31.750 1.2500	-7.9 -0.31	6.8 0.27	92.0 3.62	105.0 4.13	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.70 5.94
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	93.0 3.66	100.0 3.94	0.8 0.03	142.0 5.59	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.59 5.71
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	93.0 3.66	100.0 3.94	3.3 0.13	142.0 5.59	133.0 5.24	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.57 5.67
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	93.0 3.66	100.0 3.94	3.0 0.12	142.0 5.59	134.0 5.28	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.71 5.97
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.5 0.14	93.0 3.66	99.0 3.90	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.35 7.40
46.672 1.8375	36.512 1.4375	-11.9 -0.47	6.5 0.26	93.0 3.66	106.0 4.17	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.32 7.32
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	93.0 3.66	100.0 3.94	0.8 0.03	144.0 5.67	137.0 5.39	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.82 6.23
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	93.0 3.66	100.0 3.94	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.99 6.59
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	92.0 3.62	99.0 3.90	3.3 0.13	141.0 5.55	134.0 5.28	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.10 6.84

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

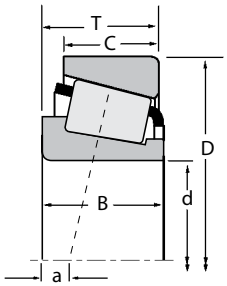
[7] Compound radius on inner race. Details on drawing for bearing.

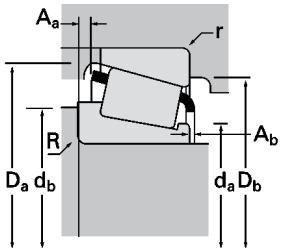
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
82.550 3.2500	159.995 6.2990	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	757	752A
82.550 3.2500	161.925 6.3750	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	757	752
82.550 3.2500	161.925 6.3750	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6559C	6535
82.550 3.2500	168.275 6.6250	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	757	753
82.550 3.2500	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	839	832
82.550 3.2500	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	842	832
82.550 3.2500	180.975 7.1250	53.975 2.1250	350000 78700	0.73	0.82	90800 20400	114000 25600	0.80	458000 103000	H917849	H917810
83.345 3.2813	125.412 4.9375	25.400 1.0000	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27689	27620
83.345 3.2813	125.412 4.9375	25.400 1.0000	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27690	27620
83.345 3.2813	125.412 4.9375	25.400 1.0000	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27691	27620
83.345 3.2813	133.350 5.2500	33.338 1.3125	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47688	47620
84.000 3.3071	140.000 5.5118	32.000 1.2598	170000 38200	0.42	1.42	44000 9890	31900 7160	1.38	264000 59400	XUA32018X	Y32018X
84.138 3.3125	133.350 5.2500	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	498	492A
84.138 3.3125	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	498	493
84.138 3.3125	152.400 6.0000	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	664	652
84.138 3.3125	171.450 6.7500	49.212 1.9375	284000 63700	0.76	0.79	73500 16500	96200 21600	0.76	351000 78800	9386H	9321
84.138 3.3125	177.800 7.0000	52.388 2.0625	284000 63700	0.76	0.79	73500 16500	96200 21600	0.76	351000 78800	9386H	9320
84.975 3.3455	125.412 4.9375	25.400 1.0000	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27695	27620
85.000 3.3465	130.000 5.1181	29.000 1.1417	151000 33800	0.44	1.36	39000 8770	29500 6640	1.32	235000 52900	XAA32017X	Y32017X
85.000 3.3465	130.000 5.1181	30.000 1.1811	149000 33600	0.44	1.35	38700 8700	29400 6620	1.31	245000 55100	JM716648	JM716610
85.000 3.3465	130.000 5.1181	30.000 1.1811	149000 33600	0.44	1.35	38700 8700	29400 6620	1.31	245000 55100	JM716649	JM716610
85.000 3.3465	140.000 5.5118	39.000 1.5354	220000 49500	0.41	1.47	57000 12800	39800 8940	1.43	339000 76300	JHM516849	JHM516810
85.000 3.3465	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	665X	653
85.000 3.3465	150.000 5.9055	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	665X	653X
85.000 3.3465	150.000 5.9055	46.000 1.8110	307000 69100	0.33	1.80	79700 17900	45400 10200	1.76	446000 100000	JH217249	JH217210
85.000 3.3465	188.912 7.4375	53.297 2.0983	299000 67300	0.87	0.69	77600 17400	115000 25900	0.67	392000 88100	90334	90744
85.000 3.3465	200.000 7.8740	52.761 2.0772	376000 84600	0.63	0.95	97500 21900	106000 23700	0.92	519000 117000	98335	98788
85.026 3.3475	150.000 5.9055	44.455 1.7502	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	749	743

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	94.0 3.70	100.0 3.94	0.8 0.03	150.0 5.91	146.0 5.75	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.26 9.40
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	94.0 3.70	100.0 3.94	3.3 0.13	150.0 5.91	144.0 5.67	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.39 9.68
55.100 2.1693	42.862 1.6875	-13.2 -0.52	3.5 0.14	98.0 3.86	104.0 4.09	3.3 0.13	154.0 6.06	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	5.03 11.09
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	94.0 3.70	100.0 3.94	3.3 0.13	150.0 5.91	147.0 5.79	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.86 10.72
56.363 2.2190	41.275 1.6250	-18.5 -0.73	0.8 0.03	94.0 3.70	95.0 3.74	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	5.43 11.98
56.363 2.2190	41.275 1.6250	-18.5 -0.73	3.5 0.14	94.0 3.70	101.0 3.98	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	5.42 11.95
53.183 2.0938	35.720 1.4063	0.5 0.02	3.3 0.13	100.0 3.94	114.0 4.49	3.3 0.13	170.0 6.69	152.0 5.98	9.50 0.38	2.80 0.11	147	20.7	0.1123	6.22 13.72
25.400 1.0000	19.845 0.7813	0.5 0.02	0.8 0.03	90.0 3.54	90.0 3.54	1.5 0.06	120.0 4.72	115.0 4.53	1.50 0.06	1.70 0.07	98.2	41.8	0.1198	1.05 2.31
25.400 1.0000	19.845 0.7813	0.5 0.02	3.5 0.14	90.0 3.54	96.0 3.78	1.5 0.06	120.0 4.72	115.0 4.53	1.60 0.06	1.70 0.07	98.2	41.8	0.1198	1.03 2.28
25.400 1.0000	19.845 0.7813	0.5 0.02	6.4 0.25	90.0 3.54	102.0 4.02	1.5 0.06	120.0 4.72	115.0 4.53	1.50 0.06	1.70 0.07	98.2	41.8	0.1198	1.00 2.21
33.338 1.3125	26.195 1.0313	-4.3 -0.17	3.5 0.14	91.0 3.58	97.0 3.82	3.3 0.13	128.0 5.04	119.0 4.69	2.30 0.09	2.40 0.09	119	29.2	0.1273	1.66 3.66
32.000 1.2598	24.000 0.9449	-2.0 -0.08	0.5 0.02	94.0 3.70	94.0 3.70	1.5 0.06	134.0 5.28	128.0 5.04	3.20 0.13	2.20 0.09	128	42.8	0.1317	1.96 4.32
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	91.0 3.58	98.0 3.86	3.3 0.13	128.0 5.04	120.0 4.72	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.45 3.19
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	91.0 3.58	98.0 3.86	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.56 3.45
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	94.0 3.70	100.0 3.94	3.3 0.13	141.0 5.55	134.0 5.28	4.50 0.18	2.00 0.08	137	27.3	0.0919	3.03 6.69
46.038 1.8125	31.750 1.2500	4.3 0.17	3.5 0.14	98.5 3.87	111.0 4.37	3.3 0.13	164.0 6.46	147.0 5.79	9.00 0.35	3.90 0.15	118	18.6	0.1053	4.70 10.36
46.038 1.8125	34.925 1.3750	4.3 0.17	3.5 0.14	98.5 3.87	111.0 4.37	3.3 0.13	164.0 6.46	148.0 5.83	9.00 0.35	3.90 0.15	118	18.6	0.1053	5.40 11.91
25.400 1.0000	19.845 0.7813	0.5 0.02	5.0 0.20	91.0 3.58	100.0 3.94	1.5 0.06	120.0 4.72	115.0 4.53	1.50 0.06	1.70 0.07	98.2	41.8	0.1198	0.98 2.15
29.000 1.1417	22.000 0.8661	-0.5 -0.02	6.5 0.26	92.0 3.62	106.0 4.17	1.5 0.06	125.0 4.92	119.0 4.69	2.10 0.08	2.70 0.11	109	36.3	0.1270	1.31 2.89
29.000 1.1417	24.000 0.9449	-0.3 -0.01	6.0 0.24	92.0 3.62	104.0 4.09	2.5 0.10	125.0 4.92	117.0 4.61	2.10 0.08	2.50 0.10	117	36.6	0.1303	1.32 2.92
29.000 1.1417	24.000 0.9449	-0.3 -0.01	3.0 0.12	92.0 3.62	98.0 3.86	2.5 0.10	125.0 4.92	117.0 4.61	2.10 0.08	2.50 0.10	117	36.6	0.1303	1.36 3.00
38.000 1.4961	31.500 1.2402	-5.8 -0.23	3.0 0.12	94.0 3.70	100.0 3.94	2.5 0.10	134.0 5.28	125.0 4.92	1.50 0.06	3.60 0.14	141	35.1	0.0929	2.27 4.99
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	95.0 3.74	101.0 3.98	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.63 5.79
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	95.0 3.74	101.0 3.98	3.0 0.12	141.0 5.55	133.0 5.24	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.86 6.30
46.000 1.8110	38.000 1.4961	-11.9 -0.47	3.0 0.12	95.0 3.74	101.0 3.98	2.5 0.10	142.0 5.59	134.0 5.28	1.10 0.04	3.40 0.14	169	33.3	0.0924	3.34 7.37
52.761 2.0772	31.750 1.2500	10.4 0.41	3.5 0.14	112.0 4.41	116.0 4.57	3.3 0.13	179.5 7.06	161.0 6.34	13.50 0.53	-0.60 -0.02	150	23.8	0.1180	6.57 14.48
49.212 1.9375	34.925 1.3750	1.3 0.05	3.5 0.14	109.0 4.29	115.0 4.53	3.3 0.13	188.0 7.40	174.0 6.85	8.60 0.34	5.40 0.21	203	37.4	0.1197	7.70 16.96
46.672 1.8375	35.000 1.3780	-11.9 -0.47	3.5 0.14	95.0 3.74	101.0 3.98	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.20 7.06

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

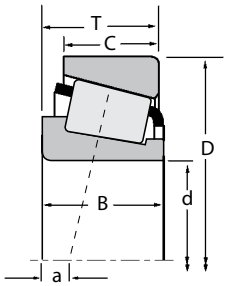
[8] Pin-type cage. Please consult The Timken Company.

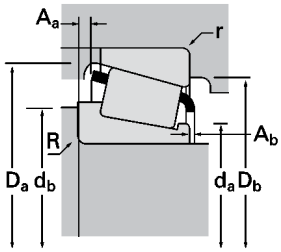
Continued on next page.

B

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
85.026 3.3475	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	749	742
85.026 3.3475	150.089 5.9090	44.450 1.7500	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	749-S	742
85.725 3.3750	133.350 5.2500	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	497	492A
85.725 3.3750	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	497	493
85.725 3.3750	136.525 5.3750	30.162 1.1875	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	497A	493
85.725 3.3750	142.138 5.5960	42.862 1.6875	242000 54300	0.43	1.39	62700 14100	46300 10400	1.35	399000 89700	HM617048	HM617010
85.725 3.3750	142.138 5.5960	42.862 1.6875	242000 54300	0.43	1.39	62700 14100	46300 10400	1.35	399000 89700	HM617049	HM617010
85.725 3.3750	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	665	653
85.725 3.3750	146.050 5.7500	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	665A	653
85.725 3.3750	147.828 5.8200	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	596	592AX
85.725 3.3750	150.000 5.9055	35.966 1.4160	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	596	JM719113
85.725 3.3750	150.000 5.9055	35.992 1.4170	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	596	593X
85.725 3.3750	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	596	592A
85.725 3.3750	152.400 6.0000	41.275 1.6250	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	665	652
85.725 3.3750	161.925 6.3750	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	758	752
85.725 3.3750	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	677	672
85.725 3.3750	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	841	832
87.312 3.4375	123.825 4.8750	20.638 0.8125	85800 19300	0.33	1.82	22200 5000	12600 2820	1.77	156000 35200	L217847	L217810
87.312 3.4375	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	596-S	592A
87.312 3.4375	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221432	HH221410
87.960 3.4630	148.430 5.8437	28.575 1.1250	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42346	42584
87.960 3.4630	149.225 5.8750	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42346	42587
88.900 3.5000	121.442 4.7812	15.083 0.5938	55100 12400	0.33	1.81	14300 3210	8080 1820	1.77	88700 20000	LL217849	LL217810
88.900 3.5000	123.825 4.8750	20.638 0.8125	85800 19300	0.33	1.82	22200 5000	12600 2820	1.77	156000 35200	L217849	L217810
88.900 3.5000	127.000 5.0000	20.638 0.8125	85800 19300	0.33	1.82	22200 5000	12600 2820	1.77	156000 35200	L217849	L217813
88.900 3.5000	148.430 5.8437	28.575 1.1250	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42350	42584
88.900 3.5000	149.225 5.8750	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42350	42587
88.900 3.5000	150.000 5.9055	35.966 1.4160	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	593A	JM719113

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
46.672 1.8375	36.512 1.4375	-11.9 -0.47	3.5 0.14	95.0 3.74	101.0 3.98	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.25 7.16
46.672 1.8375	36.512 1.4375	-11.9 -0.47	5.0 0.20	95.0 3.74	104.0 4.09	3.3 0.13	142.0 5.59	134.0 5.28	1.90 0.07	1.20 0.05	160	26.3	0.0898	3.22 7.10
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	93.0 3.66	99.0 3.90	3.3 0.13	128.0 5.04	120.0 4.72	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.40 3.08
29.769 1.1720	22.225 0.8750	-0.8 -0.03	3.5 0.14	93.0 3.66	99.0 3.90	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.51 3.34
29.769 1.1720	22.225 0.8750	-0.8 -0.03	6.4 0.25	93.0 3.66	105.0 4.13	3.3 0.13	130.0 5.12	122.0 4.80	2.50 0.10	2.10 0.08	105	29.3	0.1252	1.48 3.27
42.862 1.6875	34.133 1.3438	-7.4 -0.29	1.5 0.06	95.0 3.75	99.0 3.90	3.3 0.13	137.0 5.39	125.0 4.92	3.30 0.13	2.40 0.09	163	38.9	0.0996	2.64 5.82
42.862 1.6875	34.133 1.3438	-7.4 -0.29	4.8 0.19	95.0 3.75	106.0 4.17	3.3 0.13	137.0 5.39	125.0 4.92	3.30 0.13	2.40 0.09	163	38.9	0.0996	2.62 5.77
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	95.0 3.74	102.0 4.02	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.60 5.72
41.275 1.6250	31.750 1.2500	-7.9 -0.31	6.4 0.25	95.0 3.74	107.0 4.21	3.3 0.13	139.0 5.47	131.0 5.16	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.57 5.66
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	96.0 3.78	102.0 4.02	3.3 0.13	142.0 5.59	133.0 5.24	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.49 5.48
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	96.0 3.78	102.0 4.02	2.5 0.10	143.0 5.63	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.59 5.72
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	96.0 3.78	102.0 4.02	3.0 0.12	142.0 5.59	134.0 5.28	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.59 5.70
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	96.0 3.78	102.0 4.02	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.87 6.33
41.275 1.6250	31.750 1.2500	-7.9 -0.31	3.5 0.14	95.0 3.74	102.0 4.02	3.3 0.13	141.0 5.55	134.0 5.28	4.50 0.18	2.00 0.08	137	27.3	0.0919	2.97 6.54
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	97.0 3.82	103.0 4.06	3.3 0.13	150.0 5.91	144.0 5.67	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.23 9.33
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	99.0 3.90	105.0 4.13	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	4.12 9.08
56.363 2.2190	41.275 1.6250	-18.5 -0.73	3.5 0.14	97.0 3.82	104.0 4.09	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	5.24 11.54
20.638 0.8125	16.670 0.6563	0.0 0.00	1.5 0.06	93.0 3.66	96.0 3.78	1.5 0.06	119.0 4.69	116.0 4.57	0.50 0.02	2.10 0.08	111	74.7	0.1152	0.77 1.70
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	97.0 3.82	103.0 4.06	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.81 6.19
57.531 2.2650	46.038 1.8125	-15.0 -0.59	8.0 0.31	103.0 4.06	118.0 4.65	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	8.17 18.00
28.971 1.1406	21.433 0.8438	3.0 0.12	3.0 0.12	98.0 3.86	103.0 4.06	3.0 0.12	142.0 5.59	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.96 4.32
28.971 1.1406	24.608 0.9688	3.0 0.12	3.0 0.12	98.0 3.86	103.0 4.06	3.3 0.13	143.0 5.63	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	2.10 4.63
15.083 0.5938	11.112 0.4375	3.0 0.12	1.5 0.06	94.0 3.70	97.0 3.82	1.5 0.06	117.0 4.61	115.0 4.53	0.50 0.02	2.00 0.08	73.4	74.1	0.0996	0.47 1.04
20.638 0.8125	16.670 0.6563	0.0 0.00	1.5 0.06	94.0 3.70	97.0 3.82	1.5 0.06	119.0 4.69	116.0 4.57	0.50 0.02	2.10 0.08	111	74.7	0.1152	0.74 1.63
20.638 0.8125	19.050 0.7500	0.0 0.00	1.5 0.06	94.0 3.70	97.0 3.82	1.5 0.06	121.0 4.76	117.0 4.61	0.50 0.02	2.10 0.08	111	74.7	0.1152	0.85 1.87
28.971 1.1406	21.433 0.8438	3.0 0.12	3.0 0.12	98.0 3.86	104.0 4.09	3.0 0.12	142.0 5.59	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.93 4.26
28.971 1.1406	24.608 0.9688	3.0 0.12	3.0 0.12	98.0 3.86	104.0 4.09	3.3 0.13	143.0 5.63	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	2.07 4.57
36.322 1.4300	27.000 1.0630	-2.5 -0.10	6.4 0.25	98.0 3.86	110.0 4.33	2.5 0.10	143.0 5.63	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.44 5.37

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

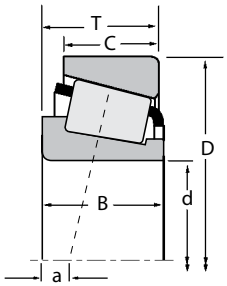
(7) Compound radius on inner race. Details on drawing for bearing.

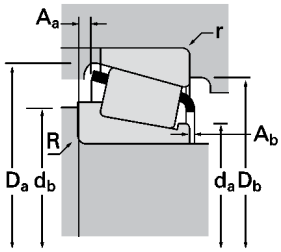
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
88.900 3.5000	150.000 5.9055	35.966 1.4160	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	593	JM719113
88.900 3.5000	150.000 5.9055	35.992 1.4170	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	593	593X
88.900 3.5000	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	593	592A
88.900 3.5000	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	593A	592A
88.900 3.5000	152.400 6.0000	39.688 1.5625	275000 61800	0.40	1.49	71200 16000	49000 11000	1.45	404000 90800	HM518445	HM518410
88.900 3.5000	159.995 6.2990	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	759	752A
88.900 3.5000	160.000 6.2992	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6580	6525X
88.900 3.5000	160.096 6.3030	30.124 1.1860	167000 37600	0.42	1.42	43400 9750	31400 7060	1.38	230000 51700	69350X	69630
88.900 3.5000	161.925 6.3750	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	759	752
88.900 3.5000	161.925 6.3750	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	766	752
88.900 3.5000	161.925 6.3750	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6580	6535
88.900 3.5000	161.925 6.3750	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6580	6536
88.900 3.5000	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	679	672
88.900 3.5000	168.275 6.6250	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	759	753
88.900 3.5000	168.275 6.6250	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	766	753
88.900 3.5000	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	850	832
88.900 3.5000	171.450 6.7500	47.625 1.8750	315000 70700	0.37	1.63	81500 18300	51200 11500	1.59	474000 107000	77350	77675
88.900 3.5000	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	775	772
88.900 3.5000	190.500 7.5000	57.150 2.2500	424000 95300	0.33	1.79	110000 24700	63000 14200	1.74	630000 142000	855	854
88.900 3.5000	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221434	HH221410
88.900 3.5000	200.000 7.8740	52.761 2.0772	376000 84600	0.63	0.95	97500 21900	106000 23700	0.92	519000 117000	98350	98788
89.090 3.5075	147.638 5.8125	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	593-S	592XE
89.090 3.5075	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	593-S	592A
89.891 3.5390	168.275 6.6250	53.975 2.1250	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	850A	832
89.975 3.5423	146.975 5.7864	40.000 1.5748	254000 57000	0.33	1.80	65800 14800	37400 8420	1.76	388000 87300	HM218248	HM218210
89.992 3.5430	160.096 6.3030	30.124 1.1860	167000 37600	0.42	1.42	43400 9750	31400 7060	1.38	230000 51700	69354	69630
90.000 3.5433	135.000 5.3150	24.000 0.9449	110000 24600	0.49	1.21	28400 6390	24000 5410	1.18	155000 34900	JP9049	JP9010
90.000 3.5433	140.000 5.5118	32.000 1.2598	170000 38200	0.42	1.42	44000 9890	31900 7160	1.38	264000 59400	XAA32018X	Y32018X

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	98.0 3.86	104.0 4.09	2.5 0.10	143.0 5.63	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.47 5.44
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	98.0 3.86	104.0 4.09	3.0 0.12	142.0 5.59	134.0 5.28	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.46 5.43
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	98.0 3.86	104.0 4.09	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.75 6.05
36.322 1.4300	30.162 1.1875	-2.5 -0.10	6.4 0.25	98.0 3.86	110.0 4.33	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.71 5.98
39.688 1.5625	30.162 1.1875	-6.4 -0.25	6.4 0.25	100.0 3.94	112.0 4.41	3.3 0.13	147.0 5.79	137.0 5.39	3.20 0.13	3.50 0.14	162	33.7	0.0966	2.79 6.14
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	99.0 3.90	106.0 4.17	0.8 0.03	150.0 5.91	146.0 5.75	3.30 0.13	0.90 0.04	177	29.4	0.0945	3.94 8.69
55.100 2.1693	44.450 1.7500	-13.2 -0.52	3.5 0.14	102.0 4.01	109.0 4.29	3.0 0.12	153.5 6.04	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	4.52 9.97
30.162 1.1875	22.301 0.8780	-0.5 -0.02	2.3 0.09	98.0 3.86	102.0 4.02	3.3 0.13	149.0 5.87	143.0 5.63	3.80 0.15	2.50 0.10	117	39.6	0.0874	2.40 5.28
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	99.0 3.90	106.0 4.17	3.3 0.13	150.0 5.91	144.0 5.67	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.07 8.97
48.260 1.9000	38.100 1.5000	-11.9 -0.47	7.0 0.28	99.0 3.90	113.0 4.45	3.3 0.13	150.0 5.91	144.0 5.67	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.02 8.87
55.100 2.1693	42.862 1.6875	-13.2 -0.52	3.5 0.14	102.0 4.01	109.0 4.29	3.3 0.13	154.0 6.06	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	4.66 10.28
55.100 2.1693	42.862 1.6875	-13.2 -0.52	3.5 0.14	102.0 4.01	109.0 4.29	0.8 0.03	154.0 6.06	144.0 5.67	4.10 0.16	0.90 0.03	199	33.5	0.1037	4.68 10.32
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.98 8.77
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	99.0 3.90	106.0 4.17	3.3 0.13	150.0 5.91	147.0 5.79	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.54 10.01
48.260 1.9000	38.100 1.5000	-11.9 -0.47	7.0 0.28	99.0 3.90	113.0 4.45	3.3 0.13	150.0 5.91	147.0 5.79	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.49 9.91
56.363 2.2190	41.275 1.6250	-18.5 -0.73	3.5 0.14	100.0 3.94	106.0 4.17	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	5.04 11.12
48.260 1.9000	38.100 1.5000	-9.7 -0.38	5.0 0.20	101.0 3.98	110.0 4.33	3.3 0.13	161.0 6.34	153.0 6.02	3.50 0.14	1.00 0.04	206	37.7	0.1017	4.87 10.74
48.006 1.8900	38.100 1.5000	-8.1 -0.32	4.8 0.19	103.0 4.06	112.0 4.41	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	41.3	0.1067	5.73 12.64
57.531 2.2650	44.450 1.7500	-15.2 -0.60	8.0 0.31	103.0 4.06	118.0 4.65	3.3 0.13	174.0 6.85	170.0 6.69	5.60 0.22	0.60 0.02	264	44.9	0.1072	7.65 16.87
57.531 2.2650	46.038 1.8125	-15.0 -0.59	8.0 0.31	105.0 4.13	120.0 4.72	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	8.07 17.78
49.212 1.9375	34.925 1.3750	1.3 0.05	3.5 0.14	112.0 4.41	118.0 4.65	3.3 0.13	188.0 7.40	174.0 6.85	8.60 0.34	5.40 0.21	203	37.4	0.1197	7.49 16.51
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	98.0 3.86	105.0 4.13	0.8 0.03	142.0 5.59	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.34 5.16
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	98.0 3.86	105.0 4.13	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.74 6.04
56.363 2.2190	41.275 1.6250	-18.5 -0.73	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	155.0 6.10	149.0 5.87	5.20 0.20	1.60 0.06	198	34.8	0.0937	4.98 10.98
40.000 1.5748	32.500 1.2795	-8.6 -0.34	7.0 0.28	99.0 3.90	112.0 4.41	3.5 0.14	141.0 5.55	133.0 5.24	1.40 0.06	2.90 0.12	168	34.7	0.0921	2.53 5.58
30.162 1.1875	22.301 0.8780	-0.5 -0.02	2.3 0.09	99.0 3.90	103.0 4.06	3.3 0.13	149.0 5.87	143.0 5.63	3.80 0.15	2.50 0.10	117	39.6	0.0874	2.36 5.20
22.500 0.8858	17.500 0.6890	5.6 0.22	2.0 0.08	97.0 3.82	100.0 3.94	2.0 0.08	130.0 5.12	125.0 4.92	1.90 0.07	3.30 0.13	83.8	46	0.1196	1.09 2.41
32.000 1.2598	24.000 0.9449	-2.0 -0.08	6.0 0.24	98.0 3.86	111.0 4.37	1.5 0.06	134.0 5.28	128.0 5.04	3.20 0.13	2.20 0.09	128	41.1	0.1317	1.70 3.75

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

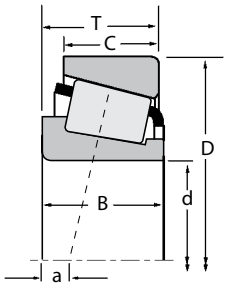
[7] Compound radius on inner race. Details on drawing for bearing.

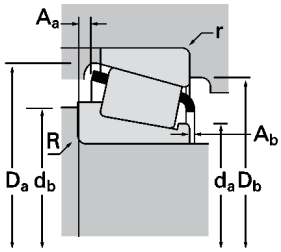
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
90.000 3.5433	145.000 5.7087	35.000 1.3780	206000 46300	0.44	1.35	53400 12000	40600 9130	1.31	313000 70500	JM718149A	JM718110
90.000 3.5433	145.000 5.7087	35.000 1.3780	206000 46300	0.44	1.35	53400 12000	40600 9130	1.31	313000 70500	JM718149	JM718110
90.000 3.5433	149.225 5.8750	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42354X	42587
90.000 3.5433	150.000 5.9055	35.992 1.4170	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	597X	593X
90.000 3.5433	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	597X	592A
90.000 3.5433	155.000 6.1024	44.000 1.7323	306000 68900	0.34	1.76	79400 17900	46400 10400	1.71	447000 101000	JHM318448	JHM318410
90.000 3.5433	160.000 6.2992	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6581X	6525X
90.000 3.5433	161.925 6.3750	53.975 2.1250	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6581X	6535
90.000 3.5433	190.000 7.4803	50.800 2.0000	299000 67300	0.87	0.69	77600 17400	115000 25900	0.67	392000 88100	J90354	J90748
90.000 3.5433	190.000 7.4803	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	JHH221436	JHH221413
90.488 3.5625	161.925 6.3750	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	760	752
90.488 3.5625	168.275 6.6250	47.625 1.8750	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	760	753
91.975 3.6210	142.875 5.6250	30.000 1.1811	152000 34100	0.48	1.25	39300 8830	32200 7230	1.22	240000 53900	LM718947	LM718910
92.075 3.6250	130.175 5.1250	20.638 0.8125	88300 19900	0.35	1.72	22900 5150	13700 3080	1.67	166000 37400	L319245	L319210
92.075 3.6250	146.050 5.7500	33.338 1.3125	182000 41000	0.45	1.34	47300 10600	36300 8160	1.30	307000 69000	47890	47820
92.075 3.6250	147.638 5.8125	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	598	592XE
92.075 3.6250	147.638 5.8125	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	598	592XS
92.075 3.6250	148.430 5.8437	28.575 1.1250	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42362	42584
92.075 3.6250	149.225 5.8750	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42362	42587
92.075 3.6250	150.000 5.9055	35.966 1.4160	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	598	JM719113
92.075 3.6250	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	598	592A
92.075 3.6250	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	598	592-S
92.075 3.6250	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	598A	592A
92.075 3.6250	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	598X	592A
92.075 3.6250	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	681	672
92.075 3.6250	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	681A	672
92.075 3.6250	171.450 6.7500	47.625 1.8750	315000 70700	0.37	1.63	81500 18300	51200 11500	1.59	474000 107000	77362	77675
92.075 3.6250	171.450 6.7500	47.625 1.8750	315000 70700	0.37	1.63	81500 18300	51200 11500	1.59	474000 107000	77364	77675

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
34.000 1.3386	27.000 1.0630	-2.0 -0.08	6.0 0.24	99.0 3.90	112.0 4.41	2.5 0.10	138.5 5.46	131.0 5.16	2.10 0.08	3.80 0.15	138	35.1	0.0946	2.13 4.69
34.000 1.3386	27.000 1.0630	-2.0 -0.08	3.0 0.12	99.0 3.90	106.0 4.17	2.5 0.10	138.5 5.46	131.0 5.16	2.10 0.08	3.80 0.15	138	35.1	0.0946	2.14 4.72
28.971 1.1406	24.608 0.9688	3.0 0.12	3.0 0.12	99.0 3.90	104.0 4.09	3.3 0.13	143.0 5.63	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	2.04 4.49
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.0 0.12	99.0 3.90	104.0 4.09	3.0 0.12	142.0 5.59	134.0 5.28	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.42 5.34
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.0 0.12	99.0 3.90	104.0 4.09	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.71 5.97
44.000 1.7323	35.500 1.3976	-9.9 -0.39	3.0 0.12	100.0 3.94	106.0 4.17	2.5 0.10	148.0 5.83	140.0 5.51	1.30 0.05	3.30 0.13	179	32.4	0.0948	3.32 7.31
55.100 2.1693	44.450 1.7500	-13.2 -0.52	3.0 0.12	102.0 4.02	109.0 4.29	3.0 0.12	153.5 6.04	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	4.47 9.86
55.100 2.1693	42.862 1.6875	-13.2 -0.52	3.0 0.12	102.0 4.02	109.0 4.29	3.3 0.13	154.0 6.06	141.0 5.55	4.10 0.16	0.90 0.03	199	33.5	0.1037	4.61 10.16
46.038 1.8125	31.750 1.2500	12.7 0.50	3.5 0.14	112.0 4.40	120.0 4.72	3.3 0.13	179.5 7.06	162.0 6.38	11.00 0.43	3.60 0.14	150	23.8	0.1180	6.04 13.31
57.531 2.2650	46.038 1.8125	-15.0 -0.59	8.0 0.31	106.0 4.17	121.0 4.76	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	7.94 17.51
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	150.0 5.91	144.0 5.67	3.30 0.13	0.90 0.04	177	29.4	0.0945	3.98 8.78
48.260 1.9000	38.100 1.5000	-11.9 -0.47	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	150.0 5.91	147.0 5.79	3.30 0.13	0.90 0.04	177	29.4	0.0945	4.45 9.82
30.000 1.1811	22.000 0.8661	1.8 0.07	3.5 0.14	100.0 3.94	106.0 4.17	3.3 0.13	138.0 5.43	129.0 5.08	2.70 0.11	1.90 0.08	124	37.6	0.1355	1.63 3.60
21.433 0.8438	16.670 0.6563	1.3 0.05	3.5 0.14	99.0 3.90	105.0 4.13	1.5 0.06	125.0 4.92	122.0 4.80	0.70 0.03	1.40 0.05	125	90.7	0.1220	0.86 1.89
34.925 1.3750	26.195 1.0313	-1.0 -0.04	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	140.0 5.51	131.0 5.16	2.60 0.10	0.30 0.01	153	38.1	0.1428	2.05 4.53
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	101.0 3.98	107.0 4.21	0.8 0.03	142.0 5.59	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.22 4.89
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	142.0 5.59	133.0 5.24	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.20 4.85
28.971 1.1406	21.433 0.8438	3.0 0.12	3.5 0.14	101.0 3.98	107.0 4.21	3.0 0.12	142.0 5.59	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.82 4.02
28.971 1.1406	24.608 0.9688	3.0 0.12	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	143.0 5.63	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.96 4.33
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	101.0 3.98	107.0 4.21	2.5 0.10	143.0 5.63	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.34 5.16
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.62 5.77
36.322 1.4300	39.688 1.5625	-2.5 -0.10	3.5 0.14	101.0 3.98	107.0 4.21	3.3 0.13	147.0 5.79	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.76 6.09
36.322 1.4300	30.162 1.1875	-2.5 -0.10	6.4 0.25	101.0 3.98	113.0 4.45	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.59 5.70
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	104.0 4.09	107.0 4.21	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.61 5.76
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	104.0 4.09	110.0 4.33	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.83 8.45
41.275 1.6250	30.162 1.1875	-2.8 -0.11	6.4 0.25	104.0 4.09	116.0 4.57	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.80 8.38
48.260 1.9000	38.100 1.5000	-9.7 -0.38	3.5 0.14	103.0 4.06	109.0 4.29	3.3 0.13	161.0 6.34	153.0 6.02	3.50 0.14	1.00 0.04	206	37.7	0.1017	4.72 10.40
48.260 1.9000	38.100 1.5000	-9.7 -0.38	6.4 0.25	103.0 4.06	115.0 4.53	3.3 0.13	161.0 6.34	153.0 6.02	3.50 0.14	1.00 0.04	206	37.7	0.1017	4.68 10.33

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

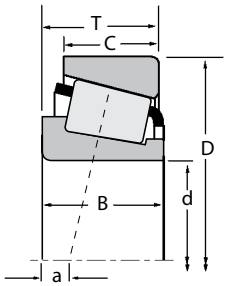
[7] Compound radius on inner race. Details on drawing for bearing.

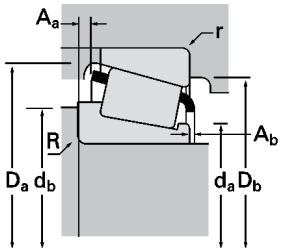
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
92.075 3.6250	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	778	772
92.075 3.6250	190.500 7.5000	57.150 2.2500	424000 95300	0.33	1.79	110000 24700	63000 14200	1.74	630000 142000	857	854
92.075 3.6250	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221438	HH221410
92.075 3.6250	214.312 8.4375	73.025 2.8750	596000 134000	0.46	1.31	155000 34800	121000 27300	1.27	786000 177000	EE213362	213843
93.662 3.6875	148.430 5.8437	28.575 1.1250	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42368	42584
93.662 3.6875	149.225 5.8750	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42368	42587
93.662 3.6875	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	597	592A
94.975 3.7392	149.974 5.9045	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42373	42590
94.975 3.7392	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	682	672
95.000 3.7402	135.000 5.3150	20.000 0.7874	76900 17300	0.58	1.03	19900 4480	19900 4470	1.00	133000 29900	JL819349	JL819310
95.000 3.7402	145.000 5.7087	24.000 0.9449	116000 26100	0.47	1.27	30100 6770	24400 5480	1.24	172000 38700	JP10044	JP10010
95.000 3.7402	145.000 5.7087	39.000 1.5354	228000 51300	0.28	2.16	59100 13300	28100 6320	2.10	378000 85100	XAA33019	Y33019
95.000 3.7402	150.000 5.9055	35.000 1.3780	199000 44700	0.44	1.36	51500 11600	39000 8770	1.32	316000 71100	JM719149	JM719113
95.000 3.7402	152.400 6.0000	39.690 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	J594X	592A
95.000 3.7402	160.000 6.2992	46.000 1.8110	328000 73800	0.34	1.77	85100 19100	49300 11100	1.73	506000 114000	JF9549	JF9510
95.000 3.7402	190.000 7.4803	57.000 2.2441	424000 95300	0.33	1.79	110000 24700	63000 14200	1.74	630000 142000	862	853
95.250 3.7500	130.175 5.1250	20.638 0.8125	88300 19900	0.35	1.72	22900 5150	13700 3080	1.67	166000 37400	L319249	L319210
95.250 3.7500	136.525 5.3750	30.162 1.1875	129000 29100	0.28	2.11	33500 7530	16300 3660	2.06	227000 51100	LM119348	LM119311
95.250 3.7500	146.050 5.7500	33.338 1.3125	182000 41000	0.45	1.34	47300 10600	36300 8160	1.30	307000 69000	47896	47820
95.250 3.7500	146.050 5.7500	33.338 1.3125	182000 41000	0.45	1.34	47300 10600	36300 8160	1.30	307000 69000	47898	47820
95.250 3.7500	147.638 5.8125	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	594	592XS
95.250 3.7500	147.828 5.8200	35.717 1.4062	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	594	592AX
95.250 3.7500	148.430 5.8437	28.575 1.1250	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42375	42584
95.250 3.7500	148.430 5.8437	28.575 1.1250	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42376	42584
95.250 3.7500	148.430 5.8437	28.575 1.1250	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42375A	42584
95.250 3.7500	149.225 5.8750	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42375	42587
95.250 3.7500	149.225 5.8750	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42376	42587
95.250 3.7500	150.000 5.9055	35.966 1.4160	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	594AA	JM719113

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
48.006 1.8900	38.100 1.5000	-8.1 -0.32	3.5 0.14	105.0 4.13	111.0 4.37	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	41.3	0.1067	5.57 12.29
57.531 2.2650	44.450 1.7500	-15.2 -0.60	8.0 0.31	106.0 4.17	121.0 4.76	3.3 0.13	174.0 6.85	170.0 6.69	5.60 0.22	0.60 0.02	264	44.9	0.1072	7.45 16.42
57.531 2.2650	46.038 1.8125	-15.0 -0.59	8.0 0.31	107.0 4.21	122.0 4.80	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	7.86 17.33
73.025 2.8750	53.975 2.1250	-18.3 -0.72	9.7 0.38	117.0 4.61	135.0 5.31	6.4 0.25	196.0 7.71	182.0 7.17	* *	* *	262	38.1	0.1180	12.33 27.19
28.971 1.1406	21.433 0.8438	3.0 0.12	3.0 0.12	102.0 4.02	107.0 4.21	3.0 0.12	142.0 5.59	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.78 3.91
28.971 1.1406	24.608 0.9688	3.0 0.12	3.0 0.12	102.0 4.02	107.0 4.21	3.3 0.13	143.0 5.63	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.92 4.22
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	102.0 4.02	109.0 4.29	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.55 5.63
28.971 1.1406	24.608 0.9688	3.0 0.12	3.0 0.12	103.0 4.06	108.0 4.25	3.3 0.13	143.0 5.63	135.0 5.31	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.91 4.22
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	106.0 4.17	113.0 4.45	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.69 8.15
20.000 0.7874	14.000 0.5512	10.9 0.43	5.0 0.20	102.0 4.02	111.0 4.37	2.5 0.10	129.0 5.08	123.0 4.84	2.50 0.10	1.40 0.05	93.3	70.5	0.1298	0.85 1.88
22.500 0.8858	17.500 0.6890	6.1 0.24	3.0 0.12	102.0 4.02	108.0 4.25	3.0 0.12	140.0 5.51	134.0 5.28	1.90 0.08	3.30 0.13	104	40.9	0.1264	1.27 2.79
39.000 1.5354	32.500 1.2795	-10.2 -0.40	6.0 0.24	102.0 4.02	114.0 4.49	1.5 0.06	139.0 5.47	133.0 5.24	1.90 0.07	2.30 0.09	192	48.4	0.0907	2.23 4.93
34.000 1.3386	27.000 1.0630	-1.5 -0.06	3.0 0.12	104.0 4.09	109.0 4.29	2.5 0.10	143.0 5.63	135.0 5.31	3.10 0.12	3.00 0.12	150	36.1	0.1413	2.17 4.78
36.322 1.4300	30.162 1.1875	2.5 0.10	8.0 0.31	103.0 4.06	119.0 4.69	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	38.3	0.1416	2.43 5.37
46.000 1.8110	38.000 1.4961	-10.7 -0.42	3.0 0.12	105.5 4.15	111.0 4.37	3.0 0.12	154.0 6.06	145.0 5.71	1.40 0.06	3.00 0.12	210	39.7	0.0998	3.73 8.22
57.531 2.2650	48.000 1.8898	-15.2 -0.60	6.4 0.25	108.0 4.25	120.0 4.72	3.0 0.12	174.0 6.86	170.0 6.69	5.60 0.22	0.60 0.02	264	44.9	0.1072	7.36 16.22
21.433 0.8438	16.670 0.6563	1.3 0.05	1.5 0.06	101.0 3.98	103.0 4.06	1.5 0.06	125.0 4.92	122.0 4.80	0.70 0.03	1.40 0.05	125	90.7	0.1220	0.79 1.75
30.162 1.1875	24.608 0.9688	-4.6 -0.18	2.3 0.09	102.0 4.02	105.0 4.13	2.3 0.09	131.0 5.16	126.0 4.96	1.30 0.05	-0.20 -0.01	149	69	0.1213	1.35 2.97
34.925 1.3750	26.195 1.0313	-1.0 -0.04	3.5 0.14	103.0 4.06	110.0 4.33	3.3 0.13	140.0 5.51	131.0 5.16	2.60 0.10	0.30 0.01	153	38.1	0.1428	1.93 4.25
34.925 1.3750	26.195 1.0313	-1.0 -0.04	7.0 0.28	103.0 4.06	117.0 4.61	3.3 0.13	140.0 5.51	131.0 5.16	2.60 0.10	0.30 0.01	153	38.1	0.1428	1.87 4.12
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	104.0 4.09	110.0 4.33	3.3 0.13	142.0 5.59	133.0 5.24	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.07 4.56
36.322 1.4300	26.192 1.0312	-2.5 -0.10	3.5 0.14	104.0 4.09	110.0 4.33	3.3 0.13	142.0 5.59	133.0 5.24	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.10 4.63
28.971 1.1406	21.433 0.8438	3.0 0.12	3.0 0.12	103.0 4.06	108.0 4.25	3.0 0.12	142.0 5.59	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.73 3.82
28.971 1.1406	21.433 0.8438	3.0 0.12	3.5 0.14	103.0 4.06	109.0 4.29	3.0 0.12	142.0 5.59	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.72 3.79
28.971 1.1406	21.433 0.8438	3.0 0.12	0.8 0.03	103.0 4.06	104.0 4.09	3.0 0.12	142.0 5.59	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.73 3.82
28.971 1.1406	24.608 0.9688	3.0 0.12	3.0 0.12	103.0 4.06	108.0 4.25	3.3 0.13	143.0 5.63	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.87 4.13
28.971 1.1406	24.608 0.9688	3.0 0.12	3.5 0.14	103.0 4.06	109.0 4.29	3.3 0.13	143.0 5.63	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.86 4.10
36.322 1.4300	27.000 1.0630	-2.5 -0.10	0.8 0.03	104.0 4.09	107.0 4.21	2.5 0.10	143.0 5.63	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.22 4.90

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

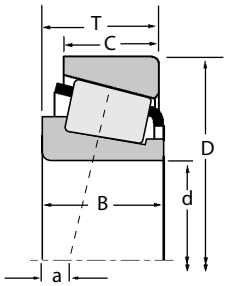
(7) Compound radius on inner race. Details on drawing for bearing.

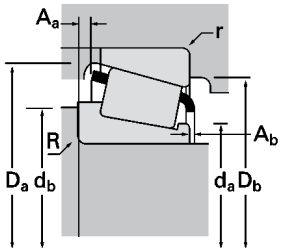
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
95.250 3.7500	150.000 5.9055	35.966 1.4160	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	594	JM719113
95.250 3.7500	150.000 5.9055	35.992 1.4170	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	594	593X
95.250 3.7500	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	594	592A
95.250 3.7500	152.400 6.0000	39.688 1.5625	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	594A	592A
95.250 3.7500	157.162 6.1875	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52375	52618
95.250 3.7500	161.925 6.3750	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52375	52637
95.250 3.7500	161.925 6.3750	39.690 1.5626	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52375	52638
95.250 3.7500	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	683	672
95.250 3.7500	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	683XA	672
95.250 3.7500	171.450 6.7500	47.625 1.8750	315000 70700	0.37	1.63	81500 18300	51200 11500	1.59	474000 107000	77375	77675
95.250 3.7500	171.450 6.7500	47.625 1.8750	315000 70700	0.37	1.63	81500 18300	51200 11500	1.59	474000 107000	77376	77675
95.250 3.7500	171.450 6.7500	50.800 2.0000	315000 70700	0.37	1.63	81500 18300	51200 11500	1.59	474000 107000	77375	77676X
95.250 3.7500	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	776	772
95.250 3.7500	190.500 7.5000	57.150 2.2500	424000 95300	0.33	1.79	110000 24700	63000 14200	1.74	630000 142000	864	854
95.250 3.7500	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221440	HH221410
95.250 3.7500	200.025 7.8750	61.912 2.4375	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221440	HH221416
95.250 3.7500	200.025 7.8750	73.025 2.8750	662000 149000	0.32	1.88	172000 38600	93700 21100	1.83	906000 204000	EH220749	EH220710
96.838 3.8125	148.430 5.8437	28.575 1.1250	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42381	42584
96.838 3.8125	149.225 5.8750	31.750 1.2500	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42381	42587
96.838 3.8125	188.912 7.4375	50.800 2.0000	299000 67300	0.87	0.69	77600 17400	115000 25900	0.67	392000 88100	90381	90744
98.425 3.8750	157.162 6.1875	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52387	52618
98.425 3.8750	161.925 6.3750	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52387	52637
98.425 3.8750	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	685	672
98.425 3.8750	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	779	772
98.425 3.8750	184.150 7.2500	63.500 2.5000	491000 110000	0.37	1.60	127000 28600	81500 18300	1.56	772000 174000	HH421246C	HH421210
98.425 3.8750	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221442	HH221410
98.425 3.8750	212.725 8.3750	66.675 2.6250	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224332	HH224310
99.975 3.9360	156.975 6.1801	42.000 1.6535	278000 62500	0.33	1.80	72100 16200	41000 9230	1.76	438000 98500	HM220149	HM220110

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	104.0 4.09	110.0 4.33	2.5 0.10	143.0 5.63	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.21 4.87
36.322 1.4300	27.000 1.0630	-2.5 -0.10	3.5 0.14	104.0 4.09	110.0 4.33	3.0 0.12	142.0 5.59	134.0 5.28	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.20 4.85
36.322 1.4300	30.162 1.1875	-2.5 -0.10	3.5 0.14	104.0 4.09	110.0 4.33	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.48 5.48
36.322 1.4300	30.162 1.1875	-2.5 -0.10	5.0 0.20	104.0 4.09	113.0 4.45	3.3 0.13	144.0 5.67	135.0 5.31	4.10 0.16	1.70 0.07	151	36.8	0.1416	2.47 5.44
36.116 1.4219	26.195 1.0313	-0.5 -0.02	3.5 0.14	105.0 4.13	112.0 4.41	3.3 0.13	152.0 5.98	142.0 5.59	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.66 5.86
36.116 1.4219	26.195 1.0313	-0.5 -0.02	3.5 0.14	105.0 4.13	112.0 4.41	3.3 0.13	154.0 6.06	144.0 5.67	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.90 6.39
36.116 1.4219	29.370 1.1563	-0.5 -0.02	3.5 0.14	105.0 4.13	112.0 4.41	3.3 0.13	154.0 6.06	143.0 5.63	4.40 0.17	2.50 0.10	175	41.7	0.1519	3.07 6.76
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	106.0 4.17	113.0 4.45	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.68 8.12
41.275 1.6250	30.162 1.1875	-2.8 -0.11	5.0 0.20	106.0 4.17	116.0 4.57	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.67 8.08
48.260 1.9000	38.100 1.5000	-9.7 -0.38	3.5 0.14	106.0 4.17	113.0 4.45	3.3 0.13	161.0 6.34	153.0 6.02	3.50 0.14	1.00 0.04	206	37.7	0.1017	4.54 10.01
48.260 1.9000	38.100 1.5000	-9.7 -0.38	6.4 0.25	106.0 4.17	118.0 4.65	3.3 0.13	161.0 6.34	153.0 6.02	3.50 0.14	1.00 0.04	206	37.7	0.1017	4.51 9.93
48.260 1.9000	41.275 1.6250	-9.7 -0.38	3.5 0.14	106.0 4.17	113.0 4.45	3.3 0.13	161.0 6.34	152.0 5.98	3.50 0.14	1.00 0.04	206	37.7	0.1017	4.74 10.44
48.006 1.8900	38.100 1.5000	-8.1 -0.32	3.5 0.14	107.0 4.21	114.0 4.49	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	41.3	0.1067	5.40 11.90
57.531 2.2650	44.450 1.7500	-15.2 -0.60	8.0 0.31	108.0 4.25	123.0 4.84	3.3 0.13	174.0 6.85	170.0 6.69	5.60 0.22	0.60 0.02	264	44.9	0.1072	7.24 15.95
57.531 2.2650	46.038 1.8125	-15.0 -0.59	8.0 0.31	110.0 4.33	125.0 4.92	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	7.65 16.86
57.531 2.2650	50.800 2.0000	-15.0 -0.59	8.0 0.31	110.0 4.33	125.0 4.92	3.3 0.13	179.0 7.05	174.0 6.85	2.50 0.10	3.20 0.13	266	28.4	0.1072	9.15 20.17
73.025 2.8750	58.738 2.3125	-24.6 -0.97	3.3 0.13	115.5 4.55	120.0 4.72	3.3 0.13	187.0 7.36	177.0 6.97	5.80 0.23	2.40 0.09	306	26.2	0.1106	10.64 23.46
28.971 1.1406	21.433 0.8438	3.0 0.12	3.5 0.14	104.0 4.09	110.0 4.33	3.0 0.12	142.0 5.59	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.66 3.67
28.971 1.1406	24.608 0.9688	3.0 0.12	3.5 0.14	104.0 4.09	110.0 4.33	3.3 0.13	143.0 5.63	134.0 5.28	2.80 0.11	3.00 0.12	130	37.2	0.1386	1.80 3.98
46.038 1.8125	31.750 1.2500	12.7 0.50	3.5 0.14	113.0 4.44	125.0 4.92	3.3 0.13	179.5 7.06	161.0 6.34	11.00 0.43	3.60 0.14	150	22.1	0.1180	5.59 12.33
36.116 1.4219	26.195 1.0313	-0.5 -0.02	3.5 0.14	108.0 4.25	114.0 4.49	3.3 0.13	152.0 5.98	142.0 5.59	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.52 5.55
36.116 1.4219	26.195 1.0313	-0.5 -0.02	3.5 0.14	108.0 4.25	114.0 4.49	3.3 0.13	154.0 6.06	144.0 5.67	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.76 6.08
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	109.0 4.29	116.0 4.57	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.53 7.77
48.006 1.8900	38.100 1.5000	-8.1 -0.32	3.5 0.14	110.0 4.33	116.0 4.57	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	41.3	0.1067	5.22 11.50
63.500 2.5000	52.388 2.0625	-16.8 -0.66	6.4 0.25	115.0 4.53	127.0 5.00	3.3 0.13	176.0 6.93	163.0 6.42	3.10 0.12	3.10 0.12	298	40.9	0.1162	7.31 16.11
57.531 2.2650	46.038 1.8125	-15.0 -0.59	3.5 0.14	113.0 4.45	119.0 4.69	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	7.49 16.52
66.675 2.6250	53.975 2.1250	-18.8 -0.74	3.5 0.14	119.0 4.69	123.0 4.84	3.3 0.13	201.5 7.94	192.0 7.56	4.90 0.19	2.80 0.11	367	47.8	0.1182	11.31 24.94
42.000 1.6535	34.000 1.3386	-8.6 -0.34	8.0 0.31	108.0 4.25	123.0 4.84	3.5 0.14	151.0 5.94	142.0 5.59	2.10 0.08	2.40 0.09	204	45.9	0.0981	2.80 6.17

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

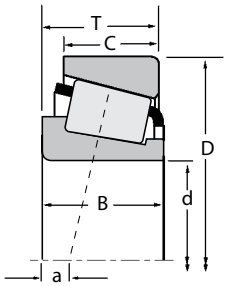
[7] Compound radius on inner race. Details on drawing for bearing.

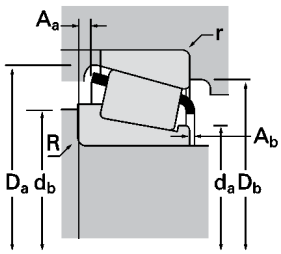
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
99.975 3.9360	214.975 8.4636	64.798 2.5511	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224334	HH224314
100.000 3.9370	145.000 5.7087	24.000 0.9449	116000 26100	0.47	1.27	30100 6770	24400 5480	1.24	172000 38700	JP10049A	JP10010
100.000 3.9370	145.000 5.7087	24.000 0.9449	116000 26100	0.47	1.27	30100 6770	24400 5480	1.24	172000 38700	JP10049	JP10010
100.000 3.9370	145.000 5.7087	24.000 0.9449	116000 26100	0.47	1.27	30100 6770	24400 5480	1.24	172000 38700	JP10049	JP10010A
100.000 3.9370	150.000 5.9055	32.000 1.2598	150000 33800	0.50	1.20	39000 8770	33500 7530	1.16	242000 54400	JLM820048	JLM820012
100.000 3.9370	155.000 6.1024	36.000 1.4173	214000 48200	0.47	1.27	55600 12500	45000 10100	1.24	355000 79900	JM720249	JM720210
100.000 3.9370	160.000 6.2992	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52394X	52630X
100.000 3.9370	160.000 6.2992	41.000 1.6142	259000 58100	0.47	1.28	67000 15100	54000 12100	1.24	416000 93500	JHM720249	JHM720210
100.000 3.9370	180.000 7.0866	48.000 1.8898	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	783	773
100.000 3.9370	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	783	772
100.000 3.9370	200.000 7.8740	52.761 2.0772	376000 84600	0.63	0.95	97500 21900	106000 23700	0.92	519000 117000	98394X	98788
100.000 3.9370	215.000 8.4646	66.680 2.6250	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	JHH224333	JHH224315
100.012 3.9375	157.162 6.1875	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52393	52618
100.012 3.9375	161.925 6.3750	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52393	52637
100.012 3.9375	161.925 6.3750	39.688 1.5625	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52393	52638
101.600 4.0000	134.938 5.3125	15.875 0.6250	60100 13500	0.37	1.62	15600 3500	9890 2220	1.58	104000 23400	LL420549	LL420510
101.600 4.0000	136.525 5.3750	21.433 0.8438	90500 20400	0.37	1.63	23500 5280	14800 3330	1.59	175000 39400	L420449	L420410
101.600 4.0000	146.050 5.7500	21.433 0.8438	88900 20000	0.39	1.53	23100 5180	15500 3480	1.49	175000 39400	L521945	L521910
101.600 4.0000	146.050 5.7500	25.400 1.0000	122000 27400	0.46	1.31	31600 7100	24800 5580	1.27	202000 45400	LM720648	LM720610
101.600 4.0000	152.400 6.0000	21.433 0.8438	88900 20000	0.39	1.53	23100 5180	15500 3480	1.49	175000 39400	L521945	L521914
101.600 4.0000	157.162 6.1875	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52400	52618
101.600 4.0000	157.162 6.1875	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52401	52618
101.600 4.0000	160.000 6.2992	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52400	52630X
101.600 4.0000	161.925 6.3750	36.512 1.4375	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52400	52637
101.600 4.0000	161.925 6.3750	39.688 1.5625	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52400	52638
101.600 4.0000	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	687	672
101.600 4.0000	168.275 6.6250	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	687	672A
101.600 4.0000	171.450 6.7500	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	687	674

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
66.675 2.6250	50.800 2.0000	-18.8 -0.74	3.5 0.14	120.0 4.72	124.0 4.88	3.3 0.13	201.0 7.92	192.0 7.56	4.80 0.19	2.80 0.11	367	43.4	0.1182	11.30 24.91
22.500 0.8858	17.500 0.6890	6.1 0.24	5.0 0.20	106.0 4.17	116.0 4.57	3.0 0.12	140.0 5.51	134.0 5.28	1.90 0.08	3.30 0.13	104	40.9	0.1264	1.13 2.49
22.500 0.8858	17.500 0.6890	6.1 0.24	3.0 0.12	106.0 4.17	112.0 4.41	3.0 0.12	140.0 5.51	134.0 5.28	1.90 0.08	3.30 0.13	104	40.9	0.1264	1.13 2.49
22.500 0.8858	17.500 0.6890	6.1 0.24	3.0 0.12	106.0 4.17	112.0 4.41	0.8 0.03	140.0 5.51	136.0 5.35	1.90 0.08	3.30 0.13	104	40.9	0.1264	1.15 2.54
30.000 1.1811	26.000 1.0236	4.6 0.18	2.3 0.09	107.0 4.21	111.0 4.37	2.3 0.09	144.0 5.67	135.0 5.31	2.40 0.09	0.90 0.04	133	38.3	0.1405	1.81 3.99
35.000 1.3780	28.000 1.1024	0.3 0.01	3.0 0.12	109.0 4.29	115.0 4.53	2.5 0.10	149.0 5.87	140.0 5.51	3.00 0.12	3.00 0.12	175	48.5	0.1043	2.36 5.20
36.116 1.4219	26.195 1.0313	-0.5 -0.02	3.5 0.14	109.0 4.29	116.0 4.57	3.0 0.12	153.0 6.02	144.0 5.67	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.59 5.72
40.000 1.5748	32.000 1.2598	-2.5 -0.10	3.0 0.12	109.0 4.30	117.0 4.61	2.5 0.10	154.0 6.06	143.0 5.63	3.40 0.13	3.60 0.14	188	45.5	0.1068	2.99 6.60
48.006 1.8900	40.000 1.5748	-8.1 -0.32	3.5 0.14	111.0 4.37	118.0 4.65	3.0 0.12	168.0 6.61	160.0 6.30	3.60 0.14	1.30 0.05	227	41.3	0.1067	5.09 11.23
48.006 1.8900	38.100 1.5000	-8.1 -0.32	3.5 0.14	111.0 4.37	118.0 4.65	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	41.3	0.1067	5.12 11.30
49.212 1.9375	34.925 1.3750	1.3 0.05	3.5 0.14	120.5 4.75	126.0 4.96	3.3 0.13	188.0 7.40	174.0 6.85	8.60 0.34	5.40 0.21	203	37.4	0.1197	6.85 15.11
66.675 2.6250	53.975 2.1250	-18.8 -0.74	7.0 0.28	120.0 4.72	131.0 5.16	3.3 0.13	201.5 7.94	193.0 7.60	4.90 0.19	2.80 0.11	367	47.8	0.1182	11.46 25.27
36.116 1.4219	26.195 1.0313	-0.5 -0.02	3.5 0.14	109.0 4.29	116.0 4.57	3.3 0.13	152.0 5.98	142.0 5.59	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.45 5.39
36.116 1.4219	26.195 1.0313	-0.5 -0.02	3.5 0.14	109.0 4.29	116.0 4.57	3.3 0.13	154.0 6.06	144.0 5.67	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.69 5.93
36.116 1.4219	29.370 1.1563	-0.5 -0.02	3.5 0.14	109.0 4.29	116.0 4.57	3.3 0.13	154.0 6.06	143.0 5.63	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.86 6.29
15.083 0.5938	11.908 0.4688	5.6 0.22	1.5 0.06	107.0 4.21	109.0 4.29	1.5 0.06	130.0 5.12	128.0 5.04	1.10 0.04	2.10 0.08	95.5	89.7	0.1126	0.56 1.24
21.433 0.8438	16.670 0.6563	2.8 0.11	1.5 0.06	107.0 4.21	109.0 4.29	1.5 0.06	132.0 5.20	128.0 5.04	0.70 0.03	1.60 0.06	140	102	0.1286	0.84 1.86
21.433 0.8438	16.670 0.6563	4.8 0.19	1.5 0.06	109.0 4.29	112.0 4.41	1.5 0.06	141.0 5.55	136.0 5.35	0.80 0.03	1.50 0.06	152	108	0.1346	1.16 2.56
25.400 1.0000	19.050 0.7500	4.8 0.19	1.5 0.06	109.0 4.29	110.0 4.33	1.5 0.06	141.0 5.55	136.0 5.35	2.50 0.10	1.10 0.04	128	58.4	0.1342	1.29 2.84
21.433 0.8438	16.670 0.6563	4.8 0.19	1.5 0.06	109.0 4.29	112.0 4.41	1.5 0.06	144.0 5.67	139.0 5.47	0.80 0.03	1.50 0.06	152	108	0.1346	1.35 2.99
36.116 1.4219	26.195 1.0313	-5.1 -0.20	3.5 0.14	111.0 4.37	117.0 4.61	3.3 0.13	152.0 5.98	142.0 5.59	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.39 5.27
36.116 1.4219	26.195 1.0313	-0.5 -0.02	8.0 0.31	111.0 4.37	126.0 4.96	3.3 0.13	152.0 5.98	142.0 5.59	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.39 5.27
36.116 1.4219	26.195 1.0313	-5.1 -0.20	3.5 0.14	111.0 4.37	117.0 4.61	3.0 0.12	153.0 6.02	144.0 5.67	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.54 5.59
36.116 1.4219	26.195 1.0313	-5.1 -0.20	3.5 0.14	111.0 4.37	117.0 4.61	3.3 0.13	154.0 6.06	144.0 5.67	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.63 5.81
36.116 1.4219	29.370 1.1563	-5.1 -0.20	3.5 0.14	111.0 4.37	117.0 4.61	3.3 0.13	154.0 6.06	143.0 5.63	4.40 0.17	2.50 0.10	175	41.7	0.1519	2.80 6.17
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	112.0 4.41	118.0 4.65	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.36 7.42
41.275 1.6250	34.925 1.3750	-2.8 -0.11	3.5 0.14	112.0 4.41	118.0 4.65	3.3 0.13	160.0 6.30	149.0 5.87	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.46 7.64
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	112.0 4.41	118.0 4.65	3.3 0.13	160.0 6.30	150.0 5.91	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.54 7.81

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

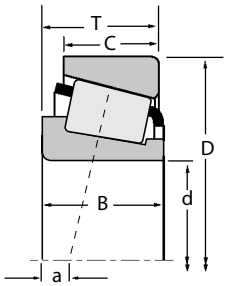
[7] Compound radius on inner race. Details on drawing for bearing.

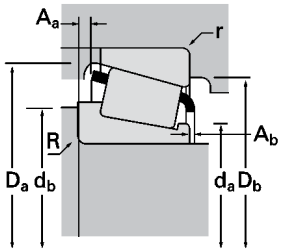
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
101.600 4.0000	177.800 7.0000	34.925 1.3750	158000 35500	1.17	0.51	40900 9200	82100 18400	0.50	219000 49200	LM921845	LM921810
101.600 4.0000	180.000 7.0866	48.000 1.8898	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	780	773
101.600 4.0000	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	780	772
101.600 4.0000	190.500 7.5000	57.150 2.2500	424000 95300	0.33	1.79	110000 24700	63000 14200	1.74	630000 142000	861	854
101.600 4.0000	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221449A	HH221410
101.600 4.0000	190.500 7.5000	57.150 2.2500	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221449	HH221410
101.600 4.0000	200.000 7.8740	52.761 2.0772	376000 84600	0.63	0.95	97500 21900	106000 23700	0.92	519000 117000	98400	98788
101.600 4.0000	212.725 8.3750	66.675 2.6250	530000 119000	0.33	1.84	137000 30900	76600 17200	1.79	786000 177000	941	932
101.600 4.0000	212.725 8.3750	66.675 2.6250	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224335	HH224310
101.600 4.0000	214.312 8.4375	55.562 2.1875	435000 97800	0.67	0.89	113000 25400	130000 29300	0.87	610000 137000	H924033	H924010
101.600 4.0000	214.975 8.4636	64.798 2.5511	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224335	HH224314
101.600 4.0000	250.825 9.8750	76.200 3.0000	647000 145000	0.70	0.86	168000 37700	201000 45100	0.84	827000 186000	HH923649	HH923611
103.188 4.0625	171.450 6.7500	41.275 1.6250	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	689	674
104.775 4.1250	142.083 5.5938	15.875 0.6250	60200 13500	0.39	1.53	15600 3510	10500 2350	1.49	107000 24000	LL521845	LL521810
104.775 4.1250	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	782	772
104.775 4.1250	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	786	772
104.775 4.1250	180.975 7.1250	47.625 1.8750	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	787	772
104.775 4.1250	190.500 7.5000	47.625 1.8750	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71412	71750
106.000 4.1732	160.000 6.2992	35.000 1.3780	210000 47300	0.44	1.35	54500 12300	41500 9320	1.31	339000 76200	XGA32021X	Y32021X
106.362 4.1875	165.100 6.5000	36.512 1.4375	210000 47100	0.50	1.21	54400 12200	46300 10400	1.18	355000 79700	56418	56650
106.975 4.2116	146.975 5.7864	28.500 1.1220	158000 35600	0.27	2.23	41000 9220	18900 4250	2.17	285000 64100	LM121349	LM121310
107.950 4.2500	142.083 5.5938	15.875 0.6250	60200 13500	0.39	1.53	15600 3510	10500 2350	1.49	107000 24000	LL521849C	LL521810
107.950 4.2500	146.050 5.7500	21.433 0.8438	88900 20000	0.39	1.53	23100 5180	15500 3480	1.49	175000 39400	L521949	L521910
107.950 4.2500	152.400 6.0000	21.433 0.8438	88900 20000	0.39	1.53	23100 5180	15500 3480	1.49	175000 39400	L521949	L521914
107.950 4.2500	158.750 6.2500	23.020 0.9063	107000 24000	0.61	0.99	27600 6220	28700 6450	0.96	179000 40100	37425	37625
107.950 4.2500	159.987 6.2987	34.925 1.3750	181000 40700	0.40	1.49	47000 10600	32300 7270	1.45	357000 80300	LM522546	LM522510
107.950 4.2500	161.925 6.3750	34.925 1.3750	178000 40000	0.51	1.19	46100 10400	39900 8970	1.16	308000 69200	48190	48120
107.950 4.2500	165.100 6.5000	36.512 1.4375	210000 47100	0.50	1.21	54400 12200	46300 10400	1.18	355000 79700	56425	56650

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
31.750 1.2500	19.050 0.7500	34.5 1.36	3.3 0.13	119.0 4.69	128.0 5.04	3.3 0.13	172.0 6.77	154.0 6.06	8.90 0.35	3.30 0.13	114	37.4	0.1153	3.10 6.83
48.006 1.8900	40.000 1.5748	-8.1 -0.32	3.5 0.14	113.0 4.45	119.0 4.69	3.0 0.12	168.0 6.61	160.0 6.30	3.60 0.14	1.30 0.05	227	38.2	0.1067	5.00 11.02
48.006 1.8900	38.100 1.5000	-8.1 -0.32	3.5 0.14	113.0 4.45	119.0 4.69	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	38.2	0.1067	5.03 11.08
57.531 2.2650	44.450 1.7500	-15.2 -0.60	8.0 0.31	114.0 4.49	129.0 5.08	3.3 0.13	174.0 6.85	170.0 6.69	5.60 0.22	0.60 0.02	264	44.9	0.1072	6.79 14.97
57.531 2.2650	46.038 1.8125	-15.0 -0.59	3.5 0.14	116.0 4.56	122.0 4.80	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	7.27 16.02
57.531 2.2650	46.038 1.8125	-15.0 -0.59	8.0 0.31	116.0 4.56	131.0 5.16	3.3 0.13	179.0 7.05	171.0 6.73	2.50 0.10	3.20 0.13	266	28.4	0.1072	7.20 15.88
49.212 1.9375	34.925 1.3750	1.3 0.05	3.5 0.14	120.5 4.75	128.0 5.04	3.3 0.13	188.0 7.40	174.0 6.85	8.60 0.34	5.40 0.21	203	37.4	0.1197	6.76 14.89
66.675 2.6250	53.975 2.1250	-19.8 -0.78	7.0 0.28	117.0 4.61	130.0 5.12	3.3 0.13	193.0 7.60	187.0 7.36	6.70 0.26	1.20 0.05	339	39.7	0.1153	10.95 24.13
66.675 2.6250	53.975 2.1250	-18.8 -0.74	7.0 0.28	121.0 4.76	132.0 5.20	3.3 0.13	201.5 7.94	192.0 7.56	4.80 0.19	2.80 0.11	367	43.4	0.1182	11.00 24.26
52.388 2.0625	39.688 1.5625	6.9 0.27	3.5 0.14	128.0 5.04	132.0 5.20	3.3 0.13	205.0 8.07	186.0 7.32	6.60 0.26	3.40 0.13	246	32.2	0.1299	8.95 19.72
66.675 2.6250	50.800 2.0000	-18.8 -0.74	7.0 0.28	121.0 4.76	132.0 5.20	3.3 0.13	201.0 7.92	192.0 7.56	4.80 0.19	2.80 0.11	367	43.4	0.1182	11.12 24.51
73.025 2.8750	50.800 2.0000	-3.3 -0.13	6.4 0.25	131.0 5.15	149.0 5.87	3.3 0.13	229.0 9.01	210.0 8.27	15.10 0.60	4.60 0.18	282	35.2	0.1370	17.07 37.64
41.275 1.6250	30.162 1.1875	-2.8 -0.11	3.5 0.14	113.5 4.46	123.0 4.84	3.3 0.13	160.0 6.30	150.0 5.91	5.00 0.20	2.00 0.08	182	37.2	0.1056	3.46 7.62
15.083 0.5938	11.908 0.4688	7.4 0.29	1.5 0.06	111.0 4.37	113.0 4.45	1.5 0.06	137.0 5.39	135.0 5.31	0.80 0.03	2.20 0.09	105	110	0.1179	0.68 1.50
48.006 1.8900	38.100 1.5000	-8.1 -0.32	3.5 0.14	116.0 4.57	122.0 4.80	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	38.2	0.1067	4.83 10.66
48.006 1.8900	38.100 1.5000	-8.1 -0.32	6.4 0.25	116.0 4.57	128.0 5.04	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	38.2	0.1067	4.80 10.58
48.006 1.8900	38.100 1.5000	-8.1 -0.32	7.0 0.28	116.0 4.57	129.0 5.08	3.3 0.13	168.0 6.61	161.0 6.34	3.60 0.14	1.30 0.05	227	41.3	0.1067	4.78 10.54
49.212 1.9375	34.925 1.3750	-6.6 -0.26	3.5 0.14	118.0 4.65	124.0 4.88	3.3 0.13	181.0 7.13	171.0 6.73	5.40 0.21	1.50 0.06	269	45.7	0.1156	5.78 12.74
35.000 1.3780	26.000 1.0236	-0.3 -0.01	6.0 0.24	115.0 4.53	128.0 5.04	2.0 0.08	154.0 6.06	147.0 5.79	3.20 0.13	2.60 0.10	176	50.7	0.1024	2.36 5.19
36.512 1.4375	26.988 1.0625	2.0 0.08	3.5 0.14	116.0 4.57	122.0 4.80	3.3 0.13	159.0 6.26	149.0 5.87	4.00 0.16	1.50 0.06	191	47.7	0.1584	2.68 5.91
28.000 1.1024	24.000 0.9449	-3.8 -0.15	2.3 0.09	112.0 4.41	116.0 4.57	2.3 0.09	142.0 5.59	138.0 5.43	0.60 0.02	2.30 0.09	195	75.6	0.1302	1.31 2.90
15.083 0.5938	11.908 0.4688	7.4 0.29	1.5 0.06	113.0 4.45	115.0 4.53	1.5 0.06	137.0 5.39	135.0 5.31	0.80 0.03	2.20 0.09	105	110	0.1179	0.62 1.37
21.433 0.8438	16.670 0.6563	4.8 0.19	1.5 0.06	114.0 4.49	116.0 4.57	1.5 0.06	141.0 5.55	136.0 5.35	0.80 0.03	1.50 0.06	152	108	0.1346	0.99 2.17
21.433 0.8438	16.670 0.6563	4.8 0.19	1.5 0.06	114.0 4.49	116.0 4.57	1.5 0.06	144.0 5.67	139.0 5.47	0.80 0.03	1.50 0.06	152	108	0.1346	1.18 2.60
21.438 0.8440	15.875 0.6250	13.7 0.54	3.5 0.14	115.0 4.53	122.0 4.80	3.3 0.13	152.0 5.98	143.0 5.63	2.60 0.10	3.00 0.12	124	57	0.1443	1.35 2.98
34.925 1.3750	26.987 1.0625	-1.5 -0.06	3.5 0.14	116.0 4.57	122.0 4.80	3.3 0.13	154.0 6.06	146.0 5.75	2.50 0.10	1.30 0.05	232	63.3	0.1576	2.34 5.17
34.925 1.3750	26.988 1.0625	3.8 0.15	3.5 0.14	116.0 4.57	122.0 4.80	3.3 0.13	156.0 6.14	146.0 5.75	2.90 0.11	0.70 0.03	180	44.7	0.1558	2.35 5.17
36.512 1.4375	26.988 1.0625	2.0 0.08	3.5 0.14	117.0 4.61	123.0 4.84	3.3 0.13	159.0 6.26	149.0 5.87	4.00 0.16	1.50 0.06	191	47.7	0.1584	2.60 5.74

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

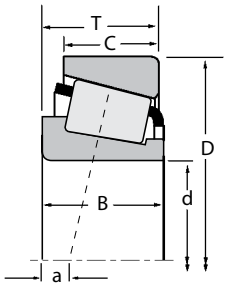
(7) Compound radius on inner race. Details on drawing for bearing.

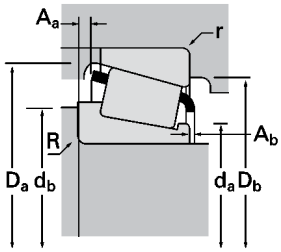
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
107.950 4.2500	165.100 6.5000	36.512 1.4375	210000 47100	0.50	1.21	54400 12200	46300 10400	1.18	355000 79700	56426	56650
107.950 4.2500	168.275 6.6250	36.512 1.4375	210000 47100	0.50	1.21	54400 12200	46300 10400	1.18	355000 79700	56425	56662
107.950 4.2500	171.450 6.7500	34.000 1.3386	182000 41000	0.47	1.27	47300 10600	38300 8600	1.24	268000 60300	67425	67675
107.950 4.2500	190.500 7.5000	47.625 1.8750	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71425	71750
107.950 4.2500	212.725 8.3750	66.675 2.6250	530000 119000	0.33	1.84	137000 30900	76600 17200	1.79	786000 177000	936	932
107.950 4.2500	212.725 8.3750	66.675 2.6250	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224340	HH224310
109.538 4.3125	158.750 6.2500	23.020 0.9063	107000 24000	0.61	0.99	27600 6220	28700 6450	0.96	179000 40100	37431	37625
109.538 4.3125	158.750 6.2500	23.020 0.9063	107000 24000	0.61	0.99	27600 6220	28700 6450	0.96	179000 40100	37431A	37625
109.952 4.3288	190.500 7.5000	47.625 1.8750	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71432	71750
109.975 4.3297	179.974 7.0856	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64432	64708
110.000 4.3301	214.312 8.4375	55.562 2.1875	435000 97800	0.67	0.89	113000 25400	130000 29300	0.87	610000 137000	H924043	H924010
109.987 4.3302	159.987 6.2987	34.925 1.3750	181000 40700	0.40	1.49	47000 10600	32300 7270	1.45	357000 80300	LM522548	LM522510
109.987 4.3302	159.987 6.2987	34.925 1.3750	181000 40700	0.40	1.49	47000 10600	32300 7270	1.45	357000 80300	LM522549	LM522510
109.992 4.3304	177.800 7.0000	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64433	64700
110.000 4.3307	165.000 6.4961	35.000 1.3780	210000 47300	0.50	1.21	54500 12300	46400 10400	1.18	356000 80100	JM822049	JM822010
110.000 4.3307	180.000 7.0866	47.000 1.8504	344000 77300	0.41	1.48	89100 20000	61900 13900	1.44	554000 125000	JHM522649A	JHM522610
110.000 4.3307	212.725 8.3750	66.675 2.6250	530000 119000	0.33	1.84	137000 30900	76600 17200	1.79	786000 177000	942	932
110.000 4.3307	215.000 8.4646	61.500 2.4213	502000 113000	0.44	1.38	130000 29300	97000 21800	1.34	753000 169000	XFA32224	Y32224
110.332 4.3438	171.450 6.7500	34.000 1.3386	182000 41000	0.47	1.27	47300 10600	38300 8600	1.24	268000 60300	67434	67675
111.125 4.3750	171.450 6.7500	34.000 1.3386	182000 41000	0.47	1.27	47300 10600	38300 8600	1.24	268000 60300	67437	67675
111.125 4.3750	190.500 7.5000	47.625 1.8750	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71437	71750
111.125 4.3750	214.312 8.4375	55.562 2.1875	435000 97800	0.67	0.89	113000 25400	130000 29300	0.87	610000 137000	H924045	H924010
114.300 4.5000	152.400 6.0000	21.433 0.8438	92400 20800	0.41	1.45	23900 5380	16900 3810	1.41	188000 42300	L623149	L623110
114.300 4.5000	177.800 7.0000	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64450	64700
114.300 4.5000	178.000 7.0079	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64450	64701X
114.300 4.5000	179.974 7.0856	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64450	64708
114.300 4.5000	180.975 7.1250	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64450	64713
114.300 4.5000	190.500 7.5000	47.625 1.8750	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71450	71750

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
36.512 1.4375	26.988 1.0625	2.0 0.08	8.0 0.31	117.0 4.61	132.0 5.20	3.3 0.13	159.0 6.26	149.0 5.87	4.00 0.16	1.50 0.06	191	47.7	0.1584	2.54 5.59
36.512 1.4375	26.988 1.0625	2.0 0.08	3.5 0.14	117.0 4.61	123.0 4.84	3.3 0.13	161.0 6.34	151.0 5.94	4.00 0.16	1.50 0.06	191	47.7	0.1584	2.78 6.13
30.162 1.1875	25.268 0.9948	4.6 0.18	3.5 0.14	116.0 4.57	123.0 4.84	3.3 0.13	164.0 6.46	156.0 6.14	3.40 0.13	2.10 0.08	152	50.5	0.0987	2.51 5.53
49.212 1.9375	34.925 1.3750	-6.6 -0.26	3.5 0.14	120.0 4.72	126.0 4.96	3.3 0.13	181.0 7.13	171.0 6.73	5.40 0.21	1.50 0.06	269	45.7	0.1156	5.57 12.29
66.675 2.6250	53.975 2.1250	-19.8 -0.78	8.0 0.31	122.0 4.80	137.0 5.39	3.3 0.13	193.0 7.60	187.0 7.36	6.70 0.26	1.20 0.05	339	39.7	0.1153	10.38 22.89
66.675 2.6250	53.975 2.1250	-18.8 -0.74	8.0 0.31	126.0 4.96	139.0 5.47	3.3 0.13	201.5 7.94	192.0 7.56	4.90 0.19	2.80 0.11	367	47.8	0.1182	10.44 23.01
21.438 0.8440	15.875 0.6250	13.7 0.54	3.5 0.14	116.0 4.57	123.0 4.84	3.3 0.13	152.0 5.98	143.0 5.63	2.60 0.10	3.00 0.12	124	48.7	0.1443	1.31 2.88
21.438 0.8440	15.875 0.6250	13.7 0.54	5.0 0.20	117.0 4.61	126.0 4.96	3.3 0.13	152.0 5.98	143.0 5.63	2.60 0.10	3.00 0.12	124	57	0.1443	1.30 2.87
49.212 1.9375	34.925 1.3750	-6.6 -0.26	3.5 0.14	122.0 4.80	128.0 5.04	3.3 0.13	181.0 7.13	171.0 6.73	5.40 0.21	1.50 0.06	269	45.7	0.1156	5.44 12.00
41.275 1.6250	30.162 1.1875	1.3 0.05	3.5 0.14	121.0 4.76	128.0 5.04	3.3 0.13	173.0 6.81	161.0 6.34	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.86 8.50
52.388 2.0625	39.688 1.5625	6.9 0.27	3.5 0.14	131.0 5.16	139.0 5.47	3.3 0.13	205.0 8.07	186.0 7.32	6.60 0.26	3.40 0.13	246	32.2	0.1299	8.37 18.46
34.925 1.3750	26.987 1.0625	-1.5 -0.06	8.0 0.31	118.0 4.65	133.0 5.24	3.3 0.13	154.0 6.06	146.0 5.75	2.50 0.10	1.30 0.05	232	63.3	0.1576	2.18 4.80
34.925 1.3750	26.987 1.0625	-1.5 -0.06	3.5 0.14	118.0 4.65	124.0 4.88	3.3 0.13	154.0 6.06	146.0 5.75	2.50 0.10	1.30 0.05	232	63.3	0.1576	2.25 4.96
41.275 1.6250	30.162 1.1875	1.3 0.05	3.5 0.14	121.0 4.76	128.0 5.04	3.3 0.13	172.0 6.77	160.0 6.30	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.71 8.18
35.000 1.3780	26.500 1.0433	3.0 0.12	3.0 0.12	119.0 4.69	125.0 4.92	2.5 0.10	159.0 6.26	149.0 5.87	3.00 0.12	2.00 0.08	192	45.8	0.1585	2.44 5.38
46.000 1.8110	38.000 1.4961	-5.8 -0.23	7.0 0.28	122.0 4.80	138.0 5.43	2.5 0.10	172.0 6.77	162.0 6.38	2.70 0.10	3.90 0.15	259	52.1	0.1134	4.59 10.13
66.675 2.6250	53.975 2.1250	-19.8 -0.78	6.4 0.25	124.0 4.88	136.0 5.35	3.3 0.13	193.0 7.60	187.0 7.36	6.60 0.26	1.20 0.05	339	39.7	0.1153	10.25 22.59
58.000 2.2835	50.000 1.9685	-9.4 -0.37	3.0 0.12	133.0 5.24	137.0 5.39	2.5 0.10	204.0 8.03	192.0 7.56	7.80 0.31	3.00 0.12	329	52.3	0.1253	9.85 21.72
30.162 1.1875	25.268 0.9948	4.6 0.18	3.5 0.14	118.0 4.65	124.0 4.88	3.3 0.13	164.0 6.46	156.0 6.14	3.40 0.13	2.10 0.08	152	50.5	0.0987	2.41 5.32
30.162 1.1875	25.268 0.9948	4.6 0.18	3.5 0.14	119.0 4.69	125.0 4.92	3.3 0.13	164.0 6.46	156.0 6.14	3.40 0.13	2.10 0.08	152	50.5	0.0987	2.38 5.25
49.212 1.9375	34.925 1.3750	-6.6 -0.26	3.5 0.14	123.0 4.84	129.0 5.08	3.3 0.13	181.0 7.13	171.0 6.73	5.40 0.21	1.50 0.06	269	45.7	0.1156	5.36 11.82
52.388 2.0625	39.688 1.5625	6.9 0.27	3.5 0.14	131.0 5.16	139.0 5.47	3.3 0.13	205.0 8.07	186.0 7.32	6.60 0.26	3.40 0.13	246	32.2	0.1299	8.29 18.28
21.432 0.8438	16.670 0.6563	6.4 0.25	1.5 0.06	120.0 4.72	123.0 4.84	1.5 0.06	147.0 5.79	143.0 5.63	1.10 0.04	1.60 0.06	171	102	0.1422	1.05 2.31
41.275 1.6250	30.162 1.1875	1.3 0.05	3.5 0.14	125.0 4.92	131.0 5.16	3.3 0.13	172.0 6.77	160.0 6.30	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.47 7.64
41.275 1.6250	30.162 1.1875	1.3 0.05	3.5 0.14	125.0 4.92	131.0 5.16	3.0 0.12	172.0 6.77	160.0 6.30	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.48 7.68
41.275 1.6250	30.162 1.1875	1.3 0.05	3.5 0.14	125.0 4.92	131.0 5.16	3.3 0.13	173.0 6.81	161.0 6.34	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.61 7.96
41.275 1.6250	30.162 1.1875	1.3 0.05	3.5 0.14	125.0 4.92	131.0 5.16	3.3 0.13	173.0 6.81	161.0 6.34	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.68 8.11
49.212 1.9375	34.925 1.3750	-6.6 -0.26	3.5 0.14	125.0 4.92	132.0 5.20	3.3 0.13	181.0 7.13	171.0 6.73	5.40 0.21	1.50 0.06	269	45.7	0.1156	5.15 11.34

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

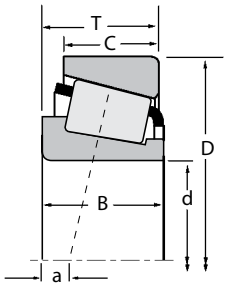
[7] Compound radius on inner race. Details on drawing for bearing.

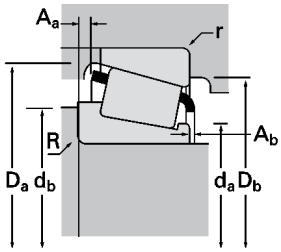
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
114.300 4.5000	206.375 8.1250	66.675 2.6250	530000 119000	0.33	1.84	137000 30900	76600 17200	1.79	786000 177000	938	930
114.300 4.5000	212.725 8.3750	66.675 2.6250	530000 119000	0.33	1.84	137000 30900	76600 17200	1.79	786000 177000	938	932
114.300 4.5000	212.725 8.3750	66.675 2.6250	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224346	HH224310
114.300 4.5000	214.975 8.4636	64.798 2.5511	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224346	HH224314
114.300 4.5000	228.600 9.0000	53.975 2.1250	458000 103000	0.74	0.81	119000 26700	150000 33700	0.79	673000 151000	HM926740	HM926710
114.300 4.5000	273.050 10.7500	82.550 3.2500	832000 187000	0.63	0.95	216000 48500	234000 52500	0.92	1080000 243000	HH926744	HH926710
114.300 4.5000	279.400 11.0000	82.550 3.2500	832000 187000	0.63	0.95	216000 48500	234000 52500	0.92	1080000 243000	HH926744	HH926716
114.975 4.5266	177.800 7.0000	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64452A	64700
114.975 4.5266	179.974 7.0856	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64452	64708
114.975 4.5266	180.975 7.1250	41.275 1.6250	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64452A	64713
114.975 4.5266	212.725 8.3750	66.675 2.6250	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224349	HH224310
115.000 4.5276	165.000 6.4961	28.000 1.1024	148000 33200	0.46	1.31	38300 8620	30100 6770	1.27	245000 55100	JLM722948	JLM722912
115.000 4.5276	178.000 7.0079	40.000 1.5748	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64452X	64701X
115.087 4.5310	190.500 7.5000	47.625 1.8750	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71453	71750
115.087 4.5310	190.500 7.5000	47.625 1.8750	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71455	71750
117.475 4.6250	179.974 7.0856	34.925 1.3750	181000 40700	0.50	1.21	46900 10600	39900 8980	1.18	271000 61000	68462	68709
117.475 4.6250	180.975 7.1250	34.925 1.3750	181000 40700	0.50	1.21	46900 10600	39900 8980	1.18	271000 61000	68462	68712
117.475 4.6250	180.975 7.1250	34.925 1.3750	181000 40700	0.50	1.21	46900 10600	39900 8980	1.18	271000 61000	68463	68712
119.964 4.7230	215.900 8.5000	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74472	74850
119.975 4.7234	174.625 6.8750	35.720 1.4063	226000 50900	0.33	1.80	58700 13200	33400 7510	1.76	422000 94900	M224748	M224710
120.000 4.7244	170.000 6.6929	25.400 1.0000	134000 30200	0.46	1.31	34800 7820	27300 6140	1.27	231000 52000	JL724348	JL724314
120.000 4.7244	170.000 6.6929	27.000 1.0630	153000 34400	0.47	1.27	39700 8920	32100 7220	1.24	238000 53500	JP12049A	JP12010
120.000 4.7244	170.000 6.6929	27.000 1.0630	153000 34400	0.47	1.27	39700 8920	32100 7220	1.24	238000 53500	JP12049	JP12010
120.000 4.7244	180.000 7.0866	36.000 1.4173	229000 51400	0.41	1.45	59300 13300	41900 9430	1.41	377000 84700	JM624649	JM624610
120.000 4.7244	180.000 7.0866	38.000 1.4961	271000 60900	0.46	1.31	70200 15800	55100 12400	1.27	466000 105000	XAA32024X	Y32024X
120.000 4.7244	215.900 8.5000	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74473X	74850
120.000 4.7244	230.000 9.0551	53.975 2.1250	348000 78300	0.74	0.81	90200 20300	114000 25600	0.79	486000 109000	97472X	97905X
120.650 4.7500	161.925 6.3750	21.433 0.8438	97500 21900	0.43	1.38	25300 5680	18800 4230	1.34	206000 46400	L624549	L624514

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
66.675 2.6250	53.975 2.1250	-19.8 -0.78	7.0 0.28	128.0 5.04	141.0 5.55	3.3 0.13	193.0 7.60	184.0 7.24	6.70 0.26	1.20 0.05	339	39.7	0.1153	8.92 19.66
66.675 2.6250	53.975 2.1250	-19.8 -0.78	7.0 0.28	128.0 5.04	141.0 5.55	3.3 0.13	193.0 7.60	187.0 7.36	6.70 0.26	1.20 0.05	339	39.7	0.1153	9.82 21.64
66.675 2.6250	53.975 2.1250	-18.8 -0.74	7.0 0.28	131.0 5.16	143.0 5.63	3.3 0.13	201.5 7.94	192.0 7.56	4.90 0.19	2.80 0.11	367	47.8	0.1182	9.88 21.77
66.675 2.6250	50.800 2.0000	-18.8 -0.74	7.0 0.28	131.0 5.16	143.0 5.63	3.3 0.13	201.0 7.92	192.0 7.56	4.90 0.19	2.80 0.11	367	47.8	0.1182	9.99 22.02
49.428 1.9460	38.100 1.5000	13.5 0.53	3.5 0.14	142.0 5.59	146.0 5.75	3.3 0.13	219.0 8.63	200.0 7.87	9.00 0.36	6.40 0.25	295	39	0.1416	9.54 21.04
82.550 3.2500	53.975 2.1250	-6.6 -0.26	6.4 0.25	147.5 5.80	164.0 6.46	6.4 0.25	253.0 9.97	230.0 9.06	15.10 0.60	4.10 0.16	384	37.8	0.1472	21.92 48.32
82.550 3.2500	53.975 2.1250	-6.6 -0.26	6.4 0.25	147.5 5.80	164.0 6.46	6.4 0.25	253.0 9.97	233.0 9.17	15.10 0.60	4.10 0.16	384	37.8	0.1472	23.08 50.88
41.275 1.6250	30.162 1.1875	1.3 0.05	9.0 0.35	126.0 4.96	143.0 5.63	3.3 0.13	172.0 6.77	160.0 6.30	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.33 7.34
41.275 1.6250	30.162 1.1875	1.3 0.05	3.5 0.14	126.0 4.96	132.0 5.20	3.3 0.13	173.0 6.81	161.0 6.34	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.57 7.87
41.275 1.6250	30.162 1.1875	1.3 0.05	9.0 0.35	126.0 4.96	143.0 5.63	3.3 0.13	173.0 6.81	161.0 6.34	5.30 0.21	2.00 0.08	219	45.3	0.1153	3.54 7.80
66.675 2.6250	53.975 2.1250	-18.8 -0.74	7.0 0.28	131.0 5.16	144.0 5.67	3.3 0.13	201.5 7.94	192.0 7.56	4.90 0.19	2.80 0.11	367	47.8	0.1182	9.81 21.63
27.000 1.0630	21.000 0.8268	5.6 0.22	3.3 0.13	121.0 4.76	127.0 5.00	3.0 0.12	158.0 6.22	151.0 5.94	2.20 0.09	2.40 0.09	161	57.2	0.1449	1.76 3.87
40.000 1.5748	30.162 1.1875	1.3 0.05	3.5 0.14	125.5 4.95	132.0 5.20	3.0 0.12	172.0 6.77	160.0 6.30	4.00 0.16	2.00 0.08	219	45.3	0.1153	3.37 7.44
49.212 1.9375	34.925 1.3750	-6.6 -0.26	3.5 0.14	126.0 4.96	133.0 5.24	3.3 0.13	181.0 7.13	171.0 6.73	5.40 0.21	1.50 0.06	269	45.7	0.1156	5.09 11.22
49.212 1.9375	34.925 1.3750	-6.6 -0.26	8.0 0.31	126.0 4.96	141.0 5.55	3.3 0.13	181.0 7.13	171.0 6.73	5.40 0.21	1.50 0.06	269	45.7	0.1156	5.02 11.06
31.750 1.2500	25.400 1.0000	5.3 0.21	3.5 0.14	125.0 4.92	132.0 5.20	0.8 0.03	172.0 6.77	165.0 6.50	5.10 0.20	2.30 0.09	163	51.7	0.1026	2.71 5.96
31.750 1.2500	25.400 1.0000	5.3 0.21	3.5 0.14	125.0 4.92	132.0 5.20	3.3 0.13	172.0 6.77	163.0 6.42	5.10 0.20	2.30 0.09	163	51.7	0.1026	2.74 6.04
31.750 1.2500	25.400 1.0000	5.3 0.21	8.0 0.31	125.0 4.92	140.0 5.51	3.3 0.13	172.0 6.77	163.0 6.42	5.10 0.20	2.30 0.09	163	51.7	0.1026	2.66 5.87
47.625 1.8750	34.925 1.3750	2.3 0.09	3.5 0.14	136.0 5.35	142.0 5.59	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	68.5	0.1338	7.52 16.57
36.512 1.4375	27.783 1.0938	-3.6 -0.14	3.5 0.14	129.0 5.08	134.0 5.28	1.5 0.06	168.0 6.61	162.0 6.38	3.80 0.15	0.50 0.02	279	86.6	0.1575	2.70 5.96
25.400 1.0000	19.050 0.7500	7.9 0.31	3.3 0.13	127.0 5.00	132.0 5.20	3.3 0.13	163.0 6.42	156.0 6.14	2.70 0.11	1.20 0.05	170	70.6	0.1472	1.62 3.56
25.000 0.9843	19.500 0.7677	7.9 0.31	6.0 0.24	127.0 5.00	139.0 5.47	3.0 0.12	164.0 6.46	158.0 6.22	2.80 0.11	3.70 0.14	158	76.7	0.1451	1.60 3.53
25.000 0.9843	19.500 0.7677	7.9 0.31	3.0 0.12	127.0 5.00	133.0 5.24	3.0 0.12	164.0 6.46	158.0 6.22	2.80 0.11	3.70 0.14	158	76.7	0.1451	1.62 3.58
36.000 1.4173	26.000 1.0236	0.0 0.00	3.5 0.14	128.0 5.04	135.0 5.31	1.5 0.06	173.0 6.81	166.0 6.54	3.60 0.14	2.70 0.10	227	61.6	0.1084	2.93 6.46
38.000 1.4961	29.000 1.1417	1.5 0.06	5.0 0.20	130.0 5.12	141.0 5.55	2.0 0.08	174.0 6.85	165.0 6.50	3.50 0.14	3.00 0.12	255	58.3	0.1169	3.26 7.19
47.625 1.8750	34.925 1.3750	2.3 0.09	4.0 0.16	137.0 5.39	144.0 5.67	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	68.5	0.1338	7.51 16.55
49.428 1.9460	38.100 1.5000	13.2 0.52	3.5 0.14	140.0 5.51	145.0 5.71	3.3 0.13	213.0 8.38	198.0 7.80	8.20 0.32	4.80 0.19	237	44.6	0.1311	8.92 19.66
21.433 0.8438	16.670 0.6563	8.4 0.33	1.5 0.06	127.0 5.00	129.0 5.08	1.5 0.06	156.0 6.14	151.0 5.94	1.20 0.05	1.60 0.06	195	139	0.1509	1.21 2.66

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

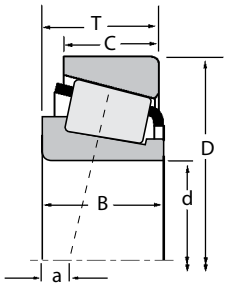
[7] Compound radius on inner race. Details on drawing for bearing.

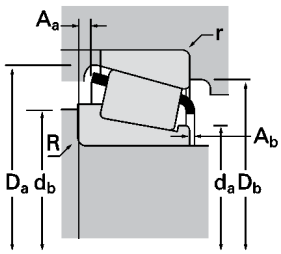
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
120.650 4.7500	166.688 6.5625	25.400 1.0000	134000 30200	0.46	1.31	34800 7820	27300 6140	1.27	231000 52000	L724349	L724310
120.650 4.7500	169.862 6.6875	25.400 1.0000	132000 29700	0.33	1.80	34300 7710	19500 4390	1.76	273000 61400	L225842	L225810
120.650 4.7500	172.242 6.7812	35.720 1.4063	226000 50900	0.33	1.80	58700 13200	33400 7510	1.76	422000 94900	M224749	M224711
120.650 4.7500	174.625 6.8750	35.720 1.4063	226000 50900	0.33	1.80	58700 13200	33400 7510	1.76	422000 94900	M224749	M224710
120.650 4.7500	174.625 6.8750	35.720 1.4063	226000 50900	0.33	1.80	58700 13200	33400 7510	1.76	422000 94900	M224749	M224712
120.650 4.7500	180.975 7.1250	25.400 1.0000	132000 29700	0.33	1.80	34300 7710	19500 4390	1.76	273000 61400	L225842	L225818
120.650 4.7500	182.562 7.1875	39.688 1.5625	248000 55800	0.31	1.97	64300 14500	33600 7550	1.91	493000 111000	48282	48220
120.650 4.7500	190.500 7.5000	46.038 1.8125	335000 75300	0.43	1.41	86800 19500	63400 14300	1.37	543000 122000	HM624749	HM624710
120.650 4.7500	199.974 7.8730	46.038 1.8125	335000 75300	0.43	1.41	86800 19500	63400 14300	1.37	543000 122000	HM624749	HM624716
120.650 4.7500	206.375 8.1250	47.625 1.8750	350000 78700	0.46	1.31	90800 20400	71300 16000	1.27	593000 133000	795	792
120.650 4.7500	234.950 9.2500	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95475	95925
120.650 4.7500	254.000 10.0000	77.788 3.0625	843000 189000	0.32	1.87	218000 49100	120000 27000	1.82	1240000 279000	HH228340	HH228310
120.650 4.7500	259.974 10.2352	77.788 3.0625	843000 189000	0.32	1.87	218000 49100	120000 27000	1.82	1240000 279000	HH228340	HH228318
120.650 4.7500	273.050 10.7500	82.550 3.2500	832000 187000	0.63	0.95	216000 48500	234000 52500	0.92	1080000 243000	HH926749	HH926710
123.825 4.8750	182.562 7.1875	39.688 1.5625	248000 55800	0.31	1.97	64300 14500	33600 7550	1.91	493000 111000	48286	48220
124.943 4.9190	234.950 9.2500	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95491	95925
125.000 4.9213	175.000 6.8898	25.400 1.0000	139000 31200	0.48	1.26	36000 8100	29400 6600	1.23	246000 55300	JL725346	JL725316
125.298 4.9330	228.600 9.0000	53.975 2.1250	458000 103000	0.74	0.81	119000 26700	150000 33700	0.79	673000 151000	HM926745	HM926710
127.000 5.0000	165.895 6.5313	18.258 0.7188	83500 18800	0.33	1.80	21600 4870	12300 2770	1.76	153000 34400	LL225749	LL225710
127.000 5.0000	169.862 6.6875	25.400 1.0000	132000 29700	0.33	1.80	34300 7710	19500 4390	1.76	273000 61400	L225849	L225810
127.000 5.0000	171.450 6.7500	25.400 1.0000	139000 31200	0.48	1.26	36000 8100	29400 6600	1.23	246000 55300	L725349	L725311
127.000 5.0000	174.625 6.8750	36.512 1.4375	204000 45800	0.31	1.95	52900 11900	27800 6250	1.90	413000 92900	LM125748	LM125711
127.000 5.0000	180.975 7.1250	25.400 1.0000	132000 29700	0.33	1.80	34300 7710	19500 4390	1.76	273000 61400	L225849	L225818
127.000 5.0000	182.562 7.1875	39.688 1.5625	248000 55800	0.31	1.97	64300 14500	33600 7550	1.91	493000 111000	48290	48220
127.000 5.0000	196.850 7.7500	46.038 1.8125	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67388	67322
127.000 5.0000	203.200 8.0000	46.038 1.8125	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67388	67320
127.000 5.0000	215.900 8.5000	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74500	74850
127.000 5.0000	228.600 9.0000	53.975 2.1250	348000 78300	0.74	0.81	90200 20300	114000 25600	0.79	486000 109000	97500	97900

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.400 1.0000	19.050 0.7500	7.9 0.31	3.3 0.13	128.0 5.04	133.0 5.24	3.3 0.13	161.0 6.34	154.0 6.06	2.70 0.11	1.20 0.05	170	70.6	0.1472	1.48 3.27
26.195 1.0313	20.638 0.8125	2.5 0.10	1.5 0.06	129.0 5.08	131.0 5.16	1.5 0.06	164.0 6.46	160.0 6.30	0.70 0.03	1.60 0.06	253	134	0.1511	1.86 4.11
36.512 1.4375	27.783 1.0938	-3.6 -0.14	3.5 0.14	129.0 5.08	135.0 5.31	1.5 0.06	167.0 6.57	162.0 6.38	3.80 0.15	0.50 0.02	279	86.6	0.1575	2.52 5.57
36.512 1.4375	27.783 1.0938	-3.6 -0.14	3.5 0.14	129.0 5.08	135.0 5.31	1.5 0.06	168.0 6.61	162.0 6.38	3.80 0.15	0.50 0.02	279	86.6	0.1575	2.67 5.88
36.512 1.4375	27.783 1.0938	-3.6 -0.14	3.5 0.14	129.0 5.08	135.0 5.31	3.3 0.13	168.0 6.61	161.0 6.34	3.80 0.15	0.50 0.02	279	86.6	0.1575	2.67 5.88
26.195 1.0313	20.638 0.8125	2.5 0.10	1.5 0.06	129.0 5.08	131.0 5.16	1.5 0.06	166.0 6.54	164.0 6.46	0.70 0.03	1.60 0.06	253	134	0.1511	2.35 5.18
38.100 1.5000	33.338 1.3125	-5.6 -0.22	3.5 0.14	131.0 5.16	137.0 5.39	3.3 0.13	176.0 6.93	168.0 6.61	1.90 0.07	3.20 0.13	353	91.3	0.1138	3.64 8.03
46.038 1.8125	34.925 1.3750	-3.8 -0.15	3.5 0.14	132.0 5.20	138.0 5.43	1.5 0.06	184.0 7.24	174.0 6.85	3.70 0.15	2.60 0.10	279	51.5	0.1178	4.60 10.15
46.038 1.8125	34.925 1.3750	-3.8 -0.15	3.5 0.14	132.0 5.20	138.0 5.43	1.5 0.06	185.0 7.28	178.0 7.01	3.70 0.15	2.60 0.10	279	51.5	0.1178	5.40 11.90
47.625 1.8750	34.925 1.3750	-1.8 -0.07	3.3 0.13	134.0 5.28	139.0 5.47	3.3 0.13	198.0 7.80	186.0 7.32	5.30 0.21	2.80 0.11	326	56.2	0.1269	6.32 13.94
63.500 2.5000	49.212 1.9375	-14.0 -0.55	6.4 0.25	137.0 5.39	149.0 5.87	3.3 0.13	217.0 8.54	209.0 8.23	6.40 0.25	3.80 0.15	454	59.3	0.1323	12.35 27.22
82.550 3.2500	61.912 2.4375	-23.4 -0.92	9.7 0.38	142.0 5.59	158.0 6.22	6.4 0.25	233.5 9.20	223.0 8.78	7.10 0.28	0.00 0.00	530	44.8	0.1329	18.50 40.79
82.550 3.2500	61.912 2.4375	-23.4 -0.92	9.7 0.38	142.0 5.59	158.0 6.22	4.0 0.16	233.5 9.20	228.0 8.98	7.10 0.28	0.00 0.00	530	44.8	0.1329	19.74 43.52
82.550 3.2500	53.975 2.1250	-6.6 -0.26	6.4 0.25	147.5 5.80	168.0 6.61	6.4 0.25	253.0 9.97	230.0 9.06	15.10 0.60	4.10 0.16	384	37.8	0.1472	21.16 46.65
38.100 1.5000	33.338 1.3125	-5.6 -0.22	3.5 0.14	133.0 5.24	139.0 5.47	3.3 0.13	176.0 6.93	168.0 6.61	1.90 0.07	3.20 0.13	353	91.3	0.1138	3.46 7.63
63.500 2.5000	49.212 1.9375	-14.0 -0.55	6.4 0.25	140.0 5.51	152.0 5.98	3.3 0.13	217.0 8.54	209.0 8.23	6.40 0.25	3.80 0.15	454	59.3	0.1323	11.93 26.31
25.400 1.0000	18.288 0.7200	9.1 0.36	3.3 0.13	133.0 5.24	138.0 5.43	3.3 0.13	168.0 6.61	161.0 6.34	3.00 0.12	1.50 0.06	187	77.6	0.1535	1.69 3.72
49.428 1.9460	38.100 1.5000	13.5 0.53	3.5 0.14	143.0 5.63	154.0 6.06	3.3 0.13	219.0 8.63	200.0 7.87	9.00 0.36	6.40 0.25	295	39	0.1416	8.74 19.27
17.462 0.6875	13.495 0.5313	6.1 0.24	1.5 0.06	133.0 5.24	135.0 5.31	1.5 0.06	160.0 6.30	158.0 6.22	1.30 0.05	2.10 0.08	164	141	0.1297	0.92 2.02
26.195 1.0313	20.638 0.8125	2.5 0.10	1.5 0.06	134.0 5.28	136.0 5.35	1.5 0.06	164.0 6.46	160.0 6.30	0.70 0.03	1.60 0.06	253	106	0.1511	1.61 3.55
25.400 1.0000	18.288 0.7200	9.1 0.36	3.3 0.13	134.0 5.28	139.0 5.47	3.3 0.13	167.0 6.57	160.0 6.30	3.00 0.12	1.50 0.06	187	77.6	0.1535	1.50 3.30
36.512 1.4375	31.750 1.2500	-4.3 -0.17	3.3 0.13	135.0 5.31	140.0 5.51	3.3 0.13	168.0 6.61	161.0 6.34	2.20 0.09	0.60 0.02	315	134	0.1594	2.54 5.60
26.195 1.0313	20.638 0.8125	2.5 0.10	1.5 0.06	134.0 5.28	136.0 5.35	1.5 0.06	166.0 6.54	164.0 6.46	0.70 0.03	1.60 0.06	253	106	0.1511	2.10 4.63
38.100 1.5000	33.338 1.3125	-5.6 -0.22	3.5 0.14	135.0 5.31	141.0 5.55	3.3 0.13	176.0 6.93	168.0 6.61	1.90 0.07	3.20 0.13	353	91.3	0.1138	3.27 7.22
46.038 1.8125	38.100 1.5000	-6.4 -0.25	3.5 0.14	138.0 5.43	144.0 5.67	3.3 0.13	189.0 7.44	180.0 7.09	4.20 0.17	1.30 0.05	384	70.1	0.1220	5.01 11.05
46.038 1.8125	38.100 1.5000	-6.4 -0.25	3.5 0.14	138.0 5.43	144.0 5.67	3.3 0.13	191.0 7.52	183.0 7.20	4.20 0.17	1.30 0.05	384	70.1	0.1220	5.61 12.37
47.625 1.8750	34.925 1.3750	2.3 0.09	3.5 0.14	141.0 5.55	148.0 5.83	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	68.5	0.1338	7.01 15.45
49.428 1.9460	38.100 1.5000	13.2 0.52	3.5 0.14	143.5 5.65	151.0 5.94	3.3 0.13	213.0 8.38	197.0 7.76	8.20 0.32	4.80 0.19	237	44.6	0.1311	8.24 18.17

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

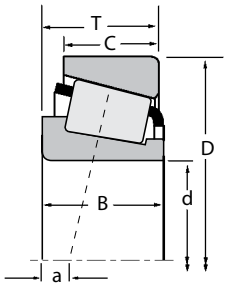
[7] Compound radius on inner race. Details on drawing for bearing.

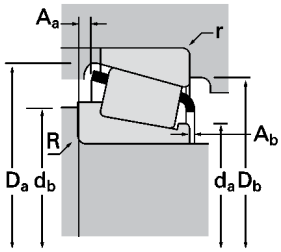
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
127.000 5.0000	228.600 9.0000	53.975 2.1250	458000 103000	0.74	0.81	119000 26700	150000 33700	0.79	673000 151000	HM926747	HM926710
127.000 5.0000	234.950 9.2500	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95500	95925
127.000 5.0000	244.475 9.6250	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95500	95962
127.000 5.0000	250.825 9.8750	63.500 2.5000	590000 133000	0.37	1.63	153000 34400	96200 21600	1.59	867000 195000	EE116050	116098
127.000 5.0000	254.000 10.0000	66.675 2.6250	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99500	99100
127.000 5.0000	254.000 10.0000	77.788 3.0625	843000 189000	0.32	1.87	218000 49100	120000 27000	1.82	1240000 279000	HH228349	HH228310
127.000 5.0000	288.925 11.3750	82.550 3.2500	977000 220000	0.32	1.88	253000 56900	138000 31100	1.83	1340000 302000	HH231637	HH231610
127.000 5.0000	295.275 11.6250	82.550 3.2500	977000 220000	0.32	1.88	253000 56900	138000 31100	1.83	1340000 302000	HH231637	HH231615
127.000 5.0000	304.800 12.0000	88.900 3.5000	904000 203000	0.73	0.82	234000 52700	292000 65700	0.80	1250000 282000	HH932132	HH932110
127.000 5.0000	311.150 12.2500	88.900 3.5000	904000 203000	0.73	0.82	234000 52700	292000 65700	0.80	1250000 282000	HH932132	HH932115
127.792 5.0312	228.600 9.0000	53.975 2.1250	458000 103000	0.74	0.81	119000 26700	150000 33700	0.79	673000 151000	HM926749	HM926710
128.588 5.0625	190.500 7.5000	34.925 1.3750	164000 36900	0.65	0.92	42500 9560	47500 10700	0.89	300000 67400	48506	48750
128.588 5.0625	206.375 8.1250	47.625 1.8750	350000 78700	0.46	1.31	90800 20400	71300 16000	1.27	593000 133000	799	792
129.975 5.1171	234.975 9.2510	64.798 2.5511	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95512	95929
130.000 5.1181	185.000 7.2835	29.000 1.1417	181000 40800	0.47	1.27	47000 10600	38100 8560	1.24	283000 63600	JP13049A	JP13010
130.000 5.1181	185.000 7.2835	29.000 1.1417	181000 40800	0.47	1.27	47000 10600	38100 8560	1.24	283000 63600	JP13049	JP13010
130.000 5.1181	206.375 8.1250	47.625 1.8750	350000 78700	0.46	1.31	90800 20400	71300 16000	1.27	593000 133000	797	792
130.000 5.1181	230.000 9.0551	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95512X	95905
130.000 5.1181	234.950 9.2500	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95512X	95925
130.000 5.1181	234.975 9.2510	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95512X	95928
130.175 5.1250	196.850 7.7500	46.038 1.8125	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67389	67322
130.175 5.1250	203.200 8.0000	46.038 1.8125	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67389	67320
130.175 5.1250	206.375 8.1250	47.625 1.8750	350000 78700	0.46	1.31	90800 20400	71300 16000	1.27	593000 133000	799A	792
133.350 5.2500	173.038 6.8125	19.050 0.7500	89300 20100	0.35	1.72	23100 5200	13800 3100	1.68	170000 38300	LL327049	LL327010
133.350 5.2500	177.008 6.9688	25.400 1.0000	136000 30600	0.35	1.72	35300 7940	21000 4730	1.68	289000 65000	L327249	L327210
133.350 5.2500	190.500 7.5000	39.688 1.5625	262000 58900	0.32	1.87	67900 15300	37300 8390	1.82	542000 122000	48385	48320
133.350 5.2500	196.850 7.7500	46.038 1.8125	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67390	67322
133.350 5.2500	196.850 7.7500	46.038 1.8125	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67391	67322

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
49.428 1.9460	38.100 1.5000	13.5 0.53	3.5 0.14	143.0 5.63	156.0 6.14	3.3 0.13	219.0 8.63	200.0 7.87	9.00 0.36	6.40 0.25	295	39	0.1416	8.61 18.98
63.500 2.5000	49.212 1.9375	-14.0 -0.55	6.4 0.25	142.0 5.59	154.0 6.06	3.3 0.13	217.0 8.54	209.0 8.23	6.40 0.25	3.80 0.15	454	53.8	0.1323	11.73 25.86
63.500 2.5000	49.212 1.9375	-14.0 -0.55	6.4 0.25	142.0 5.59	154.0 6.06	3.3 0.13	217.0 8.54	213.0 8.39	6.40 0.25	3.80 0.15	454	53.8	0.1323	13.08 28.83
63.500 2.5000	47.625 1.8750	-13.5 -0.53	3.3 0.13	144.0 5.67	148.0 5.83	4.8 0.19	224.0 8.82	220.0 8.66	8.50 0.34	1.60 0.06	417	57.3	0.1279	13.61 30.00
66.675 2.6250	47.625 1.8750	-12.2 -0.48	6.4 0.25	149.0 5.87	159.0 6.26	3.3 0.13	238.0 9.37	227.0 8.94	9.70 0.38	3.50 0.14	556	73.5	0.1459	15.44 34.03
82.550 3.2500	61.912 2.4375	-23.4 -0.92	9.7 0.38	148.0 5.83	164.0 6.46	6.4 0.25	233.5 9.20	223.0 8.78	7.10 0.28	0.00 0.00	530	44.8	0.1329	17.70 39.02
87.312 3.4375	57.150 2.2500	-26.7 -1.05	13.5 0.53	150.0 5.91	174.0 6.85	6.4 0.25	263.5 10.38	255.0 10.04	12.70 0.50	1.10 0.04	601	57.7	0.1083	25.21 55.57
87.312 3.4375	57.150 2.2500	-26.7 -1.05	13.5 0.53	150.0 5.91	174.0 6.85	6.4 0.25	263.5 10.38	258.0 10.16	12.70 0.50	1.10 0.04	601	57.7	0.1083	27.02 59.58
82.550 3.2500	57.150 2.2500	1.8 0.07	6.4 0.25	172.0 6.77	182.0 7.17	6.4 0.25	288.0 11.34	260.0 10.24	21.50 0.85	8.90 0.35	514	55.6	0.1333	29.48 65.00
82.550 3.2500	57.150 2.2500	1.8 0.07	6.4 0.25	172.0 6.77	182.0 7.17	6.4 0.25	288.0 11.34	262.0 10.31	21.50 0.85	8.90 0.35	514	55.6	0.1333	30.73 67.75
49.428 1.9460	38.100 1.5000	13.5 0.53	3.5 0.14	143.0 5.63	156.0 6.14	3.3 0.13	219.0 8.63	200.0 7.87	9.00 0.36	6.40 0.25	295	39	0.1416	8.55 18.84
31.750 1.2500	25.400 1.0000	16.5 0.65	3.5 0.14	138.0 5.43	144.0 5.67	3.3 0.13	183.0 7.20	170.0 6.69	4.40 0.18	0.80 0.03	218	71.4	0.1783	3.07 6.76
47.625 1.8750	34.925 1.3750	-1.8 -0.07	3.3 0.13	140.0 5.51	146.0 5.75	3.3 0.13	198.0 7.80	186.0 7.32	5.30 0.21	2.80 0.11	326	61.9	0.1269	5.74 12.66
63.500 2.5000	49.950 1.9665	-14.0 -0.55	6.4 0.25	145.0 5.71	157.0 6.18	3.3 0.13	217.0 8.54	208.0 8.19	6.40 0.25	3.80 0.15	454	59.3	0.1323	11.52 25.41
27.000 1.0630	21.000 0.8268	8.9 0.35	6.0 0.24	137.0 5.39	149.0 5.87	3.0 0.12	179.0 7.05	172.0 6.77	2.40 0.09	4.10 0.16	192	60.3	0.1064	2.15 4.73
27.000 1.0630	21.000 0.8268	8.9 0.35	3.0 0.12	137.0 5.39	143.0 5.63	3.0 0.12	179.0 7.05	172.0 6.77	2.40 0.09	4.10 0.16	192	60.3	0.1064	2.16 4.76
47.625 1.8750	34.925 1.3750	-1.8 -0.07	3.5 0.14	141.0 5.55	148.0 5.83	3.3 0.13	198.0 7.80	186.0 7.32	5.30 0.21	2.80 0.11	326	61.9	0.1269	5.63 12.42
63.500 2.5000	49.212 1.9375	-14.0 -0.55	6.0 0.24	145.0 5.71	156.0 6.14	3.3 0.13	217.0 8.54	207.0 8.15	6.40 0.25	3.80 0.15	454	59.3	0.1323	10.71 23.60
63.500 2.5000	49.212 1.9375	-14.0 -0.55	6.0 0.24	145.0 5.71	156.0 6.14	3.3 0.13	217.0 8.54	209.0 8.23	6.40 0.25	3.80 0.15	454	59.3	0.1323	11.43 25.21
63.500 2.5000	49.212 1.9375	-14.0 -0.55	6.0 0.24	145.0 5.71	156.0 6.14	3.3 0.13	217.0 8.54	209.0 8.23	6.40 0.25	3.80 0.15	454	59.3	0.1323	11.41 25.14
46.038 1.8125	38.100 1.5000	-6.4 -0.25	3.5 0.14	141.0 5.55	146.0 5.75	3.3 0.13	189.0 7.44	180.0 7.09	4.20 0.17	1.30 0.05	384	70.1	0.1220	4.78 10.54
46.038 1.8125	38.100 1.5000	-6.4 -0.25	3.5 0.14	141.0 5.55	146.0 5.75	3.3 0.13	191.0 7.52	183.0 7.20	4.20 0.17	1.30 0.05	384	70.1	0.1220	5.38 11.86
47.625 1.8750	34.925 1.3750	-1.8 -0.07	3.5 0.14	142.0 5.59	148.0 5.83	3.3 0.13	198.0 7.80	186.0 7.32	5.30 0.21	2.80 0.11	326	61.9	0.1269	5.62 12.39
17.462 0.6875	14.288 0.5625	7.6 0.30	1.5 0.06	139.0 5.47	141.0 5.55	1.5 0.06	167.0 6.57	164.0 6.46	1.40 0.06	1.90 0.08	188	146	0.1377	1.00 2.21
26.195 1.0313	20.638 0.8125	4.1 0.16	1.5 0.06	140.0 5.51	142.0 5.59	1.5 0.06	171.0 6.73	167.0 6.57	0.80 0.03	1.70 0.07	280	156	0.1585	1.71 3.78
39.688 1.5625	33.338 1.3125	-4.1 -0.16	3.5 0.14	142.0 5.59	148.0 5.83	3.3 0.13	184.0 7.24	177.0 6.97	2.80 0.11	1.20 0.05	404	95.6	0.1209	3.56 7.85
46.038 1.8125	38.100 1.5000	-6.4 -0.25	3.5 0.14	143.0 5.63	149.0 5.87	3.3 0.13	189.0 7.44	180.0 7.09	4.20 0.17	1.30 0.05	384	70.1	0.1220	4.55 10.02
46.038 1.8125	38.100 1.5000	-6.4 -0.25	8.0 0.31	143.0 5.63	157.0 6.18	3.3 0.13	189.0 7.44	180.0 7.09	4.20 0.17	1.30 0.05	384	70.1	0.1220	4.53 10.00

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

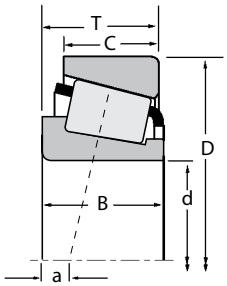
[8] Pin-type cage. Please consult The Timken Company.

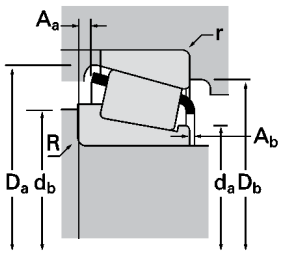
Continued on next page.

B

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
133.350 5.2500	203.200 8.0000	46.038 1.8125	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67390	67320
133.350 5.2500	203.200 8.0000	46.038 1.8125	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67391	67320
133.350 5.2500	214.975 8.4636	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74525	74845
133.350 5.2500	215.900 8.5000	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74525	74850
133.350 5.2500	215.900 8.5000	53.975 2.1250	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74525	74853
133.350 5.2500	234.950 9.2500	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95525	95925
133.350 5.2500	234.950 9.2500	63.500 2.5000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95528	95925
136.525 5.3750	190.500 7.5000	39.688 1.5625	262000 58900	0.32	1.87	67900 15300	37300 8390	1.82	542000 122000	48393	48320
136.525 5.3750	203.200 8.0000	39.688 1.5625	262000 58900	0.32	1.87	67900 15300	37300 8390	1.82	542000 122000	48393	48328
136.525 5.3750	215.900 8.5000	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74537	74850
136.525 5.3750	217.488 8.5625	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74537	74856
136.525 5.3750	228.600 9.0000	57.150 2.2500	482000 108000	0.42	1.43	125000 28100	90000 20200	1.39	809000 182000	896	892
139.700 5.5000	187.325 7.3750	28.575 1.1250	177000 39800	0.36	1.69	45900 10300	27900 6270	1.65	375000 84300	LM328448	LM328410
139.700 5.5000	214.975 8.4636	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74550	74845
139.700 5.5000	215.900 8.5000	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74550	74850
139.700 5.5000	215.900 8.5000	47.625 1.8750	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74550A	74850
139.700 5.5000	222.250 8.7500	34.925 1.3750	229000 51400	0.44	1.37	59300 13300	44400 9970	1.34	342000 77000	73551	73875
139.700 5.5000	228.600 9.0000	57.150 2.2500	482000 108000	0.42	1.43	125000 28100	90000 20200	1.39	809000 182000	898	892
139.700 5.5000	228.600 9.0000	57.150 2.2500	482000 108000	0.42	1.43	125000 28100	90000 20200	1.39	809000 182000	898A	892
139.700 5.5000	236.538 9.3125	57.150 2.2500	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231132	HM231110
139.700 5.5000	241.300 9.5000	57.150 2.2500	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231132	HM231115
139.700 5.5000	254.000 10.0000	66.675 2.6250	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99550	99100
139.700 5.5000	288.925 11.3750	82.550 3.2500	977000 220000	0.32	1.88	253000 56900	138000 31100	1.83	1340000 302000	HH231649	HH231610
139.700 5.5000	295.275 11.6250	82.550 3.2500	977000 220000	0.32	1.88	253000 56900	138000 31100	1.83	1340000 302000	HH231649	HH231615
139.700 5.5000	307.975 12.1250	88.900 3.5000	1130000 254000	0.33	1.84	293000 65900	164000 36800	1.79	1580000 354000	HH234031	HH234010
139.700 5.5000	307.975 12.1250	88.900 3.5000	1130000 254000	0.33	1.84	293000 65900	164000 36800	1.79	1580000 354000	HH234032	HH234010
140.000 5.5118	195.000 7.6772	29.000 1.1417	188000 42300	0.50	1.19	48800 11000	42000 9440	1.16	304000 68400	JP14049	JP14010
142.875 5.6250	193.675 7.6250	28.575 1.1250	182000 40900	0.37	1.63	47100 10600	29700 6690	1.59	394000 88600	36686	36620

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
46.038 1.8125	38.100 1.5000	-6.4 -0.25	3.5 0.14	143.0 5.63	149.0 5.87	3.3 0.13	191.0 7.52	183.0 7.20	4.20 0.17	1.30 0.05	384	70.1	0.1220	5.14 11.34
46.038 1.8125	38.100 1.5000	-6.4 -0.25	8.0 0.31	143.0 5.63	157.0 6.18	3.3 0.13	191.0 7.52	183.0 7.20	4.20 0.17	1.30 0.05	384	70.1	0.1220	5.13 11.31
47.625 1.8750	34.925 1.3750	2.3 0.09	3.5 0.14	146.0 5.75	152.0 5.98	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	63.3	0.1338	6.41 14.14
47.625 1.8750	34.925 1.3750	2.3 0.09	3.5 0.14	146.0 5.75	152.0 5.98	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	63.3	0.1338	6.52 14.38
47.625 1.8750	47.625 1.8750	2.3 0.09	3.5 0.14	146.0 5.75	152.0 5.98	3.3 0.13	209.0 8.23	196.0 7.72	4.80 0.19	2.00 0.08	363	63.3	0.1338	7.20 15.86
63.500 2.5000	49.212 1.9375	-14.0 -0.55	9.7 0.38	148.0 5.83	166.0 6.54	3.3 0.13	217.0 8.54	209.0 8.23	6.40 0.25	3.80 0.15	454	53.8	0.1323	10.99 24.23
63.500 2.5000	49.212 1.9375	-14.0 -0.55	4.8 0.19	148.0 5.83	157.0 6.18	3.3 0.13	217.0 8.54	209.0 8.23	6.40 0.25	3.80 0.15	454	59.3	0.1323	11.11 24.50
39.688 1.5625	33.338 1.3125	-4.1 -0.16	3.5 0.14	144.0 5.67	151.0 5.94	3.3 0.13	184.0 7.24	177.0 6.97	2.80 0.11	1.20 0.05	404	95.6	0.1209	3.35 7.38
39.688 1.5625	33.338 1.3125	-4.1 -0.16	3.5 0.14	144.0 5.67	151.0 5.94	3.3 0.13	186.0 7.32	182.0 7.17	2.80 0.11	1.20 0.05	404	95.6	0.1209	4.37 9.64
47.625 1.8750	34.925 1.3750	2.3 0.09	3.5 0.14	148.0 5.83	155.0 6.10	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	68.5	0.1338	6.27 13.82
47.625 1.8750	34.925 1.3750	2.3 0.09	3.5 0.14	148.0 5.83	155.0 6.10	3.3 0.13	209.0 8.23	197.0 7.76	4.80 0.19	2.00 0.08	363	68.5	0.1338	6.40 14.10
57.150 2.2500	44.450 1.7500	-6.1 -0.24	3.5 0.14	150.0 5.91	156.0 6.14	3.3 0.13	216.0 8.50	205.0 8.07	6.40 0.25	1.40 0.05	430	78.2	0.1355	8.95 19.72
29.370 1.1563	23.020 0.9063	3.6 0.14	1.5 0.06	147.0 5.79	149.0 5.87	1.5 0.06	182.0 7.17	176.0 6.93	1.20 0.05	1.90 0.08	336	179	0.1700	2.20 4.85
47.625 1.8750	34.925 1.3750	2.3 0.09	3.5 0.14	151.0 5.94	158.0 6.22	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	63.3	0.1338	5.91 13.02
47.625 1.8750	34.925 1.3750	2.3 0.09	3.5 0.14	151.0 5.94	158.0 6.22	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	63.3	0.1338	6.01 13.26
47.625 1.8750	34.925 1.3750	2.3 0.09	6.4 0.25	154.0 6.06	166.0 6.54	3.3 0.13	208.0 8.19	196.0 7.72	4.80 0.19	2.00 0.08	363	63.3	0.1338	6.00 13.23
31.623 1.2450	23.812 0.9375	6.4 0.25	3.5 0.14	150.0 5.91	156.0 6.14	3.3 0.13	207.0 8.15	204.0 8.03	5.70 0.23	3.90 0.15	244	82	0.1122	4.26 9.40
57.150 2.2500	44.450 1.7500	-6.1 -0.24	3.5 0.14	153.0 6.02	160.0 6.30	3.3 0.13	216.0 8.50	205.0 8.07	6.40 0.25	1.40 0.05	430	78.2	0.1355	8.64 19.04
57.150 2.2500	44.450 1.7500	-6.1 -0.24	6.4 0.25	153.0 6.02	165.0 6.50	3.3 0.13	216.0 8.50	205.0 8.07	6.40 0.25	1.40 0.05	430	78.2	0.1355	8.59 18.93
56.642 2.2300	44.450 1.7500	-11.4 -0.45	3.5 0.14	156.0 6.14	160.0 6.30	3.3 0.13	224.0 8.82	217.0 8.54	4.30 0.17	3.70 0.14	533	85.9	0.1327	9.90 21.82
56.642 2.2300	44.450 1.7500	-11.4 -0.45	3.5 0.14	156.0 6.14	160.0 6.30	3.3 0.13	224.0 8.82	219.0 8.62	4.30 0.17	3.70 0.14	533	85.9	0.1327	10.52 23.19
66.675 2.6250	47.625 1.8750	-12.2 -0.48	7.0 0.28	156.0 6.14	170.0 6.69	3.3 0.13	238.0 9.37	227.0 8.94	9.70 0.38	3.50 0.14	556	73.5	0.1459	14.00 30.87
87.312 3.4375	57.150 2.2500	-26.7 -1.05	9.7 0.38	161.0 6.34	177.0 6.97	6.4 0.25	263.5 10.38	255.0 10.04	12.70 0.50	1.10 0.04	601	57.7	0.1083	23.53 51.87
87.312 3.4375	57.150 2.2500	-26.7 -1.05	9.7 0.38	161.0 6.34	177.0 6.97	6.4 0.25	263.5 10.38	258.0 10.16	12.70 0.50	1.10 0.04	601	57.7	0.1083	25.34 55.87
93.662 3.6875	66.675 2.6250	-26.4 -1.04	9.7 0.38	168.0 6.61	180.0 7.09	6.8 0.27	285.5 11.24	276.0 10.87	12.50 0.49	-0.90 -0.04	718	62.1	0.1157	30.78 67.85
93.662 3.6875	66.675 2.6250	-26.4 -1.04	9.7 0.38	168.0 6.61	180.0 7.09	6.8 0.27	285.5 11.24	276.0 10.87	10.50 0.42	1.10 0.04	718	62.1	0.1157	29.48 64.99
27.000 1.0630	21.000 0.8268	11.9 0.47	3.0 0.12	148.0 5.83	153.0 6.02	3.0 0.12	189.0 7.44	182.0 7.17	2.60 0.10	4.10 0.16	220	68.1	0.1133	2.29 5.06
28.575 1.1250	23.020 0.9063	4.8 0.19	1.5 0.06	151.0 5.94	153.0 6.02	1.5 0.06	188.0 7.40	182.0 7.17	1.20 0.05	2.70 0.11	366	152	0.1768	2.43 5.35

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

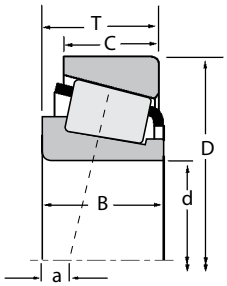
[7] Compound radius on inner race. Details on drawing for bearing.

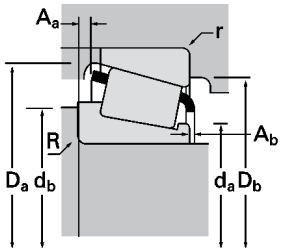
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
142.875 5.6250	200.025 7.8750	41.275 1.6250	265000 59600	0.34	1.78	68800 15500	39600 8900	1.74	560000 126000	48684	48620
142.875 5.6250	200.025 7.8750	41.275 1.6250	265000 59600	0.34	1.78	68800 15500	39600 8900	1.74	560000 126000	48685	48620
142.875 5.6250	222.250 8.7500	34.925 1.3750	229000 51400	0.44	1.37	59300 13300	44400 9970	1.34	342000 77000	73562	73875
142.875 5.6250	236.538 9.3125	57.150 2.2500	477000 107000	0.44	1.36	124000 27800	93600 21000	1.32	810000 182000	82562A	82931
142.875 5.6250	241.300 9.5000	57.150 2.2500	477000 107000	0.44	1.36	124000 27800	93600 21000	1.32	810000 182000	82562A	82950
142.875 5.6250	241.300 9.5000	57.150 2.2500	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231136	HM231115
146.050 5.7500	188.120 7.4063	22.225 0.8750	105000 23500	0.38	1.57	27200 6100	17700 3990	1.53	214000 48200	LL529749	LL529710
146.050 5.7500	193.675 7.6250	28.575 1.1250	182000 40900	0.37	1.63	47100 10600	29700 6690	1.59	394000 88600	36690	36620
146.050 5.7500	193.675 7.6250	28.575 1.1250	182000 40900	0.37	1.63	47100 10600	29700 6690	1.59	394000 88600	36691	36620
146.050 5.7500	203.200 8.0000	28.575 1.1250	182000 40900	0.37	1.63	47100 10600	29700 6690	1.59	394000 88600	36690	36626
146.050 5.7500	203.200 8.0000	45.100 1.7756	309000 69500	0.33	1.80	80100 18000	45600 10300	1.76	573000 129000	M229349A	M229310
146.050 5.7500	203.200 8.0000	45.100 1.7756	309000 69500	0.33	1.80	80100 18000	45600 10300	1.76	573000 129000	M229349	M229310
146.050 5.7500	236.538 9.3125	57.150 2.2500	477000 107000	0.44	1.36	124000 27800	93600 21000	1.32	810000 182000	82576	82931
146.050 5.7500	241.300 9.5000	57.150 2.2500	477000 107000	0.44	1.36	124000 27800	93600 21000	1.32	810000 182000	82576	82950
146.050 5.7500	241.300 9.5000	57.150 2.2500	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231140	HM231115
146.050 5.7500	244.475 9.6250	47.625 1.8750	372000 83600	0.35	1.71	96400 21700	58100 13100	1.66	595000 134000	81575	81962
146.050 5.7500	254.000 10.0000	66.675 2.6250	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99575	99100
146.050 5.7500	268.288 10.5625	74.612 2.9375	726000 163000	0.39	1.55	188000 42300	125000 28100	1.51	1170000 263000	EE107057	107105
146.050 5.7500	304.800 12.0000	60.325 2.3750	718000 161000	0.33	1.80	186000 41800	106000 23800	1.76	871000 196000	EE750576	751200
146.050 5.7500	304.800 12.0000	88.900 3.5000	904000 203000	0.73	0.82	234000 52700	292000 65700	0.80	1250000 282000	HH932145	HH932110
146.050 5.7500	307.975 12.1250	88.900 3.5000	975000 219000	0.33	1.84	253000 56800	141000 31700	1.79	1480000 333000	EE450577	451212
146.050 5.7500	307.975 12.1250	88.900 3.5000	1130000 254000	0.33	1.84	293000 65900	164000 36800	1.79	1580000 354000	HH234040	HH234010
146.050 5.7500	311.150 12.2500	88.900 3.5000	904000 203000	0.73	0.82	234000 52700	292000 65700	0.80	1250000 282000	HH932145	HH932115
149.225 5.8750	236.538 9.3125	57.150 2.2500	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231148	HM231110
149.225 5.8750	236.538 9.3125	57.150 2.2500	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231149	HM231110
149.225 5.8750	241.300 9.5000	57.150 2.2500	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231149	HM231115
149.225 5.8750	254.000 10.0000	67.945 2.6750	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99587	99100
150.000 5.9055	203.200 8.0000	28.580 1.1250	179000 40300	0.46	1.31	46500 10500	36500 8210	1.27	339000 76100	JL730646	L730610

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
39.688 1.5625	34.130 1.3437	-3.0 -0.12	8.0 0.31	151.0 5.94	166.0 6.54	3.3 0.13	193.0 7.60	185.0 7.28	2.80 0.11	2.50 0.10	440	115	0.1261	3.74 8.25
39.688 1.5625	34.130 1.3437	-3.0 -0.12	3.5 0.14	151.0 5.94	158.0 6.22	3.3 0.13	193.0 7.60	185.0 7.28	2.80 0.11	2.50 0.10	440	115	0.1261	3.84 8.46
31.623 1.2450	23.812 0.9375	6.4 0.25	3.5 0.14	152.0 5.98	159.0 6.26	3.3 0.13	207.0 8.15	204.0 8.03	5.70 0.23	3.90 0.15	244	82	0.1122	4.09 9.01
56.642 2.2300	44.450 1.7500	-3.6 -0.14	8.0 0.31	157.0 6.18	172.0 6.77	3.3 0.13	226.0 8.90	213.0 8.39	5.80 0.23	2.10 0.08	460	81.1	0.1405	9.43 20.78
56.642 2.2300	44.450 1.7500	-3.6 -0.14	8.0 0.31	157.0 6.18	172.0 6.77	3.3 0.13	226.0 8.90	215.0 8.46	5.80 0.23	2.10 0.08	460	81.1	0.1405	10.05 22.15
56.642 2.2300	44.450 1.7500	-11.4 -0.45	3.5 0.14	158.0 6.22	162.0 6.38	3.3 0.13	224.0 8.82	219.0 8.62	4.30 0.17	3.70 0.14	533	85.9	0.1327	10.20 22.50
20.638 0.8125	16.670 0.6563	9.4 0.37	1.5 0.06	152.0 5.98	155.0 6.10	1.5 0.06	182.0 7.17	179.0 7.05	0.50 0.02	1.80 0.07	248	186	0.1557	1.42 3.12
28.575 1.1250	23.020 0.9063	4.8 0.19	1.5 0.06	153.0 6.02	155.0 6.10	1.5 0.06	188.0 7.40	182.0 7.17	1.20 0.05	2.70 0.11	366	121	0.1768	2.27 5.00
28.575 1.1250	23.020 0.9063	4.8 0.19	4.8 0.19	153.0 6.02	162.0 6.38	1.5 0.06	188.0 7.40	182.0 7.17	1.20 0.05	2.70 0.11	366	152	0.1768	2.23 4.91
28.575 1.1250	23.020 0.9063	4.8 0.19	1.5 0.06	153.0 6.02	155.0 6.10	1.5 0.06	190.0 7.48	186.0 7.32	1.20 0.05	2.70 0.11	366	121	0.1768	2.80 6.17
40.000 1.5748	38.100 1.5000	-2.5 -0.10	5.0 0.20	154.0 6.06	164.0 6.46	3.5 0.14	197.0 7.76	187.0 7.36	1.50 0.06	2.80 0.11	402	98	0.1220	3.99 8.79
40.000 1.5748	38.100 1.5000	-2.5 -0.10	3.5 0.14	154.0 6.06	160.0 6.30	3.5 0.14	197.0 7.76	187.0 7.36	1.50 0.06	2.80 0.11	402	98	0.1220	4.00 8.81
56.642 2.2300	44.450 1.7500	-3.6 -0.14	3.5 0.14	160.0 6.30	166.0 6.54	3.3 0.13	226.0 8.90	213.0 8.39	5.80 0.23	2.10 0.08	460	81.1	0.1405	9.20 20.28
56.642 2.2300	44.450 1.7500	-3.6 -0.14	3.5 0.14	160.0 6.30	166.0 6.54	3.3 0.13	226.0 8.90	215.0 8.46	5.80 0.23	2.10 0.08	460	81.1	0.1405	9.82 21.65
56.642 2.2300	44.450 1.7500	-11.4 -0.45	3.5 0.14	160.0 6.30	164.0 6.46	3.3 0.13	224.0 8.82	219.0 8.62	4.30 0.17	3.70 0.14	533	85.9	0.1327	9.88 21.79
50.005 1.9687	33.338 1.3125	-5.3 -0.21	3.5 0.14	161.0 6.34	166.0 6.54	3.3 0.13	229.0 9.02	225.0 8.86	8.30 0.33	-0.10 0.00	413	98.4	0.1250	8.19 18.06
66.675 2.6250	47.625 1.8750	-12.2 -0.48	7.0 0.28	162.0 6.38	175.0 6.89	3.3 0.13	238.0 9.37	227.0 8.94	9.70 0.38	3.50 0.14	556	73.5	0.1459	13.25 29.22
74.612 2.9375	57.150 2.2500	-15.0 -0.59	6.4 0.25	166.0 6.54	176.0 6.93	6.4 0.25	249.5 9.82	237.0 9.33	7.70 0.30	3.00 0.12	606	76.3	0.1163	17.37 38.30
61.912 2.4375	41.275 1.6250	-10.7 -0.42	3.3 0.13	172.0 6.77	167.0 6.57	6.4 0.25	272.0 10.71	270.0 10.63	6.70 0.26	3.50 0.14	431	54.4	0.0974	17.64 38.90
82.550 3.2500	57.150 2.2500	1.8 0.07	6.4 0.25	174.5 6.87	195.0 7.68	6.4 0.25	288.0 11.34	260.0 10.24	21.50 0.85	8.90 0.35	514	55.6	0.1333	26.84 59.16
93.662 3.6875	61.912 2.4375	-28.2 -1.11	9.7 0.38	172.0 6.77	185.0 7.28	6.8 0.27	275.0 10.82	269.0 10.59	17.90 0.70	-2.80 -0.11	747	76.3	0.1176	29.59 65.24
93.662 3.6875	66.675 2.6250	-26.4 -1.04	9.7 0.38	173.0 6.81	186.0 7.32	6.8 0.27	285.5 11.24	276.0 10.87	10.50 0.42	0.80 0.03	718	62.1	0.1157	28.43 62.67
82.550 3.2500	57.150 2.2500	1.8 0.07	6.4 0.25	174.5 6.87	195.0 7.68	6.4 0.25	288.0 11.34	262.0 10.31	21.50 0.85	8.90 0.35	514	55.6	0.1333	28.08 61.91
56.642 2.2300	44.450 1.7500	-11.4 -0.45	6.4 0.25	163.0 6.42	172.0 6.77	3.3 0.13	224.0 8.82	217.0 8.54	4.30 0.17	3.70 0.14	533	85.9	0.1327	8.88 19.59
56.642 2.2300	44.450 1.7500	-11.4 -0.45	3.5 0.14	163.0 6.42	167.0 6.57	3.3 0.13	224.0 8.82	217.0 8.54	4.30 0.17	3.70 0.14	533	85.9	0.1327	8.94 19.70
56.642 2.2300	44.450 1.7500	-11.4 -0.45	3.5 0.14	163.0 6.42	167.0 6.57	3.3 0.13	224.0 8.82	219.0 8.62	4.30 0.17	3.70 0.14	533	85.9	0.1327	9.56 21.07
66.675 2.6250	47.625 1.8750	-12.2 -0.48	7.0 0.28	165.0 6.50	178.0 7.01	3.3 0.13	238.0 9.37	227.0 8.94	9.70 0.38	3.50 0.14	556	73.5	0.1459	12.87 28.37
28.575 1.1250	21.438 0.8440	11.4 0.45	3.3 0.13	158.0 6.22	164.0 6.46	3.3 0.13	198.0 7.80	190.0 7.48	2.40 0.10	1.40 0.06	295	103	0.1763	2.49 5.48

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

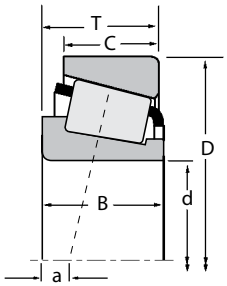
(7) Compound radius on inner race. Details on drawing for bearing.

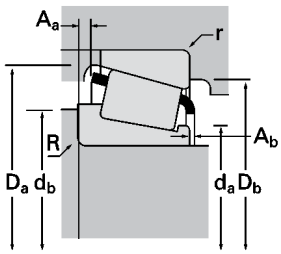
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
150.000 5.9055	205.000 8.0709	28.580 1.1250	179000 40300	0.46	1.31	46500 10500	36500 8210	1.27	339000 76100	JL730646	JL730612
150.000 5.9055	244.475 9.6250	47.625 1.8750	372000 83600	0.35	1.71	96400 21700	58100 13100	1.66	595000 134000	81590	81962
150.000 5.9055	245.000 9.6457	47.625 1.8750	372000 83600	0.35	1.71	96400 21700	58100 13100	1.66	595000 134000	81590	81964
150.812 5.9375	244.475 9.6250	47.625 1.8750	372000 83600	0.35	1.71	96400 21700	58100 13100	1.66	595000 134000	81593	81962
152.400 6.0000	192.088 7.5625	25.000 0.9843	132000 29700	0.42	1.44	34200 7690	24400 5480	1.40	277000 62200	L630349	L630310
152.400 6.0000	203.200 8.0000	28.575 1.1250	179000 40300	0.46	1.31	46500 10500	36500 8210	1.27	339000 76100	L730649	L730610
152.400 6.0000	203.200 8.0000	41.275 1.6250	262000 59000	0.35	1.73	68000 15300	40400 9090	1.68	556000 125000	LM330448	LM330410
152.400 6.0000	244.475 9.6250	47.625 1.8750	372000 83600	0.35	1.71	96400 21700	58100 13100	1.66	595000 134000	81600	81962
152.400 6.0000	249.974 9.8415	66.675 2.6250	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99600	99097
152.400 6.0000	250.000 9.8425	66.675 2.6250	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99600	99098X
152.400 6.0000	254.000 10.0000	66.675 2.6250	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99600	99100
152.400 6.0000	268.288 10.5625	74.612 2.9375	726000 163000	0.39	1.55	188000 42300	125000 28100	1.51	1170000 263000	EE107060	107105
152.400 6.0000	285.750 11.2500	76.200 3.0000	701000 158000	0.40	1.49	182000 40800	125000 28100	1.45	1060000 237000	EE217060	217112
152.400 6.0000	307.975 12.1250	88.900 3.5000	975000 219000	0.33	1.84	253000 56800	141000 31700	1.79	1480000 333000	EE450601	451212
152.400 6.0000	307.975 12.1250	88.900 3.5000	1130000 254000	0.33	1.84	293000 65900	164000 36800	1.79	1580000 354000	HH234048	HH234010
152.400 6.0000	307.975 12.1250	88.900 3.5000	1130000 254000	0.33	1.84	293000 65900	164000 36800	1.79	1580000 354000	HH234049	HH234010
152.400 6.0000	317.500 12.5000	88.900 3.5000	1130000 254000	0.33	1.84	293000 65900	164000 36800	1.79	1580000 354000	HH234049	HH234018
155.575 6.1250	330.200 13.0000	85.725 3.3750	960000 216000	0.81	0.74	249000 56000	345000 77500	0.72	1400000 316000	H936340	H936310
155.575 6.1250	336.550 13.2500	85.725 3.3750	960000 216000	0.81	0.74	249000 56000	345000 77500	0.72	1400000 316000	H936340	H936313
155.575 6.1250	342.900 13.5000	85.725 3.3750	960000 216000	0.81	0.74	249000 56000	345000 77500	0.72	1400000 316000	H936340	H936316
158.750 6.2500	205.583 8.0938	23.812 0.9375	136000 30600	0.37	1.61	35300 7930	22500 5060	1.57	280000 63000	L432348	L432310
158.750 6.2500	225.425 8.8750	41.275 1.6250	281000 63100	0.38	1.57	72800 16400	47800 10700	1.52	635000 143000	46780	46720
158.750 6.2500	285.750 11.2500	76.200 3.0000	701000 158000	0.40	1.49	182000 40800	125000 28100	1.45	1060000 237000	EE217062X	217112
158.750 6.2500	304.800 12.0000	66.675 2.6250	591000 133000	0.36	1.67	153000 34500	94500 21200	1.62	867000 195000	EE280626	281200
159.951 6.2973	244.475 9.6250	47.625 1.8750	372000 83600	0.35	1.71	96400 21700	58100 13100	1.66	595000 134000	81629	81962
159.951 6.2973	244.475 9.6250	47.625 1.8750	372000 83600	0.35	1.71	96400 21700	58100 13100	1.66	595000 134000	81630	81962
160.000 6.2992	240.000 9.4488	46.000 1.8110	393000 88400	0.44	1.37	102000 22900	76300 17200	1.34	759000 171000	JM734445	JM734410
160.325 6.3120	288.925 11.3750	63.500 2.5000	763000 171000	0.32	1.88	198000 44500	108000 24300	1.83	1240000 278000	HM237532	HM237510

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
28.575 1.1250	21.438 0.8440	11.4 0.45	3.3 0.13	158.0 6.22	164.0 6.46	3.3 0.13	198.0 7.80	190.0 7.48	2.40 0.10	1.40 0.06	295	103	0.1763	2.61 5.76
50.005 1.9687	33.338 1.3125	-5.3 -0.21	3.5 0.14	163.0 6.42	169.0 6.65	3.3 0.13	229.0 9.02	225.0 8.86	8.30 0.33	-0.10 0.00	413	98.4	0.1250	7.87 17.36
50.005 1.9687	33.338 1.3125	-5.3 -0.21	3.5 0.14	163.0 6.42	169.0 6.65	3.3 0.13	229.0 9.02	225.0 8.86	8.30 0.33	-0.10 0.00	413	98.4	0.1250	7.92 17.46
50.005 1.9687	33.338 1.3125	-5.3 -0.21	3.5 0.14	164.0 6.46	169.0 6.65	3.3 0.13	229.0 9.02	225.0 8.86	8.30 0.33	-0.10 0.00	413	98.4	0.1250	7.80 17.21
24.000 0.9449	19.000 0.7480	10.2 0.40	2.0 0.08	158.0 6.22	162.0 6.38	2.0 0.08	187.0 7.36	183.0 7.20	1.90 0.08	2.50 0.10	293	164	0.1698	1.56 3.44
28.575 1.1250	21.438 0.8440	11.4 0.45	3.3 0.13	160.0 6.30	165.0 6.50	3.3 0.13	198.0 7.80	190.0 7.48	2.40 0.10	1.40 0.06	295	103	0.1763	2.35 5.18
41.275 1.6250	34.925 1.3750	-1.8 -0.07	3.3 0.13	162.0 6.37	166.0 6.54	3.3 0.13	197.0 7.76	189.0 7.44	2.90 0.11	0.90 0.04	456	135	0.1289	3.51 7.74
50.005 1.9687	33.338 1.3125	-5.3 -0.21	3.5 0.14	165.0 6.50	171.0 6.73	3.3 0.13	229.0 9.02	225.0 8.86	8.30 0.33	-0.10 0.00	413	98.4	0.1250	7.64 16.84
66.675 2.6250	53.400 2.1024	-12.2 -0.48	7.0 0.28	169.5 6.68	181.0 7.13	3.0 0.12	240.0 9.44	226.0 8.90	9.70 0.38	3.50 0.14	556	66.7	0.1459	12.05 26.56
66.675 2.6250	47.625 1.8750	-12.2 -0.48	7.0 0.28	169.5 6.68	181.0 7.13	3.3 0.13	238.0 9.37	226.0 8.90	9.70 0.38	3.50 0.14	556	66.7	0.1459	11.85 26.13
66.675 2.6250	47.625 1.8750	-12.2 -0.48	7.0 0.28	169.5 6.68	181.0 7.13	3.3 0.13	238.0 9.37	227.0 8.94	9.70 0.38	3.50 0.14	556	66.7	0.1459	12.47 27.50
74.612 2.9375	57.150 2.2500	-15.0 -0.59	6.4 0.25	171.0 6.73	181.0 7.13	6.4 0.25	249.5 9.82	237.0 9.33	7.70 0.30	3.00 0.12	606	76.3	0.1163	16.50 36.38
73.025 2.8750	55.562 2.1875	-15.0 -0.59	1.5 0.06	171.0 6.73	171.0 6.73	6.4 0.25	260.5 10.25	251.0 9.88	15.00 0.59	1.70 0.07	556	71.8	0.1140	19.41 42.80
93.662 3.6875	61.912 2.4375	-28.2 -1.11	9.7 0.38	177.0 6.97	189.0 7.44	6.8 0.27	275.0 10.82	269.0 10.59	17.90 0.70	-2.80 -0.11	747	76.3	0.1176	28.50 62.82
93.662 3.6875	66.675 2.6250	-26.4 -1.04	9.7 0.38	179.0 7.05	191.0 7.52	6.8 0.27	285.5 11.24	276.0 10.87	12.50 0.49	-0.90 -0.04	718	62.1	0.1157	28.63 63.11
93.662 3.6875	66.675 2.6250	-26.4 -1.04	9.7 0.38	179.0 7.05	191.0 7.52	6.8 0.27	285.5 11.24	276.0 10.87	10.50 0.42	0.80 0.03	718	62.1	0.1157	27.33 60.25
93.662 3.6875	66.675 2.6250	-26.4 -1.04	9.7 0.38	179.0 7.05	191.0 7.52	6.8 0.27	285.5 11.24	280.0 11.02	10.50 0.42	0.80 0.03	718	62.1	0.1157	29.75 65.59
79.375 3.1250	53.975 2.1250	16.8 0.66	6.4 0.25	192.5 7.58	209.0 8.23	6.4 0.25	311.5 12.26	282.0 11.10	18.40 0.72	9.20 0.36	638	69.1	0.1475	31.49 69.42
79.375 3.1250	53.975 2.1250	16.8 0.66	6.4 0.25	192.5 7.58	209.0 8.23	6.4 0.25	311.0 12.24	285.0 11.22	18.40 0.72	9.20 0.36	638	69.1	0.1475	32.89 72.51
79.375 3.1250	53.975 2.1250	16.8 0.66	6.4 0.25	192.5 7.58	209.0 8.23	6.4 0.25	311.5 12.26	287.0 11.30	18.40 0.72	9.20 0.36	638	69.1	0.1475	34.32 75.66
23.812 0.9375	18.258 0.7188	9.4 0.37	4.8 0.19	166.0 6.54	174.0 6.85	1.5 0.06	199.0 7.83	195.0 7.68	2.00 0.08	1.20 0.05	320	177	0.1683	1.85 4.09
39.688 1.5625	33.338 1.3125	2.5 0.10	3.5 0.14	169.0 6.65	176.0 6.93	3.3 0.13	218.0 8.58	209.0 8.23	4.00 0.16	2.00 0.08	572	133	0.1432	5.15 11.34
73.025 2.8750	55.562 2.1875	-15.0 -0.59	13.5 0.53	176.0 6.93	200.0 7.87	6.4 0.25	260.5 10.25	251.0 9.88	15.00 0.59	1.70 0.07	556	71.8	0.1140	18.84 41.54
69.106 2.7207	42.862 1.6875	-12.2 -0.48	6.4 0.25	180.0 7.09	192.0 7.56	3.3 0.13	282.5 11.12	279.0 10.98	15.20 0.60	0.90 0.04	591	86	0.1115	19.79 43.62
50.005 1.9687	33.338 1.3125	-5.3 -0.21	3.5 0.14	165.0 6.50	176.0 6.93	3.3 0.13	229.0 9.02	225.0 8.86	8.30 0.33	-0.10 0.00	413	98.4	0.1250	7.03 15.49
46.830 1.8437	33.338 1.3125	-5.3 -0.21	3.5 0.14	171.0 6.73	176.0 6.93	3.3 0.13	229.0 9.02	225.0 8.86	8.30 0.33	3.10 0.12	413	98.4	0.1250	6.88 15.18
44.500 1.7520	37.000 1.4567	5.1 0.20	3.0 0.12	173.0 6.81	178.0 7.01	2.5 0.10	232.0 9.13	222.0 8.74	2.70 0.11	4.00 0.16	548	117	0.1164	7.16 15.78
63.500 2.5000	47.625 1.8750	-11.7 -0.46	7.0 0.28	181.0 7.13	192.0 7.56	3.3 0.13	271.5 10.68	266.0 10.47	5.80 0.23	4.10 0.16	751	101	0.1168	17.34 38.23

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

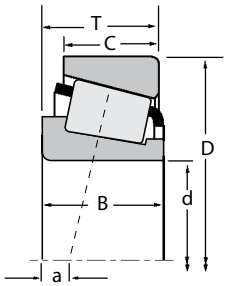
[7] Compound radius on inner race. Details on drawing for bearing.

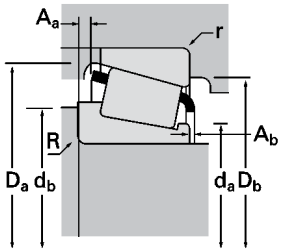
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
165.100 6.5000	215.900 8.5000	26.195 1.0313	165000 37200	0.36	1.65	42900 9640	26800 6010	1.60	335000 75300	L433749	L433710
165.100 6.5000	225.425 8.8750	41.275 1.6250	281000 63100	0.38	1.57	72800 16400	47800 10700	1.52	635000 143000	46790	46720
165.100 6.5000	225.425 8.8750	41.275 1.6250	281000 63100	0.38	1.57	72800 16400	47800 10700	1.52	635000 143000	46790A	46720
165.100 6.5000	247.650 9.7500	47.625 1.8750	375000 84300	0.44	1.36	97200 21900	73200 16500	1.33	779000 175000	67780	67720
165.100 6.5000	254.000 10.0000	46.038 1.8125	389000 87400	0.37	1.62	101000 22700	63800 14300	1.58	644000 145000	86650	86100
165.100 6.5000	288.925 11.3750	63.500 2.5000	611000 137000	0.47	1.28	159000 35600	127000 28600	1.25	1070000 242000	94649	94113
165.100 6.5000	288.925 11.3750	63.500 2.5000	763000 171000	0.32	1.88	198000 44500	108000 24300	1.83	1240000 278000	HM237535	HM237510
165.100 6.5000	288.925 11.3750	63.500 2.5000	763000 171000	0.32	1.88	198000 44500	108000 24300	1.83	1240000 278000	HM237536	HM237510
165.100 6.5000	298.450 11.7500	82.550 3.2500	909000 204000	0.38	1.59	236000 53000	152000 34300	1.55	1520000 341000	EE219065	219117
165.100 6.5000	311.150 12.2500	82.550 3.2500	909000 204000	0.38	1.59	236000 53000	152000 34300	1.55	1520000 341000	EE219065	219122
165.100 6.5000	311.150 12.2500	82.550 3.2500	1040000 233000	0.33	1.81	269000 60400	152000 34200	1.77	1680000 378000	H238140	H238110
165.100 6.5000	336.550 13.2500	92.075 3.6250	1290000 291000	0.37	1.62	336000 75400	213000 47900	1.57	1930000 434000	HH437549	HH437510
165.100 6.5000	361.950 14.2500	106.362 4.1875	1420000 319000	0.33	1.79	367000 82600	211000 47300	1.74	1950000 439000	EE108065	108142
165.100 6.5000	365.049 14.3720	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420651	421437
166.687 6.5625	225.425 8.8750	41.275 1.6250	281000 63100	0.38	1.57	72800 16400	47800 10700	1.52	635000 143000	46792	46720
168.275 6.6250	247.650 9.7500	47.625 1.8750	375000 84300	0.44	1.36	97200 21900	73200 16500	1.33	779000 175000	67782	67720
168.275 6.6250	330.200 13.0000	85.725 3.3750	960000 216000	0.81	0.74	249000 56000	345000 77500	0.72	1400000 316000	H936349	H936310
168.275 6.6250	342.900 13.5000	85.725 3.3750	960000 216000	0.81	0.74	249000 56000	345000 77500	0.72	1400000 316000	H936349	H936316
170.000 6.6929	230.000 9.0551	39.000 1.5354	310000 69700	0.38	1.57	80400 18100	52700 11900	1.52	590000 133000	JHM534149	JHM534110
170.000 6.6929	240.000 9.4488	46.000 1.8110	393000 88400	0.44	1.37	102000 22900	76300 17200	1.34	759000 171000	JM734449	JM734410
170.000 6.6929	254.000 10.0000	46.038 1.8125	389000 87400	0.37	1.62	101000 22700	63800 14300	1.58	644000 145000	86669	86100
170.000 6.6929	254.000 10.0000	46.038 1.8125	438000 98500	0.32	1.88	114000 25500	62000 13900	1.83	740000 166000	M235149	M235113
171.450 6.7500	260.350 10.2500	66.675 2.6250	605000 136000	0.40	1.49	157000 35300	108000 24300	1.45	1180000 265000	HM535349	HM535310
174.625 6.8750	247.650 9.7500	47.625 1.8750	375000 84300	0.44	1.36	97200 21900	73200 16500	1.33	779000 175000	67786	67720
174.625 6.8750	247.650 9.7500	47.625 1.8750	375000 84300	0.44	1.36	97200 21900	73200 16500	1.33	779000 175000	67787	67720
174.625 6.8750	260.350 10.2500	53.975 2.1250	497000 112000	0.33	1.80	129000 29000	73400 16500	1.76	933000 210000	M236845	M236810
174.625 6.8750	288.925 11.3750	63.500 2.5000	611000 137000	0.47	1.28	159000 35600	127000 28600	1.25	1070000 242000	94687	94113
174.625 6.8750	298.450 11.7500	82.550 3.2500	909000 204000	0.38	1.59	236000 53000	152000 34300	1.55	1520000 341000	EE219068	219117

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
26.195 1.0313	20.638 0.8125	8.6 0.34	1.5 0.06	172.0 6.77	174.0 6.85	1.5 0.06	209.0 8.23	205.0 8.07	2.50 0.10	1.40 0.06	365	168	0.1748	2.35 5.18
39.688 1.5625	33.338 1.3125	2.5 0.10	3.5 0.14	174.0 6.85	181.0 7.13	3.3 0.13	218.0 8.58	209.0 8.23	4.00 0.16	2.00 0.08	572	175	0.1432	4.64 10.24
39.687 1.5625	33.338 1.3125	2.5 0.10	8.0 0.31	174.0 6.85	189.0 7.44	3.3 0.13	218.0 8.58	209.0 8.23	4.00 0.16	2.00 0.08	572	154	0.1432	4.54 10.01
47.625 1.8750	38.100 1.5000	4.8 0.19	3.5 0.14	179.0 7.05	185.0 7.28	3.3 0.13	240.0 9.45	229.0 9.02	4.80 0.19	1.80 0.07	622	122	0.1214	7.95 17.53
46.038 1.8125	33.338 1.3125	-1.5 -0.06	4.8 0.19	176.0 6.93	185.0 7.28	3.3 0.13	239.0 9.41	234.0 9.21	6.90 0.27	1.90 0.08	466	112	0.1041	7.55 16.65
63.500 2.5000	47.625 1.8750	-0.8 -0.03	7.0 0.28	186.0 7.32	197.0 7.76	3.3 0.13	272.0 10.71	259.0 10.20	6.80 0.27	5.20 0.21	692	93.8	0.1287	16.98 37.44
63.500 2.5000	47.625 1.8750	-11.7 -0.46	7.0 0.28	184.0 7.24	195.0 7.68	3.3 0.13	271.5 10.68	266.0 10.47	5.80 0.23	4.10 0.16	751	101	0.1168	16.73 36.89
63.500 2.5000	47.625 1.8750	-11.7 -0.46	7.0 0.28	187.0 7.36	195.0 7.68	3.3 0.13	271.5 10.68	266.0 10.47	5.80 0.23	4.10 0.16	751	101	0.1168	16.72 36.85
82.550 3.2500	63.500 2.5000	-15.2 -0.60	6.4 0.25	185.0 7.28	196.0 7.72	6.4 0.25	282.0 11.10	269.0 10.59	10.00 0.39	0.20 0.01	841	94.9	0.1286	23.74 52.33
82.550 3.2500	63.500 2.5000	-15.2 -0.60	6.4 0.25	185.0 7.28	196.0 7.72	6.4 0.25	282.0 11.10	275.0 10.83	10.00 0.39	0.20 0.01	841	94.9	0.1286	26.75 58.97
82.550 3.2500	65.088 2.5625	-18.5 -0.73	6.4 0.25	188.0 7.40	198.0 7.80	6.4 0.25	288.5 11.36	280.0 11.02	8.20 0.32	2.10 0.08	914	92.1	0.1265	27.13 59.80
95.250 3.7500	69.850 2.7500	-21.3 -0.84	3.3 0.13	196.0 7.72	196.0 7.72	6.4 0.25	308.0 12.12	297.0 11.69	11.70 0.46	1.00 0.04	910	75	0.1310	37.04 81.66
104.775 4.1250	76.200 3.0000	-32.8 -1.29	13.5 0.53	194.0 7.64	215.0 8.46	3.3 0.13	329.0 12.95	323.0 12.72	16.90 0.66	5.60 0.22	942	71.4	0.1274	47.23 104.13
88.897 3.4999	63.500 2.5000	-15.5 -0.61	9.7 0.38	199.0 7.83	215.0 8.46	3.3 0.13	334.5 13.16	329.0 12.95	19.10 0.75	2.40 0.10	1150	128	0.1450	44.52 98.14
39.687 1.5625	33.338 1.3125	2.5 0.10	3.5 0.14	175.0 6.89	182.0 7.17	3.3 0.13	218.0 8.58	209.0 8.23	4.00 0.16	2.00 0.08	572	154	0.1432	4.51 9.95
47.625 1.8750	38.100 1.5000	4.8 0.19	3.5 0.14	181.0 7.13	187.0 7.36	3.3 0.13	240.0 9.45	229.0 9.02	4.80 0.19	1.80 0.07	622	122	0.1214	7.64 16.85
79.375 3.1250	53.975 2.1250	16.8 0.66	6.4 0.25	192.5 7.58	218.0 8.58	6.4 0.25	311.5 12.26	282.0 11.10	18.40 0.72	9.20 0.36	638	69.1	0.1475	29.48 64.99
79.375 3.1250	53.975 2.1250	16.8 0.66	6.4 0.25	192.5 7.58	218.0 8.58	6.4 0.25	311.5 12.26	287.0 11.30	18.40 0.72	9.20 0.36	638	69.1	0.1475	32.31 71.22
38.000 1.4961	31.000 1.2205	4.6 0.18	3.0 0.12	178.0 7.01	184.0 7.24	2.5 0.10	224.0 8.82	217.0 8.54	1.00 0.04	3.40 0.13	480	89.8	0.1350	4.29 9.46
44.500 1.7520	37.000 1.4567	5.1 0.20	3.0 0.12	180.0 7.09	185.0 7.28	2.5 0.10	232.0 9.13	222.0 8.74	2.70 0.11	4.00 0.16	548	117	0.1164	6.25 13.79
46.038 1.8125	33.338 1.3125	-1.5 -0.06	4.8 0.19	180.0 7.09	189.0 7.44	3.3 0.13	239.0 9.41	234.0 9.21	6.90 0.27	1.90 0.08	466	112	0.1041	7.09 15.63
46.038 1.8125	33.338 1.3125	-4.6 -0.18	4.8 0.19	182.0 7.17	189.0 7.44	3.3 0.13	240.0 9.45	235.0 9.25	4.90 0.19	3.00 0.12	531	107	0.1037	7.30 16.09
66.675 2.6250	52.388 2.0625	-8.6 -0.34	3.5 0.14	188.0 7.40	192.0 7.56	3.3 0.13	250.0 9.84	236.0 9.29	6.00 0.24	2.10 0.08	750	116	0.1263	12.16 26.80
47.625 1.8750	38.100 1.5000	4.8 0.19	8.0 0.31	185.0 7.28	200.0 7.87	3.3 0.13	240.0 9.45	229.0 9.02	4.80 0.19	1.80 0.07	622	122	0.1214	6.89 15.20
47.625 1.8750	38.100 1.5000	4.8 0.19	3.5 0.14	185.0 7.28	192.0 7.56	3.3 0.13	240.0 9.45	229.0 9.02	4.80 0.19	1.80 0.07	622	122	0.1214	7.00 15.44
53.975 2.1250	41.275 1.6250	-6.6 -0.26	3.5 0.14	189.0 7.44	193.0 7.60	3.3 0.13	249.0 9.80	241.0 9.49	4.60 0.18	3.20 0.13	691	100	0.1150	9.41 20.75
63.500 2.5000	47.625 1.8750	-0.8 -0.03	7.0 0.28	193.0 7.60	204.0 8.03	3.3 0.13	272.0 10.71	259.0 10.20	6.80 0.27	5.20 0.21	692	93.8	0.1287	15.72 34.65
82.550 3.2500	63.500 2.5000	-15.2 -0.60	6.4 0.25	193.0 7.60	204.0 8.03	6.4 0.25	282.0 11.10	269.0 10.59	10.00 0.39	0.20 0.01	841	94.9	0.1286	22.09 48.70

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

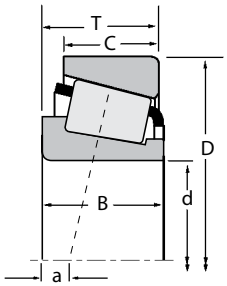
[7] Compound radius on inner race. Details on drawing for bearing.

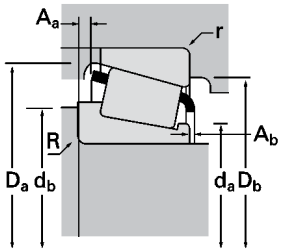
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
174.625 6.8750	311.150 12.2500	82.550 3.2500	909000 204000	0.38	1.59	236000 53000	152000 34300	1.55	1520000 341000	EE219068	219122
174.625 6.8750	311.150 12.2500	82.550 3.2500	1040000 233000	0.33	1.81	269000 60400	152000 34200	1.77	1680000 378000	H238148	H238110
177.800 7.0000	215.900 8.5000	20.638 0.8125	113000 25500	0.45	1.33	29400 6600	22600 5090	1.30	252000 56600	LL735449	LL735410
177.800 7.0000	247.650 9.7500	47.625 1.8750	375000 84300	0.44	1.36	97200 21900	73200 16500	1.33	779000 175000	67790	67720
177.800 7.0000	247.650 9.7500	47.625 1.8750	375000 84300	0.44	1.36	97200 21900	73200 16500	1.33	779000 175000	67791	67720
177.800 7.0000	260.350 10.2500	53.975 2.1250	497000 112000	0.33	1.80	129000 29000	73400 16500	1.76	933000 210000	M236848	M236810
177.800 7.0000	260.350 10.2500	53.975 2.1250	497000 112000	0.33	1.80	129000 29000	73400 16500	1.76	933000 210000	M236849	M236810
177.800 7.0000	269.875 10.6250	55.562 2.1875	508000 114000	0.33	1.80	132000 29600	74900 16800	1.76	999000 225000	M238840	M238810
177.800 7.0000	288.925 11.3750	63.500 2.5000	611000 137000	0.47	1.28	159000 35600	127000 28600	1.25	1070000 242000	94700	94113
177.800 7.0000	288.925 11.3750	63.500 2.5000	763000 171000	0.32	1.88	198000 44500	108000 24300	1.83	1240000 278000	HM237545	HM237510
177.800 7.0000	298.450 11.7500	63.500 2.5000	611000 137000	0.47	1.28	159000 35600	127000 28600	1.25	1070000 242000	94700	94118
177.800 7.0000	319.964 12.5970	88.900 3.5000	1030000 231000	0.32	1.88	267000 59900	145000 32700	1.83	1580000 356000	H239640	H239610
177.800 7.0000	320.675 12.6250	88.900 3.5000	1030000 231000	0.32	1.88	267000 59900	145000 32700	1.83	1580000 356000	H239640	H239612
177.800 7.0000	327.025 12.8750	90.488 3.5625	997000 224000	0.37	1.64	258000 58100	162000 36300	1.60	1580000 354000	EE470078X	470128
177.800 7.0000	330.200 13.0000	90.488 3.5625	997000 224000	0.37	1.64	258000 58100	162000 36300	1.60	1580000 354000	EE470073	470130
177.800 7.0000	330.200 13.0000	90.488 3.5625	997000 224000	0.37	1.64	258000 58100	162000 36300	1.60	1580000 354000	EE470078X	470130
177.800 7.0000	336.550 13.2500	90.488 3.5625	997000 224000	0.37	1.64	258000 58100	162000 36300	1.60	1580000 354000	EE470073	470132
177.800 7.0000	355.600 14.0000	61.912 2.4375	811000 182000	0.40	1.50	210000 47300	144000 32300	1.46	1080000 243000	EE780705	781400
177.800 7.0000	360.000 14.1732	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420701	421417
177.800 7.0000	365.049 14.3720	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420701	421437
177.800 7.0000	368.300 14.5000	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420701	421450
177.800 7.0000	428.625 16.8750	106.362 4.1875	1280000 289000	0.76	0.79	333000 74900	432000 97200	0.77	1700000 382000	EE350701	351687
179.975 7.0856	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93708	93125
180.000 7.0866	250.000 9.8425	47.000 1.8504	401000 90100	0.48	1.25	104000 23400	85500 19200	1.22	786000 177000	JM736149A	JM736110
180.000 7.0866	250.000 9.8425	47.000 1.8504	401000 90100	0.48	1.25	104000 23400	85500 19200	1.22	786000 177000	JM736149	JM736110
184.150 7.2500	234.950 9.2500	34.000 1.3386	263000 59100	0.33	1.79	68100 15300	39100 8780	1.74	550000 124000	LM236749	LM236710
184.150 7.2500	235.229 9.2610	34.000 1.3386	263000 59100	0.33	1.79	68100 15300	39100 8780	1.74	550000 124000	LM236749	LM236710A
184.150 7.2500	236.538 9.3125	26.192 1.0312	161000 36100	0.40	1.49	41700 9360	28700 6440	1.45	337000 75700	LL537649	LL537610

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
82.550 3.2500	63.500 2.5000	-15.2 -0.60	6.4 0.25	193.0 7.60	204.0 8.03	6.4 0.25	282.0 11.10	275.0 10.83	10.00 0.39	0.20 0.01	841	94.9	0.1286	25.10 55.34
82.550 3.2500	65.088 2.5625	-18.5 -0.73	6.4 0.25	195.0 7.68	205.0 8.07	6.4 0.25	288.5 11.36	280.0 11.02	8.20 0.32	2.10 0.08	914	92.1	0.1265	25.48 56.18
20.638 0.8125	15.083 0.5938	17.8 0.70	1.5 0.06	184.0 7.24	186.0 7.32	1.5 0.06	212.0 8.35	207.0 8.15	1.30 0.05	1.60 0.06	346	241	0.1825	1.44 3.18
47.625 1.8750	38.100 1.5000	4.8 0.19	3.5 0.14	188.0 7.40	194.0 7.64	3.3 0.13	240.0 9.45	229.0 9.02	4.80 0.19	1.80 0.07	622	122	0.1214	6.68 14.72
47.625 1.8750	38.100 1.5000	4.8 0.19	10.5 0.41	188.0 7.40	208.0 8.19	3.3 0.13	240.0 9.45	229.0 9.02	4.80 0.19	1.80 0.07	622	122	0.1214	6.46 14.25
53.975 2.1250	41.275 1.6250	-6.6 -0.26	8.0 0.31	191.0 7.52	204.0 8.03	3.3 0.13	249.0 9.80	241.0 9.49	4.60 0.18	3.20 0.13	691	100	0.1150	8.93 19.68
53.975 2.1250	41.275 1.6250	-6.6 -0.26	3.5 0.14	191.0 7.52	195.0 7.68	3.3 0.13	249.0 9.80	241.0 9.49	4.60 0.18	3.20 0.13	691	100	0.1150	9.04 19.93
55.562 2.1875	42.862 1.6875	-6.1 -0.24	3.5 0.14	194.0 7.64	198.0 7.80	3.3 0.13	256.0 10.08	250.0 9.84	5.90 0.23	2.10 0.08	788	118	0.1201	10.95 24.15
63.500 2.5000	47.625 1.8750	-0.8 -0.03	7.0 0.28	195.0 7.68	207.0 8.15	3.3 0.13	272.0 10.71	259.0 10.20	6.80 0.27	5.20 0.21	692	93.8	0.1287	15.28 33.68
63.500 2.5000	47.625 1.8750	-11.7 -0.46	7.0 0.28	194.0 7.64	205.0 8.07	3.3 0.13	271.5 10.68	266.0 10.47	5.80 0.23	4.10 0.16	751	101	0.1168	15.03 33.12
63.500 2.5000	47.625 1.8750	-0.8 -0.03	7.0 0.28	195.0 7.68	207.0 8.15	3.3 0.13	272.0 10.71	263.0 10.35	6.80 0.27	5.20 0.21	692	93.8	0.1287	16.91 37.29
85.725 3.3750	65.088 2.5625	-22.4 -0.88	3.5 0.14	198.0 7.80	202.0 7.95	4.8 0.19	300.5 11.84	293.0 11.54	11.50 0.45	2.80 0.11	906	90.3	0.1242	27.52 60.68
85.725 3.3750	65.088 2.5625	-22.4 -0.88	3.5 0.14	198.0 7.80	202.0 7.95	4.8 0.19	300.5 11.84	293.0 11.54	11.50 0.45	2.80 0.11	906	90.3	0.1242	27.71 61.08
92.075 3.6250	63.500 2.5000	-21.8 -0.86	9.7 0.38	201.0 7.91	217.0 8.54	6.4 0.25	306.5 12.07	294.0 11.57	* *	* *	914	105	0.1304	30.42 67.07
92.075 3.6250	63.500 2.5000	-21.8 -0.86	13.5 0.53	201.0 7.91	225.0 8.86	6.4 0.25	306.5 12.07	295.0 11.61	* *	* *	914	105	0.1304	31.28 68.95
92.075 3.6250	63.500 2.5000	-21.8 -0.86	9.7 0.38	201.0 7.91	217.0 8.54	6.4 0.25	306.5 12.07	295.0 11.61	* *	* *	914	105	0.1304	31.48 69.40
92.075 3.6250	63.500 2.5000	-21.8 -0.86	13.5 0.53	201.0 7.91	225.0 8.86	6.4 0.25	306.5 12.07	298.0 11.73	* *	* *	914	105	0.1304	32.93 72.60
60.325 2.3750	41.275 1.6250	-0.3 -0.01	4.8 0.19	209.0 8.23	207.0 8.15	4.8 0.19	321.0 12.64	320.0 12.60	7.80 0.30	5.50 0.22	646	79.4	0.1185	24.23 53.41
88.897 3.4999	63.500 2.5000	-15.5 -0.61	12.7 0.50	208.0 8.19	231.0 9.09	3.3 0.13	334.5 13.16	327.0 12.87	19.10 0.75	2.40 0.10	1150	128	0.1450	40.54 89.37
88.897 3.4999	63.500 2.5000	-15.5 -0.61	12.7 0.50	208.0 8.19	231.0 9.09	3.3 0.13	334.5 13.16	329.0 12.95	19.10 0.75	2.40 0.10	1150	128	0.1450	41.96 92.51
88.897 3.4999	63.500 2.5000	-15.5 -0.61	12.7 0.50	208.0 8.19	231.0 9.09	3.3 0.13	334.5 13.16	331.0 13.03	19.10 0.75	2.40 0.10	1150	128	0.1450	42.89 94.56
95.250 3.7500	61.912 2.4375	13.0 0.51	6.4 0.25	221.0 8.70	230.0 9.06	6.4 0.25	383.0 15.08	365.0 14.37	21.10 0.83	16.00 0.63	828	77.3	0.1568	62.57 137.95
63.500 2.5000	46.038 1.8125	7.9 0.31	3.5 0.14	204.0 8.03	209.0 8.23	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	21.19 46.71
45.000 1.7717	37.000 1.4567	8.9 0.35	9.5 0.37	190.0 7.48	209.0 8.23	2.5 0.10	242.5 9.55	232.0 9.13	3.40 0.13	4.10 0.16	589	128	0.1227	6.60 14.54
45.000 1.7717	37.000 1.4567	8.9 0.35	3.0 0.12	190.5 7.50	196.0 7.72	2.5 0.10	242.5 9.55	232.0 9.13	3.40 0.13	4.10 0.16	589	128	0.1227	6.64 14.64
33.000 1.2992	28.000 1.1024	5.1 0.20	2.0 0.08	191.0 7.52	195.0 7.68	2.0 0.08	229.0 9.02	224.0 8.82	0.40 0.02	3.60 0.14	559	173	0.1353	3.34 7.37
33.000 1.2992	28.000 1.1024	5.1 0.20	2.0 0.08	191.0 7.52	195.0 7.68	2.0 0.08	229.0 9.02	224.0 8.82	0.40 0.02	3.60 0.14	559	173	0.1353	3.37 7.42
25.400 1.0000	19.050 0.7500	13.7 0.54	1.5 0.06	192.0 7.56	194.0 7.64	1.5 0.06	230.0 9.06	225.0 8.86	3.20 0.12	1.40 0.06	418	211	0.1293	2.59 5.71

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

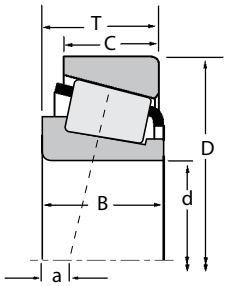
(7) Compound radius on inner race. Details on drawing for bearing.

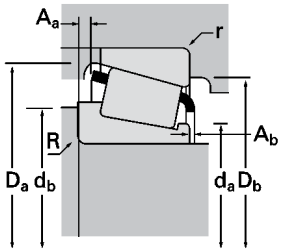
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
184.150 7.2500	266.700 10.5000	47.625 1.8750	386000 86700	0.48	1.26	99900 22500	81700 18400	1.22	835000 188000	67883	67820
187.325 7.3750	266.700 10.5000	47.625 1.8750	386000 86700	0.48	1.26	99900 22500	81700 18400	1.22	835000 188000	67884	67820
187.325 7.3750	269.875 10.6250	55.562 2.1875	508000 114000	0.33	1.80	132000 29600	74900 16800	1.76	999000 225000	M238849	M238810
187.325 7.3750	282.575 11.1250	50.800 2.0000	398000 89400	0.42	1.44	103000 23200	73300 16500	1.41	692000 156000	87737	87111
187.325 7.3750	320.675 12.6250	88.900 3.5000	1030000 231000	0.32	1.88	267000 59900	145000 32700	1.83	1580000 356000	H239649	H239612
190.000 7.4803	260.000 10.2362	46.000 1.8110	399000 89700	0.48	1.26	103000 23300	84500 19000	1.22	807000 181000	JM738249	JM738210
190.000 7.4803	269.875 10.6250	55.560 2.1875	508000 114000	0.33	1.80	132000 29600	74900 16800	1.76	999000 225000	JM238848	M238810
190.078 7.4834	289.992 11.4170	46.000 1.8110	386000 86700	0.48	1.26	99900 22500	81700 18400	1.22	835000 188000	67886	67835
190.500 7.5000	266.700 10.5000	47.625 1.8750	386000 86700	0.48	1.26	99900 22500	81700 18400	1.22	835000 188000	67885	67820
190.500 7.5000	282.575 11.1250	50.800 2.0000	398000 89400	0.42	1.44	103000 23200	73300 16500	1.41	692000 156000	87750	87111
190.500 7.5000	284.162 11.1875	55.562 2.1875	565000 127000	0.36	1.68	147000 33000	89700 20200	1.63	1060000 239000	82788	82722
190.500 7.5000	288.925 11.3750	55.562 2.1875	565000 127000	0.36	1.68	147000 33000	89700 20200	1.63	1060000 239000	82788	82720
190.500 7.5000	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93750	93125
190.500 7.5000	327.025 12.8750	90.488 3.5625	997000 224000	0.37	1.64	258000 58100	162000 36300	1.60	1580000 354000	EE470075	470128
190.500 7.5000	330.200 13.0000	63.500 2.5000	664000 149000	0.38	1.56	172000 38700	113000 25500	1.52	1050000 235000	EE210753	211300
190.500 7.5000	336.550 13.2500	90.488 3.5625	997000 224000	0.37	1.64	258000 58100	162000 36300	1.60	1580000 354000	EE470075	470132
190.500 7.5000	336.550 13.2500	98.425 3.8750	1130000 254000	0.58	1.04	293000 65800	289000 64900	1.01	2050000 460000	HH840249	HH840210
190.500 7.5000	360.000 14.1732	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420751	421417
190.500 7.5000	365.049 14.3720	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420751	421437
190.500 7.5000	368.300 14.5000	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420751	421450
190.500 7.5000	428.625 16.8750	106.362 4.1875	1280000 289000	0.76	0.79	333000 74900	432000 97200	0.77	1700000 382000	EE350750	351687
192.088 7.5625	266.700 10.5000	47.625 1.8750	386000 86700	0.48	1.26	99900 22500	81700 18400	1.22	835000 188000	67887	67820
193.675 7.6250	282.575 11.1250	50.800 2.0000	398000 89400	0.42	1.44	103000 23200	73300 16500	1.41	692000 156000	87762	87111
196.850 7.7500	257.175 10.1250	39.688 1.5625	295000 66300	0.45	1.34	76400 17200	58400 13100	1.31	718000 161000	LM739749	LM739710
196.850 7.7500	266.700 10.5000	39.688 1.5625	295000 66300	0.45	1.34	76400 17200	58400 13100	1.31	718000 161000	LM739749	LM739719
196.850 7.7500	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93775	93125
200.000 7.8740	300.000 11.8110	65.000 2.5591	682000 153000	0.52	1.15	177000 39700	158000 35500	1.12	1280000 287000	JHM840449	JHM840410
200.025 7.8750	292.100 11.5000	57.945 2.2813	588000 132000	0.33	1.80	152000 34300	86800 19500	1.76	1170000 263000	M241543	M241510

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
46.833 1.8438	38.100 1.5000	10.2 0.40	3.5 0.14	198.0 7.80	204.0 8.03	3.3 0.13	259.0 10.20	246.0 9.69	5.10 0.20	1.80 0.07	728	147	0.1310	8.61 18.98
46.833 1.8438	38.100 1.5000	10.2 0.40	3.5 0.14	201.0 7.91	206.0 8.11	3.3 0.13	259.0 10.20	246.0 9.69	5.10 0.20	1.80 0.07	728	147	0.1310	8.27 18.23
55.562 2.1875	42.862 1.6875	-6.1 -0.24	3.5 0.14	201.0 7.91	205.0 8.07	3.3 0.13	256.0 10.08	250.0 9.84	5.90 0.23	2.10 0.08	788	118	0.1201	9.77 21.53
47.625 1.8750	36.512 1.4375	3.8 0.15	3.5 0.14	201.0 7.91	207.0 8.15	3.3 0.13	266.5 10.50	261.0 10.28	8.80 0.34	2.60 0.10	575	131	0.1155	9.78 21.56
85.725 3.3750	65.088 2.5625	-22.4 -0.88	5.5 0.22	205.0 8.07	214.0 8.43	4.8 0.19	300.5 11.84	293.0 11.54	11.50 0.45	2.80 0.11	906	90.3	0.1242	25.83 56.94
44.000 1.7323	36.500 1.4370	10.9 0.43	3.0 0.12	200.0 7.87	206.0 8.11	2.5 0.10	252.0 9.92	242.0 9.53	3.20 0.13	4.00 0.16	653	147	0.1265	6.83 15.06
55.562 2.1875	42.862 1.6875	-6.1 -0.24	3.0 0.12	203.0 7.99	206.0 8.11	3.3 0.13	256.0 10.08	250.0 9.84	5.90 0.23	2.10 0.08	788	118	0.1201	9.48 20.89
46.000 1.8110	35.999 1.4173	10.7 0.42	6.4 0.25	203.0 7.99	214.0 8.43	3.3 0.13	259.0 10.20	256.0 10.08	4.60 0.18	2.10 0.08	728	147	0.1310	10.57 23.29
46.833 1.8438	38.100 1.5000	10.2 0.40	3.5 0.14	203.0 7.99	209.0 8.23	3.3 0.13	259.0 10.20	246.0 9.69	5.10 0.20	1.80 0.07	728	147	0.1310	7.92 17.47
47.625 1.8750	36.512 1.4375	3.8 0.15	3.5 0.14	203.0 7.99	209.0 8.23	3.3 0.13	266.5 10.50	261.0 10.28	8.80 0.34	2.60 0.10	575	131	0.1155	9.43 20.79
55.562 2.1875	42.862 1.6875	-2.8 -0.11	3.5 0.14	203.0 7.99	210.0 8.27	3.3 0.13	271.0 10.67	263.0 10.35	5.20 0.21	2.30 0.09	805	111	0.1238	11.55 25.46
55.562 2.1875	42.862 1.6875	-2.8 -0.11	3.5 0.14	203.0 7.99	210.0 8.27	3.3 0.13	271.0 10.67	265.0 10.43	5.20 0.21	2.30 0.09	805	111	0.1238	12.27 27.04
63.500 2.5000	46.038 1.8125	7.9 0.31	4.3 0.17	212.0 8.35	218.0 8.58	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	19.65 43.32
92.075 3.6250	63.500 2.5000	-21.8 -0.86	6.4 0.25	210.0 8.27	220.0 8.66	6.4 0.25	306.5 12.07	294.0 11.57	* *	* *	914	105	0.1304	27.89 61.49
61.912 2.4375	42.862 1.6875	-4.6 -0.18	7.0 0.28	210.0 8.27	221.0 8.70	3.3 0.13	300.0 11.81	299.0 11.77	11.60 0.46	4.00 0.16	737	116	0.1227	19.85 43.75
92.075 3.6250	63.500 2.5000	-21.8 -0.86	6.4 0.25	210.0 8.27	220.0 8.66	6.4 0.25	306.5 12.07	298.0 11.73	* *	* *	914	105	0.1304	30.61 67.48
95.250 3.7500	73.025 2.8750	-5.6 -0.22	6.4 0.25	215.5 8.49	234.0 9.21	6.4 0.25	318.0 12.52	290.0 11.42	14.50 0.57	5.10 0.20	1090	104	0.1605	35.46 78.18
88.897 3.4999	63.500 2.5000	-15.5 -0.61	6.4 0.25	218.0 8.58	227.0 8.94	3.3 0.13	334.5 13.16	327.0 12.87	19.10 0.75	2.40 0.10	1150	128	0.1450	38.26 84.34
88.897 3.4999	63.500 2.5000	-15.5 -0.61	6.4 0.25	218.0 8.58	227.0 8.94	3.3 0.13	334.5 13.16	329.0 12.95	19.10 0.75	2.40 0.10	1150	128	0.1450	39.68 87.48
88.897 3.4999	63.500 2.5000	-15.5 -0.61	6.4 0.25	218.0 8.58	227.0 8.94	3.3 0.13	334.5 13.16	331.0 13.03	19.10 0.75	2.40 0.10	1150	128	0.1450	40.61 89.53
95.250 3.7500	61.912 2.4375	13.0 0.51	6.4 0.25	237.0 9.33	240.0 9.45	6.4 0.25	383.0 15.08	365.0 14.37	21.10 0.83	16.00 0.63	828	77.3	0.1568	59.74 131.70
46.833 1.8438	38.100 1.5000	10.2 0.40	10.5 0.41	204.0 8.03	223.0 8.78	3.3 0.13	259.0 10.20	246.0 9.69	5.10 0.20	1.80 0.07	728	147	0.1310	7.52 16.58
47.625 1.8750	36.512 1.4375	3.8 0.15	3.5 0.14	206.0 8.11	211.0 8.31	3.3 0.13	266.5 10.50	261.0 10.28	8.80 0.34	2.60 0.10	575	131	0.1155	9.07 20.00
39.688 1.5625	30.162 1.1875	11.4 0.45	3.5 0.14	206.0 8.11	213.0 8.39	3.3 0.13	251.0 9.88	239.0 9.41	3.40 0.14	2.10 0.08	762	232	0.1296	5.26 11.60
39.688 1.5625	30.162 1.1875	11.4 0.45	3.5 0.14	206.0 8.11	213.0 8.39	3.3 0.13	252.0 9.92	243.0 9.57	3.40 0.14	2.10 0.08	762	232	0.1296	6.16 13.58
63.500 2.5000	46.038 1.8125	7.9 0.31	4.3 0.17	216.0 8.50	223.0 8.78	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	18.69 41.20
62.000 2.4409	51.000 2.0079	8.1 0.32	3.5 0.14	215.0 8.46	223.0 8.78	2.5 0.10	289.0 11.37	273.0 10.75	4.80 0.19	6.10 0.24	854	126	0.1428	15.39 33.92
57.945 2.2813	46.038 1.8125	-4.8 -0.19	3.5 0.14	215.0 8.46	219.0 8.62	3.3 0.13	279.0 10.98	272.0 10.71	4.80 0.19	2.00 0.08	954	128	0.1279	12.50 27.55

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

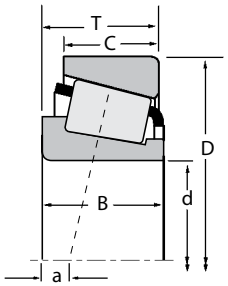
[7] Compound radius on inner race. Details on drawing for bearing.

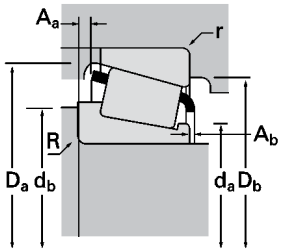
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.)							Part Number	
			Dynamic (1)	Factors (5)		Dynamic (2)	Factors (5)		Static		
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
200.025 7.8750	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93787	93125
200.025 7.8750	317.500 12.5000	68.262 2.6875	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93787	93126
200.025 7.8750	320.000 12.5984	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93787	J93129A
200.025 7.8750	355.600 14.0000	69.850 2.7500	781000 175000	0.33	1.82	202000 45500	114000 25700	1.77	1400000 314000	EE130787	131400
200.025 7.8750	384.175 15.1250	112.712 4.4375	1640000 369000	0.33	1.80	426000 95700	242000 54500	1.76	3110000 699000	H247535	H247510
200.025 7.8750	393.700 15.5000	111.125 4.3750	1650000 370000	0.30	2.01	427000 96000	218000 49100	1.96	2600000 585000	HH144642	HH144614
201.612 7.9375	365.049 14.3720	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420793	421437
201.612 7.9375	368.300 14.5000	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420793	421450
203.200 8.0000	261.142 10.2812	28.575 1.1250	192000 43200	0.41	1.47	49900 11200	34900 7850	1.43	405000 91100	LL641149	LL641110
203.200 8.0000	276.225 10.8750	42.862 1.6875	406000 91300	0.32	1.88	105000 23700	57500 12900	1.83	811000 182000	LM241149	LM241110
203.200 8.0000	282.575 11.1250	46.038 1.8125	393000 88300	0.51	1.18	102000 22900	88700 19900	1.15	876000 197000	67983	67920
203.200 8.0000	292.100 11.5000	57.945 2.2813	588000 132000	0.33	1.80	152000 34300	86800 19500	1.76	1170000 263000	M241547C	M241510
203.200 8.0000	292.100 11.5000	57.945 2.2813	588000 132000	0.33	1.80	152000 34300	86800 19500	1.76	1170000 263000	M241547	M241510
203.200 8.0000	317.500 12.5000	53.975 2.1250	518000 116000	0.31	1.91	134000 30200	72000 16200	1.86	900000 202000	EE132083	132125
203.200 8.0000	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93800	93125
203.200 8.0000	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93800A	93125
203.200 8.0000	360.000 14.1732	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420801	421417
203.200 8.0000	365.049 14.3720	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420801	421437
203.200 8.0000	368.300 14.5000	92.075 3.6250	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420801	421450
203.200 8.0000	406.400 16.0000	92.075 3.6250	1040000 234000	0.80	0.75	270000 60700	369000 82900	0.73	1460000 328000	EE114080	114160
203.200 8.0000	482.600 19.0000	117.475 4.6250	1410000 317000	0.87	0.69	366000 82200	542000 122000	0.67	2010000 453000	EE380080	380190
204.788 8.0625	292.100 11.5000	57.945 2.2813	588000 132000	0.33	1.80	152000 34300	86800 19500	1.76	1170000 263000	M241549	M241510
204.788 8.0625	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93806A	93125
206.375 8.1250	282.575 11.1250	46.038 1.8125	393000 88300	0.51	1.18	102000 22900	88700 19900	1.15	876000 197000	67985	67920
206.375 8.1250	317.500 12.5000	53.975 2.1250	518000 116000	0.31	1.91	134000 30200	72000 16200	1.86	900000 202000	EE132084	132125
206.375 8.1250	336.550 13.2500	98.425 3.8750	1250000 282000	0.33	1.80	325000 73100	185000 41600	1.76	2320000 522000	H242649	H242610
209.550 8.2500	279.400 11.0000	46.038 1.8125	393000 88300	0.51	1.18	102000 22900	88700 19900	1.15	876000 197000	67989	67919
209.550 8.2500	282.575 11.1250	46.038 1.8125	393000 88300	0.51	1.18	102000 22900	88700 19900	1.15	876000 197000	67989	67920

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
63.500 2.5000	46.038 1.8125	7.9 0.31	4.3 0.17	219.0 8.62	225.0 8.86	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	18.20 40.11
63.500 2.5000	50.800 2.0000	7.9 0.31	4.3 0.17	219.0 8.62	225.0 8.86	3.3 0.13	300.0 11.81	285.0 11.22	9.20 0.36	4.20 0.17	912	126	0.1460	19.10 42.10
63.500 2.5000	46.038 1.8125	7.9 0.31	4.3 0.17	219.0 8.62	225.0 8.86	3.3 0.13	298.0 11.73	287.0 11.30	9.20 0.36	4.20 0.17	912	126	0.1460	18.64 41.10
69.850 2.7500	49.212 1.9375	-9.9 -0.39	6.8 0.27	226.0 8.90	236.0 9.29	1.5 0.06	330.5 13.01	329.0 12.95	12.30 0.48	3.30 0.13	1160	168	0.1358	28.09 61.93
112.712 4.4375	90.488 3.5625	-27.9 -1.10	6.4 0.25	231.0 9.09	241.0 9.49	6.4 0.25	362.0 14.26	346.0 13.62	10.20 0.40	2.80 0.11	1960	148	0.1638	60.18 132.67
111.125 4.3750	84.138 3.3125	-33.8 -1.33	6.4 0.25	226.0 8.90	235.0 9.25	6.4 0.25	356.5 14.04	352.0 13.86	15.60 0.62	1.40 0.06	1470	128	0.1429	58.68 129.37
88.897 3.4999	63.500 2.5000	-15.5 -0.61	3.3 0.13	226.0 8.90	229.0 9.02	3.3 0.13	334.5 13.16	329.0 12.95	19.10 0.75	2.40 0.10	1150	128	0.1450	37.37 82.39
88.897 3.4999	63.500 2.5000	-15.5 -0.61	3.3 0.13	226.0 8.90	229.0 9.02	3.3 0.13	334.5 13.16	331.0 13.03	19.10 0.75	2.40 0.10	1150	128	0.1450	38.30 84.44
27.783 1.0938	21.433 0.8438	15.7 0.62	1.5 0.06	212.0 8.35	214.0 8.43	1.5 0.06	254.0 10.00	249.0 9.80	3.10 0.12	1.70 0.07	522	231	0.1398	3.47 7.64
42.862 1.6875	34.133 1.3438	1.8 0.07	3.5 0.14	214.0 8.43	220.0 8.66	3.3 0.13	267.0 10.51	260.0 10.24	2.80 0.11	1.30 0.05	774	182	0.1170	6.96 15.35
46.038 1.8125	36.512 1.4375	16.0 0.63	3.5 0.14	216.0 8.50	222.0 8.74	3.3 0.13	275.0 10.83	260.0 10.24	4.50 0.18	1.70 0.07	820	172	0.1388	8.65 19.06
57.945 2.2813	46.038 1.8125	-4.8 -0.19	3.5 0.14	217.0 8.54	221.0 8.70	3.3 0.13	279.0 10.98	272.0 10.71	4.80 0.19	2.00 0.08	954	128	0.1279	12.04 26.55
57.945 2.2813	46.038 1.8125	-4.8 -0.19	3.5 0.14	217.0 8.54	221.0 8.70	3.3 0.13	279.0 10.98	272.0 10.71	4.80 0.19	2.00 0.08	954	128	0.1279	12.04 26.55
53.975 2.1250	34.925 1.3750	-6.1 -0.24	4.0 0.16	218.0 8.58	225.0 8.86	3.3 0.13	293.0 11.54	294.0 11.57	10.80 0.42	3.20 0.13	798	125	0.1174	13.87 30.57
63.500 2.5000	46.038 1.8125	7.9 0.31	4.3 0.17	222.0 8.74	227.0 8.94	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	17.70 39.01
63.500 2.5000	46.038 1.8125	7.9 0.31	8.0 0.31	222.0 8.74	234.0 9.21	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	17.58 38.77
88.897 3.4999	63.500 2.5000	-15.5 -0.61	3.3 0.13	227.0 8.94	230.0 9.06	3.3 0.13	334.5 13.16	327.0 12.87	19.10 0.75	2.40 0.10	1150	128	0.1450	35.59 78.47
88.897 3.4999	63.500 2.5000	-15.5 -0.61	3.3 0.13	227.0 8.94	230.0 9.06	3.3 0.13	334.5 13.16	329.0 12.95	19.10 0.75	2.40 0.10	1150	128	0.1450	37.02 81.62
88.897 3.4999	63.500 2.5000	-15.5 -0.61	3.3 0.13	227.0 8.94	230.0 9.06	3.3 0.13	334.5 13.16	331.0 13.03	19.10 0.75	2.40 0.10	1150	128	0.1450	37.95 83.67
85.725 3.3750	57.150 2.2500	24.9 0.98	6.4 0.25	237.0 9.33	246.0 9.69	6.4 0.25	373.5 14.71	349.0 13.74	19.00 0.75	10.60 0.42	795	80.2	0.1571	44.72 98.58
95.250 3.7500	73.025 2.8750	34.3 1.35	6.4 0.25	274.0 10.79	280.0 11.02	6.4 0.25	428.5 16.87	402.0 15.83	22.30 0.88	16.90 0.67	1100	104	0.1792	88.54 195.20
57.945 2.2813	46.038 1.8125	-4.8 -0.19	3.5 0.14	219.0 8.62	223.0 8.78	3.3 0.13	279.0 10.98	272.0 10.71	4.80 0.19	2.00 0.08	954	128	0.1279	11.81 26.04
63.500 2.5000	46.038 1.8125	7.9 0.31	4.3 0.17	223.0 8.78	229.0 9.02	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	17.44 38.46
46.038 1.8125	36.512 1.4375	16.0 0.63	3.5 0.14	219.0 8.62	224.0 8.82	3.3 0.13	275.0 10.83	260.0 10.24	4.50 0.18	1.70 0.07	820	172	0.1388	8.28 18.25
53.975 2.1250	34.925 1.3750	-6.1 -0.24	4.0 0.16	220.0 8.66	227.0 8.94	3.3 0.13	293.0 11.54	294.0 11.57	10.80 0.42	3.20 0.13	798	125	0.1174	13.44 29.62
100.012 3.9375	77.788 3.0625	-25.4 -1.00	3.3 0.13	227.0 8.94	231.0 9.09	3.3 0.13	318.0 12.51	306.0 12.05	11.20 0.44	1.80 0.07	1400	135	0.1465	33.01 72.76
46.038 1.8125	36.512 1.4375	16.0 0.63	3.5 0.14	221.0 8.70	227.0 8.94	3.3 0.13	273.0 10.75	259.0 10.20	4.50 0.18	1.70 0.07	820	172	0.1388	7.48 16.49
46.038 1.8125	36.512 1.4375	16.0 0.63	3.5 0.14	221.0 8.70	227.0 8.94	3.3 0.13	275.0 10.83	260.0 10.24	4.50 0.18	1.70 0.07	820	172	0.1388	7.91 17.43

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

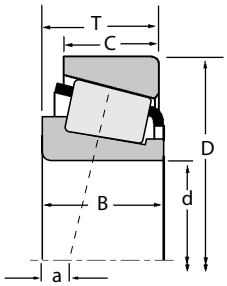
[7] Compound radius on inner race. Details on drawing for bearing.

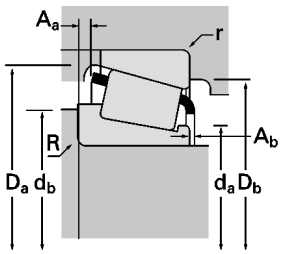
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
209.550 8.2500	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93825	93125
209.550 8.2500	317.500 12.5000	63.500 2.5000	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93825A	93125
209.550 8.2500	317.500 12.5000	68.262 2.6875	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93825	93126
209.550 8.2500	355.600 14.0000	68.262 2.6875	703000 158000	0.59	1.02	182000 41000	184000 41400	0.99	1420000 319000	96825	96140
212.725 8.3750	285.750 11.2500	46.038 1.8125	398000 89500	0.48	1.25	103000 23200	85000 19100	1.21	892000 200000	LM742745	LM742710
215.900 8.5000	285.750 11.2500	46.038 1.8125	398000 89500	0.48	1.25	103000 23200	85000 19100	1.21	892000 200000	LM742749AA	LM742710
215.900 8.5000	285.750 11.2500	46.038 1.8125	398000 89500	0.48	1.25	103000 23200	85000 19100	1.21	892000 200000	LM742749	LM742710
215.900 8.5000	288.925 11.3750	46.038 1.8125	398000 89500	0.48	1.25	103000 23200	85000 19100	1.21	892000 200000	LM742749	LM742714
215.900 8.5000	290.010 11.4177	31.750 1.2500	221000 49800	0.39	1.56	57400 12900	37900 8510	1.52	453000 102000	543085	543114
215.900 8.5000	355.600 14.0000	69.850 2.7500	781000 175000	0.33	1.82	202000 45500	114000 25700	1.77	1400000 314000	EE130851	131400
215.900 8.5000	360.000 14.1732	82.550 3.2500	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420850	421417
215.900 8.5000	365.049 14.3720	82.550 3.2500	1080000 243000	0.40	1.49	280000 63000	193000 43300	1.45	1820000 409000	EE420850	421437
219.969 8.6602	290.010 11.4177	31.750 1.2500	221000 49800	0.39	1.56	57400 12900	37900 8510	1.52	453000 102000	543086	543114
220.662 8.6875	314.325 12.3750	61.912 2.4375	636000 143000	0.33	1.80	165000 37100	93900 21100	1.76	1240000 279000	M244249A	M244210
220.663 8.6875	314.325 12.3750	61.912 2.4375	682000 153000	0.33	1.80	177000 39700	101000 22600	1.76	1370000 308000	M244249	M244210
223.838 8.8125	295.275 11.6250	46.038 1.8125	403000 90700	0.50	1.20	105000 23500	89200 20100	1.17	919000 207000	LM844049	LM844010
225.425 8.8750	355.600 14.0000	69.850 2.7500	781000 175000	0.33	1.82	202000 45500	114000 25700	1.77	1400000 314000	EE130889	131400
225.425 8.8750	400.050 15.7500	88.900 3.5000	1100000 248000	0.44	1.36	286000 64200	215000 48300	1.33	1920000 432000	EE430888	431575
228.397 8.9920	431.800 17.0000	92.075 3.6250	1090000 245000	0.88	0.68	282000 63500	427000 96000	0.66	1600000 361000	EE113089	113170
228.460 8.9945	431.800 17.0000	92.075 3.6250	1090000 245000	0.88	0.68	282000 63500	427000 96000	0.66	1600000 361000	EE113091	113170
228.600 9.0000	320.675 12.6250	50.800 2.0000	431000 97000	0.49	1.23	112000 25100	93200 21000	1.20	821000 185000	88900	88126
228.600 9.0000	327.025 12.8750	52.388 2.0625	431000 97000	0.49	1.23	112000 25100	93200 21000	1.20	821000 185000	88900	88128
228.600 9.0000	355.600 14.0000	68.262 2.6875	703000 158000	0.59	1.02	182000 41000	184000 41400	0.99	1420000 319000	96900	96140
228.600 9.0000	355.600 14.0000	69.850 2.7500	781000 175000	0.33	1.82	202000 45500	114000 25700	1.77	1400000 314000	EE130902	131400
228.600 9.0000	355.600 14.0000	69.850 2.7500	932000 210000	0.47	1.27	242000 54300	196000 44000	1.24	1690000 380000	HM746646	HM746610
228.600 9.0000	358.775 14.1250	71.438 2.8125	896000 202000	0.33	1.80	232000 52200	132000 29700	1.76	1850000 416000	M249732	M249710
228.600 9.0000	400.050 15.7500	88.900 3.5000	1100000 248000	0.44	1.36	286000 64200	215000 48300	1.33	1920000 432000	EE430900	431575
228.600 9.0000	488.950 19.2500	123.825 4.8750	1750000 394000	0.94	0.64	455000 102000	730000 164000	0.62	2510000 564000	HH949549	HH949510

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
63.500 2.5000	46.038 1.8125	7.9 0.31	4.3 0.17	227.0 8.93	233.0 9.17	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	16.67 36.76
63.500 2.5000	46.038 1.8125	7.9 0.31	12.7 0.50	227.0 8.93	250.0 9.84	3.3 0.13	300.0 11.81	286.0 11.26	9.20 0.36	4.20 0.17	912	126	0.1460	16.29 35.91
63.500 2.5000	50.800 2.0000	7.9 0.31	4.3 0.17	227.0 8.93	233.0 9.17	3.3 0.13	300.0 11.81	285.0 11.22	9.20 0.36	4.20 0.17	912	126	0.1460	17.57 38.74
66.675 2.6250	47.625 1.8750	17.0 0.67	7.0 0.28	235.0 9.25	246.0 9.69	3.3 0.13	334.0 13.15	318.0 12.52	12.00 0.47	3.80 0.15	1140	160	0.1626	26.64 58.73
46.038 1.8125	34.925 1.3750	14.2 0.56	3.5 0.14	225.0 8.86	230.0 9.06	3.3 0.13	279.0 10.98	266.0 10.47	5.10 0.20	2.00 0.08	867	225	0.1388	7.93 17.47
46.038 1.8125	34.925 1.3750	14.2 0.56	9.0 0.35	227.0 8.94	243.0 9.57	3.3 0.13	279.0 10.98	266.0 10.47	5.10 0.20	2.00 0.08	867	225	0.1388	7.51 16.56
46.038 1.8125	34.925 1.3750	14.2 0.56	3.5 0.14	227.0 8.94	233.0 9.17	3.3 0.13	279.0 10.98	266.0 10.47	5.10 0.20	2.00 0.08	867	225	0.1388	7.54 16.62
46.038 1.8125	34.925 1.3750	14.2 0.56	3.5 0.14	227.0 8.94	233.0 9.17	3.3 0.13	280.0 11.02	267.0 10.51	5.10 0.20	2.00 0.08	867	225	0.1388	7.93 17.48
31.750 1.2500	22.225 0.8750	13.0 0.51	3.5 0.14	226.0 8.90	232.0 9.13	3.3 0.13	276.0 10.87	272.0 10.71	4.10 0.16	2.80 0.11	608	217	0.1135	5.38 11.87
69.850 2.7500	49.212 1.9375	-9.9 -0.39	6.8 0.27	237.0 9.33	248.0 9.76	1.5 0.06	330.5 13.01	329.0 12.95	12.30 0.48	3.30 0.13	1160	168	0.1358	25.25 55.66
79.372 3.1249	63.500 2.5000	-6.1 -0.24	1.5 0.06	236.0 9.29	236.0 9.29	3.3 0.13	334.5 13.16	327.0 12.87	9.60 0.38	2.40 0.10	1150	128	0.1450	30.87 68.06
79.372 3.1249	63.500 2.5000	-6.1 -0.24	1.5 0.06	236.0 9.29	236.0 9.29	3.3 0.13	334.5 13.16	329.0 12.95	9.60 0.38	2.40 0.10	1150	128	0.1450	32.30 71.21
31.750 1.2500	22.225 0.8750	13.0 0.51	3.5 0.14	229.0 9.02	235.0 9.25	3.3 0.13	276.0 10.87	272.0 10.71	4.10 0.16	2.80 0.11	608	217	0.1135	5.04 11.10
66.675 2.6250	49.212 1.9375	-4.6 -0.18	1.5 0.06	235.0 9.25	235.0 9.25	3.3 0.13	300.0 11.81	293.0 11.54	3.30 0.13	0.30 0.01	1070	132	0.1327	14.89 32.83
61.912 2.4375	49.212 1.9375	-4.6 -0.18	6.4 0.25	235.0 9.25	245.0 9.65	3.3 0.13	300.0 11.81	293.0 11.54	5.00 0.20	2.40 0.10	1150	141	0.1360	14.51 31.99
46.038 1.8125	34.925 1.3750	17.0 0.67	3.5 0.14	235.0 9.25	241.0 9.49	3.3 0.13	288.0 11.34	275.0 10.83	2.30 0.21	1.90 0.08	927	269	0.1434	8.02 17.69
69.850 2.7500	49.212 1.9375	-9.9 -0.39	6.8 0.27	244.0 9.61	255.0 10.04	1.5 0.06	330.5 13.01	329.0 12.95	12.30 0.48	3.30 0.13	1160	168	0.1358	23.44 51.67
87.312 3.4375	63.500 2.5000	-4.8 -0.19	1.5 0.06	251.0 9.88	251.0 9.88	3.3 0.13	364.0 14.34	360.0 14.17	14.80 0.58	1.50 0.06	1350	143	0.1572	43.79 96.54
85.725 3.3750	49.212 1.9375	41.4 1.63	6.4 0.25	267.0 10.51	274.0 10.79	6.4 0.25	397.5 15.64	375.0 14.76	19.40 0.77	11.50 0.45	967	98.1	0.1723	48.70 107.36
85.725 3.3750	49.212 1.9375	41.4 1.63	6.4 0.25	267.0 10.51	274.0 10.79	6.4 0.25	397.5 15.64	375.0 14.76	19.40 0.77	11.50 0.45	967	98.1	0.1723	48.70 107.36
49.212 1.9375	33.338 1.3125	14.2 0.56	6.4 0.25	242.0 9.53	253.0 9.96	3.3 0.13	309.0 12.17	299.0 11.77	11.20 0.44	2.70 0.10	800	189	0.1352	10.94 24.12
49.212 1.9375	34.925 1.3750	14.2 0.56	6.4 0.25	242.0 9.53	253.0 9.96	3.3 0.13	309.0 12.17	302.0 11.89	11.20 0.44	2.70 0.10	800	189	0.1352	12.02 26.49
66.675 2.6250	47.625 1.8750	17.0 0.67	7.0 0.28	249.0 9.80	260.0 10.24	3.3 0.13	334.0 13.15	318.0 12.52	12.00 0.47	3.80 0.15	1140	160	0.1626	23.21 51.17
69.850 2.7500	49.212 1.9375	-9.9 -0.39	6.8 0.27	247.0 9.72	257.0 10.12	1.5 0.06	330.5 13.01	329.0 12.95	12.30 0.48	3.30 0.13	1160	168	0.1358	22.82 50.31
69.850 2.7500	50.800 2.0000	6.9 0.27	6.4 0.25	248.0 9.76	258.0 10.16	6.4 0.25	339.0 13.34	324.0 12.76	6.10 0.24	4.40 0.17	1190	149	0.1542	25.23 55.63
71.438 2.8125	53.975 2.1250	-6.9 -0.27	3.5 0.14	251.0 9.88	256.0 10.08	3.3 0.13	343.0 13.50	335.0 13.19	8.00 0.32	3.00 0.12	1630	168	0.1526	26.73 58.94
87.312 3.4375	63.500 2.5000	-4.8 -0.19	10.5 0.41	253.0 9.96	271.0 10.67	3.3 0.13	364.0 14.34	360.0 14.17	14.80 0.58	1.50 0.06	1350	143	0.1572	42.71 94.16
111.125 4.3750	73.025 2.8750	39.9 1.57	6.4 0.25	280.0 11.02	297.0 11.69	6.4 0.25	456.0 17.95	416.0 16.38	21.50 0.85	11.80 0.46	1300	91.5	0.1931	94.73 208.84

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

(7) Compound radius on inner race. Details on drawing for bearing.

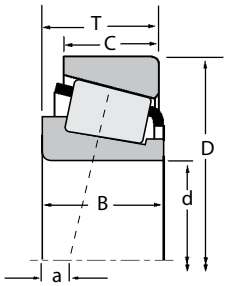
(8) Pin-type cage. Please consult The Timken Company.

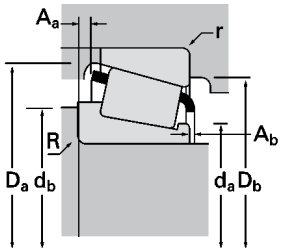
Continued on next page.

B

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
228.600 9.0000	508.000 20.0000	117.475 4.6250	1430000 322000	0.94	0.64	371000 83500	596000 134000	0.62	2100000 473000	EE390090	390200
231.775 9.1250	268.288 10.5625	22.500 0.8858	135000 30400	0.33	1.80	35100 7890	20000 4490	1.76	349000 78500	LL244549	LL244510
231.775 9.1250	336.550 13.2500	65.088 2.5625	773000 174000	0.33	1.80	200000 45100	114000 25700	1.76	1570000 352000	M246942	M246910
234.950 9.2500	311.150 12.2500	46.038 1.8125	432000 97200	0.36	1.66	112000 25200	69600 15600	1.61	926000 208000	LM446349	LM446310
234.950 9.2500	314.325 12.3750	49.212 1.9375	509000 114000	0.40	1.51	132000 29700	89700 20200	1.47	1040000 233000	LM545849A	LM545810
234.950 9.2500	314.325 12.3750	49.212 1.9375	479000 108000	0.40	1.51	124000 27900	84400 19000	1.47	949000 213000	LM545849E	LM545810
234.950 9.2500	320.675 12.6250	50.800 2.0000	431000 97000	0.49	1.23	112000 25100	93200 21000	1.20	821000 185000	88925	88126
234.950 9.2500	327.025 12.8750	52.388 2.0625	431000 97000	0.49	1.23	112000 25100	93200 21000	1.20	821000 185000	88925	88128
234.950 9.2500	355.600 14.0000	68.262 2.6875	703000 158000	0.59	1.02	182000 41000	184000 41400	0.99	1420000 319000	96925	96140
234.950 9.2500	381.000 15.0000	74.612 2.9375	982000 221000	0.33	1.80	255000 57200	145000 32600	1.76	2030000 455000	M252330	M252310
234.950 9.2500	384.175 15.1250	112.712 4.4375	1740000 390000	0.33	1.80	450000 101000	256000 57600	1.76	3370000 757000	H247548	H247510
234.950 9.2500	384.175 15.1250	112.712 4.4375	1640000 369000	0.33	1.80	426000 95700	242000 54500	1.76	3110000 699000	H247549	H247510
235.077 9.2550	314.325 12.3750	49.212 1.9375	479000 108000	0.40	1.51	124000 27900	84400 19000	1.47	949000 213000	LM545847	LM545810
236.538 9.3125	320.675 12.6250	44.450 1.7500	431000 97000	0.49	1.23	112000 25100	93200 21000	1.20	821000 185000	88931	88126
237.330 9.3437	336.550 13.2500	65.088 2.5625	722000 162000	0.33	1.80	187000 42100	107000 24000	1.76	1420000 319000	M246948	M246910
237.330 9.3437	336.550 13.2500	65.088 2.5625	773000 174000	0.33	1.80	200000 45100	114000 25700	1.76	1570000 352000	M246949	M246910
237.330 9.3437	358.775 14.1250	71.438 2.8125	896000 202000	0.33	1.80	232000 52200	132000 29700	1.76	1850000 416000	M249736	M249710
241.300 9.5000	349.148 13.7460	57.150 2.2500	647000 146000	0.35	1.70	168000 37700	101000 22800	1.65	1250000 282000	EE127095	127135
241.300 9.5000	355.600 14.0000	50.800 2.0000	549000 123000	0.36	1.65	142000 32000	88500 19900	1.61	1030000 231000	EE170950	171400
241.300 9.5000	355.600 14.0000	57.150 2.2500	647000 146000	0.35	1.70	168000 37700	101000 22800	1.65	1250000 282000	EE127095	127140
241.300 9.5000	365.049 14.3720	50.800 2.0000	549000 123000	0.36	1.65	142000 32000	88500 19900	1.61	1030000 231000	EE170950	171436
241.300 9.5000	368.300 14.5000	50.800 2.0000	549000 123000	0.36	1.65	142000 32000	88500 19900	1.61	1030000 231000	EE170950	171450
241.300 9.5000	368.300 14.5000	68.262 2.6875	828000 186000	0.34	1.75	215000 48200	126000 28400	1.70	1530000 345000	EE125095	125145
241.300 9.5000	393.700 15.5000	73.817 2.9062	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275095	275155
241.300 9.5000	406.400 16.0000	69.850 2.7500	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275095	275160
241.300 9.5000	444.500 17.5000	101.600 4.0000	1560000 350000	0.34	1.78	403000 90700	233000 52400	1.73	2420000 544000	EE923095	923175
241.300 9.5000	488.950 19.2500	120.650 4.7500	2070000 465000	0.31	1.92	537000 121000	287000 64600	1.87	3310000 744000	EE295950	295193
241.300 9.5000	508.000 20.0000	117.475 4.6250	1430000 322000	0.94	0.64	371000 83500	596000 134000	0.62	2100000 473000	EE390095	390200

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight
Bearing			Shaft			Housing			Cage					kg (lbs.)
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
95.250 3.7500	73.025 2.8750	49.5 1.95	6.4 0.25	277.0 10.91	287.0 11.30	6.4 0.25	456.0 17.96	423.0 16.65	22.50 0.88	19.20 0.76	1260	106	0.1909	94.81 209.02
21.500 0.8465	18.500 0.7283	15.7 0.62	2.0 0.08	237.0 9.33	241.0 9.49	2.0 0.08	263.0 10.35	259.0 10.20	0.30 0.01	2.40 0.09	694	584	0.1422	1.86 4.09
65.088 2.5625	50.800 2.0000	-4.8 -0.19	6.4 0.25	249.0 9.80	258.0 10.16	3.3 0.13	322.0 12.68	313.0 12.32	5.20 0.20	3.30 0.13	1350	198	0.1436	18.41 40.59
46.038 1.8125	33.338 1.3125	6.6 0.26	3.5 0.14	246.0 9.69	252.0 9.92	3.3 0.13	301.0 11.85	294.0 11.57	5.50 0.22	1.60 0.06	1010	243	0.1328	8.68 19.14
49.212 1.9375	36.512 1.4375	8.4 0.33	6.4 0.25	246.0 9.69	258.0 10.16	3.3 0.13	306.0 12.05	296.0 11.65	4.50 0.18	2.80 0.11	997	163	0.1367	9.86 21.74
53.975 2.1250	36.512 1.4375	8.4 0.33	3.5 0.14	247.0 9.72	252.0 9.92	3.3 0.13	306.0 12.05	296.0 11.65	4.30 0.17	0.00 0.00	938	176	0.1338	10.17 22.42
49.212 1.9375	33.338 1.3125	14.2 0.56	6.4 0.25	246.0 9.69	258.0 10.16	3.3 0.13	309.0 12.17	299.0 11.77	11.20 0.44	2.70 0.10	800	189	0.1352	10.05 22.15
49.212 1.9375	34.925 1.3750	14.2 0.56	6.4 0.25	246.0 9.69	258.0 10.16	3.3 0.13	309.0 12.17	302.0 11.89	11.20 0.44	2.70 0.10	800	189	0.1352	11.12 24.52
66.675 2.6250	47.625 1.8750	17.0 0.67	7.0 0.28	254.0 10.00	265.0 10.43	3.3 0.13	334.0 13.15	318.0 12.52	12.00 0.47	3.80 0.15	1140	160	0.1626	22.00 48.50
74.612 2.9375	57.150 2.2500	-6.6 -0.26	6.4 0.25	261.0 10.28	271.0 10.67	3.3 0.13	363.5 14.32	356.0 14.02	8.30 0.33	3.50 0.14	1840	226	0.1588	33.39 73.60
112.712 4.4375	90.488 3.5625	-27.9 -1.10	6.4 0.25	259.0 10.20	269.0 10.59	6.4 0.25	362.0 14.26	346.0 13.62	8.60 0.34	4.40 0.17	2080	156	0.1671	49.18 108.42
112.712 4.4375	90.488 3.5625	-27.9 -1.10	6.4 0.25	259.0 10.20	269.0 10.59	6.4 0.25	362.0 14.26	346.0 13.62	10.20 0.40	2.80 0.11	1960	148	0.1638	49.65 109.45
53.975 2.1250	36.512 1.4375	8.4 0.33	3.5 0.14	247.0 9.72	252.0 9.92	3.3 0.13	306.0 12.05	296.0 11.65	4.30 0.17	0.00 0.00	938	176	0.1338	10.14 22.34
44.450 1.7500	33.338 1.3125	20.6 0.81	3.5 0.14	247.0 9.72	254.0 10.00	3.3 0.13	309.0 12.17	299.0 11.77	4.80 0.19	1.10 0.04	800	189	0.1352	9.32 20.56
69.850 2.7500	50.800 2.0000	-4.8 -0.19	6.4 0.25	253.0 9.96	263.0 10.35	3.3 0.13	322.0 12.68	313.0 12.32	4.30 0.17	1.20 0.05	1260	174	0.1401	17.78 39.21
65.088 2.5625	50.800 2.0000	-4.8 -0.19	6.4 0.25	253.0 9.96	262.0 10.31	3.3 0.13	322.0 12.68	313.0 12.32	5.20 0.20	3.30 0.13	1350	198	0.1436	17.37 38.29
71.438 2.8125	53.975 2.1250	-6.9 -0.27	6.4 0.25	258.0 10.16	267.0 10.51	3.3 0.13	343.0 13.50	335.0 13.19	8.00 0.32	3.00 0.12	1630	168	0.1526	24.87 54.82
57.150 2.2500	44.450 1.7500	2.5 0.10	6.4 0.25	257.0 10.12	267.0 10.51	3.3 0.13	329.0 12.95	325.0 12.80	6.50 0.25	1.60 0.06	1180	164	0.1392	16.53 36.44
50.800 2.0000	33.338 1.3125	5.8 0.23	6.4 0.25	260.0 10.24	269.0 10.59	3.3 0.13	337.0 13.27	334.0 13.15	8.60 0.34	3.30 0.13	1070	172	0.1354	15.41 33.98
57.150 2.2500	44.450 1.7500	2.5 0.10	6.4 0.25	257.0 10.12	267.0 10.51	3.3 0.13	329.0 12.95	327.0 12.87	6.50 0.25	1.60 0.06	1180	164	0.1392	17.77 39.18
50.800 2.0000	33.338 1.3125	5.8 0.23	6.4 0.25	260.0 10.24	269.0 10.59	3.3 0.13	337.0 13.27	338.0 13.31	8.60 0.34	3.30 0.13	1070	172	0.1354	16.80 37.05
50.800 2.0000	33.338 1.3125	5.8 0.23	6.4 0.25	260.0 10.24	269.0 10.59	3.3 0.13	337.0 13.27	340.0 13.39	8.60 0.34	3.30 0.13	1070	172	0.1354	17.29 38.12
68.262 2.6875	53.975 2.1250	-2.3 -0.09	6.4 0.25	257.0 10.12	269.0 10.59	3.3 0.13	344.0 13.54	341.0 13.43	7.70 0.30	0.10 0.00	1310	221	0.1432	24.20 53.35
69.850 2.7500	50.005 1.9687	2.5 0.10	6.4 0.25	268.0 10.55	278.0 10.94	6.4 0.25	378.0 14.89	366.0 14.41	14.40 0.57	3.30 0.13	1450	201	0.1555	31.84 70.19
69.850 2.7500	46.038 1.8125	2.5 0.10	6.4 0.25	268.0 10.55	278.0 10.94	6.4 0.25	378.0 14.89	373.0 14.69	14.40 0.57	3.30 0.13	1450	201	0.1555	33.95 74.84
100.012 3.9375	76.200 3.0000	-19.3 -0.76	6.4 0.25	268.0 10.55	277.0 10.91	4.8 0.19	407.0 16.02	403.0 15.87	12.30 0.48	2.10 0.08	1630	136	0.1531	62.00 136.69
120.650 4.7500	92.075 3.6250	-31.0 -1.22	6.4 0.25	276.0 10.87	285.0 11.22	6.4 0.25	450.5 17.74	444.0 17.48	18.70 0.73	4.00 0.16	2250	172	0.1664	98.39 216.91
95.250 3.7500	73.025 2.8750	49.5 1.95	6.4 0.25	288.0 11.34	297.0 11.69	6.4 0.25	456.0 17.96	423.0 16.65	22.50 0.88	18.90 0.74	1260	106	0.1909	91.31 201.31

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

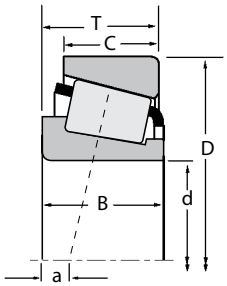
[7] Compound radius on inner race. Details on drawing for bearing.

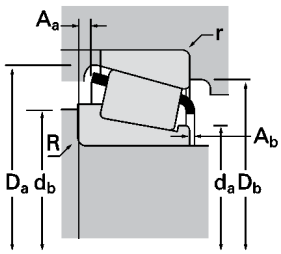
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
244.475 9.6250	381.000 15.0000	79.375 3.1250	889000 200000	0.52	1.16	231000 51800	204000 45800	1.13	1690000 381000	EE126097	126150
247.650 9.7500	304.800 12.0000	22.225 0.8750	146000 32700	0.32	1.85	37800 8490	21000 4720	1.80	373000 83900	28880	28820
247.650 9.7500	346.075 13.6250	63.500 2.5000	787000 177000	0.34	1.75	204000 45900	120000 27000	1.70	1620000 365000	M348449	M348410
247.650 9.7500	355.600 14.0000	50.800 2.0000	549000 123000	0.36	1.65	142000 32000	88500 19900	1.61	1030000 231000	EE170975	171400
247.650 9.7500	365.049 14.3720	50.800 2.0000	549000 123000	0.36	1.65	142000 32000	88500 19900	1.61	1030000 231000	EE170975	171436
247.650 9.7500	368.300 14.5000	50.800 2.0000	549000 123000	0.36	1.65	142000 32000	88500 19900	1.61	1030000 231000	EE170975	171450
247.650 9.7500	381.000 15.0000	74.612 2.9375	982000 221000	0.33	1.80	255000 57200	145000 32600	1.76	2030000 455000	M252337	M252310
247.650 9.7500	406.400 16.0000	115.888 4.5625	1930000 433000	0.33	1.80	499000 112000	284000 63900	1.76	3770000 846000	HH249949	HH249910
249.250 9.8130	381.000 15.0000	79.375 3.1250	889000 200000	0.52	1.16	231000 51800	204000 45800	1.13	1690000 381000	EE126098	126150
254.000 10.0000	323.850 12.7500	22.225 0.8750	148000 33300	0.35	1.73	38400 8630	22800 5120	1.69	391000 87800	29875	29820
254.000 10.0000	358.775 14.1250	71.438 2.8125	896000 202000	0.33	1.80	232000 52200	132000 29700	1.76	1850000 416000	M249749	M249710
254.000 10.0000	358.775 14.1250	71.438 2.8125	896000 202000	0.33	1.80	232000 52200	132000 29700	1.76	1850000 416000	M249749X	M249710
254.000 10.0000	365.125 14.3750	58.738 2.3125	666000 150000	0.37	1.60	173000 38800	111000 24900	1.56	1330000 299000	EE134100	134143
254.000 10.0000	368.300 14.5000	58.738 2.3125	666000 150000	0.37	1.60	173000 38800	111000 24900	1.56	1330000 299000	EE134100	134145
254.000 10.0000	393.700 15.5000	73.817 2.9062	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275100	275155
254.000 10.0000	400.050 15.7500	57.150 2.2500	782000 176000	0.33	1.81	203000 45600	115000 25900	1.76	1390000 313000	EE251001	251575
254.000 10.0000	406.400 16.0000	69.850 2.7500	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275100	275160
254.000 10.0000	422.275 16.6250	86.121 3.3906	1280000 288000	0.33	1.80	332000 74700	189000 42500	1.76	2020000 455000	HM252343	HM252310
254.000 10.0000	422.275 16.6250	86.121 3.3906	1320000 297000	0.33	1.80	343000 77000	195000 43900	1.76	2110000 475000	HM252344	HM252310
254.000 10.0000	533.400 21.0000	133.350 5.2500	2100000 471000	0.94	0.64	543000 122000	872000 196000	0.62	3090000 694000	HH953749	HH953710
257.175 10.1250	342.900 13.5000	57.150 2.2500	667000 150000	0.35	1.73	173000 38900	103000 23100	1.68	1430000 321000	M349549A	M349510
257.175 10.1250	342.900 13.5000	57.150 2.2500	667000 150000	0.35	1.73	173000 38900	103000 23100	1.68	1430000 321000	M349549	M349510
260.350 10.2500	365.125 14.3750	58.738 2.3125	666000 150000	0.37	1.60	173000 38800	111000 24900	1.56	1330000 299000	EE134102	134143
260.350 10.2500	368.300 14.5000	58.738 2.3125	666000 150000	0.37	1.60	173000 38800	111000 24900	1.56	1330000 299000	EE134102	134145
260.350 10.2500	400.050 15.7500	69.850 2.7500	811000 182000	0.39	1.52	210000 47300	142000 31900	1.48	1450000 326000	EE221026	221575
260.350 10.2500	419.100 16.5000	85.725 3.3750	1100000 248000	0.60	0.99	286000 64200	296000 66500	0.97	2010000 451000	EE435102	435165
260.350 10.2500	422.275 16.6250	86.121 3.3906	1280000 288000	0.33	1.80	332000 74700	189000 42500	1.76	2020000 455000	HM252348	HM252310
260.350 10.2500	422.275 16.6250	86.121 3.3906	1320000 297000	0.33	1.80	343000 77000	195000 43900	1.76	2110000 475000	HM252349	HM252310

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
76.200 3.0000	57.150 2.2500	9.7 0.38	6.4 0.25	266.0 10.47	275.0 10.83	4.8 0.19	358.0 14.09	343.0 13.50	13.10 0.52	2.00 0.08	1320	169	0.1640	30.30 66.80
22.225 0.8750	15.875 0.6250	17.3 0.68	1.5 0.06	256.0 10.08	258.0 10.16	1.5 0.06	294.0 11.57	291.0 11.46	1.70 0.06	1.90 0.07	807	572	0.1479	3.18 7.01
63.500 2.5000	50.800 2.0000	-1.3 -0.05	6.4 0.25	263.0 10.35	273.0 10.75	6.4 0.25	332.0 13.07	321.0 12.64	4.00 0.16	3.60 0.14	1450	213	0.1483	17.51 38.60
50.800 2.0000	33.338 1.3125	5.8 0.23	6.4 0.25	264.0 10.39	274.0 10.79	3.3 0.13	337.0 13.27	334.0 13.15	8.60 0.34	3.30 0.13	1070	172	0.1354	14.44 31.83
50.800 2.0000	33.338 1.3125	5.8 0.23	6.4 0.25	264.0 10.39	274.0 10.79	3.3 0.13	337.0 13.27	338.0 13.31	8.60 0.34	3.30 0.13	1070	172	0.1354	15.83 34.90
50.800 2.0000	33.338 1.3125	5.8 0.23	6.4 0.25	264.0 10.39	274.0 10.79	3.3 0.13	337.0 13.27	340.0 13.39	8.60 0.34	3.30 0.13	1070	172	0.1354	16.32 35.98
74.612 2.9375	57.150 2.2500	-6.6 -0.26	6.4 0.25	270.0 10.63	280.0 11.02	3.3 0.13	363.5 14.32	356.0 14.02	8.30 0.33	3.50 0.14	1840	226	0.1588	30.47 67.16
117.475 4.6250	93.662 3.6875	-28.7 -1.13	6.4 0.25	275.0 10.83	284.0 11.18	6.4 0.25	383.0 15.08	366.0 14.41	9.00 0.35	4.10 0.16	2370	173	0.1746	57.93 127.71
76.200 3.0000	57.150 2.2500	9.7 0.38	6.4 0.25	269.0 10.59	279.0 10.98	4.8 0.19	358.0 14.09	343.0 13.50	13.10 0.52	2.00 0.08	1320	169	0.1640	29.19 64.36
22.225 0.8750	15.875 0.6250	21.1 0.83	1.5 0.06	266.0 10.47	267.0 10.51	1.5 0.06	312.0 12.28	310.0 12.20	1.70 0.07	1.90 0.07	907	657	0.1567	4.26 9.39
71.438 2.8125	53.975 2.1250	-6.9 -0.27	3.5 0.14	270.0 10.63	274.0 10.79	3.3 0.13	343.0 13.50	335.0 13.19	8.00 0.32	3.00 0.12	1630	168	0.1526	21.35 47.07
71.438 2.8125	53.975 2.1250	-6.9 -0.27	3.5 0.14	270.0 10.63	274.0 10.79	3.3 0.13	343.0 13.50	335.0 13.19	8.00 0.32	3.00 0.12	1630	168	0.1526	21.35 47.07
58.738 2.3125	42.862 1.6875	5.1 0.20	6.4 0.25	272.0 10.71	281.0 11.06	6.4 0.25	347.0 13.66	339.0 13.35	8.30 0.32	1.70 0.07	1330	187	0.1474	18.11 39.93
58.738 2.3125	42.862 1.6875	5.1 0.20	6.4 0.25	272.0 10.71	281.0 11.06	6.4 0.25	347.0 13.66	340.0 13.39	8.30 0.32	1.70 0.07	1330	187	0.1474	18.72 41.28
69.850 2.7500	50.005 1.9687	2.5 0.10	6.4 0.25	277.0 10.91	287.0 11.30	6.4 0.25	378.0 14.89	366.0 14.41	14.40 0.57	3.30 0.13	1450	201	0.1555	29.13 64.23
55.562 2.1875	41.275 1.6250	3.3 0.13	3.3 0.13	272.0 10.71	278.0 10.94	1.5 0.06	369.0 14.53	371.0 14.61	6.30 0.25	5.30 0.21	1320	218	0.1413	24.88 54.85
69.850 2.7500	46.038 1.8125	2.5 0.10	6.4 0.25	277.0 10.91	287.0 11.30	6.4 0.25	378.0 14.89	373.0 14.69	14.40 0.57	3.30 0.13	1450	201	0.1555	31.24 68.88
79.771 3.1406	66.675 2.6250	-9.4 -0.37	6.8 0.27	281.0 11.06	287.0 11.30	3.3 0.13	399.5 15.73	392.0 15.43	13.00 0.51	4.80 0.19	1500	148	0.1482	41.60 91.71
79.771 3.1406	66.675 2.6250	-9.4 -0.37	6.8 0.27	281.0 11.06	287.0 11.30	3.3 0.13	399.5 15.73	392.0 15.43	10.50 0.41	6.10 0.24	1550	152	0.1498	41.76 92.06
120.650 4.7500	77.788 3.0625	45.5 1.79	6.4 0.25	306.5 12.06	328.0 12.91	6.4 0.25	495.5 19.51	455.0 17.91	21.80 0.86	14.20 0.56	1670	104	0.2101	120.15 264.88
57.150 2.2500	44.450 1.7500	2.5 0.10	10.7 0.42	269.0 10.59	289.0 11.38	3.3 0.13	333.0 13.11	322.0 12.68	4.80 0.19	3.00 0.12	1420	193	0.1475	13.33 29.40
57.150 2.2500	44.450 1.7500	2.5 0.10	6.4 0.25	269.0 10.59	281.0 11.06	3.3 0.13	333.0 13.11	322.0 12.68	4.80 0.19	3.00 0.12	1420	193	0.1475	13.57 29.92
58.738 2.3125	42.862 1.6875	5.1 0.20	6.4 0.25	276.0 10.87	286.0 11.26	6.4 0.25	347.0 13.66	339.0 13.35	8.30 0.32	1.70 0.07	1330	187	0.1474	16.93 37.32
58.738 2.3125	42.862 1.6875	5.1 0.20	6.4 0.25	276.0 10.87	286.0 11.26	6.4 0.25	347.0 13.66	340.0 13.39	8.30 0.32	1.70 0.07	1330	187	0.1474	17.54 38.67
67.470 2.6563	46.038 1.8125	0.8 0.03	9.7 0.38	280.0 11.02	296.0 11.65	6.4 0.25	371.5 14.63	366.0 14.41	14.30 0.56	5.60 0.22	1320	207	0.1497	26.68 58.82
84.138 3.3125	61.912 2.4375	19.8 0.78	6.4 0.25	285.0 11.22	295.0 11.61	3.3 0.13	395.0 15.56	376.0 14.80	14.10 0.55	2.00 0.08	1480	123	0.1787	41.85 92.26
79.771 3.1406	66.675 2.6250	-9.4 -0.37	6.8 0.27	285.0 11.22	292.0 11.50	3.3 0.13	399.5 15.73	392.0 15.43	13.00 0.51	4.80 0.19	1500	148	0.1482	40.16 88.54
79.771 3.1406	66.675 2.6250	-9.4 -0.37	6.8 0.27	285.0 11.22	292.0 11.50	3.3 0.13	399.5 15.73	392.0 15.43	10.50 0.41	6.10 0.24	1550	152	0.1498	40.16 88.53

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

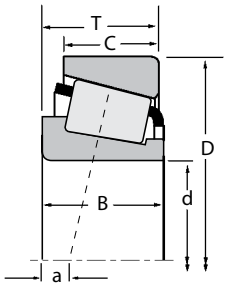
[7] Compound radius on inner race. Details on drawing for bearing.

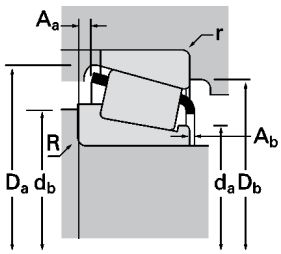
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
260.350 10.2500	488.950 19.2500	120.650 4.7500	2070000 465000	0.31	1.92	537000 121000	287000 64600	1.87	3310000 744000	EE295102	295193
263.525 10.3750	325.438 12.8125	28.575 1.1250	217000 48800	0.37	1.64	56300 12700	35200 7920	1.60	554000 125000	38880	38820
263.525 10.3750	355.600 14.0000	57.150 2.2500	688000 155000	0.36	1.67	178000 40100	110000 24700	1.62	1510000 339000	LM451345	LM451310
266.560 10.4945	325.438 12.8125	29.500 1.1614	210000 47100	0.37	1.64	54400 12200	34000 7650	1.60	527000 118000	38884	38820
266.700 10.5000	323.850 12.7500	22.225 0.8750	148000 33300	0.35	1.73	38400 8630	22800 5120	1.69	391000 87800	29880	29820
266.700 10.5000	325.438 12.8125	28.575 1.1250	217000 48800	0.37	1.64	56300 12700	35200 7920	1.60	554000 125000	38885	38820
266.700 10.5000	355.600 14.0000	57.150 2.2500	688000 155000	0.36	1.67	178000 40100	110000 24700	1.62	1510000 339000	LM451349A	LM451310
266.700 10.5000	355.600 14.0000	57.150 2.2500	688000 155000	0.36	1.67	178000 40100	110000 24700	1.62	1510000 339000	LM451349	LM451310
266.700 10.5000	393.700 15.5000	73.817 2.9062	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275105	275155
266.700 10.5000	406.400 16.0000	69.850 2.7500	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275105	275160
266.700 10.5000	444.500 17.5000	120.650 4.7500	1790000 402000	0.58	1.04	464000 104000	457000 103000	1.01	3520000 791000	H852849	H852810
269.875 10.6250	381.000 15.0000	74.612 2.9375	982000 221000	0.33	1.80	255000 57200	145000 32600	1.76	2030000 455000	M252349	M252310
273.050 10.7500	393.700 15.5000	73.817 2.9062	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275108	275155
273.050 10.7500	406.400 16.0000	69.850 2.7500	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275108	275160
276.225 10.8750	352.425 13.8750	36.512 1.4375	326000 73400	0.54	1.11	84600 19000	78000 17500	1.08	750000 169000	L853049	L853010
279.400 11.0000	317.500 12.5000	24.384 0.9600	159000 35800	0.35	1.73	41200 9270	24400 5500	1.69	467000 105000	LL352149	LL352110
279.400 11.0000	469.900 18.5000	95.250 3.7500	1380000 310000	0.38	1.59	357000 80300	231000 52000	1.55	2350000 527000	EE722110	722185
279.400 11.0000	488.950 19.2500	120.650 4.7500	2070000 465000	0.31	1.92	537000 121000	287000 64600	1.87	3310000 744000	EE295110	295193
279.982 11.0229	380.009 14.9610	65.088 2.5625	708000 159000	0.43	1.39	184000 41300	136000 30500	1.35	1720000 387000	LM654642	LM654611
280.000 11.0236	406.400 16.0000	69.850 2.7500	851000 191000	0.39	1.55	221000 49600	146000 32800	1.51	1660000 374000	EE128112	128160
280.192 11.0312	400.050 15.7500	52.388 2.0625	590000 133000	0.41	1.47	153000 34400	107000 24000	1.43	1180000 266000	EE101103	101575
280.192 11.0312	406.400 16.0000	52.388 2.0625	590000 133000	0.41	1.47	153000 34400	107000 24000	1.43	1180000 266000	EE101103	101600
280.192 11.0312	406.400 16.0000	69.850 2.7500	906000 204000	0.39	1.55	235000 52800	155000 34900	1.51	1820000 409000	EE128110	128160
280.192 11.0312	406.400 16.0000	69.850 2.7500	851000 191000	0.39	1.55	221000 49600	146000 32800	1.51	1660000 374000	EE128111	128160
285.750 11.2500	354.012 13.9375	33.338 1.3125	253000 56800	0.49	1.22	65500 14700	55200 12400	1.19	596000 134000	545112	545139
285.750 11.2500	358.775 14.1250	33.338 1.3125	253000 56800	0.49	1.22	65500 14700	55200 12400	1.19	596000 134000	545112	545141
288.925 11.3750	406.400 16.0000	77.788 3.0625	1170000 262000	0.34	1.77	302000 68000	175000 39300	1.73	2520000 567000	M255449	M255410
292.100 11.5000	374.650 14.7500	47.625 1.8750	510000 115000	0.40	1.49	132000 29700	90900 20400	1.45	1150000 258000	L555249	L555210

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
120.650 4.7500	92.075 3.6250	-31.0 -1.22	6.4 0.25	290.0 11.42	299.0 11.77	6.4 0.25	450.5 17.74	444.0 17.48	18.70 0.73	4.00 0.16	2250	172	0.1664	91.30 201.28
28.575 1.1250	25.400 1.0000	20.3 0.80	1.5 0.06	275.0 10.83	275.0 10.83	1.5 0.06	315.0 12.40	312.0 12.28	1.30 0.05	1.30 0.05	1030	496	0.1676	5.15 11.35
57.150 2.2500	44.450 1.7500	5.1 0.20	3.5 0.14	279.0 10.98	283.0 11.14	3.3 0.13	343.0 13.50	335.0 13.19	5.90 0.23	3.40 0.13	1550	212	0.1536	15.43 34.02
33.470 1.3177	25.400 1.0000	19.6 0.77	1.5 0.06	275.0 10.83	277.0 10.91	1.5 0.06	315.0 12.40	312.0 12.28	0.50 0.02	-0.80 -0.03	993	480	0.1656	5.35 11.79
22.225 0.8750	15.875 0.6250	21.1 0.83	1.5 0.06	275.0 10.83	277.0 10.91	1.5 0.06	312.0 12.28	310.0 12.20	1.70 0.07	1.90 0.07	907	657	0.1567	3.36 7.40
28.575 1.1250	25.400 1.0000	20.3 0.80	1.5 0.06	277.0 10.91	277.0 10.91	1.5 0.06	315.0 12.40	312.0 12.28	1.30 0.05	1.30 0.05	1030	496	0.1676	4.85 10.70
57.150 2.2500	44.450 1.7500	5.1 0.20	10.5 0.41	281.0 11.06	299.0 11.77	3.3 0.13	343.0 13.50	335.0 13.19	5.90 0.23	3.40 0.13	1550	212	0.1536	14.52 32.00
57.150 2.2500	44.450 1.7500	5.1 0.20	3.5 0.14	281.0 11.06	285.0 11.22	3.3 0.13	343.0 13.50	335.0 13.19	5.90 0.23	3.40 0.13	1550	212	0.1536	14.84 32.72
69.850 2.7500	50.005 1.9687	2.5 0.10	6.4 0.25	287.0 11.30	296.0 11.65	6.4 0.25	378.0 14.89	366.0 14.41	14.40 0.57	3.30 0.13	1450	201	0.1555	26.29 57.96
69.850 2.7500	46.038 1.8125	2.5 0.10	6.4 0.25	287.0 11.30	296.0 11.65	6.4 0.25	378.0 14.89	373.0 14.69	14.40 0.57	3.30 0.13	1450	201	0.1555	28.40 62.61
117.475 4.6250	88.900 3.5000	-0.5 -0.02	6.4 0.25	297.0 11.69	315.0 12.40	6.4 0.25	422.5 16.63	390.0 15.35	19.20 0.76	4.10 0.16	2250	171	0.2040	72.32 159.43
74.612 2.9375	57.150 2.2500	-6.6 -0.26	6.4 0.25	287.0 11.30	296.0 11.65	3.3 0.13	363.5 14.32	356.0 14.02	8.30 0.33	3.50 0.14	1840	226	0.1588	25.28 55.74
69.850 2.7500	50.005 1.9687	2.5 0.10	6.4 0.25	291.0 11.46	301.0 11.85	6.4 0.25	378.0 14.89	366.0 14.41	14.40 0.57	3.30 0.13	1450	201	0.1555	24.82 54.71
69.850 2.7500	46.038 1.8125	2.5 0.10	6.4 0.25	291.0 11.46	301.0 11.85	6.4 0.25	378.0 14.89	373.0 14.69	14.40 0.57	3.30 0.13	1450	201	0.1555	26.92 59.36
34.925 1.3750	23.812 0.9375	35.1 1.38	3.5 0.14	288.0 11.34	293.0 11.54	3.3 0.13	342.0 13.46	332.0 13.07	6.00 0.24	3.40 0.14	1060	350	0.1517	7.67 16.91
24.384 0.9600	18.288 0.7200	20.3 0.80	1.5 0.06	286.0 11.26	288.0 11.34	1.5 0.06	312.0 12.28	309.0 12.17	1.80 0.07	2.10 0.08	1130	860	0.1688	2.58 5.69
93.662 3.6875	69.850 2.7500	-7.6 -0.30	9.7 0.38	314.0 12.36	321.0 12.64	3.3 0.13	433.0 17.04	430.0 16.93	16.80 0.66	0.40 0.02	1890	143	0.1669	58.94 129.95
120.650 4.7500	92.075 3.6250	-31.0 -1.22	1.3 0.05	304.0 11.97	303.0 11.93	6.4 0.25	450.5 17.74	444.0 17.48	18.70 0.73	4.00 0.16	2250	172	0.1664	83.81 184.76
65.088 2.5625	49.212 1.9375	11.4 0.45	3.5 0.14	298.0 11.73	302.0 11.89	3.3 0.13	368.0 14.49	356.0 14.02	7.90 0.31	0.70 0.03	1920	265	0.1744	20.64 45.51
67.673 2.6643	53.975 2.1250	6.6 0.26	6.4 0.25	307.0 12.09	308.0 12.13	3.3 0.13	384.0 15.12	378.0 14.88	8.20 0.32	0.90 0.04	1620	240	0.1592	27.03 59.58
50.211 1.9768	34.925 1.3750	15.7 0.62	6.8 0.27	307.0 12.09	309.0 12.17	3.3 0.13	376.0 14.80	374.0 14.72	7.70 0.30	5.30 0.21	1380	227	0.1527	18.74 41.31
50.211 1.9768	34.925 1.3750	15.7 0.62	6.8 0.27	307.0 12.09	309.0 12.17	3.3 0.13	376.0 14.80	377.0 14.84	7.70 0.30	5.30 0.21	1380	227	0.1527	19.83 43.72
67.673 2.6643	53.975 2.1250	6.6 0.26	6.8 0.27	307.0 12.09	309.0 12.17	3.3 0.13	384.0 15.12	378.0 14.88	6.90 0.27	1.50 0.06	1730	255	0.1628	26.81 59.09
67.673 2.6643	53.975 2.1250	6.6 0.26	6.8 0.27	307.0 12.09	309.0 12.17	3.3 0.13	384.0 15.12	378.0 14.88	8.20 0.32	0.90 0.04	1620	240	0.1592	26.96 59.43
31.750 1.2500	22.225 0.8750	32.8 1.29	3.5 0.14	298.0 11.73	302.0 11.89	3.3 0.13	345.0 13.58	338.0 13.31	5.70 0.22	2.90 0.11	1020	477	0.1446	6.28 13.84
31.750 1.2500	22.225 0.8750	32.8 1.29	3.5 0.14	298.0 11.73	302.0 11.89	3.3 0.13	345.0 13.58	340.0 13.39	5.70 0.22	2.90 0.11	1020	477	0.1446	6.74 14.86
77.788 3.0625	60.325 2.3750	-4.1 -0.16	6.4 0.25	310.0 12.20	316.0 12.44	3.3 0.13	388.0 15.27	379.0 14.92	5.80 0.23	3.90 0.16	2300	287	0.1722	29.40 64.81
47.625 1.8750	34.925 1.3750	17.5 0.69	3.5 0.14	305.0 12.01	309.0 12.17	3.3 0.13	362.0 14.25	355.0 13.98	5.50 0.22	2.30 0.09	1480	340	0.1553	11.78 25.97

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

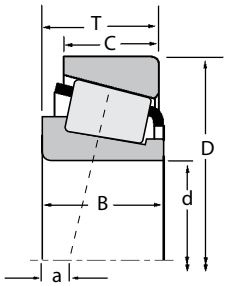
[7] Compound radius on inner race. Details on drawing for bearing.

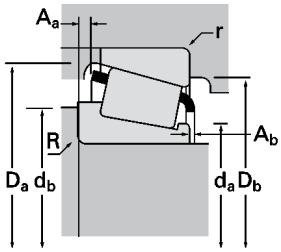
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
292.100 11.5000	393.700 15.5000	63.500 2.5000	468000 105000	0.61	0.98	121000 27300	127000 28500	0.96	997000 224000	84115	84155
292.100 11.5000	469.900 18.5000	95.250 3.7500	1380000 310000	0.38	1.59	357000 80300	231000 52000	1.55	2350000 527000	EE722115	722185
292.100 11.5000	558.800 22.0000	136.525 5.3750	2640000 594000	0.40	1.52	685000 154000	464000 104000	1.48	4100000 923000	EE790114	790221
298.450 11.7500	444.500 17.5000	63.500 2.5000	758000 170000	0.38	1.59	196000 44200	127000 28600	1.55	1390000 312000	EE291175	291750
299.975 11.8100	495.300 19.5000	141.288 5.5625	2810000 632000	0.33	1.80	729000 164000	415000 93300	1.76	5650000 1270000	HH258248	HH258210
300.038 11.8125	422.275 16.6250	82.550 3.2500	1270000 286000	0.34	1.78	330000 74100	190000 42700	1.73	2770000 622000	HM256849	HM256810
304.800 12.0000	393.700 15.5000	50.800 2.0000	575000 129000	0.36	1.67	149000 33500	91600 20600	1.63	1310000 295000	L357049	L357010
304.800 12.0000	406.400 16.0000	63.500 2.5000	754000 170000	0.44	1.36	196000 44000	148000 33200	1.32	1740000 392000	LM757049AA	LM757010
304.800 12.0000	406.400 16.0000	63.500 2.5000	754000 170000	0.44	1.36	196000 44000	148000 33200	1.32	1740000 392000	LM757049	LM757010
304.800 12.0000	438.048 17.2460	76.200 3.0000	879000 198000	0.42	1.44	228000 51200	162000 36500	1.40	1780000 401000	EE129120X	129172
304.800 12.0000	444.500 17.5000	63.500 2.5000	758000 170000	0.38	1.59	196000 44200	127000 28600	1.55	1390000 312000	EE291201	291749
304.800 12.0000	444.500 17.5000	63.500 2.5000	758000 170000	0.38	1.59	196000 44200	127000 28600	1.55	1390000 312000	EE291201	291750
304.800 12.0000	495.300 19.5000	76.200 3.0000	1320000 298000	0.40	1.49	343000 77200	236000 53100	1.45	2090000 471000	EE941205	941950
304.800 12.0000	495.300 19.5000	95.250 3.7500	1440000 324000	0.40	1.49	374000 84000	257000 57800	1.45	2550000 573000	EE724120	724195
304.800 12.0000	499.948 19.6830	101.600 4.0000	1140000 257000	1.17	0.51	296000 66600	594000 134000	0.50	1890000 424000	M959442	M959410
304.800 12.0000	558.800 22.0000	136.525 5.3750	2640000 594000	0.40	1.52	685000 154000	464000 104000	1.48	4100000 923000	EE790120	790221
312.738 12.3125	358.775 14.1250	22.225 0.8750	131000 29500	0.82	0.73	34000 7640	47900 10800	0.71	383000 86100	LL957049	LL957010
314.325 12.3750	495.300 19.5000	120.650 4.7500	1920000 432000	0.58	1.04	498000 112000	491000 110000	1.01	3950000 889000	H859049	H859010
317.500 12.5000	444.500 17.5000	63.500 2.5000	758000 170000	0.38	1.59	196000 44200	127000 28600	1.55	1390000 312000	EE291250	291749
317.500 12.5000	444.500 17.5000	63.500 2.5000	758000 170000	0.38	1.59	196000 44200	127000 28600	1.55	1390000 312000	EE291250	291750
317.500 12.5000	447.675 17.6250	85.725 3.3750	1320000 297000	0.33	1.79	342000 76900	196000 44100	1.74	2790000 628000	HM259048	HM259010
317.500 12.5000	447.675 17.6250	85.725 3.3750	1430000 322000	0.33	1.79	372000 83600	213000 47900	1.74	3140000 706000	HM259049	HM259010
317.500 12.5000	596.900 23.5000	136.525 5.3750	2830000 636000	0.42	1.42	733000 165000	530000 119000	1.38	4600000 1030000	EE720125	720236
317.500 12.5000	622.300 24.5000	147.638 5.8125	2700000 607000	0.94	0.64	700000 157000	1120000 253000	0.62	4130000 927000	H961649	H961610
323.850 12.7500	381.000 15.0000	28.575 1.1250	239000 53700	0.44	1.36	61900 13900	46600 10500	1.33	672000 151000	LL758744	LL758715
325.438 12.8125	596.900 23.5000	136.525 5.3750	2830000 636000	0.42	1.42	733000 165000	530000 119000	1.38	4600000 1030000	EE720128	720236
330.200 13.0000	415.925 16.3750	47.625 1.8750	475000 107000	0.50	1.20	123000 27700	105000 23600	1.17	1180000 266000	L860049	L860010
330.200 13.0000	482.600 19.0000	66.675 2.6250	878000 197000	0.42	1.44	228000 51200	162000 36500	1.40	1770000 398000	EE203130	203190

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
50.800 2.0000	44.450 1.7500	36.6 1.44	3.5 0.14	309.0 12.17	313.0 12.32	6.4 0.25	378.0 14.88	363.0 14.29	13.90 0.55	2.80 0.11	1230	302	0.1660	18.03 39.75
93.662 3.6875	69.850 2.7500	-7.6 -0.30	9.7 0.38	324.0 12.76	330.0 12.99	3.3 0.13	433.0 17.04	430.0 16.93	16.80 0.66	0.40 0.02	1890	143	0.1669	54.75 120.70
136.525 5.3750	98.425 3.8750	-24.4 -0.96	6.4 0.25	329.0 12.95	335.0 13.19	6.4 0.25	514.0 20.24	501.0 19.72	20.00 0.79	7.30 0.29	2660	170	0.1898	132.40 291.88
61.912 2.4375	39.688 1.5625	7.6 0.30	8.0 0.31	320.0 12.60	332.0 13.07	1.5 0.06	415.0 16.34	416.0 16.38	11.40 0.45	7.00 0.28	1580	245	0.1557	29.43 64.87
141.288 5.5625	114.300 4.5000	-34.5 -1.36	6.4 0.25	332.0 13.07	342.0 13.46	6.4 0.25	467.5 18.40	448.0 17.64	10.70 0.42	7.70 0.30	3850	220	0.2048	106.33 234.41
82.550 3.2500	63.500 2.5000	-5.6 -0.22	6.4 0.25	319.0 12.56	328.0 12.91	3.3 0.13	403.5 15.88	394.0 15.51	7.40 0.29	3.50 0.14	2550	282	0.1779	33.74 74.39
50.800 2.0000	38.100 1.5000	12.7 0.50	6.4 0.25	319.0 12.56	329.0 12.95	3.3 0.13	380.0 14.96	374.0 14.72	5.60 0.22	1.90 0.08	1750	301	0.1585	14.35 31.64
63.500 2.5000	47.625 1.8750	16.3 0.64	12.7 0.50	322.0 12.68	344.0 13.54	3.3 0.13	393.0 15.47	380.0 14.96	6.90 0.27	2.50 0.10	1990	260	0.1775	21.36 47.09
63.500 2.5000	47.625 1.8750	16.3 0.64	6.4 0.25	322.0 12.68	331.0 13.03	3.3 0.13	393.0 15.47	380.0 14.96	6.90 0.27	2.50 0.10	1990	260	0.1775	21.44 47.26
76.992 3.0312	53.975 2.1250	7.4 0.29	6.4 0.25	328.0 12.91	334.0 13.15	4.8 0.19	411.5 16.20	406.0 15.98	15.00 0.59	-2.00 -0.08	1880	273	0.1711	33.00 72.75
61.912 2.4375	39.688 1.5625	7.6 0.30	8.0 0.31	324.0 12.76	337.0 13.27	3.3 0.13	415.0 16.34	415.0 16.34	11.40 0.45	7.00 0.28	1580	245	0.1557	27.92 61.55
61.912 2.4375	39.688 1.5625	7.6 0.30	8.0 0.31	324.0 12.76	337.0 13.27	1.5 0.06	415.0 16.34	416.0 16.38	11.40 0.45	7.00 0.28	1580	245	0.1557	27.96 61.65
74.612 2.9375	53.975 2.1250	9.1 0.36	6.4 0.25	329.0 12.95	339.0 13.35	3.3 0.13	463.0 18.22	459.0 18.07	10.30 0.40	5.90 0.23	1770	187	0.1657	48.34 106.57
92.075 3.6250	69.850 2.7500	-1.5 -0.06	16.0 0.63	330.0 12.99	359.0 14.13	6.4 0.25	459.0 18.07	450.0 17.72	17.30 0.68	2.20 0.09	2180	166	0.1783	62.33 137.41
79.375 3.1250	53.975 2.1250	105.4 4.15	6.4 0.25	344.0 13.54	353.0 13.90	6.4 0.25	481.0 18.94	438.0 17.24	* *	* *	1520	157	0.2137	63.02 138.93
136.525 5.3750	98.425 3.8750	-24.4 -0.96	1.3 0.05	335.0 13.19	335.0 13.19	6.4 0.25	514.0 20.24	501.0 19.72	20.00 0.79	7.30 0.29	2660	170	0.1898	126.22 278.25
20.638 0.8125	14.288 0.5625	79.5 3.13	2.3 0.09	322.0 12.68	325.0 12.80	1.5 0.06	354.0 13.94	346.0 13.62	3.10 0.12	2.10 0.08	990	809	0.2091	3.06 6.75
119.062 4.6875	88.900 3.5000	8.4 0.33	6.4 0.25	344.5 13.57	361.0 14.21	6.4 0.25	473.0 18.62	439.0 17.28	17.80 0.70	3.60 0.14	2950	250	0.2225	83.09 183.19
61.912 2.4375	39.688 1.5625	7.6 0.30	8.0 0.31	334.0 13.15	346.0 13.62	3.3 0.13	415.0 16.34	415.0 16.34	11.40 0.45	7.00 0.28	1580	245	0.1557	24.90 54.90
61.912 2.4375	39.688 1.5625	7.6 0.30	8.0 0.31	334.0 13.15	346.0 13.62	1.5 0.06	415.0 16.34	416.0 16.38	11.40 0.45	7.00 0.28	1580	245	0.1557	24.95 55.00
85.725 3.3750	68.262 2.6875	-4.8 -0.19	3.5 0.14	337.0 13.27	341.0 13.43	3.3 0.13	427.5 16.84	418.0 16.46	6.40 0.25	3.70 0.15	2710	281	0.1809	40.55 89.39
85.725 3.3750	68.262 2.6875	-4.8 -0.19	3.5 0.14	337.0 13.27	341.0 13.43	3.3 0.13	427.5 16.84	418.0 16.46	6.80 0.27	3.70 0.15	2940	304	0.1863	40.26 88.76
136.525 5.3750	98.425 3.8750	-16.8 -0.66	19.8 0.78	353.0 13.90	390.0 15.35	6.4 0.25	547.5 21.55	534.0 21.02	20.40 0.80	7.90 0.31	3160	183	0.2053	152.24 335.63
131.762 5.1875	82.550 3.2500	60.5 2.38	14.3 0.56	373.0 14.69	410.0 16.14	12.7 0.50	581.5 22.90	531.0 20.91	25.10 0.99	17.60 0.69	2500	149	0.2401	169.68 374.08
28.575 1.1250	20.638 0.8125	35.1 1.38	3.5 0.14	333.0 13.11	339.0 13.35	3.3 0.13	373.0 14.69	365.0 14.37	2.80 0.11	2.50 0.10	1500	792	0.2007	5.27 11.61
136.525 5.3750	98.425 3.8750	-16.8 -0.66	6.4 0.25	359.0 14.13	369.0 14.53	6.4 0.25	547.5 21.55	534.0 21.02	20.40 0.80	8.20 0.32	3160	183	0.2053	147.98 326.23
47.625 1.8750	34.925 1.3750	35.3 1.39	3.5 0.14	345.0 13.58	349.0 13.74	3.3 0.13	402.0 15.83	394.0 15.51	7.30 0.29	0.10 0.00	1820	479	0.1774	14.01 30.88
63.500 2.5000	44.450 1.7500	16.3 0.64	6.8 0.27	354.0 13.94	364.0 14.33	6.8 0.27	456.0 17.96	449.0 17.68	15.50 0.61	5.80 0.23	2140	336	0.1778	35.76 78.83

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

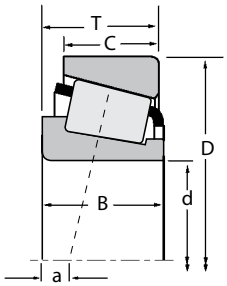
Continued on next page.

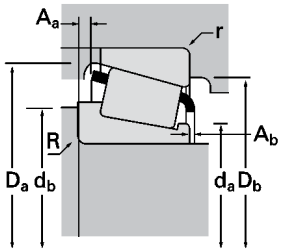
[7] Compound radius on inner race. Details on drawing for bearing.

[8] Pin-type cage. Please consult The Timken Company.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
330.200 13.0000	482.600 19.0000	85.725 3.3750	1230000 276000	0.39	1.54	318000 71400	213000 47800	1.49	2320000 523000	EE526130	526190
333.375 13.1250	469.900 18.5000	90.488 3.5625	1570000 353000	0.33	1.79	407000 91400	233000 52400	1.74	3460000 777000	HM261049	HM261010
342.900 13.5000	450.850 17.7500	66.675 2.6250	953000 214000	0.35	1.70	247000 55600	149000 33500	1.66	2210000 497000	LM361649	LM361610
342.900 13.5000	457.098 17.9960	66.675 2.6250	807000 181000	0.71	0.84	209000 47000	255000 57400	0.82	1940000 436000	LM961548	LM961510
342.900 13.5000	457.098 17.9960	68.262 2.6875	807000 181000	0.71	0.84	209000 47000	255000 57400	0.82	1940000 436000	LM961548	LM961511
346.075 13.6250	469.900 18.5000	60.325 2.3750	537000 121000	0.50	1.20	139000 31300	119000 26800	1.17	1110000 250000	EE161363	161850
346.075 13.6250	482.600 19.0000	60.325 2.3750	537000 121000	0.50	1.20	139000 31300	119000 26800	1.17	1110000 250000	EE161363	161900
346.075 13.6250	482.600 19.0000	66.675 2.6250	878000 197000	0.42	1.44	228000 51200	162000 36500	1.40	1770000 398000	EE203136	203190
346.075 13.6250	482.600 19.0000	66.675 2.6250	878000 197000	0.42	1.44	228000 51200	162000 36500	1.40	1770000 398000	EE203137	203190
346.075 13.6250	488.950 19.2500	95.250 3.7500	1590000 358000	0.33	1.79	413000 92900	237000 53200	1.74	3440000 774000	HM262748	HM262710
346.075 13.6250	488.950 19.2500	95.250 3.7500	1690000 381000	0.33	1.79	439000 98700	252000 56600	1.74	3760000 845000	HM262749	HM262710
349.250 13.7500	501.650 19.7500	90.488 3.5625	1320000 298000	0.37	1.63	343000 77200	216000 48500	1.59	2780000 626000	EE333137	333197
354.012 13.9375	469.900 18.5000	60.325 2.3750	537000 121000	0.50	1.20	139000 31300	119000 26800	1.17	1110000 250000	EE161394	161850
354.012 13.9375	482.600 19.0000	60.325 2.3750	537000 121000	0.50	1.20	139000 31300	119000 26800	1.17	1110000 250000	EE161394	161900
355.600 14.0000	444.500 17.5000	60.325 2.3750	718000 162000	0.31	1.95	186000 41900	98000 22000	1.90	1970000 444000	L163149	L163110
355.600 14.0000	501.650 19.7500	74.612 2.9375	899000 202000	0.44	1.36	233000 52400	176000 39500	1.33	1870000 420000	EE231400	231975
355.600 14.0000	501.650 19.7500	90.488 3.5625	1320000 298000	0.37	1.63	343000 77200	216000 48500	1.59	2780000 626000	EE333140	333197
361.950 14.2500	406.400 16.0000	23.812 0.9375	194000 43600	0.40	1.49	50300 11300	34600 7780	1.45	574000 129000	LL562749	LL562710
368.250 14.4980	523.875 20.6250	101.600 4.0000	1940000 437000	0.33	1.80	504000 113000	287000 64500	1.76	4340000 977000	HM265049	HM265010
371.475 14.6250	501.650 19.7500	74.612 2.9375	899000 202000	0.44	1.36	233000 52400	176000 39500	1.33	1870000 420000	EE231462	231975
374.650 14.7500	431.800 17.0000	28.575 1.1250	249000 56000	0.33	1.80	64500 14500	36700 8260	1.76	745000 167000	LL264648	LL264610
381.000 15.0000	479.425 18.8750	49.212 1.9375	582000 131000	0.50	1.21	151000 33900	128000 28800	1.18	1380000 311000	L865547	L865512
381.000 15.0000	508.000 20.0000	63.500 2.5000	646000 145000	0.53	1.13	167000 37600	153000 34300	1.10	1480000 332000	EE192150	192200
381.000 15.0000	522.288 20.5625	85.725 3.3750	1360000 306000	0.39	1.56	353000 79400	233000 52400	1.51	2950000 663000	LM565949	LM565910
381.000 15.0000	546.100 21.5000	104.775 4.1250	1940000 436000	0.33	1.80	502000 113000	286000 64300	1.76	4210000 946000	HM266446	HM266410
381.000 15.0000	546.100 21.5000	104.775 4.1250	2100000 473000	0.33	1.80	545000 123000	311000 69800	1.76	4730000 1060000	HM266447	HM266410
381.000 15.0000	590.550 23.2500	114.300 4.5000	2440000 549000	0.33	1.80	633000 142000	360000 81000	1.76	5550000 1250000	M268730	M268710
384.175 15.1250	441.325 17.3750	28.575 1.1250	228000 51200	0.34	1.76	59100 13300	34400 7740	1.72	667000 150000	LL365348	LL365310

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
80.167 3.1562	60.325 2.3750	4.8 0.19	6.4 0.25	351.0 13.82	360.0 14.17	3.3 0.13	454.0 17.87	449.0 17.68	14.50 0.57	3.10 0.12	2280	287	0.1790	44.95 99.10
90.488 3.5625	71.438 2.8125	-6.1 -0.24	6.4 0.25	357.0 14.06	363.0 14.29	3.3 0.13	449.5 17.69	439.0 17.28	7.70 0.30	3.30 0.13	3310	324	0.1935	46.58 102.69
66.675 2.6250	52.388 2.0625	8.9 0.35	8.5 0.33	360.0 14.17	373.0 14.69	3.5 0.14	435.0 17.13	425.0 16.73	4.70 0.19	4.90 0.19	2730	433	0.1833	26.40 58.19
63.500 2.5000	46.038 1.8125	56.4 2.22	3.3 0.13	363.0 14.29	367.0 14.45	3.3 0.13	443.0 17.44	423.0 16.65	12.60 0.50	4.90 0.19	2280	300	0.2146	28.02 61.77
63.500 2.5000	47.625 1.8750	56.4 2.22	3.3 0.13	363.0 14.29	367.0 14.45	3.3 0.13	443.0 17.44	423.0 16.65	12.60 0.50	4.90 0.19	2280	300	0.2146	28.49 62.80
55.562 2.1875	38.100 1.5000	33.8 1.33	7.0 0.28	368.0 14.49	379.0 14.92	6.4 0.25	455.0 17.91	445.0 17.52	14.40 0.57	3.80 0.15	1730	299	0.1741	25.15 55.44
55.562 2.1875	38.100 1.5000	33.8 1.33	7.0 0.28	368.0 14.49	379.0 14.92	6.4 0.25	455.0 17.91	451.0 17.76	14.40 0.57	3.80 0.15	1730	299	0.1741	27.97 61.67
63.500 2.5000	44.450 1.7500	16.3 0.64	6.8 0.27	366.0 14.41	376.0 14.80	6.8 0.27	456.0 17.96	449.0 17.68	15.50 0.61	5.80 0.23	2140	336	0.1778	31.56 69.58
63.500 2.5000	44.450 1.7500	16.3 0.64	12.7 0.50	366.0 14.41	388.0 15.28	6.8 0.27	456.0 17.96	449.0 17.68	15.50 0.61	5.80 0.23	2140	336	0.1778	31.06 68.48
95.250 3.7500	74.612 2.9375	-6.4 -0.25	6.4 0.25	367.0 14.45	377.0 14.84	3.3 0.13	467.0 18.39	456.0 17.95	9.30 0.37	3.00 0.12	3430	322	0.1956	54.00 119.06
95.250 3.7500	74.612 2.9375	-6.4 -0.25	6.4 0.25	367.0 14.45	377.0 14.84	3.3 0.13	467.0 18.39	456.0 17.95	8.60 0.34	3.50 0.14	3650	342	0.1999	53.41 117.74
84.138 3.3125	69.850 2.7500	3.6 0.14	6.4 0.25	372.0 14.65	382.0 15.04	3.3 0.13	478.5 18.83	470.0 18.50	12.00 0.47	3.00 0.12	3040	337	0.1928	52.69 116.15
55.562 2.1875	38.100 1.5000	33.8 1.33	7.0 0.28	374.0 14.72	385.0 15.16	6.4 0.25	455.0 17.91	445.0 17.52	14.40 0.57	3.80 0.15	1730	299	0.1741	23.25 51.25
55.562 2.1875	38.100 1.5000	33.8 1.33	7.0 0.28	374.0 14.72	385.0 15.16	6.4 0.25	455.0 17.91	451.0 17.76	14.40 0.57	3.80 0.15	1730	299	0.1741	26.07 57.48
60.325 2.3750	47.625 1.8750	7.1 0.28	3.5 0.14	370.0 14.57	374.0 14.72	3.3 0.13	430.0 16.93	422.0 16.61	5.20 0.20	2.30 0.09	3210	621	0.1838	20.56 45.32
66.675 2.6250	50.800 2.0000	19.6 0.77	6.4 0.25	379.0 14.92	388.0 15.28	3.3 0.13	481.0 18.94	472.0 18.58	19.00 0.75	5.90 0.23	2390	366	0.1874	39.04 86.07
84.138 3.3125	69.850 2.7500	3.6 0.14	6.4 0.25	377.0 14.84	387.0 15.24	3.3 0.13	478.5 18.83	470.0 18.50	12.00 0.47	3.00 0.12	3040	337	0.1928	50.37 111.04
23.812 0.9375	17.462 0.6875	37.8 1.49	2.3 0.09	371.0 14.61	372.0 14.65	1.5 0.06	401.0 15.79	396.0 15.59	1.10 0.04	2.40 0.09	1670	1060	0.2005	3.68 8.11
101.600 4.0000	79.375 3.1250	-8.4 -0.33	6.4 0.25	394.0 15.51	400.0 15.75	6.4 0.25	498.5 19.63	487.0 19.17	9.30 0.36	3.70 0.14	4300	372	0.2106	66.03 145.57
66.675 2.6250	50.800 2.0000	19.6 0.77	6.4 0.25	390.0 15.35	400.0 15.75	3.3 0.13	481.0 18.94	472.0 18.58	19.00 0.75	5.90 0.23	2390	366	0.1874	34.31 75.63
28.575 1.1250	20.638 0.8125	27.9 1.10	3.5 0.14	384.0 15.12	389.0 15.31	3.3 0.13	424.0 16.69	417.0 16.42	1.90 0.08	2.90 0.12	2160	1050	0.2055	6.08 13.40
47.625 1.8750	34.925 1.3750	42.9 1.69	6.4 0.25	395.0 15.55	407.0 16.02	3.3 0.13	465.0 18.31	456.0 17.95	6.60 0.26	2.70 0.11	2260	529	0.1897	18.40 40.57
58.738 2.3125	38.100 1.5000	39.4 1.55	6.4 0.25	400.0 15.75	410.0 16.14	3.3 0.13	482.0 18.98	478.0 18.82	18.00 0.71	3.90 0.15	2290	398	0.1951	29.40 64.81
84.138 3.3125	61.912 2.4375	8.9 0.35	6.4 0.25	402.0 15.83	411.0 16.18	3.3 0.13	499.5 19.67	493.0 19.41	12.30 0.49	3.10 0.12	3380	378	0.2028	49.21 108.48
104.775 4.1250	82.550 3.2500	-7.1 -0.28	6.4 0.25	405.0 15.94	415.0 16.34	6.4 0.25	520.0 20.47	507.0 19.96	9.10 0.36	5.40 0.21	4380	279	0.2116	76.52 168.68
104.775 4.1250	82.550 3.2500	-7.1 -0.28	6.4 0.25	405.0 15.94	415.0 16.34	6.4 0.25	520.0 20.47	507.0 19.96	8.90 0.35	4.90 0.19	4760	301	0.2178	76.63 168.95
114.300 4.5000	88.900 3.5000	-9.4 -0.37	6.4 0.25	415.0 16.34	425.0 16.73	6.4 0.25	562.5 22.14	549.0 21.61	10.60 0.42	6.00 0.24	5750	421	0.2319	114.19 251.73
28.575 1.1250	20.638 0.8125	30.0 1.18	3.5 0.14	393.0 15.47	399.0 15.71	3.3 0.13	433.0 17.05	427.0 16.81	2.00 0.08	3.00 0.12	2060	1160	0.2033	6.14 13.55

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

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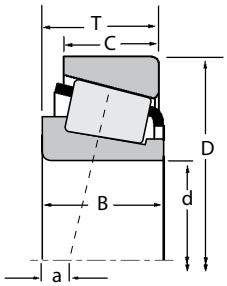
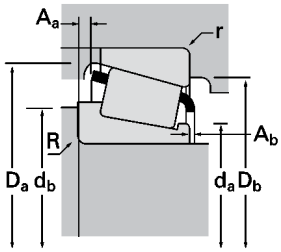
SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic [1]			Dynamic [2]		Factors [5]	Static	Part Number	
				Factors [5]							
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
384.175 15.1250	546.100 21.5000	104.775 4.1250	1940000 436000	0.33	1.80	502000 113000	286000 64300	1.76	4210000 946000	HM266448	HM266410
384.175 15.1250	546.100 21.5000	104.775 4.1250	2100000 473000	0.33	1.80	545000 123000	311000 69800	1.76	4730000 1060000	HM266449	HM266410
385.762 15.1875	514.350 20.2500	82.550 3.2500	1330000 298000	0.42	1.43	344000 77300	246000 55400	1.40	3160000 710000	LM665949	LM665910
387.248 15.2460	546.100 21.5000	87.312 3.4375	1600000 359000	0.42	1.44	414000 93000	296000 66500	1.40	3940000 886000	M667935	M667911
393.700 15.5000	546.100 21.5000	76.200 3.0000	928000 209000	0.48	1.26	241000 54100	196000 44100	1.23	2010000 451000	EE234154	234215
403.225 15.8750	460.375 18.1250	28.575 1.1250	225000 50600	0.40	1.49	58400 13100	40200 9030	1.45	708000 159000	LL566848	LL566810
406.400 16.0000	508.000 20.0000	61.912 2.4375	842000 189000	0.37	1.64	218000 49100	137000 30700	1.60	2230000 502000	L467549	L467510
406.400 16.0000	546.100 21.5000	76.200 3.0000	928000 209000	0.48	1.26	241000 54100	196000 44100	1.23	2010000 451000	EE234160	234215
406.400 16.0000	546.100 21.5000	87.312 3.4375	1600000 359000	0.42	1.44	414000 93000	296000 66500	1.40	3940000 886000	M667944	M667911
406.400 16.0000	549.275 21.6250	85.725 3.3750	1400000 316000	0.41	1.47	364000 81800	254000 57100	1.43	3130000 704000	LM567949	LM567910
406.400 16.0000	558.800 22.0000	65.088 2.5625	928000 209000	0.48	1.26	241000 54100	196000 44100	1.23	2010000 451000	EE234160	234220
406.400 16.0000	762.000 30.0000	180.975 7.1250	4100000 922000	0.94	0.64	1060000 239000	1710000 384000	0.62	6840000 1540000	H969249	H969210
409.575 16.1250	546.100 21.5000	87.312 3.4375	1440000 325000	0.42	1.44	374000 84200	268000 60100	1.40	3420000 768000	M667948	M667911
415.925 16.3750	590.550 23.2500	114.300 4.5000	2440000 549000	0.33	1.80	633000 142000	360000 81000	1.76	5550000 1250000	M268749	M268710
430.212 16.9375	603.250 23.7500	76.200 3.0000	963000 216000	0.52	1.14	250000 56100	224000 50400	1.11	2190000 491000	EE241693	242375
431.800 17.0000	533.400 21.0000	46.038 1.8125	612000 138000	0.31	1.96	159000 35700	83000 18700	1.91	1520000 342000	80385	80325
431.800 17.0000	552.450 21.7500	44.450 1.7500	614000 138000	0.32	1.88	159000 35800	86900 19500	1.83	1550000 348000	80170	80217
431.800 17.0000	565.150 22.2500	44.450 1.7500	614000 138000	0.32	1.88	159000 35800	86900 19500	1.83	1550000 348000	80170	80222
431.800 17.0000	571.500 22.5000	74.612 2.9375	1210000 271000	0.55	1.10	312000 70200	292000 65700	1.07	2810000 632000	LM869448	LM869410
431.800 17.0000	603.250 23.7500	76.200 3.0000	963000 216000	0.52	1.14	250000 56100	224000 50400	1.11	2190000 491000	EE241701	242375
447.675 17.6250	552.450 21.7500	44.450 1.7500	614000 138000	0.32	1.88	159000 35800	86900 19500	1.83	1550000 348000	80176	80217
447.675 17.6250	552.450 21.7500	44.450 1.7500	606000 136000	0.36	1.65	157000 35300	98200 22100	1.60	1510000 340000	LL469949	LL469910
447.675 17.6250	565.150 22.2500	44.450 1.7500	614000 138000	0.32	1.88	159000 35800	86900 19500	1.83	1550000 348000	80176	80222
450.850 17.7500	603.250 23.7500	85.725 3.3750	1460000 328000	0.45	1.32	379000 85100	294000 66000	1.29	3440000 773000	LM770945	LM770910
457.073 17.9950	573.088 22.5625	74.612 2.9375	1210000 271000	0.40	1.49	313000 70300	215000 48400	1.45	3170000 713000	L570648	L570610
457.200 18.0000	552.450 21.7500	44.450 1.7500	614000 138000	0.32	1.88	159000 35800	86900 19500	1.83	1550000 348000	80180	80217
457.200 18.0000	573.088 22.5625	74.612 2.9375	1210000 271000	0.40	1.49	313000 70300	215000 48400	1.45	3170000 713000	L570649	L570610
457.200 18.0000	596.900 23.5000	76.200 3.0000	1210000 272000	0.40	1.48	313000 70500	217000 48800	1.44	2890000 649000	EE244180	244235

[1] Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
[2] Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
[3] Negative value indicates effective center inside cone backface.
[4] These maximum fillet radii will be cleared by the bearing corners.
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
104.775 4.1250	82.550 3.2500	-7.1 -0.28	6.4 0.25	407.0 16.02	417.0 16.42	6.4 0.25	520.0 20.47	507.0 19.96	9.10 0.36	5.40 0.21	4380	279	0.2116	74.95 165.23
104.775 4.1250	82.550 3.2500	-7.1 -0.28	6.4 0.25	407.0 16.02	417.0 16.42	6.4 0.25	520.0 20.47	507.0 19.96	8.90 0.35	4.90 0.19	4760	301	0.2178	75.07 165.50
82.550 3.2500	63.500 2.5000	16.3 0.64	6.4 0.25	406.0 15.98	415.0 16.34	3.3 0.13	495.0 19.49	482.0 18.98	9.40 0.37	2.80 0.11	3740	480	0.2155	44.79 98.74
87.312 3.4375	68.262 2.6875	17.8 0.70	6.4 0.25	414.0 16.30	424.0 16.69	6.4 0.25	527.0 20.74	510.0 20.08	8.10 0.32	2.70 0.11	4640	498	0.2316	63.17 139.27
61.120 2.4063	55.562 2.1875	35.6 1.40	6.4 0.25	416.0 16.38	426.0 16.77	6.4 0.25	515.5 20.30	504.0 19.84	13.90 0.55	6.10 0.24	2780	448	0.2018	44.70 98.54
28.575 1.1250	20.638 0.8125	41.4 1.63	3.5 0.14	414.0 16.30	418.0 16.46	3.3 0.13	452.0 17.80	445.0 17.52	2.10 0.08	2.00 0.08	2300	1580	0.2225	6.54 14.41
61.912 2.4375	47.625 1.8750	20.3 0.80	3.3 0.13	423.0 16.65	426.0 16.77	3.3 0.13	492.0 19.37	483.0 19.02	6.20 0.24	2.70 0.11	3720	673	0.2038	26.32 58.03
61.120 2.4063	55.562 2.1875	35.6 1.40	6.4 0.25	425.0 16.73	435.0 17.13	6.4 0.25	515.5 20.30	504.0 19.84	13.90 0.55	6.10 0.24	2780	448	0.2018	40.88 90.12
87.312 3.4375	68.262 2.6875	17.8 0.70	6.4 0.25	428.0 16.85	438.0 17.24	6.4 0.25	527.0 20.74	510.0 20.08	8.10 0.32	2.20 0.08	4640	498	0.2316	55.01 121.28
84.138 3.3125	61.912 2.4375	15.5 0.61	6.4 0.25	427.0 16.81	437.0 17.20	3.3 0.13	526.5 20.72	519.0 20.43	12.70 0.50	3.20 0.12	3800	427	0.2143	53.68 118.34
61.120 2.4063	44.450 1.7500	35.6 1.40	6.4 0.25	425.0 16.73	435.0 17.13	6.4 0.25	516.0 20.31	516.0 20.31	13.90 0.55	6.10 0.24	2780	448	0.2018	40.30 88.84
161.925 6.3750	107.950 4.2500	79.2 3.12	12.7 0.50	463.5 18.24	513.0 20.20	12.7 0.50	719.5 28.32	657.0 25.87	25.80 1.02	20.50 0.81	4610	207	0.2945	313.78 691.76
87.312 3.4375	68.262 2.6875	17.8 0.70	6.4 0.25	431.0 16.97	440.0 17.32	6.4 0.25	527.0 20.74	510.0 20.08	9.40 0.37	3.10 0.12	4200	453	0.2235	53.52 117.98
114.300 4.5000	88.900 3.5000	-9.4 -0.37	6.4 0.25	441.0 17.36	451.0 17.76	6.4 0.25	562.5 22.14	549.0 21.61	10.60 0.42	6.00 0.24	5750	421	0.2319	94.63 208.62
73.025 2.8750	50.800 2.0000	47.0 1.85	6.4 0.25	455.0 17.91	465.0 18.31	6.4 0.25	563.0 22.16	558.0 21.97	18.70 0.74	-1.50 -0.06	3350	551	0.2207	59.19 130.50
46.038 1.8125	34.925 1.3750	23.4 0.92	3.3 0.13	446.0 17.56	450.0 17.72	3.3 0.13	510.0 20.08	510.0 20.08	4.20 0.16	1.20 0.05	3210	801	0.1815	20.48 45.14
44.450 1.7500	31.750 1.2500	26.2 1.03	3.3 0.13	452.0 17.80	456.0 17.95	3.3 0.13	531.0 20.91	531.0 20.91	5.90 0.23	4.40 0.17	3440	868	0.1880	25.03 55.18
44.450 1.7500	31.750 1.2500	26.2 1.03	3.3 0.13	452.0 17.80	456.0 17.95	3.3 0.13	531.0 20.91	537.0 21.14	5.90 0.23	4.40 0.17	3440	868	0.1880	27.80 61.28
74.612 2.9375	52.388 2.0625	50.0 1.97	3.3 0.13	453.0 17.83	457.0 17.99	3.3 0.13	549.0 21.61	537.0 21.14	11.40 0.45	-0.10 0.00	3720	491	0.2326	47.54 104.81
73.025 2.8750	50.800 2.0000	47.0 1.85	6.4 0.25	457.0 17.99	466.0 18.35	6.4 0.25	563.0 22.16	558.0 21.97	18.70 0.74	-1.50 -0.06	3350	551	0.2207	58.58 129.14
44.450 1.7500	31.750 1.2500	26.2 1.03	3.3 0.13	464.0 18.27	467.0 18.39	3.3 0.13	531.0 20.91	531.0 20.91	5.90 0.23	4.40 0.17	3440	868	0.1880	21.22 46.77
41.618 1.6385	32.545 1.2813	35.1 1.38	3.3 0.13	462.0 18.19	466.0 18.35	3.3 0.13	525.0 20.67	528.0 20.79	3.70 0.15	5.00 0.20	3160	930	0.1912	20.72 45.69
44.450 1.7500	31.750 1.2500	26.2 1.03	3.3 0.13	464.0 18.27	467.0 18.39	3.3 0.13	531.0 20.91	537.0 21.14	5.90 0.23	4.40 0.17	3440	868	0.1880	23.98 52.87
84.138 3.3125	60.325 2.3750	30.5 1.20	6.4 0.25	474.0 18.66	484.0 19.06	3.3 0.13	579.5 22.82	570.0 22.44	13.40 0.53	3.30 0.13	4660	537	0.2366	64.28 141.70
74.612 2.9375	57.150 2.2500	27.2 1.07	6.4 0.25	475.0 18.70	485.0 19.09	6.4 0.25	558.0 21.97	543.0 21.38	7.40 0.29	3.60 0.14	4970	560	0.2321	41.71 91.95
44.450 1.7500	31.750 1.2500	26.2 1.03	3.3 0.13	471.0 18.54	474.0 18.66	3.3 0.13	531.0 20.91	531.0 20.91	5.90 0.23	4.40 0.17	3440	868	0.1880	18.85 41.57
74.612 2.9375	57.150 2.2500	27.2 1.07	6.4 0.25	475.0 18.70	485.0 19.09	6.4 0.25	558.0 21.97	543.0 21.38	7.40 0.29	3.60 0.14	4970	560	0.2321	41.64 91.80
73.025 2.8750	53.975 2.1250	26.7 1.05	9.7 0.38	478.0 18.82	494.0 19.45	3.3 0.13	570.5 22.47	567.0 22.32	13.80 0.54	4.00 0.16	4410	627	0.2233	49.15 108.35

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

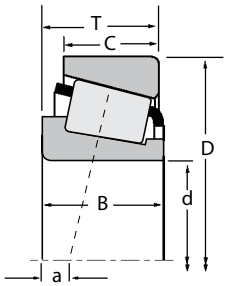
[7] Compound radius on inner race. Details on drawing for bearing.

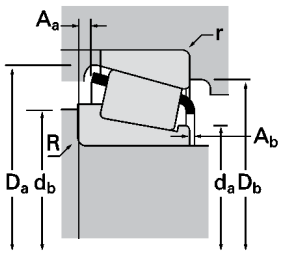
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
457.200 18.0000	603.250 23.7500	85.725 3.3750	1460000 328000	0.45	1.32	379000 85100	294000 66000	1.29	3440000 773000	LM770949	LM770910
457.200 18.0000	615.950 24.2500	85.725 3.3750	1660000 373000	0.33	1.80	430000 96700	245000 55000	1.76	4100000 921000	LM272235	LM272210
457.200 18.0000	730.148 28.7460	120.650 4.7500	2770000 623000	0.39	1.53	718000 161000	483000 109000	1.49	4870000 1100000	EE671801	672873
476.250 18.7500	565.150 22.2500	41.275 1.6250	460000 103000	0.47	1.28	119000 26800	95900 21600	1.24	1400000 315000	LL771948	LL771911
479.425 18.8750	679.450 26.7500	128.588 5.0625	3190000 717000	0.33	1.80	827000 186000	471000 106000	1.76	7400000 1660000	M272749	M272710
482.600 19.0000	615.950 24.2500	53.975 2.1250	643000 145000	0.35	1.72	167000 37500	99700 22400	1.67	1710000 384000	80480	80425
482.600 19.0000	615.950 24.2500	85.725 3.3750	1660000 373000	0.33	1.80	430000 96700	245000 55000	1.76	4100000 921000	LM272249	LM272210
482.600 19.0000	634.873 24.9950	80.962 3.1875	1440000 323000	0.34	1.75	373000 83900	219000 49200	1.70	3660000 822000	EE243190	243250
488.950 19.2500	634.873 24.9950	84.138 3.3125	1590000 357000	0.47	1.27	412000 92700	334000 75000	1.24	3870000 871000	LM772748	LM772710
488.950 19.2500	660.400 26.0000	93.662 3.6875	2030000 455000	0.31	1.95	525000 118000	276000 62000	1.90	4590000 1030000	EE640192	640260
498.323 19.6190	634.873 24.9950	80.962 3.1875	1440000 323000	0.34	1.75	373000 83900	219000 49200	1.70	3660000 822000	EE243197	243250
498.323 19.6190	634.873 24.9950	80.962 3.1875	1570000 352000	0.34	1.75	406000 91200	238000 53500	1.70	4130000 927000	EE243198	243250
498.475 19.6250	634.873 24.9950	80.962 3.1875	1570000 352000	0.34	1.75	406000 91200	238000 53500	1.70	4130000 927000	EE243195	243250
498.475 19.6250	634.873 24.9950	80.962 3.1875	1440000 323000	0.34	1.75	373000 83900	219000 49200	1.70	3660000 822000	EE243196	243250
508.000 20.0000	838.200 33.0000	146.050 5.7500	3540000 796000	0.48	1.25	918000 206000	754000 169000	1.22	6530000 1470000	EE426200	426330
533.400 21.0000	635.000 25.0000	50.800 2.0000	762000 171000	0.41	1.48	198000 44400	137000 30900	1.44	2040000 459000	LL575343	LL575310
536.575 21.1250	761.873 29.9950	146.050 5.7500	3930000 884000	0.33	1.80	1020000 229000	580000 130000	1.76	9250000 2080000	M276449	M276410
539.750 21.2500	635.000 25.0000	50.800 2.0000	762000 171000	0.41	1.48	198000 44400	137000 30900	1.44	2040000 459000	LL575349	LL575310
549.097 21.6180	692.150 27.2500	80.962 3.1875	1490000 335000	0.38	1.59	386000 86800	249000 55900	1.55	3970000 892000	L476548	L476510
549.275 21.6250	692.150 27.2500	80.962 3.1875	1490000 335000	0.38	1.59	386000 86800	249000 55900	1.55	3970000 892000	L476549	L476510
558.800 22.0000	736.600 29.0000	104.775 4.1250	2520000 567000	0.35	1.73	653000 147000	387000 87100	1.69	6370000 1430000	LM377449	LM377410
571.500 22.5000	812.800 32.0000	155.575 6.1250	4440000 999000	0.33	1.80	1150000 259000	656000 147000	1.76	10600000 2370000	M278749	M278710
584.200 23.0000	685.800 27.0000	49.212 1.9375	783000 176000	0.44	1.37	203000 45600	152000 34100	1.34	2280000 513000	LL778149	LL778110
596.900 23.5000	685.800 27.0000	31.750 1.2500	337000 75800	0.53	1.14	87400 19600	78800 17700	1.11	963000 217000	680235	680270
602.945 23.7380	787.400 31.0000	93.662 3.6875	2230000 502000	0.37	1.62	579000 130000	367000 82600	1.58	5620000 1260000	EE649237	649310
609.346 23.9900	787.400 31.0000	93.662 3.6875	2230000 502000	0.37	1.62	579000 130000	367000 82600	1.58	5620000 1260000	EE649238	649310
609.396 23.9920	762.000 30.0000	95.250 3.7500	1940000 437000	0.49	1.23	503000 113000	420000 94400	1.20	5470000 1230000	L879946	L879910
609.600 24.0000	762.000 30.0000	95.250 3.7500	1940000 437000	0.49	1.23	503000 113000	420000 94400	1.20	5470000 1230000	L879947	L879910

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a(3)	R(4)	d_a	d_b	r(4)	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
84.138 3.3125	60.325 2.3750	30.5 1.20	6.4 0.25	479.0 18.86	489.0 19.25	3.3 0.13	579.5 22.82	570.0 22.44	13.40 0.53	3.30 0.13	4660	537	0.2366	61.29 135.12
85.725 3.3750	66.675 2.6250	12.4 0.49	6.4 0.25	483.0 19.02	493.0 19.41	6.4 0.25	596.5 23.48	585.0 23.03	8.10 0.32	4.00 0.16	6040	665	0.2333	71.13 156.81
114.300 4.5000	82.550 3.2500	5.3 0.21	9.7 0.38	491.0 19.33	507.0 19.96	6.4 0.25	680.5 26.79	675.0 26.57	19.80 0.78	10.20 0.40	4970	343	0.2315	163.93 361.40
41.275 1.6250	31.750 1.2500	58.4 2.30	3.3 0.13	491.0 19.33	495.0 19.49	3.3 0.13	549.0 21.61	543.0 21.38	3.50 0.14	1.30 0.05	3790	1240	0.2189	19.28 42.51
128.588 5.0625	101.600 4.0000	-8.9 -0.35	6.4 0.25	507.0 19.96	516.0 20.31	6.4 0.25	648.0 25.52	633.0 24.92	9.90 0.39	7.60 0.30	8110	508	0.2598	141.63 312.24
46.038 1.8125	41.275 1.6250	36.6 1.44	3.3 0.13	501.0 19.72	504.0 19.84	3.3 0.13	579.0 22.80	582.0 22.91	6.20 0.24	2.90 0.12	4150	1070	0.2056	34.81 76.74
85.725 3.3750	66.675 2.6250	12.4 0.49	6.4 0.25	501.0 19.72	513.0 20.20	6.4 0.25	596.5 23.48	585.0 23.03	8.10 0.32	4.00 0.16	6040	665	0.2333	58.43 128.81
80.962 3.1875	63.500 2.5000	19.0 0.75	6.4 0.25	510.0 20.08	516.0 20.31	3.3 0.13	609.5 24.00	603.0 23.74	8.10 0.32	2.50 0.10	6060	726	0.2350	66.08 145.67
84.138 3.3125	61.912 2.4375	40.9 1.61	6.4 0.25	510.0 20.08	522.0 20.55	3.3 0.13	613.5 24.15	600.0 23.62	10.30 0.40	2.90 0.12	5450	602	0.2525	64.08 141.27
94.458 3.7188	69.850 2.7500	4.8 0.19	6.4 0.25	513.0 20.20	522.0 20.55	6.4 0.25	630.5 24.82	624.0 24.57	10.50 0.41	4.60 0.18	6320	601	0.2310	83.41 183.89
80.962 3.1875	63.500 2.5000	19.0 0.75	6.4 0.25	522.0 20.55	528.0 20.79	3.3 0.13	609.5 24.00	603.0 23.74	8.10 0.32	2.50 0.10	6060	726	0.2350	58.40 128.74
80.962 3.1875	63.500 2.5000	19.0 0.75	6.4 0.25	522.0 20.55	528.0 20.79	3.3 0.13	609.5 24.00	603.0 23.74	9.20 0.36	1.60 0.06	6590	788	0.2422	57.63 127.06
80.962 3.1875	63.500 2.5000	19.0 0.75	6.4 0.25	522.0 20.55	528.0 20.79	3.3 0.13	609.5 24.00	603.0 23.74	9.20 0.36	1.60 0.06	6590	788	0.2422	57.56 126.89
80.962 3.1875	63.500 2.5000	19.0 0.75	6.4 0.25	522.0 20.55	528.0 20.79	3.3 0.13	609.5 24.00	603.0 23.74	8.10 0.32	2.50 0.10	6060	726	0.2350	58.32 128.58
139.700 5.5000	104.775 4.1250	23.9 0.94	9.7 0.38	552.0 21.73	564.0 22.20	9.7 0.38	768.0 30.23	759.0 29.88	21.50 0.85	8.30 0.33	6650	435	0.2722	276.10 608.68
50.800 2.0000	38.100 1.5000	50.8 2.00	6.4 0.25	549.0 21.61	558.0 21.97	6.4 0.25	621.0 24.45	612.0 24.09	4.60 0.18	2.80 0.11	4810	1200	0.2270	28.27 62.33
146.050 5.7500	114.300 4.5000	-9.7 -0.38	6.4 0.25	570.0 22.44	576.0 22.68	6.4 0.25	725.5 28.57	711.0 27.99	13.30 0.52	5.50 0.22	10600	614	0.2839	202.61 446.67
50.800 2.0000	38.100 1.5000	50.8 2.00	6.4 0.25	555.0 21.85	564.0 22.20	6.4 0.25	621.0 24.45	612.0 24.09	4.60 0.18	2.80 0.11	4810	1200	0.2270	26.14 57.62
80.962 3.1875	61.912 2.4375	32.3 1.27	6.4 0.25	570.0 22.44	579.0 22.80	6.4 0.25	666.0 26.22	657.0 25.87	8.60 0.34	2.60 0.10	7260	889	0.2567	67.26 148.29
80.962 3.1875	61.912 2.4375	32.3 1.27	6.4 0.25	570.0 22.44	579.0 22.80	6.4 0.25	666.0 26.22	657.0 25.87	8.60 0.34	2.60 0.10	7260	889	0.2567	67.17 148.08
104.775 4.1250	80.962 3.1875	15.7 0.62	6.4 0.25	585.0 23.03	594.0 23.39	6.4 0.25	708.0 27.87	696.0 27.40	9.00 0.35	5.50 0.22	9310	907	0.2735	113.21 249.58
155.575 6.1250	120.650 4.7500	-11.4 -0.45	6.4 0.25	609.0 23.98	615.0 24.21	6.4 0.25	773.5 30.46	756.0 29.76	15.10 0.59	5.80 0.23	12400	669	0.2990	244.54 539.12
49.212 1.9375	34.925 1.3750	64.5 2.54	3.5 0.14	600.0 23.62	603.0 23.74	3.3 0.13	669.0 26.34	663.0 26.10	5.10 0.20	2.60 0.10	5980	1580	0.2494	28.83 63.57
31.750 1.2500	25.400 1.0000	96.0 3.78	3.5 0.14	615.0 24.21	615.0 24.21	3.3 0.13	669.0 26.34	663.0 26.10	1.80 0.07	1.50 -0.06	3740	1810	0.2225	16.76 36.95
93.662 3.6875	69.850 2.7500	31.5 1.24	6.4 0.25	630.0 24.80	639.0 25.16	6.4 0.25	755.5 29.74	747.0 29.41	11.20 0.44	6.20 0.24	9380	929	0.2790	110.72 244.10
93.662 3.6875	69.850 2.7500	31.5 1.24	6.4 0.25	633.0 24.92	642.0 25.28	6.4 0.25	755.5 29.74	747.0 29.41	11.20 0.44	6.20 0.24	9380	929	0.2790	106.26 234.25
92.075 3.6250	71.438 2.8125	57.9 2.28	6.4 0.25	633.0 24.92	642.0 25.28	6.4 0.25	741.0 29.17	720.0 28.35	11.70 0.46	5.10 0.20	9580	1010	0.3063	92.92 204.86
92.075 3.6250	71.438 2.8125	57.9 2.28	6.4 0.25	633.0 24.92	642.0 25.28	6.4 0.25	741.0 29.17	720.0 28.35	11.70 0.46	5.10 0.20	9580	1010	0.3063	92.78 204.55

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

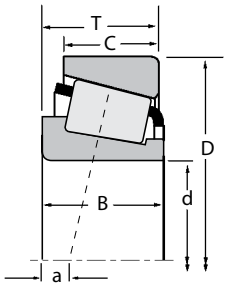
(7) Compound radius on inner race. Details on drawing for bearing.

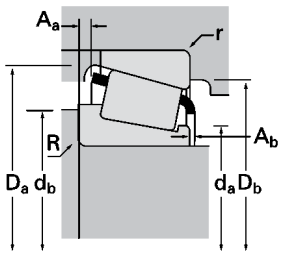
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

TS

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
609.600 24.0000	774.700 30.5000	85.725 3.3750	1980000 444000	0.40	1.49	512000 115000	353000 79300	1.45	4620000 1040000	L580049	L580010
609.600 24.0000	787.400 31.0000	93.662 3.6875	2230000 502000	0.37	1.62	579000 130000	367000 82600	1.58	5620000 1260000	EE649240	649310
615.950 24.2500	708.025 27.8750	41.275 1.6250	593000 133000	0.39	1.55	154000 34500	102000 22900	1.51	1840000 414000	LL580049	LL580010
635.000 25.0000	933.450 36.7500	179.388 7.0625	5750000 1290000	0.33	1.80	1490000 335000	848000 191000	1.76	13900000 3120000	M281635	M281610
660.235 25.9935	812.800 32.0000	95.250 3.7500	2170000 487000	0.33	1.80	561000 126000	320000 71900	1.76	5940000 1340000	L281146	L281110
660.400 26.0000	812.800 32.0000	95.250 3.7500	2170000 487000	0.33	1.80	561000 126000	320000 71900	1.76	5940000 1340000	L281148	L281110
660.400 26.0000	854.075 33.6250	85.725 3.3750	1920000 431000	0.35	1.71	496000 112000	299000 67100	1.66	4620000 1040000	EE749260	749336
673.100 26.5000	793.750 31.2500	66.675 2.6250	1090000 244000	0.36	1.67	282000 63300	174000 39000	1.62	3140000 707000	LL481448	LL481411
679.450 26.7500	901.700 35.5000	142.875 5.6250	4290000 964000	0.33	1.80	1110000 250000	633000 142000	1.76	11000000 2480000	LM281849	LM281810
682.625 26.8750	965.200 38.0000	185.738 7.3125	6120000 1380000	0.33	1.80	1590000 357000	903000 203000	1.76	14900000 3340000	M282249	M282210
759.925 29.9183	889.000 35.0000	88.900 3.5000	2010000 452000	0.31	1.97	522000 117000	272000 61300	1.91	6230000 1400000	L183448	L183410
762.000 30.0000	889.000 35.0000	88.900 3.5000	2010000 452000	0.31	1.97	522000 117000	272000 61300	1.91	6230000 1400000	L183449	L183410
801.688 31.5625	914.400 36.0000	58.738 2.3125	1060000 239000	0.40	1.51	276000 62000	187000 42100	1.47	3460000 778000	LL584449	LL584410
838.200 33.0000	1041.400 41.0000	93.662 3.6875	2160000 487000	0.44	1.37	561000 126000	420000 94500	1.33	5930000 1330000	EE763330	763410
1092.200 43.0000	1320.800 52.0000	95.250 3.7500	2280000 512000	0.57	1.05	591000 133000	577000 130000	1.02	6990000 1570000	EE776430	776520

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)													Weight kg (lbs.)
Bearing			Shaft			Housing			Cage		Factors			
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
79.375 3.1250	60.325 2.3750	45.2 1.78	6.4 0.25	633.0 24.92	642.0 25.28	6.4 0.25	749.5 29.51	741.0 29.17	-8.90 -0.35	3.80 0.15	7660	933	0.2671	82.53 181.94
93.662 3.6875	69.850 2.7500	31.5 1.24	6.4 0.25	633.0 24.92	642.0 25.28	6.4 0.25	755.5 29.74	747.0 29.41	11.20 0.44	6.20 0.24	9380	929	0.2790	106.08 233.86
41.275 1.6250	29.367 1.1562	61.7 2.43	3.5 0.14	630.0 24.80	633.0 24.92	3.3 0.13	690.0 27.17	687.0 27.05	3.10 0.12	2.80 0.11	6270	2020	0.2418	23.23 51.21
177.800 7.0000	141.288 5.5625	-13.5 -0.53	12.0 0.47	687.0 27.05	699.0 27.52	6.4 0.25	889.5 35.02	870.0 34.25	17.90 0.71	9.60 0.38	17300	805	0.3335	401.62 885.40
95.250 3.7500	73.025 2.8750	27.9 1.10	6.4 0.25	681.0 26.81	693.0 27.28	6.4 0.25	788.5 31.04	777.0 30.59	9.00 0.35	4.50 0.18	11700	915	0.2888	98.70 217.60
95.250 3.7500	73.025 2.8750	27.9 1.10	6.4 0.25	681.0 26.81	693.0 27.28	6.4 0.25	788.5 31.04	777.0 30.59	9.00 0.35	4.50 0.18	11700	915	0.2888	98.58 217.32
85.468 3.3649	60.325 2.3750	39.4 1.55	9.7 0.38	687.0 27.05	702.0 27.64	6.4 0.25	813.0 32.01	813.0 32.01	11.70 0.46	2.30 0.09	9220	1360	0.2707	108.93 240.16
61.912 2.4375	49.212 1.9375	53.8 2.12	6.4 0.25	690.0 27.17	702.0 27.64	6.4 0.25	771.0 30.35	765.0 30.12	4.10 0.16	1.60 0.06	8760	1650	0.2659	51.77 114.12
142.875 5.6250	111.125 4.3750	6.9 0.27	9.7 0.38	714.0 28.11	726.0 28.58	6.4 0.25	866.5 34.12	852.0 33.54	12.80 0.50	7.40 0.29	16300	961	0.3252	235.16 518.42
185.738 7.3125	142.875 5.6250	-15.2 -0.60	9.7 0.38	723.0 28.46	738.0 29.06	6.4 0.25	919.5 36.21	900.0 35.43	19.20 0.76	10.50 0.41	18800	842	0.3426	408.57 900.73
88.900 3.5000	72.000 2.8346	34.5 1.36	3.3 0.13	780.0 30.71	783.0 30.83	3.3 0.13	872.0 34.33	864.0 34.02	4.60 0.18	6.00 0.24	16100	2020	0.3102	89.99 198.38
88.900 3.5000	72.000 2.8346	34.5 1.36	3.3 0.13	780.0 30.71	783.0 30.83	3.3 0.13	872.0 34.33	864.0 34.02	4.60 0.18	6.00 0.24	16100	2020	0.3102	88.26 194.58
58.738 2.3125	41.275 1.6250	79.0 3.11	3.5 0.14	819.0 32.24	822.0 32.36	3.3 0.13	894.0 35.20	888.0 34.96	7.90 0.31	3.10 0.12	12400	2700	0.3058	52.69 116.16
88.900 3.5000	66.675 2.6250	83.1 3.27	6.4 0.25	870.0 34.25	876.0 34.49	6.4 0.25	1001.0 39.41	996.0 39.21	16.10 0.63	4.80 0.19	14700	1740	0.3374	154.58 340.78
88.900 3.5000	69.850 2.7500	175.8 6.92	6.4 0.25	1130.0 44.49	1135.0 44.69	6.4 0.25	1273.5 50.14	1260.0 49.61	15.60 0.61	4.90 0.19	23200	2940	0.4231	228.66 504.09

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.
(7) Compound radius on inner race. Details on drawing for bearing.
(8) Pin-type cage. Please consult The Timken Company.

If you need a product other than those shown here, please contact your Timken representative.

NOTES

TSF

TAPERED ROLLER BEARINGS

- Flange of the single-row type bearing is used for axial location in a housing.
- Through-boring of the housing results in accurately aligned seats.
- Flange is not normally clamped in position.
- To place an order or obtain a quotation, specify the inner- and outer-race part numbers.

Example: inner race — outer race

37425 - 37625-B

- Flanged outer race can be used with any single inner race from the same 'series.'
- The most commonly specified inner race part numbers are shown in the tables provided.
- Please consult a Timken representative for more information.

BEARING DATA TABLES

In the following bearing data tables, part numbers are listed in ascending order of bore, outside diameter and width.

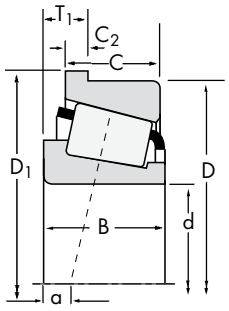
Bearing ratings shown in tables are based on environmental reference conditions. Effects of known operating conditions on bearing performance in an application should be investigated before final bearing selection is made.

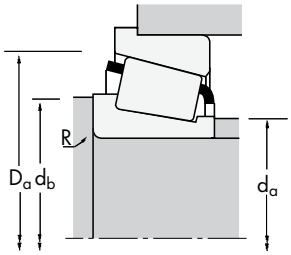
Approximate mass is listed for every part number. For weight-critical applications or exact freight cost evaluation purposes, a more accurate value should be obtained from your Timken representative.

B

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
7.938 0.3125	31.991 1.2595	4.458 0.1755	10600 2380	0.41	1.48	2750 618	1910 429	1.44	9230 2070	A2031	A2126-B
9.525 0.3750	31.991 1.2595	4.458 0.1755	10600 2380	0.41	1.48	2750 618	1910 429	1.44	9230 2070	A2037	A2126-B
11.987 0.4719	31.991 1.2595	4.458 0.1755	10600 2380	0.41	1.48	2750 618	1910 429	1.44	9230 2070	A2047	A2126-B
12.700 0.5000	34.988 1.3775	4.630 0.1823	12200 2740	0.45	1.32	3160 710	2450 550	1.29	11500 2580	A4050	A4138-B
14.987 0.5901	34.988 1.3775	4.630 0.1823	12200 2740	0.45	1.32	3160 710	2450 550	1.29	11500 2580	A4059	A4138-B
15.875 0.6250	39.992 1.5745	4.851 0.1910	12400 2790	0.53	1.14	3220 724	2900 653	1.11	12300 2770	A6062	A6157-B
15.875 0.6250	42.862 1.6875	6.350 0.2500	29100 6540	0.33	1.81	7550 1700	4280 962	1.76	29200 6560	17580	17520-B
15.875 0.6250	47.000 1.8504	6.038 0.2377	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05062	05185-B
16.993 0.6690	39.992 1.5745	4.851 0.1910	12400 2790	0.53	1.14	3220 724	2900 653	1.11	12300 2770	A6067	A6157-B
16.993 0.6690	47.000 1.8504	6.038 0.2377	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05066	05185-B
19.050 0.7500	39.992 1.5745	4.851 0.1910	12400 2790	0.53	1.14	3220 724	2900 653	1.11	12300 2770	A6075	A6157-B
19.050 0.7500	47.000 1.8504	6.038 0.2377	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05075	05185-B
19.050 0.7500	47.000 1.8504	14.381 0.5662	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05075X	05185-B
19.050 0.7500	49.225 1.9380	6.998 0.2755	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09067	09195AB
19.050 0.7500	53.975 2.1250	10.317 0.4062	43000 9670	0.59	1.02	11200 2510	11300 2540	0.99	42500 9560	21075	21212-B
19.050 0.7500	56.896 2.2400	7.455 0.2935	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1775	1729-B
19.987 0.7869	47.000 1.8504	6.048 0.2381	24700 5560	0.36	1.68	6420 1440	3920 881	1.64	25400 5720	05079	05185-B
20.000 0.7874	51.994 2.0470	5.080 0.2000	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07079	07204-B
20.625 0.8120	49.225 1.9380	8.809 0.3468	39700 8920	0.27	2.26	10300 2310	4680 1050	2.20	40500 9100	09081	09195AB
20.638 0.8125	61.912 2.4375	9.525 0.3750	82000 18400	0.28	2.13	21300 4780	10300 2310	2.07	89800 20200	3660	3620-B
22.225 0.8750	50.005 1.9687	6.749 0.2657	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07087	07196-B
22.225 0.8750	50.800 2.0000	5.080 0.2000	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07087X	07210XB
22.225 0.8750	51.994 2.0470	5.080 0.2000	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07087	07204-B
22.225 0.8750	56.896 2.2400	7.463 0.2938	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1755	1729-B
22.225 0.8750	60.325 2.3750	7.938 0.3125	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1975	1931-B
22.225 0.8750	66.421 2.6150	8.725 0.3435	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2684	2631-B
23.812 0.9375	51.994 2.0470	5.080 0.2000	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07093	07204-B
23.812 0.9375	56.896 2.2400	7.463 0.2938	42000 9450	0.31	1.95	10900 2450	5740 1290	1.90	45300 10200	1779	1729-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R [4]	d_a	d_b	D_a	G_1	G_2	Cg	
10.785 0.4246	7.938 0.3125	-3.0 -0.12	35.166 1.3845	2.388 0.0940	0.5 0.02	12.5 0.49	13.0 0.51	30.0 1.18	1.7	3.17	0.0308	0.05 0.11
10.785 0.4246	7.938 0.3125	-3.0 -0.12	35.166 1.3845	2.388 0.0940	1.3 0.05	13.5 0.53	15.0 0.59	30.0 1.18	1.7	3.17	0.0308	0.05 0.11
10.785 0.4246	7.938 0.3125	-3.0 -0.12	35.166 1.3845	2.388 0.0940	0.8 0.03	15.5 0.61	16.5 0.65	30.0 1.18	1.7	3.17	0.0308	0.05 0.10
10.988 0.4326	8.730 0.3437	-2.5 -0.10	38.062 1.4985	2.362 0.0930	1.3 0.05	17.0 0.67	18.5 0.73	33.5 1.32	2.3	4.12	0.0355	0.06 0.12
10.988 0.4326	8.730 0.3437	-2.5 -0.10	38.062 1.4985	2.362 0.0930	0.8 0.03	19.0 0.75	19.5 0.77	33.5 1.32	2.3	4.12	0.0355	0.05 0.12
11.153 0.4391	9.525 0.3750	-1.5 -0.06	43.066 1.6955	2.362 0.0930	1.3 0.05	20.5 0.81	22.0 0.87	38.0 1.50	2.9	5.64	0.0404	0.08 0.17
16.670 0.6563	13.495 0.5313	-5.8 -0.23	45.936 1.8085	3.175 0.1250	1.5 0.06	21.0 0.83	23.0 0.91	40.5 1.59	5.3	4.53	0.0423	0.13 0.29
14.381 0.5662	11.112 0.4375	-4.1 -0.16	50.861 2.0024	2.769 0.1090	1.5 0.06	21.0 0.83	23.5 0.93	44.5 1.75	5.8	5.55	0.0448	0.14 0.31
11.153 0.4391	9.525 0.3750	-1.5 -0.06	43.066 1.6955	2.362 0.0930	0.8 0.03	21.0 0.83	22.0 0.87	38.0 1.50	2.9	5.64	0.0404	0.08 0.17
14.381 0.5662	11.112 0.4375	-4.1 -0.16	50.861 2.0024	2.769 0.1090	1.5 0.06	22.0 0.87	24.5 0.96	44.5 1.75	5.8	5.55	0.0448	0.14 0.30
11.153 0.4391	9.525 0.3750	-1.5 -0.06	43.066 1.6955	2.362 0.0930	1.0 0.04	23.0 0.91	24.0 0.94	38.0 1.50	2.9	5.64	0.0404	0.07 0.16
14.381 0.5662	11.112 0.4375	-4.1 -0.16	50.861 2.0024	2.769 0.1090	1.3 0.05	23.5 0.93	25.0 0.98	44.5 1.75	5.8	5.55	0.0448	0.13 0.29
14.381 0.5662	11.112 0.4375	-4.1 -0.16	50.861 2.0024	2.769 0.1090	1.5 0.06	23.5 0.93	25.5 1.00	44.5 1.75	5.8	5.55	0.0448	0.13 0.29
19.050 0.7500	14.288 0.5625	-7.4 -0.29	53.081 2.0898	3.251 0.1280	1.3 0.05	24.0 0.94	25.5 1.00	46.5 1.83	8	4.05	0.0452	0.18 0.40
21.839 0.8598	15.875 0.6250	-5.8 -0.23	57.841 2.2772	3.967 0.1562	1.5 0.06	26.0 1.03	31.5 1.24	52.0 2.05	7	3.55	0.0558	0.26 0.57
19.837 0.7810	15.875 0.6250	-6.9 -0.27	60.757 2.3920	3.962 0.1560	1.5 0.06	25.0 0.98	27.0 1.06	53.0 2.09	10.6	5.39	0.0521	0.28 0.62
14.381 0.5662	11.112 0.4375	-4.1 -0.16	50.861 2.0024	2.769 0.1090	1.5 0.06	24.0 0.94	26.5 1.04	44.5 1.75	5.8	5.55	0.0448	0.13 0.28
14.260 0.5614	12.700 0.5000	-2.8 -0.11	55.855 2.1990	2.769 0.1090	1.5 0.06	26.0 1.02	27.5 1.08	50.0 1.97	7.6	7.07	0.0509	0.17 0.38
21.539 0.8480	14.288 0.5625	-9.1 -0.36	53.081 2.0898	3.251 0.1280	1.5 0.06	25.5 1.00	27.5 1.08	46.5 1.83	8	4.05	0.0452	0.18 0.40
30.416 1.1975	23.812 0.9375	-11.9 -0.47	66.571 2.6209	4.762 0.1875	2.3 0.09	29.5 1.16	33.5 1.32	59.0 2.32	17	6.38	0.0592	0.48 1.07
14.260 0.5614	9.525 0.3750	-2.8 -0.11	53.871 2.1209	2.779 0.1094	1.3 0.05	27.0 1.06	28.5 1.12	49.0 1.93	7.6	7.07	0.0509	0.13 0.30
14.260 0.5614	12.700 0.5000	-2.8 -0.11	54.762 2.1560	2.769 0.1090	1.5 0.06	27.0 1.06	29.0 1.14	49.0 1.93	7.6	7.07	0.0509	0.15 0.34
14.260 0.5614	12.700 0.5000	-2.8 -0.11	55.855 2.1990	2.769 0.1090	1.3 0.05	27.0 1.06	28.5 1.12	50.0 1.97	7.6	7.07	0.0509	0.16 0.36
19.837 0.7810	15.875 0.6250	-6.9 -0.27	60.757 2.3920	3.962 0.1560	1.3 0.05	27.5 1.08	29.0 1.14	53.0 2.09	10.6	5.39	0.0521	0.26 0.58
19.355 0.7620	15.875 0.6250	-5.8 -0.23	64.186 2.5270	3.967 0.1562	0.8 0.03	28.0 1.10	29.0 1.14	57.0 2.24	12.5	6.33	0.0565	0.31 0.68
25.433 1.0013	19.050 0.7500	-9.4 -0.37	70.282 2.7670	3.962 0.1560	1.5 0.06	32.0 1.26	34.0 1.34	62.0 2.44	19.3	8	0.0598	0.47 1.04
14.260 0.5614	12.700 0.5000	-2.8 -0.11	55.855 2.1990	2.769 0.1090	1.5 0.06	28.5 1.12	30.5 1.20	50.0 1.97	7.6	7.07	0.0509	0.16 0.34
19.837 0.7810	15.875 0.6250	-6.9 -0.27	60.757 2.3920	3.962 0.1560	0.8 0.03	28.5 1.12	29.5 1.16	53.0 2.09	10.6	5.39	0.0521	0.26 0.56

[4] These maximum fillet radii will be cleared by the bearing corners.

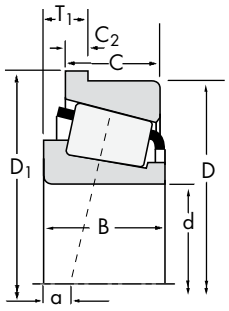
Continued on next page.

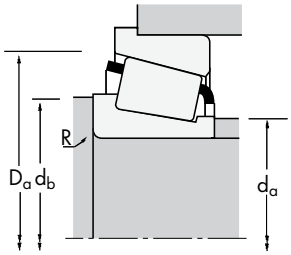
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
23.812 0.9375	72.000 2.8346	7.087 0.2790	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26093	26283-B
24.981 0.9835	50.005 1.9687	6.749 0.2657	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07098	07196-B
24.981 0.9835	51.994 2.0470	5.080 0.2000	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07098	07204-B
25.400 1.0000	50.800 2.0000	5.080 0.2000	27000 6060	0.40	1.49	6990 1570	4810 1080	1.45	29600 6650	07100-SA	07210XB
25.400 1.0000	57.150 2.2500	7.938 0.3125	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	15578	15520-B
25.400 1.0000	58.738 2.3125	7.938 0.3125	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1986	1932-B
25.400 1.0000	60.325 2.3750	7.938 0.3125	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1986	1931-B
25.400 1.0000	65.088 2.5625	10.320 0.4063	50600 11400	0.73	0.82	13100 2950	16400 3690	0.80	55800 12500	23100	23256-B
25.400 1.0000	66.421 2.6150	8.725 0.3435	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2687	2631-B
25.400 1.0000	68.262 2.6875	8.730 0.3437	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02473	02420-B
25.400 1.0000	72.000 2.8346	7.087 0.2790	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26100	26283-B
25.400 1.0000	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3189	3120-B
25.400 1.0000	72.626 2.8593	12.700 0.5000	64600 14500	0.60	1.00	16700 3760	17300 3880	0.97	64100 14400	41100	41286-B
26.975 1.0620	60.325 2.3750	7.938 0.3125	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1987	1931-B
26.987 1.0625	66.421 2.6150	8.725 0.3435	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2688	2631-B
26.987 1.0625	72.626 2.8593	12.700 0.5000	64600 14500	0.60	1.00	16700 3760	17300 3880	0.97	64100 14400	41106	41286-B
28.575 1.1250	57.150 2.2500	8.166 0.3215	42600 9570	0.35	1.73	11000 2480	6550 1470	1.69	50100 11300	15590	15520-B
28.575 1.1250	60.325 2.3750	7.938 0.3125	44800 10100	0.33	1.82	11600 2610	6560 1470	1.77	50200 11300	1985	1931-B
28.575 1.1250	66.421 2.6150	8.725 0.3435	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2689	2631-B
28.575 1.1250	69.850 2.7500	8.733 0.3438	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2578	2523-B
28.575 1.1250	72.000 2.8346	7.087 0.2790	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26112	26283-B
28.575 1.1250	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3192	3120-B
28.575 1.1250	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3198	3120-B
28.575 1.1250	72.626 2.8593	12.700 0.5000	64600 14500	0.60	1.00	16700 3760	17300 3880	0.97	64100 14400	41125	41286-B
29.367 1.1562	66.421 2.6150	8.725 0.3435	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2690	2631-B
29.367 1.1562	66.421 2.6150	8.725 0.3435	71000 16000	0.25	2.36	18400 4140	8000 1800	2.30	81700 18400	2691	2631-B
29.987 1.1806	62.000 2.4409	5.270 0.2075	40000 9000	0.38	1.57	10400 2330	6800 1530	1.53	44100 9910	17118	17244-B
29.987 1.1806	68.262 2.6875	8.730 0.3437	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02474A	02420-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
18.923 0.7450	15.875 0.6250	-4.1 -0.16	75.857 2.9865	3.962 0.1560	2.3 0.09	31.0 1.22	35.0 1.38	66.0 2.60	16.1	10.1	0.0630	0.44 0.96
14.260 0.5614	9.525 0.3750	-2.8 -0.11	53.871 2.1209	2.779 0.1094	1.5 0.06	29.0 1.14	31.0 1.22	49.0 1.93	7.6	7.07	0.0509	0.12 0.27
14.260 0.5614	12.700 0.5000	-2.8 -0.11	55.855 2.1990	2.769 0.1090	1.5 0.06	29.0 1.14	31.0 1.22	50.0 1.97	7.6	7.07	0.0509	0.15 0.33
14.260 0.5614	12.700 0.5000	-2.8 -0.11	54.762 2.1560	2.769 0.1090	3.3 0.13	29.5 1.16	35.0 1.38	49.0 1.93	7.6	7.07	0.0509	0.14 0.30
17.462 0.6875	13.495 0.5313	-5.1 -0.20	61.016 2.4022	3.970 0.1563	1.3 0.05	30.5 1.20	32.5 1.28	60.0 2.36	12.7	10.3	0.0577	0.24 0.52
19.355 0.7620	15.080 0.5937	-5.8 -0.23	62.598 2.4645	3.967 0.1562	1.3 0.05	30.5 1.20	32.5 1.28	56.0 2.20	12.5	6.33	0.0565	0.27 0.59
19.355 0.7620	15.875 0.6250	-5.8 -0.23	64.186 2.5270	3.967 0.1562	1.3 0.05	30.5 1.20	32.5 1.28	57.0 2.24	12.5	6.33	0.0565	0.29 0.64
21.463 0.8450	15.875 0.6250	-2.3 -0.09	68.953 2.7147	3.970 0.1563	1.5 0.06	34.5 1.36	39.0 1.54	63.0 2.48	11.3	6.57	0.0700	0.38 0.83
25.433 1.0013	19.050 0.7500	-9.4 -0.37	70.282 2.7670	3.962 0.1560	1.3 0.05	31.5 1.24	33.5 1.32	62.0 2.44	19.3	8	0.0598	0.45 0.99
22.225 0.8750	17.462 0.6875	-5.1 -0.20	72.128 2.8397	3.967 0.1562	0.8 0.03	33.5 1.32	34.5 1.36	65.0 2.56	17.5	8.48	0.0681	0.48 1.06
18.923 0.7450	15.875 0.6250	-4.1 -0.16	75.857 2.9865	3.962 0.1560	1.5 0.06	32.5 1.28	34.5 1.36	66.0 2.60	16.1	10.1	0.0630	0.43 0.94
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	0.8 0.03	35.0 1.38	35.5 1.40	69.0 2.72	23.4	8.76	0.0697	0.67 1.49
24.257 0.9550	17.462 0.6875	-4.1 -0.16	78.082 3.0741	5.555 0.2187	2.3 0.09	36.5 1.44	41.0 1.61	70.0 2.76	13	5.83	0.0686	0.52 1.16
19.355 0.7620	15.875 0.6250	-5.8 -0.23	64.186 2.5270	3.967 0.1562	0.8 0.03	31.5 1.24	32.5 1.28	57.0 2.24	12.5	6.33	0.0565	0.28 0.62
25.433 1.0013	19.050 0.7500	-9.4 -0.37	70.282 2.7670	3.962 0.1560	1.5 0.06	33.0 1.30	35.0 1.38	62.0 2.44	19.3	8	0.0598	0.44 0.96
24.257 0.9550	17.462 0.6875	-4.1 -0.16	78.082 3.0741	5.555 0.2187	2.3 0.09	36.5 1.44	42.0 1.65	70.0 2.76	13	5.83	0.0686	0.51 1.13
17.462 0.6875	13.495 0.5313	-5.1 -0.20	61.016 2.4022	3.970 0.1563	3.5 0.14	33.5 1.32	39.5 1.56	60.0 2.36	12.7	10.3	0.0577	0.21 0.47
19.355 0.7620	15.875 0.6250	-5.8 -0.23	64.186 2.5270	3.967 0.1562	0.8 0.03	33.5 1.32	34.0 1.34	57.0 2.24	12.5	6.33	0.0565	0.27 0.59
25.433 1.0013	19.050 0.7500	-9.4 -0.37	70.282 2.7670	3.962 0.1560	1.3 0.05	34.0 1.34	36.0 1.42	62.0 2.44	19.3	8	0.0598	0.42 0.93
25.357 0.9983	19.050 0.7500	-8.6 -0.34	73.711 2.9020	3.962 0.1560	2.3 0.09	35.0 1.38	39.0 1.54	66.0 2.60	23.6	9.63	0.0656	0.49 1.09
18.923 0.7450	15.875 0.6250	-4.1 -0.16	75.857 2.9865	3.962 0.1560	1.5 0.06	35.0 1.38	37.0 1.46	66.0 2.60	16.1	10.1	0.0630	0.41 0.90
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	3.5 0.14	37.0 1.46	43.5 1.71	69.0 2.72	23.4	8.76	0.0697	0.64 1.41
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	1.3 0.05	37.0 1.46	39.0 1.54	69.0 2.72	23.4	8.76	0.0697	0.64 1.42
24.257 0.9550	17.462 0.6875	-4.1 -0.16	78.082 3.0741	5.555 0.2187	4.8 0.19	36.5 1.44	48.0 1.89	70.0 2.76	13	5.83	0.0686	0.49 1.09
25.433 1.0013	19.050 0.7500	-9.4 -0.37	70.282 2.7670	3.962 0.1560	3.5 0.14	35.0 1.38	41.0 1.61	62.0 2.44	19.3	8	0.0598	0.41 0.91
25.433 1.0013	19.050 0.7500	-9.4 -0.37	70.282 2.7670	3.962 0.1560	0.8 0.03	36.5 1.44	37.5 1.48	62.0 2.44	19.3	8	0.0598	0.42 0.92
16.566 0.6522	14.288 0.5625	-3.6 -0.14	65.862 2.5930	3.556 0.1400	1.5 0.06	34.5 1.36	37.0 1.46	59.0 2.32	11.8	7.49	0.0579	0.24 0.53
22.225 0.8750	17.462 0.6875	-5.1 -0.20	72.128 2.8397	3.967 0.1562	0.8 0.03	38.5 1.52	39.5 1.56	65.0 2.56	17.5	8.48	0.0681	0.45 0.99

[4] These maximum fillet radii will be cleared by the bearing corners.

Continued on next page.

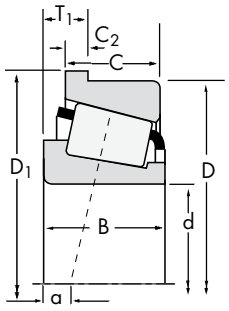
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

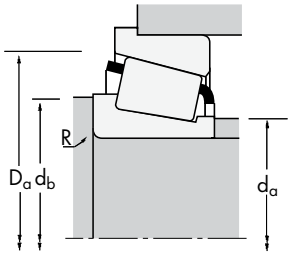
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

B

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
29.987 1.1806	72.000 2.8346	7.087 0.2790	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26118	26283-B
30.000 1.1811	69.012 2.7170	7.932 0.3123	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14117A	14276-B
30.000 1.1811	69.012 2.7170	7.932 0.3123	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14118	14276-B
30.000 1.1811	72.000 2.8346	7.087 0.2790	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26118-S	26283-B
30.000 1.1811	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3190	3120-B
30.162 1.1875	62.000 2.4409	5.270 0.2075	40000 9000	0.38	1.57	10400 2330	6800 1530	1.53	44100 9910	17119	17244-B
30.162 1.1875	64.292 2.5312	8.763 0.3450	55700 12500	0.55	1.10	14500 3250	13500 3040	1.07	71700 16100	M86649	M86611-B
30.162 1.1875	69.850 2.7500	8.733 0.3438	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2558	2523-B
30.162 1.1875	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3187	3120-B
30.162 1.1875	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3191	3120-B
30.162 1.1875	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3474	3420-B
30.162 1.1875	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	334	332-B
30.162 1.1875	80.000 3.1496	9.100 0.3583	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28118	28315-B
30.213 1.1895	63.500 2.5000	8.730 0.3437	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15118	15250-B
31.750 1.2500	58.738 2.3125	6.736 0.2652	29300 6600	0.47	1.27	7610 1710	6170 1390	1.23	35000 7880	08125	08231-B
31.750 1.2500	58.877 2.3180	6.833 0.2690	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67048	LM67010-BA
31.750 1.2500	59.131 2.3280	6.833 0.2690	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67047	LM67010-B
31.750 1.2500	59.131 2.3280	15.875 0.6250	36500 8210	0.41	1.46	9460 2130	6680 1500	1.42	44600 10000	LM67048	LM67010-B
31.750 1.2500	63.500 2.5000	7.841 0.3087	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15123	15250-B
31.750 1.2500	63.500 2.5000	8.730 0.3437	46800 10500	0.35	1.71	12100 2730	7280 1640	1.67	53900 12100	15125	15250-B
31.750 1.2500	68.262 2.6875	8.730 0.3437	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02475	02420-B
31.750 1.2500	68.262 2.6875	8.730 0.3437	59100 13300	0.42	1.44	15300 3440	10900 2450	1.40	70200 15800	02476	02420-B
31.750 1.2500	69.012 2.7170	7.932 0.3123	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14125A	14276-B
31.750 1.2500	69.850 2.7500	8.733 0.3438	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2580	2523-B
31.750 1.2500	69.850 2.7500	8.733 0.3438	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2582	2523-B
31.750 1.2500	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3188	3120-B
31.750 1.2500	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3193	3120-B
31.750 1.2500	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3199	3120-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
18.923 0.7450	15.875 0.6250	-4.1 -0.16	75.857 2.9865	3.962 0.1560	1.5 0.06	36.0 1.42	38.0 1.50	66.0 2.60	16.1	10.1	0.0630	0.40 0.88
19.583 0.7710	15.875 0.6250	-4.3 -0.17	72.873 2.8690	3.962 0.1560	3.5 0.14	40.0 1.57	43.0 1.69	65.0 2.56	18	9.4	0.0668	0.37 0.82
19.202 0.7560	15.875 0.6250	-4.3 -0.17	72.873 2.8690	3.962 0.1560	0.8 0.03	36.5 1.44	37.0 1.46	65.0 2.56	18	9.4	0.0668	0.37 0.82
18.923 0.7450	15.875 0.6250	-4.1 -0.16	75.857 2.9865	3.962 0.1560	1.5 0.06	36.0 1.42	38.0 1.50	66.0 2.60	16.1	10.1	0.0630	0.40 0.88
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	3.5 0.14	38.0 1.50	44.5 1.75	69.0 2.72	23.4	8.76	0.0697	0.62 1.37
16.566 0.6522	14.288 0.5625	-3.6 -0.14	65.862 2.5930	3.556 0.1400	1.5 0.06	34.5 1.36	37.0 1.46	59.0 2.32	11.8	7.49	0.0579	0.24 0.53
21.433 0.8438	16.670 0.6563	-3.3 -0.13	70.000 2.7559	4.000 0.1575	1.5 0.06	38.0 1.50	41.0 1.61	63.0 2.48	16.8	9.36	0.0736	0.36 0.79
25.357 0.9983	19.050 0.7500	-8.6 -0.34	73.711 2.9020	3.962 0.1560	2.3 0.09	36.5 1.44	40.0 1.57	66.0 2.60	23.6	9.63	0.0656	0.48 1.05
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	0.8 0.03	38.5 1.52	39.0 1.54	69.0 2.72	23.4	8.76	0.0697	0.63 1.38
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	3.5 0.14	38.5 1.52	44.5 1.75	69.0 2.72	23.4	8.76	0.0697	0.62 1.37
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	0.8 0.03	40.0 1.57	41.0 1.61	76.0 2.99	29.9	11.2	0.0781	0.79 1.73
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	0.8 0.03	38.0 1.50	39.0 1.54	77.0 3.03	26.5	13	0.0676	0.60 1.32
20.940 0.8244	15.875 0.6250	-4.8 -0.19	83.858 3.3015	3.970 0.1563	1.5 0.06	37.5 1.48	40.0 1.57	73.0 2.87	20.7	12.5	0.0709	0.55 1.21
20.638 0.8125	15.875 0.6250	-5.8 -0.23	67.366 2.6522	3.967 0.1562	3.5 0.14	35.5 1.40	41.5 1.63	60.0 2.36	14.6	7.58	0.0606	0.31 0.67
15.080 0.5937	10.716 0.4219	-1.3 -0.05	62.598 2.4645	2.769 0.1090	1.0 0.04	36.0 1.42	37.5 1.48	57.0 2.24	10.7	10.6	0.0601	0.17 0.38
16.764 0.6600	11.811 0.4650	-3.0 -0.12	61.773 2.4320	2.769 0.1090	3.5 0.14	36.0 1.42	42.5 1.67	57.0 2.24	12.8	9.93	0.0612	0.18 0.40
16.764 0.6600	11.811 0.4650	-3.0 -0.12	61.912 2.4375	2.769 0.1090	2.3 0.09	36.0 1.42	40.0 1.57	57.0 2.24	12.8	9.93	0.0612	0.19 0.41
16.764 0.6600	11.811 0.4650	-3.0 -0.12	61.912 2.4375	2.769 0.1090	3.5 0.14	36.0 1.42	42.5 1.67	57.0 2.24	12.8	9.93	0.0612	0.18 0.39
19.050 0.7500	15.875 0.6250	-4.8 -0.19	67.366 2.6522	3.967 0.1562	0.0 0.00	36.5 1.44	42.5 1.67	60.0 2.36	14.6	7.58	0.0606	0.28 0.62
20.638 0.8125	15.875 0.6250	-5.8 -0.23	67.366 2.6522	3.967 0.1562	3.5 0.14	36.5 1.44	42.5 1.67	60.0 2.36	14.6	7.58	0.0606	0.29 0.65
22.225 0.8750	17.462 0.6875	-5.1 -0.20	72.128 2.8397	3.967 0.1562	3.5 0.14	38.5 1.52	44.5 1.75	65.0 2.56	17.5	8.48	0.0681	0.43 0.94
22.225 0.8750	17.462 0.6875	-5.1 -0.20	72.128 2.8397	3.967 0.1562	0.8 0.03	38.5 1.52	39.0 1.54	65.0 2.56	17.5	8.48	0.0681	0.43 0.95
19.583 0.7710	15.875 0.6250	-4.3 -0.17	72.873 2.8690	3.962 0.1560	3.5 0.14	38.5 1.52	44.5 1.75	65.0 2.56	18	9.4	0.0668	0.36 0.79
25.357 0.9983	19.050 0.7500	-8.6 -0.34	73.711 2.9020	3.962 0.1560	0.8 0.03	37.5 1.48	38.5 1.52	66.0 2.60	23.6	9.63	0.0656	0.47 1.03
25.357 0.9983	19.050 0.7500	-8.6 -0.34	73.711 2.9020	3.962 0.1560	3.5 0.14	37.5 1.48	44.0 1.73	66.0 2.60	23.6	9.63	0.0656	0.46 1.01
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	0.8 0.03	39.5 1.56	40.0 1.57	69.0 2.72	23.4	8.76	0.0697	0.61 1.34
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	3.5 0.14	39.5 1.56	45.5 1.79	69.0 2.72	23.4	8.76	0.0697	0.60 1.33
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	2.3 0.09	39.5 1.56	43.0 1.69	69.0 2.72	23.4	8.76	0.0697	0.61 1.34

[4] These maximum fillet radii will be cleared by the bearing corners.

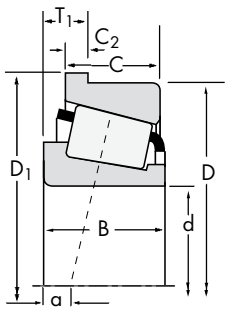
Continued on next page.

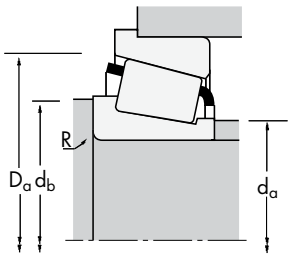
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
31.750 1.2500	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3476	3420-B
31.750 1.2500	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	346	332-B
32.004 1.2600	72.000 2.8346	7.087 0.2790	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26126	26283-B
33.338 1.3125	69.012 2.7170	7.938 0.3125	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14130	14276-B
33.338 1.3125	69.012 2.7170	7.938 0.3125	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14131	14276-B
33.338 1.3125	69.850 2.7500	8.725 0.3435	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2581	2523-B
33.338 1.3125	69.850 2.7500	8.733 0.3438	77500 17400	0.27	2.19	20100 4520	9410 2120	2.14	94400 21200	2585	2523-B
33.338 1.3125	72.000 2.8346	7.087 0.2790	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26131	26283-B
33.338 1.3125	72.000 2.8346	7.087 0.2790	54400 12200	0.36	1.67	14100 3170	8700 1960	1.62	60100 13500	26132	26283-B
33.338 1.3125	72.238 2.8440	8.733 0.3438	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16131	16284-B
33.338 1.3125	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3196	3120-B
33.338 1.3125	72.626 2.8593	11.112 0.4375	87700 19700	0.33	1.80	22700 5110	13000 2910	1.76	102000 22800	3197	3120-B
33.338 1.3125	76.200 3.0000	11.112 0.4375	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89443	HM89410-B
33.338 1.3125	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3477	3420-B
33.338 1.3125	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3483	3420-B
33.338 1.3125	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	335-S	332-B
34.925 1.3750	69.012 2.7170	7.938 0.3125	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14137A	14276-B
34.925 1.3750	69.012 2.7170	7.938 0.3125	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14138A	14276-B
34.925 1.3750	72.238 2.8440	8.733 0.3438	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16137	16284-B
34.925 1.3750	76.200 3.0000	10.320 0.4063	87700 19700	0.40	1.49	22700 5110	15600 3520	1.45	107000 24100	31593	31520-B
34.925 1.3750	76.200 3.0000	11.112 0.4375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2786	2720-B
34.925 1.3750	76.200 3.0000	11.112 0.4375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2793	2720-B
34.925 1.3750	76.200 3.0000	11.112 0.4375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2796	2720-B
34.925 1.3750	76.200 3.0000	11.112 0.4375	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89446	HM89410-B
34.925 1.3750	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3478	3420-B
34.925 1.3750	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3482	3420-B
34.925 1.3750	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	335	332-B
34.925 1.3750	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	343	332-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	1.3 0.05	41.0 1.61	43.0 1.69	76.0 2.99	29.9	11.2	0.0781	0.77 1.69
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	0.8 0.03	39.5 1.56	40.0 1.57	77.0 3.03	26.5	13	0.0676	0.58 1.29
18.923 0.7450	15.875 0.6250	-4.1 -0.16	75.857 2.9865	3.962 0.1560	1.5 0.06	37.5 1.48	39.5 1.56	66.0 2.60	16.1	10.1	0.0630	0.38 0.85
19.583 0.7710	15.875 0.6250	-4.3 -0.17	72.873 2.8690	3.962 0.1560	3.5 0.14	39.5 1.56	46.0 1.81	65.0 2.56	18	9.4	0.0668	0.35 0.77
19.583 0.7710	15.875 0.6250	-4.3 -0.17	72.873 2.8690	3.962 0.1560	0.8 0.03	39.5 1.56	40.5 1.59	65.0 2.56	18	9.4	0.0668	0.35 0.77
25.357 0.9983	19.050 0.7500	-8.6 -0.34	73.711 2.9020	3.962 0.1560	0.8 0.03	39.0 1.54	39.5 1.56	66.0 2.60	23.6	9.63	0.0656	0.45 0.99
25.357 0.9983	19.050 0.7500	-8.6 -0.34	73.711 2.9020	3.962 0.1560	3.5 0.14	39.0 1.54	45.0 1.77	66.0 2.60	23.6	9.63	0.0656	0.44 0.98
18.923 0.7450	15.875 0.6250	-4.1 -0.16	75.857 2.9865	3.962 0.1560	3.5 0.14	38.5 1.52	44.5 1.75	66.0 2.60	16.1	10.1	0.0630	0.37 0.81
18.923 0.7450	15.875 0.6250	-4.1 -0.16	75.857 2.9865	3.962 0.1560	1.5 0.06	38.5 1.52	40.5 1.59	66.0 2.60	16.1	10.1	0.0630	0.37 0.82
20.638 0.8125	15.875 0.6250	-4.1 -0.16	76.098 2.9960	3.970 0.1563	3.5 0.14	39.5 1.56	46.0 1.81	69.0 2.72	20.3	10.6	0.0707	0.41 0.91
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	3.5 0.14	40.5 1.59	47.0 1.85	69.0 2.72	23.4	8.76	0.0697	0.58 1.29
29.997 1.1810	23.812 0.9375	-10.2 -0.40	77.300 3.0433	4.762 0.1875	0.8 0.03	40.5 1.59	41.5 1.63	69.0 2.72	23.4	8.76	0.0697	0.59 1.30
28.575 1.1250	23.020 0.9063	-5.6 -0.22	80.863 3.1836	4.762 0.1875	0.8 0.03	44.5 1.75	46.5 1.83	75.0 2.95	28.9	13.1	0.0883	0.68 1.49
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	3.5 0.14	42.5 1.67	49.0 1.93	76.0 2.99	29.9	11.2	0.0781	0.74 1.64
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	0.8 0.03	42.5 1.67	43.0 1.69	76.0 2.99	29.9	11.2	0.0781	0.75 1.65
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	0.8 0.03	40.5 1.59	41.0 1.61	77.0 3.03	26.5	13	0.0676	0.57 1.26
19.583 0.7710	15.875 0.6250	-4.3 -0.17	72.873 2.8690	3.962 0.1560	1.5 0.06	41.0 1.61	43.0 1.69	65.0 2.56	18	9.4	0.0668	0.34 0.74
19.583 0.7710	15.875 0.6250	-4.3 -0.17	72.873 2.8690	3.962 0.1560	3.5 0.14	41.0 1.61	47.0 1.85	65.0 2.56	18	9.4	0.0668	0.34 0.74
20.638 0.8125	15.875 0.6250	-4.1 -0.16	76.098 2.9960	3.970 0.1563	3.5 0.14	40.5 1.59	47.0 1.85	69.0 2.72	20.3	10.6	0.0707	0.40 0.88
28.575 1.1250	23.812 0.9375	-7.6 -0.30	80.863 3.1836	4.762 0.1875	3.5 0.14	43.5 1.71	50.0 1.97	74.0 2.91	26.3	9.08	0.0773	0.64 1.42
25.654 1.0100	19.050 0.7500	-8.1 -0.32	82.550 3.2500	6.350 0.2500	5.0 0.20	41.0 1.61	51.0 2.01	73.0 2.87	28.7	12.2	0.0725	0.57 1.26
25.654 1.0100	19.050 0.7500	-8.1 -0.32	82.550 3.2500	6.350 0.2500	0.8 0.03	41.0 1.61	42.0 1.65	73.0 2.87	28.7	12.2	0.0725	0.59 1.29
25.654 1.0100	19.050 0.7500	-8.1 -0.32	82.550 3.2500	6.350 0.2500	3.5 0.14	41.0 1.61	47.5 1.87	73.0 2.87	28.7	12.2	0.0725	0.58 1.28
28.575 1.1250	23.020 0.9063	-5.6 -0.22	80.863 3.1836	4.762 0.1875	3.5 0.14	44.5 1.75	56.0 2.20	75.0 2.95	28.9	13.1	0.0883	0.66 1.45
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	3.5 0.14	43.5 1.71	50.0 1.97	76.0 2.99	29.9	11.2	0.0781	0.72 1.60
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	0.8 0.03	43.5 1.71	44.0 1.73	76.0 2.99	29.9	11.2	0.0781	0.73 1.61
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	0.8 0.03	41.5 1.63	42.5 1.67	77.0 3.03	26.5	13	0.0676	0.55 1.22
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	3.5 0.14	41.5 1.63	48.0 1.89	77.0 3.03	26.5	13	0.0676	0.55 1.21

[4] These maximum fillet radii will be cleared by the bearing corners.

Continued on next page.

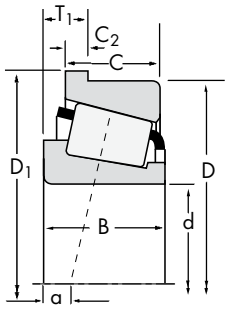
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

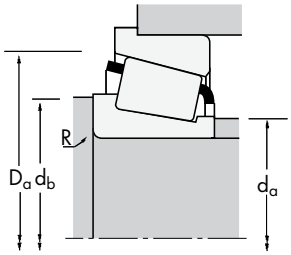
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

B

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
34.925 1.3750	80.000 3.1496	9.100 0.3583	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28137	28315-B
34.925 1.3750	80.167 3.1562	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3379	3320-B
34.925 1.3750	81.755 3.2187	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3379	3329-B
34.925 1.3750	87.312 3.4375	11.112 0.4375	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3581	3525-B
34.925 1.3750	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	449	432AB
34.925 1.3750	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	449	432-B
34.975 1.3770	69.012 2.7170	7.932 0.3123	50600 11400	0.38	1.57	13100 2950	8570 1930	1.53	61700 13900	14139	14276-B
34.976 1.3770	72.000 2.8346	6.287 0.2475	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19138	19283-B
34.975 1.3770	80.000 3.1496	9.100 0.3583	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28138	28315-B
35.000 1.3780	68.262 2.6875	7.539 0.2968	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19138X	19268-B
35.000 1.3780	72.000 2.8346	6.287 0.2475	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19138X	19283-B
35.000 1.3780	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3480	3420-B
35.000 1.3780	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	339	332-B
35.000 1.3780	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	441	432AB
35.000 1.3780	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	441	432-B
36.512 1.4375	68.262 2.6875	7.539 0.2968	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19143	19268-B
36.512 1.4375	72.000 2.8346	6.287 0.2475	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19143	19283-B
36.512 1.4375	72.238 2.8440	8.733 0.3438	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16143	16284-B
36.512 1.4375	76.200 3.0000	11.112 0.4375	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89448	HM89410-B
36.512 1.4375	76.200 3.0000	11.112 0.4375	86200 19400	0.55	1.10	22400 5030	20900 4700	1.07	119000 26700	HM89449	HM89410-B
36.512 1.4375	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3479	3420-B
36.512 1.4375	88.500 3.4843	13.492 0.5312	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44143	44348-B
38.100 1.5000	65.088 2.5625	5.944 0.2340	25100 5650	0.35	1.73	6520 1470	3860 869	1.69	33000 7430	13889	13836-B
38.100 1.5000	68.262 2.6875	7.539 0.2968	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19150	19268-B
38.100 1.5000	72.000 2.8346	6.287 0.2475	46900 10600	0.44	1.35	12200 2740	9260 2080	1.31	57800 13000	19150	19283-B
38.100 1.5000	72.238 2.8440	8.733 0.3438	52400 11800	0.40	1.49	13600 3060	9350 2100	1.45	65800 14800	16150	16284-B
38.100 1.5000	76.200 3.0000	11.112 0.4375	80400 18100	0.30	1.98	20800 4690	10800 2430	1.93	102000 23000	2788	2720-B
38.100 1.5000	79.375 3.1250	10.320 0.4063	96900 21800	0.37	1.64	25100 5650	15700 3530	1.60	119000 26800	3490	3420-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
20.940 0.8244	15.875 0.6250	-4.8 -0.19	83.858 3.3015	3.970 0.1563	1.5 0.06	41.0 1.61	43.5 1.71	73.0 2.87	20.7	12.5	0.0709	0.51 1.12
30.391 1.1965	23.812 0.9375	-10.9 -0.43	84.826 3.3396	4.762 0.1875	3.5 0.14	41.5 1.63	48.0 1.89	77.0 3.03	34.6	12.1	0.0744	0.78 1.72
30.391 1.1965	23.812 0.9375	-10.9 -0.43	86.413 3.4021	4.762 0.1875	3.5 0.14	41.5 1.63	48.0 1.89	77.0 3.03	34.6	12.1	0.0744	0.79 1.75
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	3.5 0.14	43.0 1.69	49.5 1.95	82.0 3.23	39.5	10.5	0.0808	0.94 2.07
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	0.8 0.03	43.5 1.71	44.0 1.73	87.0 3.43	42.5	11.3	0.0805	1.04 2.28
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	0.8 0.03	43.5 1.71	44.0 1.73	87.0 3.43	42.5	11.3	0.0805	1.12 2.47
19.583 0.7710	15.875 0.6250	-4.3 -0.17	72.873 2.8690	3.962 0.1560	1.3 0.05	41.0 1.61	42.5 1.67	65.0 2.56	18	9.4	0.0668	0.34 0.74
16.520 0.6504	14.288 0.5625	-1.5 -0.06	75.857 2.9865	3.556 0.1400	1.5 0.06	40.5 1.59	42.5 1.67	68.0 2.68	17.5	11.5	0.0694	0.33 0.73
20.940 0.8244	15.875 0.6250	-4.8 -0.19	83.858 3.3015	3.970 0.1563	1.5 0.06	41.0 1.61	43.5 1.71	73.0 2.87	20.7	12.5	0.0709	0.51 1.12
16.520 0.6504	11.908 0.4688	-1.5 -0.06	72.128 2.8397	3.571 0.1406	2.0 0.08	40.5 1.59	43.5 1.71	67.0 2.64	17.5	11.5	0.0694	0.27 0.60
16.520 0.6504	14.288 0.5625	-1.5 -0.06	75.857 2.9865	3.556 0.1400	2.0 0.08	40.5 1.59	43.5 1.71	68.0 2.68	17.5	11.5	0.0694	0.33 0.73
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	1.5 0.06	43.5 1.71	46.0 1.81	76.0 2.99	29.9	11.2	0.0781	0.73 1.60
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	0.8 0.03	41.5 1.63	42.5 1.67	77.0 3.03	26.5	13	0.0676	0.55 1.22
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	3.5 0.14	43.5 1.71	50.0 1.97	87.0 3.43	42.5	11.3	0.0805	1.03 2.27
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	3.5 0.14	43.5 1.71	50.0 1.97	87.0 3.43	42.5	11.3	0.0805	1.11 2.45
16.520 0.6504	11.908 0.4688	-1.5 -0.06	72.128 2.8397	3.571 0.1406	1.5 0.06	41.5 1.63	44.0 1.73	67.0 2.64	17.5	11.5	0.0694	0.26 0.58
16.520 0.6504	14.288 0.5625	-1.5 -0.06	75.857 2.9865	3.556 0.1400	1.5 0.06	41.5 1.63	44.0 1.73	68.0 2.68	17.5	11.5	0.0694	0.32 0.71
20.638 0.8125	15.875 0.6250	-4.1 -0.16	76.098 2.9960	3.970 0.1563	3.5 0.14	42.0 1.65	48.5 1.91	69.0 2.72	20.3	10.6	0.0707	0.38 0.84
28.575 1.1250	23.020 0.9063	-5.6 -0.22	80.863 3.1836	4.762 0.1875	0.8 0.03	44.5 1.75	48.5 1.91	75.0 2.95	28.9	13.1	0.0883	0.64 1.41
28.575 1.1250	23.020 0.9063	-5.6 -0.22	80.863 3.1836	4.762 0.1875	3.5 0.14	44.5 1.75	57.0 2.24	75.0 2.95	28.9	13.1	0.0883	0.64 1.41
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	0.8 0.03	44.5 1.75	45.5 1.79	76.0 2.99	29.9	11.2	0.0781	0.71 1.56
23.698 0.9330	17.462 0.6875	2.3 0.09	93.937 3.6983	5.555 0.2187	2.3 0.09	50.0 1.97	54.0 2.13	86.0 3.39	22.9	8.71	0.0899	0.76 1.68
11.908 0.4688	9.525 0.3750	-0.8 -0.03	68.161 2.6835	2.769 0.1090	1.5 0.06	42.5 1.67	45.0 1.77	63.0 2.48	14.8	23.3	0.0601	0.17 0.37
16.520 0.6504	11.908 0.4688	-1.5 -0.06	72.128 2.8397	3.571 0.1406	1.5 0.06	43.0 1.69	45.0 1.77	67.0 2.64	17.5	11.5	0.0694	0.25 0.55
16.520 0.6504	14.288 0.5625	-1.5 -0.06	75.857 2.9865	3.556 0.1400	1.5 0.06	43.0 1.69	45.0 1.77	68.0 2.68	17.5	11.5	0.0694	0.31 0.68
20.638 0.8125	15.875 0.6250	-4.1 -0.16	76.098 2.9960	3.970 0.1563	3.5 0.14	43.0 1.69	49.5 1.95	69.0 2.72	20.3	10.6	0.0707	0.37 0.81
25.654 1.0100	19.050 0.7500	-8.1 -0.32	82.550 3.2500	6.350 0.2500	3.5 0.14	43.5 1.71	50.0 1.97	73.0 2.87	28.7	12.2	0.0725	0.54 1.20
29.771 1.1721	23.812 0.9375	-8.6 -0.34	84.049 3.3090	4.762 0.1875	3.5 0.14	45.5 1.80	52.0 2.05	76.0 2.99	29.9	11.2	0.0781	0.68 1.50

[4] These maximum fillet radii will be cleared by the bearing corners.

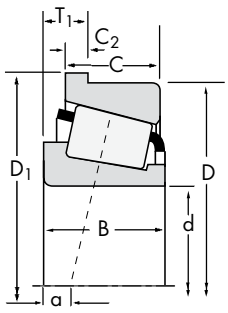
Continued on next page.

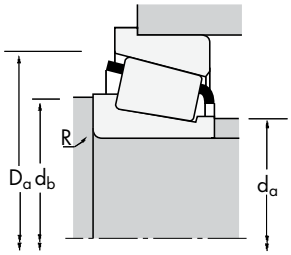
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
38.100 1.5000	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	347	332-B
38.100 1.5000	80.000 3.1496	9.100 0.3583	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28150	28315-B
38.100 1.5000	80.000 3.1496	9.100 0.3583	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28151	28315-B
38.100 1.5000	80.167 3.1562	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3381	3320-B
38.100 1.5000	80.167 3.1562	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3387	3320-B
38.100 1.5000	81.755 3.2187	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3381	3329-B
38.100 1.5000	81.755 3.2187	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3387	3329-B
38.100 1.5000	87.312 3.4375	11.112 0.4375	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3580	3525-B
38.100 1.5000	87.312 3.4375	11.112 0.4375	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3583	3525-B
38.100 1.5000	88.500 3.4843	13.492 0.5312	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44150	44348-B
38.100 1.5000	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	440	432AB
38.100 1.5000	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	444	432AB
38.100 1.5000	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	440	432-B
38.100 1.5000	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	444	432-B
38.100 1.5000	111.125 4.3750	14.288 0.5625	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	542	532-B
38.481 1.5150	65.088 2.5625	5.944 0.2340	25100 5650	0.35	1.73	6520 1470	3860 869	1.69	33000 7430	13890	13836-B
39.688 1.5625	80.167 3.1562	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3382	3320-B
39.688 1.5625	80.167 3.1562	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3386	3320-B
39.688 1.5625	81.755 3.2187	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3382	3329-B
39.688 1.5625	81.755 3.2187	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3386	3329-B
39.688 1.5625	88.500 3.4843	13.492 0.5312	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44156	44348-B
39.688 1.5625	88.500 3.4843	13.492 0.5312	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44158	44348-B
39.688 1.5625	120.650 4.7500	16.667 0.6562	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	620	612-B
40.000 1.5748	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	344A	332-B
40.000 1.5748	80.000 3.1496	9.100 0.3583	58800 13200	0.40	1.49	15200 3430	10500 2360	1.45	68900 15500	28158	28315-B
40.000 1.5748	85.725 3.3750	11.112 0.4375	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3879	3820-B
40.000 1.5748	88.500 3.4843	13.492 0.5312	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44157	44348-B
40.000 1.5748	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	442-S	432AB

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	3.5 0.14	44.0 1.73	50.0 1.97	77.0 3.03	26.5	13	0.0676	0.52 1.14
20.940 0.8244	15.875 0.6250	-4.8 -0.19	83.858 3.3015	3.970 0.1563	1.5 0.06	43.5 1.71	45.5 1.79	73.0 2.87	20.7	12.5	0.0709	0.48 1.05
20.940 0.8244	15.875 0.6250	-4.8 -0.19	83.858 3.3015	3.970 0.1563	3.5 0.14	43.5 1.71	50.0 1.97	73.0 2.87	20.7	12.5	0.0709	0.47 1.04
30.391 1.1965	23.812 0.9375	-10.9 -0.43	84.826 3.3396	4.762 0.1875	3.5 0.14	44.5 1.75	51.0 2.01	77.0 3.03	34.6	12.1	0.0744	0.73 1.62
30.391 1.1965	23.812 0.9375	-10.9 -0.43	84.826 3.3396	4.762 0.1875	0.8 0.03	44.5 1.75	45.0 1.77	77.0 3.03	34.6	12.1	0.0744	0.74 1.63
30.391 1.1965	23.812 0.9375	-10.9 -0.43	86.413 3.4021	4.762 0.1875	3.5 0.14	44.5 1.75	51.0 2.01	77.0 3.03	34.6	12.1	0.0744	0.75 1.65
30.391 1.1965	23.812 0.9375	-10.9 -0.43	86.413 3.4021	4.762 0.1875	0.8 0.03	44.5 1.75	45.0 1.77	77.0 3.03	34.6	12.1	0.0744	0.76 1.67
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	1.5 0.06	45.5 1.79	48.0 1.89	82.0 3.23	39.5	10.5	0.0808	0.90 1.98
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	3.5 0.14	45.5 1.79	52.0 2.05	82.0 3.23	39.5	10.5	0.0808	0.89 1.97
23.698 0.9330	17.462 0.6875	2.3 0.09	93.937 3.6983	5.555 0.2187	2.3 0.09	51.0 2.00	55.0 2.17	86.0 3.39	22.9	8.71	0.0899	0.74 1.64
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	0.8 0.03	45.5 1.79	46.5 1.83	87.0 3.43	42.5	11.3	0.0805	0.99 2.19
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	3.5 0.14	45.5 1.79	52.0 2.05	87.0 3.43	42.5	11.3	0.0805	0.99 2.18
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	0.8 0.03	45.5 1.79	46.5 1.83	87.0 3.43	42.5	11.3	0.0805	1.08 2.37
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	3.5 0.14	45.5 1.79	52.0 2.05	87.0 3.43	42.5	11.3	0.0805	1.07 2.36
36.957 1.4550	30.162 1.1875	-12.2 -0.48	117.373 4.6210	6.350 0.2500	3.5 0.14	49.0 1.93	55.0 2.17	100.0 3.94	64.3	16.1	0.0938	2.01 4.43
11.908 0.4688	9.525 0.3750	-0.8 -0.03	68.161 2.6835	2.769 0.1090	0.4 0.02	43.0 1.69	43.0 1.69	63.0 2.48	14.8	23.3	0.0601	0.16 0.36
30.391 1.1965	23.812 0.9375	-10.9 -0.43	84.826 3.3396	4.762 0.1875	3.5 0.14	45.5 1.79	52.0 2.05	77.0 3.03	34.6	12.1	0.0744	0.71 1.57
30.391 1.1965	23.812 0.9375	-10.9 -0.43	84.826 3.3396	4.762 0.1875	0.8 0.03	45.5 1.79	46.5 1.83	77.0 3.03	34.6	12.1	0.0744	0.72 1.58
30.391 1.1965	23.812 0.9375	-10.9 -0.43	86.413 3.4021	4.762 0.1875	3.5 0.14	45.5 1.79	52.0 2.05	77.0 3.03	34.6	12.1	0.0744	0.73 1.60
30.391 1.1965	23.812 0.9375	-10.9 -0.43	86.413 3.4021	4.762 0.1875	0.8 0.03	45.5 1.79	46.5 1.83	77.0 3.03	34.6	12.1	0.0744	0.73 1.61
23.698 0.9330	17.462 0.6875	2.3 0.09	93.937 3.6983	5.555 0.2187	2.3 0.09	51.0 2.00	56.0 2.20	86.0 3.39	22.9	8.71	0.0899	0.73 1.60
23.698 0.9330	17.462 0.6875	2.3 0.09	93.937 3.6983	5.555 0.2187	3.5 0.14	51.0 2.00	58.0 2.28	86.0 3.39	22.9	8.71	0.0899	0.72 1.59
41.275 1.6250	31.750 1.2500	-14.0 -0.55	127.691 5.0272	7.142 0.2812	0.8 0.03	52.0 2.05	53.0 2.09	110.0 4.33	75.9	16.2	0.0694	2.60 5.74
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	0.8 0.03	45.5 1.79	46.0 1.81	77.0 3.03	26.5	13	0.0676	0.50 1.11
20.940 0.8244	15.875 0.6250	-4.8 -0.19	83.858 3.3015	3.970 0.1563	1.5 0.06	45.0 1.77	47.5 1.87	73.0 2.87	20.7	12.5	0.0709	0.46 1.01
30.162 1.1875	23.812 0.9375	-8.1 -0.32	89.586 3.5270	4.762 0.1875	0.8 0.03	50.0 1.97	51.0 2.01	83.0 3.27	37.8	13.5	0.0873	0.84 1.86
23.698 0.9330	17.462 0.6875	2.3 0.09	93.937 3.6983	5.555 0.2187	2.3 0.09	51.0 2.00	56.0 2.20	86.0 3.39	22.9	8.71	0.0899	0.72 1.59
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	3.5 0.14	47.0 1.85	54.0 2.13	87.0 3.43	42.5	11.3	0.0805	0.96 2.12

[4] These maximum fillet radii will be cleared by the bearing corners.

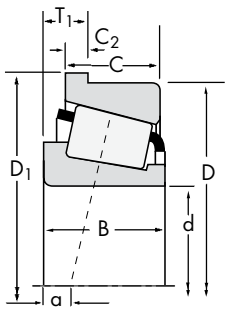
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

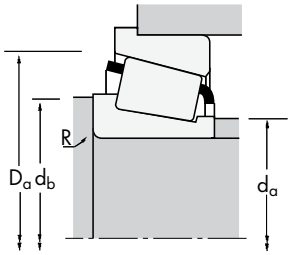
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

Continued on next page.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
40.000 1.5748	95.000 3.7402	10.000 0.3937	120000 27000	0.41	1.45	31200 7010	22100 4960	1.41	166000 37300	XGA33210	YSA33210R
40.000 1.5748	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	442-S	432-B
41.275 1.6250	76.200 3.0000	7.292 0.2871	44500 10000	0.49	1.23	11500 2600	9630 2170	1.20	55100 12400	11162	11300-B
41.275 1.6250	79.375 3.1250	8.733 0.3438	84300 19000	0.32	1.88	21900 4920	11900 2680	1.83	110000 24800	26882	26822-B
41.275 1.6250	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	336	332-B
41.275 1.6250	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	342	332-B
41.275 1.6250	80.167 3.1562	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3383	3320-B
41.275 1.6250	81.755 3.2187	10.320 0.4063	106000 23900	0.27	2.20	27600 6200	12900 2900	2.14	129000 29100	3383	3329-B
41.275 1.6250	85.725 3.3750	11.112 0.4375	115000 25900	0.40	1.49	29800 6710	20500 4610	1.45	148000 33200	3877	3820-B
41.275 1.6250	87.312 3.4375	11.100 0.4370	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3585	3525-B
41.275 1.6250	87.312 3.4375	11.112 0.4375	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3576	3525-B
41.275 1.6250	87.312 3.4375	11.112 0.4375	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3577	3525-B
41.275 1.6250	88.500 3.4843	13.492 0.5312	77900 17500	0.78	0.77	20200 4540	27000 6070	0.75	88600 19900	44162	44348-B
41.275 1.6250	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	447	432AB
41.275 1.6250	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	447	432-B
41.275 1.6250	98.425 3.8750	16.670 0.6563	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53162	53387-B
42.850 1.6870	107.950 4.2500	11.112 0.4375	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	461	453-B
42.862 1.6875	83.058 3.2700	8.733 0.3438	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25576	25521-B
42.862 1.6875	85.000 3.3465	9.525 0.3750	86400 19400	0.35	1.73	22400 5040	13300 2980	1.69	117000 26200	2973	2924-B
42.862 1.6875	87.312 3.4375	11.112 0.4375	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3579	3525-B
42.875 1.6880	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	342-S	332-B
43.000 1.6929	80.000 3.1496	7.938 0.3125	73600 16600	0.27	2.20	19100 4290	8920 2010	2.14	83400 18700	342X	332-B
44.450 1.7500	71.438 2.8125	5.969 0.2350	33400 7510	0.31	1.97	8660 1950	4530 1020	1.91	43600 9790	LL103049	LL103010-B
44.450 1.7500	73.025 2.8750	6.350 0.2500	52800 11900	0.32	1.88	13700 3080	7460 1680	1.83	78300 17600	L102849	L102810-B
44.450 1.7500	76.992 3.0312	9.126 0.3593	45900 10300	0.51	1.19	11900 2670	10300 2320	1.15	58100 13100	12175	12303-B
44.450 1.7500	79.375 3.1250	7.539 0.2968	48200 10800	0.37	1.60	12500 2810	7990 1800	1.56	61300 13800	18685	18620-B
44.450 1.7500	83.058 3.2700	8.733 0.3438	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25580	25521-B
44.450 1.7500	85.000 3.3465	7.938 0.3125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	355	354-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
32.000 1.2598	27.000 1.0630	-8.6 -0.34	102.000 4.0157	5.000 0.1968	1.5 0.06	54.0 2.13	56.0 2.20	89.0 3.50	48.4	15.3	0.0957	1.23 2.70
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	3.5 0.14	47.0 1.85	54.0 2.13	87.0 3.43	42.5	11.3	0.0805	1.04 2.30
17.384 0.6844	14.288 0.5625	-0.8 -0.03	80.863 3.1836	3.571 0.1406	1.5 0.06	46.5 1.83	49.0 1.93	73.0 2.87	19.2	12.8	0.0735	0.36 0.79
25.400 1.0000	19.050 0.7500	-7.4 -0.29	83.241 3.2772	3.970 0.1563	3.5 0.14	47.0 1.85	54.0 2.13	76.0 2.99	32.8	13.3	0.0770	0.55 1.21
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	0.8 0.03	46.0 1.81	47.0 1.85	77.0 3.03	26.5	13	0.0676	0.49 1.08
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	3.5 0.14	46.0 1.81	53.0 2.09	77.0 3.03	26.5	13	0.0676	0.48 1.06
30.391 1.1965	23.812 0.9375	-10.9 -0.43	84.826 3.3396	4.762 0.1875	3.5 0.14	47.0 1.85	54.0 2.13	77.0 3.03	34.6	12.1	0.0744	0.69 1.51
30.391 1.1965	23.812 0.9375	-10.9 -0.43	86.413 3.4021	4.762 0.1875	3.5 0.14	47.0 1.85	54.0 2.13	77.0 3.03	34.6	12.1	0.0744	0.70 1.55
30.162 1.1875	23.812 0.9375	-8.1 -0.32	89.586 3.5270	4.762 0.1875	3.5 0.14	50.5 1.98	57.0 2.24	83.0 3.27	37.8	13.5	0.0873	0.82 1.80
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	1.5 0.06	48.0 1.89	50.0 1.97	82.0 3.23	39.5	10.5	0.0808	0.85 1.88
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	0.8 0.03	48.0 1.89	49.0 1.93	82.0 3.23	39.5	10.5	0.0808	0.85 1.88
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	3.5 0.14	48.0 1.89	54.0 2.13	82.0 3.23	39.5	10.5	0.0808	0.85 1.87
23.698 0.9330	17.462 0.6875	2.3 0.09	93.937 3.6983	5.555 0.2187	2.3 0.09	51.0 2.00	57.0 2.24	86.0 3.39	22.9	8.71	0.0899	0.71 1.56
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	3.5 0.14	48.5 1.91	55.0 2.17	87.0 3.43	42.5	11.3	0.0805	0.94 2.07
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	3.5 0.14	48.5 1.91	55.0 2.17	87.0 3.43	42.5	11.3	0.0805	1.02 2.26
28.301 1.1142	20.638 0.8125	-0.3 -0.01	104.673 4.1210	6.350 0.2500	1.5 0.06	52.5 2.07	57.0 2.24	92.0 3.62	26.7	9.63	0.0930	1.11 2.44
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	0.8 0.03	53.0 2.09	54.0 2.13	100.0 3.94	58.6	17.1	0.0946	1.40 3.09
25.400 1.0000	19.050 0.7500	-6.4 -0.25	86.919 3.4220	3.970 0.1563	3.5 0.14	49.0 1.93	55.0 2.17	80.0 3.15	35.2	14.3	0.0801	0.60 1.32
25.608 1.0082	20.638 0.8125	-6.4 -0.25	89.764 3.5340	4.762 0.1875	3.5 0.14	49.5 1.95	56.0 2.20	82.0 3.23	38.2	15.7	0.0832	0.69 1.53
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	3.5 0.14	49.5 1.95	56.0 2.20	82.0 3.23	39.5	10.5	0.0808	0.82 1.81
22.403 0.8820	17.826 0.7018	-6.4 -0.25	84.658 3.3330	4.762 0.1875	3.5 0.14	47.5 1.87	54.0 2.13	77.0 3.03	26.5	13	0.0676	0.46 1.02
22.403 0.8820	17.826 0.7018	-6.1 -0.24	84.658 3.3330	4.762 0.1875	3.5 0.14	48.0 1.89	55.0 2.17	77.0 3.03	26.5	13	0.0676	0.47 1.03
12.700 0.5000	9.525 0.3750	-1.3 -0.05	74.231 2.9225	2.794 0.1100	1.5 0.06	48.5 1.91	51.0 2.01	69.0 2.72	20	23.6	0.0637	0.19 0.42
18.258 0.7188	15.083 0.5938	-3.8 -0.15	76.200 3.0000	3.175 0.1250	1.5 0.06	49.0 1.93	51.0 2.01	71.0 2.80	30.6	23.7	0.0751	0.31 0.68
17.145 0.6750	11.908 0.4688	0.0 0.00	80.564 3.1718	3.571 0.1406	1.5 0.06	49.5 1.95	52.0 2.05	75.0 2.95	21	15.8	0.0766	0.32 0.71
17.462 0.6875	13.495 0.5313	-2.0 -0.08	84.038 3.3086	3.571 0.1406	2.8 0.11	49.5 1.95	54.0 2.13	77.0 3.03	23.9	17.7	0.0725	0.37 0.81
25.400 1.0000	19.050 0.7500	-6.4 -0.25	86.919 3.4220	3.970 0.1563	3.5 0.14	50.0 1.97	57.0 2.24	80.0 3.15	35.2	14.3	0.0801	0.58 1.27
21.692 0.8540	17.462 0.6875	-4.8 -0.19	89.659 3.5299	4.762 0.1875	2.3 0.09	50.0 1.97	54.0 2.13	82.0 3.23	30	12.2	0.0732	0.54 1.20

[4] These maximum fillet radii will be cleared by the bearing corners.

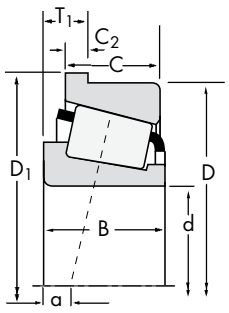
Continued on next page.

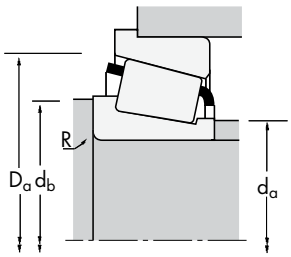
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
44.450 1.7500	85.000 3.3465	7.938 0.3125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	355X	354-B
44.450 1.7500	87.312 3.4375	11.112 0.4375	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3578	3525-B
44.450 1.7500	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	435	432AB
44.450 1.7500	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	438	432AB
44.450 1.7500	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	435	432-B
44.450 1.7500	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	438	432-B
44.450 1.7500	98.425 3.8750	16.670 0.6563	92800 20900	0.74	0.81	24000 5410	30500 6850	0.79	104000 23400	53176	53387-B
44.450 1.7500	101.600 4.0000	11.908 0.4688	123000 27600	0.40	1.50	31900 7160	21900 4910	1.46	155000 35000	49576	49520-B
44.450 1.7500	107.950 4.2500	11.115 0.4376	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	460	453-B
44.450 1.7500	108.966 4.2900	14.288 0.5625	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59175	59429-B
44.450 1.7500	120.650 4.7500	16.574 0.6525	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	615	612-B
44.450 1.7500	127.000 5.0000	17.462 0.6875	283000 63700	0.30	2.01	73500 16500	37500 8440	1.96	370000 83300	6277	6220-B
44.983 1.7710	83.058 3.2700	8.733 0.3438	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25584	25521-B
44.983 1.7710	93.264 3.6718	11.112 0.4375	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3776	3720-B
45.000 1.7717	75.000 2.9528	8.000 0.3150	61500 13800	0.39	1.53	15900 3580	10700 2410	1.49	84300 19000	X32009X	Y32009XR
45.000 1.7717	80.000 3.1496	10.000 0.3937	88000 19800	0.38	1.57	22800 5130	15000 3370	1.52	119000 26800	X33109	Y33109R
45.000 1.7717	85.000 3.3465	7.938 0.3125	75800 17000	0.31	1.96	19600 4420	10300 2320	1.91	88800 20000	358	354-B
45.000 1.7717	90.000 3.5433	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	367	362-B
45.237 1.7810	87.312 3.4375	11.112 0.4375	105000 23600	0.31	1.96	27200 6120	14300 3210	1.91	134000 30100	3586	3525-B
45.618 1.7960	83.058 3.2700	8.733 0.3438	83800 18800	0.33	1.79	21700 4880	12500 2800	1.74	111000 24900	25590	25521-B
46.038 1.8125	79.375 3.1250	7.539 0.2968	48200 10800	0.37	1.60	12500 2810	7990 1800	1.56	61300 13800	18690	18620-B
46.038 1.8125	85.000 3.3465	9.525 0.3750	86400 19400	0.35	1.73	22400 5040	13300 2980	1.69	117000 26200	2984	2924-B
46.038 1.8125	92.075 3.6250	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	436	432AB
46.038 1.8125	95.250 3.7500	11.115 0.4376	118000 26400	0.28	2.11	30500 6850	14800 3330	2.05	144000 32400	436	432-B
47.625 1.8750	88.900 3.5000	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	369-S	362AB
47.625 1.8750	90.000 3.5433	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	369A	362-B
47.625 1.8750	90.000 3.5433	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	369-S	362-B
47.625 1.8750	93.264 3.6718	11.112 0.4375	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3778	3720-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R [4]	d_a	d_b	D_a	G_1	G_2	Cg	
21.692 0.8540	17.462 0.6875	-4.8 -0.19	89.659 3.5299	4.762 0.1875	3.5 0.14	50.0 1.97	56.0 2.20	82.0 3.23	30	12.2	0.0732	0.54 1.19
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	3.5 0.14	51.0 2.01	57.0 2.24	82.0 3.23	39.5	10.5	0.0808	0.79 1.75
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	0.8 0.03	51.0 2.01	52.0 2.05	87.0 3.43	42.5	11.3	0.0805	0.90 1.98
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	3.5 0.14	51.0 2.01	57.0 2.24	87.0 3.43	42.5	11.3	0.0805	0.89 1.96
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	0.8 0.03	51.0 2.01	52.0 2.05	87.0 3.43	42.5	11.3	0.0805	0.98 2.16
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	3.5 0.14	51.0 2.01	57.0 2.24	87.0 3.43	42.5	11.3	0.0805	0.97 2.15
28.301 1.1142	20.638 0.8125	-0.3 -0.01	104.673 4.1210	6.350 0.2500	1.3 0.05	52.5 2.07	59.0 2.32	92.0 3.62	26.7	9.63	0.0930	1.06 2.33
31.750 1.2500	25.400 1.0000	-7.1 -0.28	107.056 4.2148	5.558 0.2188	0.8 0.03	54.0 2.13	55.0 2.17	98.0 3.86	49.1	14.2	0.0946	1.31 2.88
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	3.5 0.14	54.0 2.13	60.0 2.36	100.0 3.94	58.6	17.1	0.0946	1.37 3.02
36.512 1.4375	26.988 1.0625	-9.7 -0.38	115.214 4.5360	6.350 0.2500	3.5 0.14	56.0 2.20	63.0 2.48	101.0 3.98	57.3	14.7	0.0999	1.72 3.79
41.275 1.6250	31.750 1.2500	-14.0 -0.55	127.691 5.0272	7.142 0.2812	3.5 0.14	56.0 2.20	62.0 2.44	110.0 4.33	75.9	16.2	0.0694	2.49 5.50
52.388 2.0625	41.275 1.6250	-19.6 -0.77	134.925 5.3120	7.938 0.3125	3.5 0.14	60.0 2.36	67.0 2.64	117.0 4.61	103	18.7	0.0757	3.66 8.07
25.400 1.0000	19.050 0.7500	-6.4 -0.25	86.919 3.4220	3.970 0.1563	1.5 0.06	51.0 2.01	53.0 2.09	80.0 3.15	35.2	14.3	0.0801	0.57 1.27
30.302 1.1930	23.812 0.9375	-8.1 -0.32	97.937 3.8558	4.762 0.1875	3.5 0.14	53.0 2.09	59.0 2.32	90.0 3.54	49.9	14.5	0.0903	0.98 2.16
20.000 0.7874	15.500 0.6102	-3.3 -0.13	79.000 3.1102	3.500 0.1378	1.0 0.04	51.0 2.01	53.0 2.09	74.0 2.91	28.7	16.2	0.0788	0.36 0.79
26.000 1.0236	20.500 0.8071	-6.6 -0.26	85.000 3.3465	4.500 0.1772	1.5 0.06	52.0 2.05	55.0 2.17	79.0 3.11	35.7	14.5	0.0843	0.55 1.22
21.692 0.8540	17.462 0.6875	-4.8 -0.19	89.659 3.5299	4.762 0.1875	1.5 0.06	50.0 1.97	53.0 2.09	82.0 3.23	30	12.2	0.0732	0.54 1.19
22.225 0.8750	15.875 0.6250	-4.3 -0.17	94.661 3.7268	4.762 0.1875	2.0 0.08	51.0 2.01	55.0 2.17	86.0 3.39	33.8	14	0.0773	0.62 1.37
30.886 1.2160	23.812 0.9375	-10.2 -0.40	91.986 3.6215	4.750 0.1870	3.5 0.14	52.0 2.05	58.0 2.28	82.0 3.23	39.5	10.5	0.0808	0.78 1.72
25.400 1.0000	19.050 0.7500	-6.4 -0.25	86.919 3.4220	3.970 0.1563	3.5 0.14	51.0 2.01	58.0 2.28	80.0 3.15	35.2	14.3	0.0801	0.56 1.23
17.462 0.6875	13.495 0.5313	-2.0 -0.08	84.038 3.3086	3.571 0.1406	2.8 0.11	51.0 2.01	56.0 2.20	77.0 3.03	23.9	17.7	0.0725	0.35 0.77
25.608 1.0082	20.638 0.8125	-6.4 -0.25	89.764 3.5340	4.762 0.1875	3.5 0.14	52.0 2.05	58.0 2.28	82.0 3.23	38.2	15.7	0.0832	0.65 1.43
29.900 1.1772	22.225 0.8750	-9.1 -0.36	97.536 3.8400	5.558 0.2188	3.5 0.14	52.0 2.05	59.0 2.32	87.0 3.43	42.5	11.3	0.0805	0.86 1.90
29.900 1.1772	22.225 0.8750	-9.1 -0.36	100.686 3.9640	5.558 0.2188	3.5 0.14	52.0 2.05	59.0 2.32	87.0 3.43	42.5	11.3	0.0805	0.95 2.09
22.225 0.8750	16.513 0.6501	-4.3 -0.17	93.662 3.6875	4.762 0.1875	2.3 0.09	53.0 2.09	57.0 2.24	86.0 3.39	33.8	14	0.0773	0.58 1.28
22.225 0.8750	15.875 0.6250	-4.3 -0.17	94.661 3.7268	4.762 0.1875	3.5 0.14	53.0 2.09	60.0 2.36	86.0 3.39	33.8	14	0.0773	0.59 1.29
22.225 0.8750	15.875 0.6250	-4.3 -0.17	94.661 3.7268	4.762 0.1875	2.3 0.09	53.0 2.09	57.0 2.24	86.0 3.39	33.8	14	0.0773	0.59 1.30
30.302 1.1930	23.812 0.9375	-8.1 -0.32	97.937 3.8558	4.762 0.1875	6.4 0.25	55.0 2.17	67.0 2.64	90.0 3.54	49.9	14.5	0.0903	0.92 2.02

[4] These maximum fillet radii will be cleared by the bearing corners.

Continued on next page.

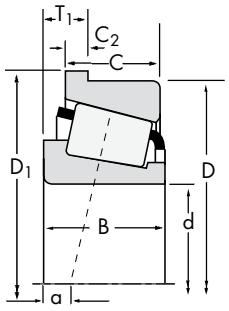
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

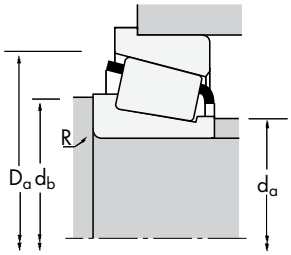
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

B

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
47.625 1.8750	93.264 3.6718	11.112 0.4375	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3779	3720-B
47.625 1.8750	95.250 3.7500	11.140 0.4386	115000 25900	0.55	1.10	29900 6710	27900 6280	1.07	157000 35400	HM804846	HM804811-B
47.625 1.8750	107.950 4.2500	11.112 0.4375	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	463	453-B
47.625 1.8750	107.950 4.2500	11.112 0.4375	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	467	453-B
47.625 1.8750	108.966 4.2900	14.288 0.5625	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59187	59429-B
47.625 1.8750	120.650 4.7500	16.574 0.6525	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	617	612-B
49.212 1.9375	90.000 3.5433	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365-S	362-B
49.212 1.9375	111.125 4.3750	14.288 0.5625	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	545	532-B
49.212 1.9375	114.300 4.5000	16.670 0.6563	207000 46500	0.43	1.39	53700 12100	39500 8880	1.36	256000 57500	65390	65320-B
49.982 1.9678	111.125 4.3750	14.288 0.5625	159000 35800	0.30	2.02	41300 9290	21000 4720	1.97	206000 46200	546	532-B
49.987 1.9680	80.962 3.1875	7.145 0.2813	56300 12700	0.36	1.69	14600 3280	8880 2000	1.64	88800 20000	L305648	L305610-B
50.000 1.9685	90.000 3.5433	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	365	362-B
50.000 1.9685	90.000 3.5433	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	366	362-B
50.800 2.0000	77.788 3.0625	5.969 0.2350	34600 7770	0.34	1.78	8960 2010	5160 1160	1.74	47200 10600	LL205449	LL205410-B
50.800 2.0000	80.962 3.1875	7.145 0.2813	56300 12700	0.36	1.69	14600 3280	8880 2000	1.64	88800 20000	L305649	L305610-B
50.800 2.0000	85.000 3.3465	7.539 0.2968	50600 11400	0.41	1.48	13100 2950	9110 2050	1.44	67500 15200	18790	18720-B
50.800 2.0000	85.725 3.3750	9.906 0.3900	47800 10700	0.57	1.06	12400 2780	12000 2710	1.03	63900 14400	18200	18337-B
50.800 2.0000	88.900 3.5000	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368	362AB
50.800 2.0000	88.900 3.5000	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368A	362AB
50.800 2.0000	90.000 3.5433	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368	362-B
50.800 2.0000	90.000 3.5433	8.887 0.3499	79500 17900	0.32	1.88	20600 4640	11300 2540	1.83	95800 21500	368A	362-B
50.800 2.0000	92.075 3.6250	8.730 0.3437	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28580	28521-B
50.800 2.0000	93.264 3.6718	11.112 0.4375	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3775	3720-B
50.800 2.0000	93.264 3.6718	11.112 0.4375	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3780	3720-B
50.800 2.0000	101.600 4.0000	11.908 0.4688	123000 27600	0.40	1.50	31900 7160	21900 4910	1.46	155000 35000	49585	49520-B
50.800 2.0000	104.775 4.1250	11.908 0.4688	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45285	45220-B
50.800 2.0000	104.775 4.1250	11.908 0.4688	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45285A	45220-B
50.800 2.0000	104.775 4.1250	11.908 0.4688	158000 35500	0.40	1.49	41000 9210	28200 6340	1.45	202000 45400	59201	59412-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
30.302 1.1930	23.812 0.9375	-8.1 -0.32	97.937 3.8558	4.762 0.1875	3.5 0.14	55.0 2.17	61.0 2.40	90.0 3.54	49.9	14.5	0.0903	0.93 2.06
29.370 1.1563	24.021 0.9457	-3.8 -0.15	100.686 3.9640	5.001 0.1969	3.5 0.14	57.5 2.26	66.0 2.60	93.0 3.66	44.8	14.6	0.1017	1.01 2.24
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	4.8 0.19	56.0 2.20	65.0 2.56	100.0 3.94	58.6	17.1	0.0946	1.31 2.89
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	0.8 0.03	56.0 2.20	57.0 2.24	100.0 3.94	58.6	17.1	0.0946	1.32 2.92
36.512 1.4375	26.988 1.0625	-9.7 -0.38	115.214 4.5360	6.350 0.2500	3.5 0.14	59.0 2.32	65.0 2.56	101.0 3.98	57.3	14.7	0.0999	1.65 3.64
41.275 1.6250	31.750 1.2500	-14.0 -0.55	127.691 5.0272	7.142 0.2812	3.5 0.14	58.0 2.28	65.0 2.56	110.0 4.33	75.9	16.2	0.0694	2.42 5.33
22.225 0.8750	15.875 0.6250	-4.3 -0.17	94.661 3.7268	4.762 0.1875	0.8 0.03	54.0 2.13	55.0 2.17	86.0 3.39	33.8	14	0.0773	0.57 1.25
36.957 1.4550	30.162 1.1875	-12.2 -0.48	117.373 4.6210	6.350 0.2500	3.5 0.14	57.0 2.24	64.0 2.52	100.0 3.94	64.3	16.1	0.0938	1.79 3.94
44.450 1.7500	34.925 1.3750	-12.4 -0.49	121.341 4.7772	7.145 0.2813	3.5 0.14	60.0 2.36	70.0 2.76	107.0 4.21	63.1	13	0.1053	2.30 5.07
36.957 1.4550	30.162 1.1875	-12.2 -0.48	117.373 4.6210	6.350 0.2500	3.5 0.14	58.0 2.28	65.0 2.56	100.0 3.94	64.3	16.1	0.0938	1.77 3.90
18.258 0.7188	14.288 0.5625	-2.5 -0.10	84.036 3.3085	3.175 0.1250	1.5 0.06	55.0 2.17	57.0 2.24	78.0 3.07	38.8	27.8	0.0841	0.38 0.83
22.225 0.8750	15.875 0.6250	-4.3 -0.17	94.661 3.7268	4.762 0.1875	2.0 0.08	55.0 2.17	58.0 2.28	86.0 3.39	33.8	14	0.0773	0.56 1.23
22.225 0.8750	15.875 0.6250	-4.3 -0.17	94.661 3.7268	4.762 0.1875	2.3 0.09	55.0 2.17	59.0 2.32	86.0 3.39	33.8	14	0.0773	0.56 1.23
12.700 0.5000	9.525 0.3750	0.0 0.00	80.582 3.1725	2.794 0.1100	1.5 0.06	55.0 2.17	57.0 2.24	75.0 2.95	24.2	29.1	0.0699	0.21 0.47
18.258 0.7188	14.288 0.5625	-2.5 -0.10	84.036 3.3085	3.175 0.1250	1.5 0.06	56.0 2.20	58.0 2.28	78.0 3.07	38.8	27.8	0.0841	0.37 0.81
17.462 0.6875	13.495 0.5313	-0.8 -0.03	88.570 3.4870	3.571 0.1406	3.5 0.14	56.0 2.20	62.0 2.44	82.0 3.23	28.6	21.5	0.0789	0.40 0.89
18.263 0.7190	12.700 0.5000	2.0 0.08	89.586 3.5270	3.556 0.1400	1.5 0.06	56.0 2.20	59.0 2.32	83.0 3.27	26.1	20.3	0.0852	0.42 0.92
22.225 0.8750	16.513 0.6501	-4.3 -0.17	93.662 3.6875	4.762 0.1875	1.5 0.06	56.0 2.20	58.0 2.28	86.0 3.39	33.8	14	0.0773	0.53 1.18
22.225 0.8750	16.513 0.6501	-4.3 -0.17	93.662 3.6875	4.762 0.1875	3.5 0.14	56.0 2.20	62.0 2.44	86.0 3.39	33.8	12.7	0.0773	0.53 1.16
22.225 0.8750	15.875 0.6250	-4.3 -0.17	94.661 3.7268	4.762 0.1875	1.5 0.06	56.0 2.20	58.0 2.28	86.0 3.39	33.8	14	0.0773	0.54 1.20
22.225 0.8750	15.875 0.6250	-4.3 -0.17	94.661 3.7268	4.762 0.1875	3.5 0.14	56.0 2.20	62.0 2.44	86.0 3.39	33.8	12.7	0.0773	0.54 1.19
25.400 1.0000	19.845 0.7813	-4.8 -0.19	95.941 3.7772	3.967 0.1562	3.5 0.14	57.0 2.24	63.0 2.48	89.0 3.50	46.4	22.6	0.0912	0.73 1.61
30.302 1.1930	23.812 0.9375	-8.1 -0.32	97.937 3.8558	4.762 0.1875	0.8 0.03	58.0 2.28	58.0 2.28	90.0 3.54	49.9	14.5	0.0903	0.88 1.95
30.302 1.1930	23.812 0.9375	-8.1 -0.32	97.937 3.8558	4.762 0.1875	3.5 0.14	58.0 2.28	64.0 2.52	90.0 3.54	49.9	14.5	0.0903	0.87 1.93
31.750 1.2500	25.400 1.0000	-7.1 -0.28	107.056 4.2148	5.558 0.2188	3.5 0.14	59.0 2.32	66.0 2.60	98.0 3.86	49.1	14.2	0.0946	1.18 2.61
30.958 1.2188	23.812 0.9375	-8.1 -0.32	110.231 4.3398	5.558 0.2188	2.3 0.09	59.0 2.32	63.0 2.48	101.0 3.98	63.5	16.9	0.0971	1.26 2.77
30.958 1.2188	23.812 0.9375	-8.1 -0.32	110.231 4.3398	5.558 0.2188	0.8 0.03	59.0 2.32	60.0 2.36	101.0 3.98	63.5	16.9	0.0971	1.25 2.76
36.512 1.4375	28.575 1.1250	-9.7 -0.38	110.500 4.3504	3.970 0.1563	0.8 0.03	61.0 2.40	62.0 2.44	101.0 3.98	57.3	14.7	0.0999	1.45 3.19

[4] These maximum fillet radii will be cleared by the bearing corners.

Continued on next page.

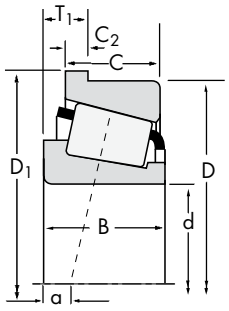
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

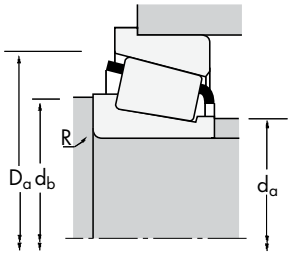
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

B

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
50.800 2.0000	104.775 4.1250	15.875 0.6250	159000 35700	0.49	1.23	41200 9260	34400 7730	1.20	223000 50200	HM807046	HM807010-B
50.800 2.0000	107.950 4.2500	11.112 0.4375	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455	453-B
50.800 2.0000	107.950 4.2500	11.115 0.4376	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	455-S	453-B
50.800 2.0000	111.125 4.3750	15.083 0.5938	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55200	55437-B
50.800 2.0000	120.650 4.7500	16.667 0.6562	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	619	612-B
50.800 2.0000	127.000 5.0000	16.670 0.6563	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65200	65500-B
52.000 2.0472	85.725 3.3750	9.906 0.3900	47800 10700	0.57	1.06	12400 2780	12000 2710	1.03	63900 14400	18204X	18337-B
52.388 2.0625	92.075 3.6250	8.730 0.3437	91600 20600	0.38	1.59	23700 5340	15300 3450	1.55	130000 29200	28584	28521-B
52.388 2.0625	93.264 3.6718	11.112 0.4375	113000 25400	0.34	1.77	29300 6590	17000 3820	1.73	153000 34300	3767	3720-B
52.388 2.0625	111.125 4.3750	15.083 0.5938	98500 22100	0.88	0.68	25500 5740	38600 8690	0.66	119000 26700	55206	55437-B
53.975 2.1250	93.264 3.6718	10.320 0.4063	120000 27000	0.33	1.82	31100 7000	17600 3950	1.77	161000 36200	33895	33820-B
53.975 2.1250	107.950 4.2500	11.115 0.4376	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	456	453-B
53.975 2.1250	120.650 4.7500	16.667 0.6562	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	621	612-B
53.975 2.1250	123.825 4.8750	14.288 0.5625	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	557-S	552-B
53.975 2.1250	127.000 5.0000	7.137 0.2810	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	557-S	553-BA
53.975 2.1250	127.000 5.0000	17.462 0.6875	283000 63700	0.30	2.01	73500 16500	37500 8440	1.96	370000 83300	6280	6220-B
53.975 2.1250	136.525 5.3750	16.662 0.6560	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	636	632-B
54.813 2.1580	135.755 5.3447	17.462 0.6875	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6380	6320-B
54.987 2.1649	135.755 5.3447	17.462 0.6875	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6381	6320-B
55.000 2.1654	96.838 3.8125	7.938 0.3125	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	385	382-B
55.000 2.1654	110.000 4.3307	16.000 0.6299	183000 41200	0.40	1.48	47500 10700	32800 7380	1.44	253000 56800	XGB-33212	Y33212R
55.000 2.1654	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	475	472-B
55.562 2.1875	107.950 4.2500	11.112 0.4375	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	466-S	453-B
55.575 2.1880	96.838 3.8125	7.938 0.3125	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	389	382-B
57.150 2.2500	84.933 3.3438	5.969 0.2350	33500 7520	0.37	1.62	8670 1950	5500 1240	1.58	46800 10500	LL408049	LL408010-B
57.150 2.2500	87.312 3.4375	7.145 0.2813	58100 13100	0.39	1.54	15100 3380	10000 2250	1.50	95600 21500	L507949	L507910-B
57.150 2.2500	96.838 3.8125	7.938 0.3125	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387	382-B
57.150 2.2500	96.838 3.8125	7.938 0.3125	84200 18900	0.35	1.69	21800 4910	13200 2980	1.65	107000 24100	387A	382-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
36.512 1.4375	28.575 1.1250	-7.4 -0.29	114.300 4.5000	7.937 0.3125	3.5 0.14	63.0 2.48	70.0 2.76	103.0 4.06	63.9	17.1	0.0760	1.60 3.53
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	0.8 0.03	59.0 2.32	60.0 2.36	100.0 3.94	58.6	17.1	0.0946	1.27 2.79
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	3.5 0.14	59.0 2.32	65.0 2.56	100.0 3.94	58.6	17.1	0.0946	1.26 2.78
26.909 1.0594	20.638 0.8125	7.1 0.28	116.683 4.5938	5.558 0.2188	3.5 0.14	64.0 2.51	71.0 2.80	107.0 4.21	36.8	13.2	0.1085	1.28 2.83
41.275 1.6250	31.750 1.2500	-14.0 -0.55	127.691 5.0272	7.142 0.2812	3.5 0.14	61.0 2.40	67.0 2.64	110.0 4.33	75.9	16.2	0.0694	2.34 5.16
44.450 1.7500	34.925 1.3750	-9.4 -0.37	134.041 5.2772	7.145 0.2813	3.5 0.14	69.0 2.72	75.0 2.95	120.0 4.72	83.2	17.2	0.0827	2.99 6.59
18.263 0.7190	12.700 0.5000	2.0 0.08	89.586 3.5270	3.556 0.1400	2.0 0.08	57.0 2.24	60.0 2.36	83.0 3.27	26.1	20.3	0.0852	0.40 0.89
25.400 1.0000	19.845 0.7813	-4.8 -0.19	95.941 3.7772	3.967 0.1562	3.5 0.14	58.0 2.28	65.0 2.56	89.0 3.50	46.4	22.6	0.0912	0.69 1.53
30.302 1.1930	23.812 0.9375	-8.1 -0.32	97.937 3.8558	4.762 0.1875	2.3 0.09	59.0 2.32	63.0 2.48	90.0 3.54	49.9	14.5	0.0903	0.85 1.87
26.909 1.0594	20.638 0.8125	7.1 0.28	116.683 4.5938	5.558 0.2188	3.5 0.14	64.0 2.51	72.0 2.83	107.0 4.21	36.8	13.2	0.1085	1.25 2.77
28.575 1.1250	22.225 0.8750	-7.6 -0.30	97.937 3.8558	4.762 0.1875	1.5 0.06	60.0 2.36	63.0 2.48	91.0 3.58	52.5	18.5	0.0910	0.78 1.72
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	3.5 0.14	61.0 2.40	68.0 2.68	100.0 3.94	58.6	17.1	0.0946	1.20 2.64
41.275 1.6250	31.750 1.2500	-14.0 -0.55	127.691 5.0272	7.142 0.2812	3.5 0.14	63.0 2.48	70.0 2.76	110.0 4.33	75.9	16.2	0.0694	2.25 4.97
36.678 1.4440	30.162 1.1875	-9.4 -0.37	130.073 5.1210	6.350 0.2500	3.5 0.14	65.0 2.56	71.0 2.80	116.0 4.57	91	21.1	0.1108	2.30 5.07
36.678 1.4440	34.925 1.3750	-9.4 -0.37	133.248 5.2460	6.350 0.2500	3.5 0.14	65.0 2.56	71.0 2.80	116.0 4.57	91	21.1	0.1108	2.45 5.39
52.388 2.0625	41.275 1.6250	-19.6 -0.77	134.925 5.3120	7.938 0.3125	3.5 0.14	67.0 2.64	74.0 2.91	117.0 4.61	103	18.7	0.0757	3.36 7.40
41.275 1.6250	31.750 1.2500	-11.2 -0.44	143.561 5.6520	7.137 0.2810	3.5 0.14	67.0 2.64	73.0 2.87	125.0 4.92	106	21	0.0814	3.20 7.06
56.007 2.2050	44.450 1.7500	-19.3 -0.76	143.579 5.6527	7.938 0.3125	0.8 0.03	70.0 2.76	71.0 2.80	126.0 4.96	124	22.4	0.0827	4.17 9.20
56.007 2.2050	44.450 1.7500	-19.3 -0.76	143.579 5.6527	7.938 0.3125	3.5 0.14	70.0 2.76	76.0 2.99	126.0 4.96	124	22.4	0.0827	4.16 9.17
21.946 0.8640	17.826 0.7018	-3.0 -0.12	101.498 3.9960	4.762 0.1875	2.3 0.09	61.0 2.40	65.0 2.56	94.0 3.70	42	15.7	0.0859	0.66 1.46
38.000 1.4961	29.000 1.1417	-9.9 -0.39	116.000 4.5669	7.000 0.2756	0.8 0.03	68.0 2.68	71.0 2.80	107.0 4.21	76.2	18.1	0.0758	1.72 3.80
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	0.8 0.03	66.0 2.60	67.0 2.64	115.0 4.53	77.2	23	0.1083	1.70 3.74
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	2.3 0.09	62.0 2.44	66.0 2.60	100.0 3.94	58.6	17.1	0.0946	1.17 2.59
21.946 0.8640	17.826 0.7018	-3.0 -0.12	101.498 3.9960	4.762 0.1875	2.3 0.09	61.0 2.40	65.0 2.56	94.0 3.70	42	15.7	0.0859	0.65 1.44
12.700 0.5000	9.525 0.3750	1.5 0.06	87.727 3.4538	2.794 0.1100	1.5 0.06	61.0 2.40	64.0 2.52	82.0 3.23	27.4	36.3	0.0749	0.24 0.52
18.258 0.7188	14.288 0.5625	-0.8 -0.03	90.487 3.5625	3.175 0.1250	1.5 0.06	62.0 2.44	65.0 2.56	85.0 3.35	46.1	36.9	0.0914	0.40 0.88
21.946 0.8640	17.826 0.7018	-3.0 -0.12	101.498 3.9960	4.762 0.1875	2.3 0.09	62.0 2.44	66.0 2.60	94.0 3.70	42	15.7	0.0859	0.63 1.38
21.946 0.8640	17.826 0.7018	-3.0 -0.12	101.498 3.9960	4.762 0.1875	3.5 0.14	62.0 2.44	69.0 2.72	94.0 3.70	42	15.7	0.0859	0.62 1.37

[4] These maximum fillet radii will be cleared by the bearing corners.

Continued on next page.

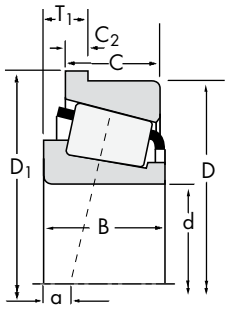
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

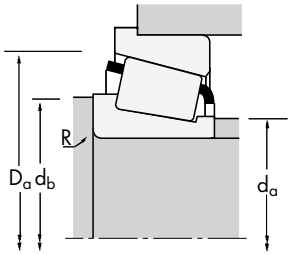
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

B

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
57.150 2.2500	97.630 3.8437	9.124 0.3592	96300 21600	0.40	1.49	25000 5610	17200 3870	1.45	142000 32000	28682	28622-B
57.150 2.2500	104.775 4.1250	11.908 0.4688	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45290	45220-B
57.150 2.2500	104.775 4.1250	11.908 0.4688	142000 31900	0.33	1.80	36800 8270	20900 4710	1.76	189000 42600	45291	45220-B
57.150 2.2500	107.950 4.2500	11.115 0.4376	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	462	453-B
57.150 2.2500	107.950 4.2500	11.115 0.4376	126000 28200	0.34	1.79	32600 7320	18700 4200	1.74	166000 37200	469	453-B
57.150 2.2500	112.712 4.4375	11.112 0.4375	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3979	3920-B
57.150 2.2500	120.650 4.7500	16.667 0.6562	192000 43200	0.31	1.91	49800 11200	26800 6020	1.86	244000 54800	623	612-B
57.150 2.2500	123.825 4.8750	14.288 0.5625	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	555-S	552-B
57.150 2.2500	135.755 5.3447	17.462 0.6875	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6375	6320-B
57.150 2.2500	136.525 5.3750	16.662 0.6560	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	635	632-B
57.150 2.2500	139.700 5.5000	17.462 0.6875	225000 50700	0.49	1.23	58500 13100	48800 11000	1.20	297000 66700	65225	65550-B
57.150 2.2500	149.225 5.8750	17.462 0.6875	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6455	6420-B
58.738 2.3125	112.712 4.4375	11.112 0.4375	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3981	3920-B
59.931 2.3595	150.089 5.9090	15.875 0.6250	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	745	742-B
59.977 2.3613	100.000 3.9370	9.525 0.3750	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28980	28921-B
59.987 2.3617	104.775 4.1250	10.320 0.4063	89600 20100	0.39	1.55	23200 5220	15400 3470	1.51	120000 27000	39236	39412-B
59.987 2.3617	129.944 5.1159	14.288 0.5625	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	558-S	553-SB
59.987 2.3617	130.175 5.1250	16.637 0.6550	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911244	HM911210-B
60.000 2.3622	100.000 3.9370	8.500 0.3346	80900 18200	0.47	1.27	21000 4710	17000 3820	1.24	101000 22800	JP6049	JP6010-B
60.000 2.3622	107.950 4.2500	10.320 0.4063	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29580	29520-B
60.000 2.3622	110.000 4.3307	10.320 0.4063	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29580	29521-B
60.000 2.3622	112.712 4.4375	11.112 0.4375	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3977	3920-B
60.000 2.3622	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	476	472-B
60.325 2.3750	100.000 3.9370	9.525 0.3750	98200 22100	0.43	1.41	25500 5720	18500 4170	1.37	149000 33500	28985	28921-B
60.325 2.3750	112.712 4.4375	11.112 0.4375	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3980	3920-B
60.325 2.3750	123.825 4.8750	14.288 0.5625	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	558	552-B
60.325 2.3750	130.175 5.1250	19.050 0.7500	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911245	HM911210-B
60.325 2.3750	135.755 5.3447	17.462 0.6875	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6376	6320-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
24.608 0.9688	19.446 0.7656	-3.3 -0.13	101.498 3.9960	3.962 0.1560	3.5 0.14	63.0 2.48	70.0 2.76	94.0 3.70	54	20.2	0.0979	0.75 1.66
30.958 1.2188	23.812 0.9375	-8.1 -0.32	110.231 4.3398	5.558 0.2188	2.3 0.09	65.0 2.56	68.0 2.68	101.0 3.98	63.5	16.9	0.0971	1.12 2.48
30.958 1.2188	23.812 0.9375	-8.1 -0.32	110.231 4.3398	5.558 0.2188	6.4 0.25	65.0 2.56	76.0 2.99	101.0 3.98	63.5	16.9	0.0971	1.09 2.41
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	2.3 0.09	63.0 2.48	67.0 2.64	100.0 3.94	58.6	17.1	0.0946	1.14 2.51
29.317 1.1542	22.225 0.8750	-7.1 -0.28	113.386 4.4640	5.558 0.2188	3.5 0.14	63.0 2.48	70.0 2.76	100.0 3.94	58.6	17.1	0.0946	1.14 2.50
30.048 1.1830	23.812 0.9375	-4.6 -0.18	117.373 4.6210	4.762 0.1875	3.5 0.14	66.0 2.60	72.0 2.83	108.0 4.25	75.2	21.3	0.1092	1.41 3.10
41.275 1.6250	31.750 1.2500	-14.0 -0.55	127.691 5.0272	7.142 0.2812	3.5 0.14	66.0 2.60	72.0 2.83	110.0 4.33	75.9	16.2	0.0694	2.16 4.77
36.678 1.4440	30.162 1.1875	-9.4 -0.37	130.073 5.1210	6.350 0.2500	3.5 0.14	67.0 2.64	73.0 2.87	116.0 4.57	91	21.1	0.1108	2.22 4.89
56.007 2.2050	44.450 1.7500	-19.3 -0.76	143.579 5.6527	7.938 0.3125	4.3 0.17	72.0 2.83	80.0 3.15	126.0 4.96	124	22.4	0.0827	4.07 8.97
41.275 1.6250	31.750 1.2500	-11.2 -0.44	143.561 5.6520	7.137 0.2810	3.5 0.14	69.0 2.72	75.0 2.95	125.0 4.92	106	21	0.0814	3.11 6.86
44.450 1.7500	34.925 1.3750	-9.4 -0.37	152.400 6.0000	7.938 0.3125	3.5 0.14	71.0 2.79	80.0 3.15	120.0 4.72	83.2	17.2	0.0827	3.60 7.94
54.229 2.1350	44.450 1.7500	-15.0 -0.59	157.061 6.1835	7.938 0.3125	3.5 0.14	75.0 2.95	81.0 3.19	140.0 5.51	158	29.1	0.0931	5.20 11.46
30.048 1.1830	23.812 0.9375	-4.6 -0.18	117.373 4.6210	4.762 0.1875	3.5 0.14	67.0 2.64	73.0 2.87	108.0 4.25	75.2	21.3	0.1092	1.37 3.02
46.672 1.8375	36.512 1.4375	-11.9 -0.47	157.912 6.2170	7.938 0.3125	3.5 0.14	75.0 2.95	81.0 3.19	143.0 5.63	160	26.3	0.0898	4.39 9.68
25.400 1.0000	19.845 0.7813	-2.5 -0.10	103.962 4.0930	3.970 0.1563	3.5 0.14	67.0 2.64	73.0 2.87	98.0 3.86	60.1	24.5	0.1032	0.79 1.75
22.000 0.8661	15.875 0.6250	-1.5 -0.06	109.433 4.3084	4.762 0.1875	2.3 0.09	67.0 2.64	71.0 2.80	102.0 4.02	51.7	19.5	0.0947	0.77 1.71
36.678 1.4440	30.162 1.1875	-9.4 -0.37	136.025 5.3553	6.350 0.2500	3.5 0.14	69.0 2.72	75.0 2.95	116.0 4.57	91	21.1	0.1108	2.45 5.41
30.924 1.2175	23.812 0.9375	7.9 0.31	136.525 5.3750	6.350 0.2500	3.5 0.14	74.5 2.93	84.0 3.31	123.5 4.87	56.4	16.5	0.0842	2.09 4.60
20.000 0.7874	15.500 0.6102	1.3 0.05	105.000 4.1339	3.000 0.1181	2.0 0.08	66.0 2.60	69.0 2.72	98.0 3.86	39.5	22.5	0.0922	0.62 1.37
25.400 1.0000	19.050 0.7500	-0.8 -0.03	111.816 4.4022	3.970 0.1563	3.5 0.14	68.0 2.68	75.0 2.95	105.0 4.13	70.3	25.8	0.1112	1.02 2.26
25.400 1.0000	19.050 0.7500	-0.8 -0.03	113.800 4.4803	3.970 0.1563	3.5 0.14	68.0 2.68	75.0 2.95	105.0 4.13	70.3	25.8	0.1112	1.08 2.37
30.048 1.1830	23.812 0.9375	-4.6 -0.18	117.373 4.6210	4.762 0.1875	3.5 0.14	68.0 2.68	74.0 2.91	108.0 4.25	75.2	21.3	0.1092	1.34 2.96
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	2.0 0.08	69.0 2.72	73.0 2.87	115.0 4.53	77.2	23	0.1083	1.59 3.51
25.400 1.0000	19.845 0.7813	-2.5 -0.10	103.962 4.0930	3.970 0.1563	3.5 0.14	67.0 2.64	73.0 2.87	98.0 3.86	60.1	24.5	0.1032	0.79 1.73
30.048 1.1830	23.812 0.9375	-4.6 -0.18	117.373 4.6210	4.762 0.1875	3.5 0.14	68.0 2.68	75.0 2.95	108.0 4.25	75.2	21.3	0.1092	1.34 2.95
36.678 1.4440	30.162 1.1875	-9.4 -0.37	130.073 5.1210	6.350 0.2500	2.3 0.09	69.0 2.72	73.0 2.87	116.0 4.57	91	21.1	0.1108	2.14 4.72
33.338 1.3125	23.812 0.9375	5.3 0.21	136.525 5.3750	6.350 0.2500	5.0 0.20	74.5 2.93	87.0 3.43	123.5 4.87	56.4	16.5	0.0842	2.15 4.75
56.007 2.2050	44.450 1.7500	-19.3 -0.76	143.579 5.6527	7.938 0.3125	3.5 0.14	74.0 2.91	81.0 3.19	126.0 4.96	124	22.4	0.0827	3.94 8.70

[4] These maximum fillet radii will be cleared by the bearing corners.

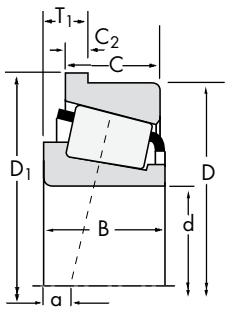
Continued on next page.

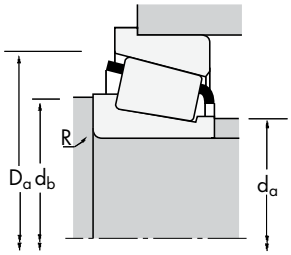
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
60.325 2.3750	136.525 5.3750	16.662 0.6560	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	637	632-B
60.325 2.3750	161.925 6.3750	23.012 0.9060	275000 61900	0.71	0.85	71400 16100	86700 19500	0.82	330000 74200	9275	9221-B
61.912 2.4375	123.825 4.8750	14.288 0.5625	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	554	552-B
61.912 2.4375	130.175 5.1250	19.050 0.7500	154000 34700	0.82	0.73	40000 9000	56200 12600	0.71	183000 41100	HM911249	HM911210-B
63.500 2.5000	104.775 4.1250	10.320 0.4063	89600 20100	0.39	1.55	23200 5220	15400 3470	1.51	120000 27000	39250	39412-B
63.500 2.5000	107.950 4.2500	10.320 0.4063	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29585	29520-B
63.500 2.5000	112.712 4.4375	7.917 0.3117	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	395	3920-B
63.500 2.5000	112.712 4.4375	11.112 0.4375	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3982	3920-B
63.500 2.5000	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	477	472-B
63.500 2.5000	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	483	472-B
63.500 2.5000	123.825 4.8750	14.288 0.5625	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	559	552-B
63.500 2.5000	127.000 5.0000	14.288 0.5625	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	565	563-B
63.500 2.5000	136.525 5.3750	16.637 0.6550	252000 56700	0.36	1.67	65400 14700	40300 9060	1.62	335000 75400	H414235	H414210-B
63.500 2.5000	136.525 5.3750	16.662 0.6560	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	639	632-B
63.500 2.5000	149.225 5.8750	17.462 0.6875	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6475	6420-B
64.960 2.5575	149.225 5.8750	17.462 0.6875	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6464	6420-B
64.963 2.5576	127.000 5.0000	14.288 0.5625	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	569	563-B
65.000 2.5591	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	478	472-B
65.088 2.5625	135.755 5.3447	17.462 0.6875	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6379	6320-B
65.883 2.5938	122.238 4.8125	13.495 0.5313	219000 49200	0.36	1.67	56800 12800	34800 7830	1.63	327000 73500	5595	5535-B
66.675 2.6250	107.950 4.2500	10.320 0.4063	102000 22900	0.46	1.31	26400 5950	20800 4670	1.27	161000 36300	29590	29520-B
66.675 2.6250	112.712 4.4375	11.112 0.4375	129000 28900	0.40	1.49	33300 7490	22900 5160	1.45	191000 43000	3984	3920-B
66.675 2.6250	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	479	472-B
66.675 2.6250	123.825 4.8750	14.288 0.5625	177000 39700	0.35	1.73	45800 10300	27100 6100	1.69	248000 55700	560	552-B
66.675 2.6250	130.200 5.1260	19.865 0.7821	179000 40300	0.50	1.20	46400 10400	39900 8970	1.16	256000 57600	HM813844	HM813815-B
66.675 2.6250	135.755 5.3447	17.462 0.6875	298000 66900	0.32	1.85	77200 17300	42900 9640	1.80	404000 90900	6386	6320-B
66.675 2.6250	136.525 5.3750	16.662 0.6560	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	641	632-B
66.675 2.6250	139.700 5.5000	17.462 0.6875	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715341	H715310-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R [4]	d_a	d_b	D_a	G_1	G_2	Cg	
41.275 1.6250	31.750 1.2500	-11.2 -0.44	143.561 5.6520	7.137 0.2810	3.5 0.14	72.0 2.83	78.0 3.07	125.0 4.92	106	21	0.0814	3.02 6.65
46.038 1.8125	30.162 1.1875	1.8 0.07	171.450 6.7500	7.137 0.2810	3.5 0.14	86.0 3.39	92.0 3.62	153.0 6.03	102	18.4	0.0984	4.83 10.64
36.678 1.4440	30.162 1.1875	-9.4 -0.37	130.073 5.1210	6.350 0.2500	3.5 0.14	71.0 2.80	77.0 3.03	116.0 4.57	91	21.1	0.1108	2.09 4.61
33.338 1.3125	23.812 0.9375	5.3 0.21	136.525 5.3750	6.350 0.2500	3.5 0.14	74.0 2.91	91.0 3.58	123.5 4.87	56.4	16.5	0.0842	2.13 4.68
22.000 0.8661	15.875 0.6250	-1.5 -0.06	109.433 4.3084	4.762 0.1875	2.0 0.08	69.0 2.72	73.0 2.87	102.0 4.02	51.7	19.5	0.0947	0.72 1.59
25.400 1.0000	19.050 0.7500	-0.8 -0.03	111.816 4.4022	3.970 0.1563	3.5 0.14	71.0 2.80	77.0 3.03	105.0 4.13	70.3	25.8	0.1112	0.96 2.11
21.996 0.8660	23.812 0.9375	-0.8 -0.03	117.373 4.6210	4.762 0.1875	3.5 0.14	70.0 2.76	77.0 3.03	108.0 4.25	56	21.4	0.0984	1.05 2.31
30.048 1.1830	23.812 0.9375	-4.6 -0.18	117.373 4.6210	4.762 0.1875	3.5 0.14	71.0 2.80	77.0 3.03	108.0 4.25	75.2	21.3	0.1092	1.26 2.78
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	0.8 0.03	72.0 2.83	73.0 2.87	115.0 4.53	77.2	23	0.1083	1.52 3.35
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	3.5 0.14	72.0 2.83	78.0 3.07	115.0 4.53	77.2	23	0.1083	1.51 3.32
36.678 1.4440	30.162 1.1875	-9.4 -0.37	130.073 5.1210	6.350 0.2500	3.5 0.14	72.0 2.83	78.0 3.07	116.0 4.57	91	21.1	0.1108	2.04 4.51
36.170 1.4240	28.575 1.1250	-8.1 -0.32	133.248 5.2460	6.350 0.2500	3.5 0.14	73.0 2.87	80.0 3.15	121.0 4.76	101	24	0.1167	2.16 4.76
41.275 1.6250	31.750 1.2500	-10.9 -0.43	143.637 5.6550	7.112 0.2800	3.5 0.14	78.0 3.07	82.0 3.23	130.0 5.12	113	22.8	0.0827	2.95 6.50
41.275 1.6250	31.750 1.2500	-11.2 -0.44	143.561 5.6520	7.137 0.2810	3.5 0.14	74.0 2.91	81.0 3.19	125.0 4.92	106	21	0.0814	2.92 6.43
54.229 2.1350	44.450 1.7500	-15.0 -0.59	157.061 6.1835	7.938 0.3125	3.5 0.14	80.0 3.15	86.0 3.39	140.0 5.51	158	29.1	0.0931	4.94 10.90
54.229 2.1350	44.450 1.7500	-15.0 -0.59	157.061 6.1835	7.938 0.3125	3.5 0.14	81.0 3.19	87.0 3.43	140.0 5.51	158	29.1	0.0931	4.88 10.76
36.170 1.4240	28.575 1.1250	-8.1 -0.32	133.248 5.2460	6.350 0.2500	3.5 0.14	74.0 2.91	81.0 3.19	121.0 4.76	101	24	0.1167	2.12 4.67
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	2.3 0.09	73.0 2.87	77.0 3.03	115.0 4.53	77.2	23	0.1083	1.48 3.26
56.007 2.2050	44.450 1.7500	-19.3 -0.76	143.579 5.6527	7.938 0.3125	3.5 0.14	77.0 3.04	84.0 3.31	126.0 4.96	124	22.4	0.0827	3.74 8.24
43.764 1.7230	36.512 1.4375	-12.2 -0.48	128.588 5.0625	6.350 0.2500	3.5 0.14	77.0 3.03	83.0 3.27	118.0 4.65	110	24.2	0.0825	2.29 5.05
25.400 1.0000	19.050 0.7500	-0.8 -0.03	111.816 4.4022	3.970 0.1563	3.5 0.14	73.0 2.87	80.0 3.15	105.0 4.13	70.3	25.8	0.1112	0.89 1.97
30.048 1.1830	23.812 0.9375	-4.6 -0.18	117.373 4.6210	4.762 0.1875	3.5 0.14	74.0 2.91	80.0 3.15	108.0 4.25	75.2	21.3	0.1092	1.19 2.61
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	2.3 0.09	74.0 2.91	78.0 3.07	115.0 4.53	77.2	23	0.1083	1.44 3.17
36.678 1.4440	30.162 1.1875	-9.4 -0.37	130.073 5.1210	6.350 0.2500	3.5 0.14	75.0 2.95	81.0 3.19	116.0 4.57	91	21.1	0.1108	1.95 4.30
36.512 1.4375	26.988 1.0625	-3.8 -0.15	138.200 5.4410	10.340 0.4071	3.5 0.14	82.0 3.23	88.0 3.46	124.0 4.88	91.7	24.3	0.1252	2.26 4.98
56.007 2.2050	44.450 1.7500	-19.3 -0.76	143.579 5.6527	7.938 0.3125	4.3 0.17	77.0 3.04	87.0 3.43	126.0 4.96	124	22.4	0.0827	3.66 8.07
41.275 1.6250	31.750 1.2500	-11.2 -0.44	143.561 5.6520	7.137 0.2810	3.5 0.14	77.0 3.03	83.0 3.27	125.0 4.92	106	21	0.0814	2.81 6.20
46.038 1.8125	36.512 1.4375	-8.6 -0.34	152.400 6.0000	7.938 0.3125	3.5 0.14	85.0 3.35	91.0 3.58	135.0 5.31	147	32.8	0.0993	3.67 8.08

[4] These maximum fillet radii will be cleared by the bearing corners.

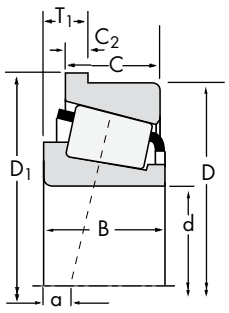
Continued on next page.

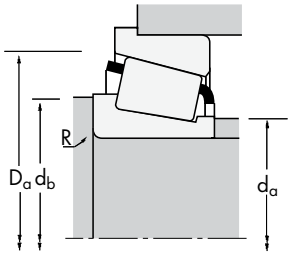
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
68.262 2.6875	110.000 4.3307	7.925 0.3120	91600 20600	0.40	1.49	23700 5340	16300 3670	1.45	125000 28100	399A	394AB
68.262 2.6875	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	480	472-B
68.262 2.6875	127.000 5.0000	14.288 0.5625	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	570	563-B
68.262 2.6875	136.525 5.3750	16.662 0.6560	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	642	632-B
68.262 2.6875	161.925 6.3750	24.600 0.9685	275000 61900	0.71	0.85	71400 16100	86700 19500	0.82	330000 74200	9278	9221-B
69.850 2.7500	112.712 4.4375	10.320 0.4063	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29675	29620-B
69.850 2.7500	112.712 4.4375	11.112 0.4375	93400 21000	0.42	1.44	24200 5450	17300 3880	1.40	130000 29300	LM613449	LM613410-B
69.850 2.7500	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	482	472-B
69.850 2.7500	127.000 5.0000	14.288 0.5625	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	566	563-B
69.850 2.7500	136.525 5.3750	16.662 0.6560	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	643	632-B
69.850 2.7500	149.225 5.8750	17.462 0.6875	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6454	6420-B
69.850 2.7500	150.089 5.9090	15.875 0.6250	294000 66100	0.33	1.84	76300 17100	42500 9550	1.80	417000 93800	745A	742-B
69.850 2.7500	152.400 6.0000	16.667 0.6562	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	655	652-B
69.850 2.7500	168.275 6.6250	22.225 0.8750	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	835	832-B
69.952 2.7540	122.238 4.8125	7.938 0.3125	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34274	34481-B
70.000 2.7559	110.000 4.3307	8.500 0.3346	84800 19100	0.46	1.30	22000 4940	17400 3900	1.27	112000 25200	JP7049	JP7010-B
70.000 2.7559	120.000 4.7244	11.095 0.4368	133000 29900	0.38	1.56	34400 7740	22700 5100	1.52	186000 41900	484	472-B
70.000 2.7559	122.238 4.8125	7.938 0.3125	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34275	34481-B
71.438 2.8125	117.475 4.6250	11.112 0.4375	128000 28800	0.44	1.38	33200 7470	24800 5570	1.34	197000 44300	33281	33462-B
71.438 2.8125	127.000 5.0000	14.288 0.5625	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567A	563-B
71.438 2.8125	136.525 5.3750	16.637 0.6550	252000 56700	0.36	1.67	65400 14700	40300 9060	1.62	335000 75400	H414249	H414210-B
71.438 2.8125	136.525 5.3750	16.662 0.6560	216000 48500	0.36	1.66	55900 12600	34700 7790	1.61	298000 67000	645	632-B
71.438 2.8125	139.700 5.5000	17.462 0.6875	249000 56000	0.47	1.27	64600 14500	52300 11800	1.24	405000 91000	H715345	H715310-B
73.025 2.8750	112.712 4.4375	10.320 0.4063	102000 23000	0.49	1.23	26500 5960	22100 4980	1.20	166000 37200	29685	29620-B
73.025 2.8750	117.475 4.6250	11.112 0.4375	109000 24500	0.51	1.18	28300 6360	24700 5550	1.15	183000 41200	LM814845	LM814810-B
73.025 2.8750	127.000 5.0000	14.288 0.5625	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567	563-B
73.025 2.8750	127.000 5.0000	14.288 0.5625	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	567X	563-B
73.025 2.8750	149.225 5.8750	17.462 0.6875	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6460	6420-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
21.996 0.8660	18.825 0.7411	-0.8 -0.03	114.673 4.5147	4.750 0.1870	2.3 0.09	74.0 2.91	78.0 3.07	106.0 4.17	56	21.4	0.0984	0.78 1.73
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	3.5 0.14	75.0 2.95	82.0 3.23	115.0 4.53	77.2	23	0.1083	1.40 3.08
36.170 1.4240	28.575 1.1250	-8.1 -0.32	133.248 5.2460	6.350 0.2500	3.5 0.14	77.0 3.03	83.0 3.27	121.0 4.76	101	24	0.1167	2.02 4.45
41.275 1.6250	31.750 1.2500	-11.2 -0.44	143.561 5.6520	7.137 0.2810	3.5 0.14	78.0 3.07	85.0 3.35	125.0 4.92	106	21	0.0814	2.76 6.08
46.038 1.8125	30.162 1.1875	0.0 0.00	171.450 6.7500	7.137 0.2810	3.5 0.14	90.5 3.56	97.0 3.82	153.0 6.03	102	18.4	0.0984	4.59 10.12
25.400 1.0000	19.050 0.7500	1.0 0.04	116.586 4.5900	3.970 0.1563	1.5 0.06	77.0 3.03	80.0 3.15	110.0 4.33	77.7	43.3	0.1170	1.00 2.20
21.996 0.8660	15.875 0.6250	0.0 0.00	119.062 4.6875	4.762 0.1875	1.5 0.06	76.0 2.99	78.0 3.07	110.0 4.33	60.3	23.1	0.1019	0.83 1.82
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	3.5 0.14	77.0 3.03	83.0 3.27	115.0 4.53	77.2	23	0.1083	1.36 2.99
36.170 1.4240	28.575 1.1250	-8.1 -0.32	133.248 5.2460	6.350 0.2500	3.5 0.14	78.0 3.07	85.0 3.35	121.0 4.76	101	24	0.1167	1.97 4.34
41.275 1.6250	31.750 1.2500	-11.2 -0.44	143.561 5.6520	7.137 0.2810	3.5 0.14	80.0 3.15	86.0 3.39	125.0 4.92	106	21	0.0814	2.70 5.96
54.229 2.1350	44.450 1.7500	-15.0 -0.59	157.061 6.1835	7.938 0.3125	5.0 0.20	85.0 3.35	94.0 3.70	140.0 5.51	158	29.1	0.0931	4.65 10.25
46.672 1.8375	36.512 1.4375	-11.9 -0.47	157.912 6.2170	7.938 0.3125	3.5 0.14	82.0 3.23	88.0 3.46	143.0 5.63	160	26.3	0.0898	4.02 8.87
41.275 1.6250	31.750 1.2500	-7.9 -0.31	159.441 6.2772	7.142 0.2812	3.5 0.14	82.0 3.23	88.0 3.46	141.0 5.55	137	27.3	0.0919	3.70 8.16
56.363 2.2190	41.275 1.6250	-18.5 -0.73	177.698 6.9960	9.525 0.3750	3.5 0.14	84.0 3.31	91.0 3.58	155.0 6.10	198	34.8	0.0937	6.28 13.84
23.012 0.9060	21.430 0.8437	1.5 0.06	126.901 4.9961	4.762 0.1875	2.0 0.08	78.0 3.07	81.0 3.19	118.0 4.65	69.3	27	0.1093	1.18 2.60
20.000 0.7874	15.500 0.6102	2.5 0.10	116.000 4.5669	3.000 0.1181	2.0 0.08	76.0 2.99	80.0 3.15	105.5 4.15	51.1	30.9	0.0995	0.70 1.55
29.007 1.1420	24.237 0.9542	-4.1 -0.16	125.435 4.9384	5.537 0.2180	2.0 0.08	77.0 3.03	80.0 3.15	115.0 4.53	77.2	23	0.1083	1.36 3.00
23.012 0.9060	21.430 0.8437	1.5 0.06	126.901 4.9961	4.762 0.1875	2.0 0.08	78.0 3.07	82.0 3.23	118.0 4.65	69.3	27	0.1093	1.18 2.60
30.162 1.1875	23.812 0.9375	-2.8 -0.11	122.133 4.8084	4.762 0.1875	3.5 0.14	79.0 3.11	85.0 3.35	114.0 4.49	84.2	24.4	0.1162	1.29 2.85
36.170 1.4240	28.575 1.1250	-8.1 -0.32	133.248 5.2460	6.350 0.2500	3.5 0.14	80.0 3.15	86.0 3.39	121.0 4.76	101	24	0.1167	1.92 4.23
41.275 1.6250	31.750 1.2500	-10.9 -0.43	143.637 5.6550	7.112 0.2800	3.5 0.14	83.0 3.27	89.0 3.50	130.0 5.12	113	22.8	0.0827	2.68 5.90
41.275 1.6250	31.750 1.2500	-11.2 -0.44	143.561 5.6520	7.137 0.2810	6.4 0.25	81.0 3.19	93.0 3.66	125.0 4.92	106	21	0.0814	2.62 5.77
46.038 1.8125	36.512 1.4375	-8.6 -0.34	152.400 6.0000	7.938 0.3125	3.5 0.14	88.0 3.46	94.0 3.70	135.0 5.31	147	32.8	0.0993	3.48 7.68
25.400 1.0000	19.050 0.7500	1.0 0.04	116.586 4.5900	3.970 0.1563	3.5 0.14	80.0 3.15	86.0 3.39	110.0 4.33	77.7	43.3	0.1170	0.92 2.03
25.400 1.0000	19.050 0.7500	2.3 0.09	122.133 4.8084	4.762 0.1875	3.5 0.14	81.0 3.19	87.0 3.43	116.0 4.57	88.6	36.6	0.1239	1.07 2.35
36.170 1.4240	28.575 1.1250	-8.1 -0.32	133.248 5.2460	6.350 0.2500	3.5 0.14	81.0 3.19	88.0 3.46	121.0 4.76	101	24	0.1167	1.87 4.12
36.170 1.4240	28.575 1.1250	-8.1 -0.32	133.248 5.2460	6.350 0.2500	4.8 0.19	81.0 3.19	90.0 3.54	121.0 4.76	101	24	0.1167	1.87 4.13
54.229 2.1350	44.450 1.7500	-15.0 -0.59	157.061 6.1835	7.938 0.3125	3.5 0.14	87.0 3.43	93.0 3.66	140.0 5.51	158	29.1	0.0931	4.51 9.94

[4] These maximum fillet radii will be cleared by the bearing corners.

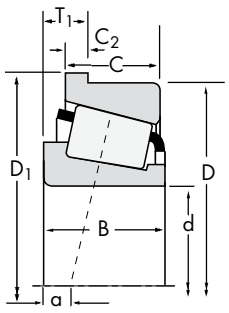
Continued on next page.

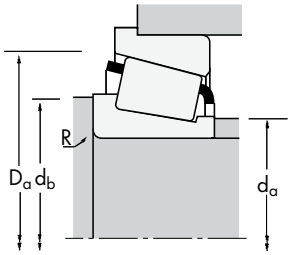
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
73.025 2.8750	152.400 6.0000	16.667 0.6562	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	657	652-B
73.817 2.9062	127.000 5.0000	14.288 0.5625	182000 40900	0.36	1.65	47100 10600	29400 6600	1.61	262000 58900	568	563-B
74.612 2.9375	139.992 5.5115	14.288 0.5625	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	577	572-B
76.200 3.0000	122.238 4.8125	7.938 0.3125	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34300	34481-B
76.200 3.0000	122.238 4.8125	7.940 0.3126	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34301	34481-B
76.200 3.0000	125.412 4.9375	10.317 0.4062	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27684	27620-B
76.200 3.0000	130.000 5.1181	13.495 0.5313	149000 33500	0.42	1.43	38700 8690	27700 6230	1.39	222000 49800	42687	42623-B
76.200 3.0000	136.525 5.3750	13.475 0.5305	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495A	493-B
76.200 3.0000	139.992 5.5115	14.288 0.5625	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	575	572-B
76.200 3.0000	149.225 5.8750	17.462 0.6875	321000 72200	0.36	1.66	83300 18700	51600 11600	1.61	463000 104000	6461	6420-B
76.200 3.0000	161.925 6.3750	17.450 0.6870	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	755	752-B
76.200 3.0000	161.925 6.3750	19.050 0.7500	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6575	6535-B
76.200 3.0000	161.925 6.3750	24.600 0.9685	275000 61900	0.71	0.85	71400 16100	86700 19500	0.82	330000 74200	9285	9221-B
76.200 3.0000	168.275 6.6250	22.225 0.8750	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	837	832-B
77.788 3.0625	117.475 4.6250	11.112 0.4375	109000 24500	0.51	1.18	28300 6360	24700 5550	1.15	183000 41200	LM814849	LM814810-B
77.788 3.0625	122.238 4.8125	7.938 0.3125	94600 21300	0.45	1.33	24500 5510	18900 4260	1.30	136000 30600	34306	34481-B
77.788 3.0625	127.000 5.0000	13.495 0.5313	149000 33500	0.42	1.43	38700 8690	27700 6230	1.39	222000 49800	42690	42620-B
79.375 3.1250	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595A	592-B
79.985 3.1490	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	590	592-B
80.000 3.1496	125.000 4.9213	10.500 0.4134	105000 23600	0.45	1.33	27200 6110	21000 4730	1.29	141000 31800	JP8049	JP8010-B
80.962 3.1875	133.350 5.2500	12.700 0.5000	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47681	47620-B
80.962 3.1875	136.525 5.3750	13.475 0.5305	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	496	493-B
80.962 3.1875	139.992 5.5115	14.288 0.5625	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	581	572-B
80.962 3.1875	168.275 6.6250	22.225 0.8750	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	838	832-B
82.550 3.2500	115.888 4.5625	7.938 0.3125	83500 18800	0.31	1.95	21700 4870	11400 2570	1.90	147000 33100	L116149	L116110-B
82.550 3.2500	125.412 4.9375	10.317 0.4062	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27687	27620-B
82.550 3.2500	133.350 5.2500	12.700 0.5000	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47685	47620-B
82.550 3.2500	133.350 5.2500	12.700 0.5000	167000 37600	0.40	1.48	43400 9750	30000 6750	1.44	262000 58900	47686	47620-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
41.275 1.6250	31.750 1.2500	-7.9 -0.31	159.441 6.2772	7.142 0.2812	3.5 0.14	85.0 3.35	91.0 3.58	141.0 5.55	137	27.3	0.0919	3.58 7.90
36.170 1.4240	28.575 1.1250	-8.1 -0.32	133.248 5.2460	6.350 0.2500	0.8 0.03	82.0 3.23	83.0 3.27	121.0 4.76	101	24	0.1167	1.86 4.09
36.098 1.4212	28.575 1.1250	-5.3 -0.21	146.240 5.7575	6.350 0.2500	3.5 0.14	85.0 3.35	91.0 3.58	134.0 5.28	126	32	0.1295	2.48 5.47
23.012 0.9060	21.430 0.8437	1.5 0.06	126.901 4.9961	4.762 0.1875	2.0 0.08	83.0 3.27	86.0 3.39	118.0 4.65	69.3	27	0.1093	1.05 2.32
23.012 0.9060	21.430 0.8437	1.5 0.06	126.901 4.9961	4.762 0.1875	3.5 0.14	83.0 3.27	89.0 3.50	118.0 4.65	69.3	27	0.1093	1.04 2.30
25.400 1.0000	19.845 0.7813	0.5 0.02	130.076 5.1211	4.762 0.1875	3.5 0.14	84.0 3.31	91.0 3.58	123.0 4.84	98.2	41.8	0.1198	1.25 2.76
31.000 1.2205	22.225 0.8750	-2.8 -0.11	135.456 5.3329	5.558 0.2188	3.5 0.14	84.0 3.31	90.0 3.54	124.0 4.88	96.2	28.6	0.1197	1.62 3.58
29.769 1.1720	22.225 0.8750	-0.8 -0.03	141.961 5.5890	5.537 0.2180	3.5 0.14	86.0 3.39	92.0 3.62	131.0 5.16	105	29.3	0.1252	1.85 4.09
36.098 1.4212	28.575 1.1250	-5.3 -0.21	146.240 5.7575	6.350 0.2500	3.5 0.14	86.0 3.39	92.0 3.62	134.0 5.28	126	32	0.1295	2.43 5.35
54.229 2.1350	44.450 1.7500	-15.0 -0.59	157.061 6.1835	7.938 0.3125	3.5 0.14	89.5 3.52	96.0 3.78	140.0 5.51	158	29.1	0.0931	4.35 9.59
48.260 1.9000	38.100 1.5000	-11.9 -0.47	169.748 6.6830	7.925 0.3120	3.5 0.14	88.0 3.46	95.0 3.74	150.0 5.91	177	29.4	0.0945	4.82 10.63
55.100 2.1693	42.862 1.6875	-13.2 -0.52	171.450 6.7500	7.938 0.3125	6.4 0.25	92.0 3.62	104.0 4.09	155.0 6.10	199	33.5	0.1037	5.43 11.98
46.038 1.8125	30.162 1.1875	0.0 0.00	171.450 6.7500	7.137 0.2810	3.5 0.14	90.5 3.56	103.0 4.06	153.0 6.03	102	18.4	0.0984	4.27 9.40
56.363 2.2190	41.275 1.6250	-18.5 -0.73	177.698 6.9960	9.525 0.3750	0.8 0.03	89.0 3.50	90.0 3.54	155.0 6.10	198	34.8	0.0937	5.97 13.15
25.400 1.0000	19.050 0.7500	2.3 0.09	122.133 4.8084	4.762 0.1875	3.5 0.14	85.0 3.35	91.0 3.58	116.0 4.57	88.6	36.6	0.1239	0.95 2.11
23.012 0.9060	21.430 0.8437	1.5 0.06	126.901 4.9961	4.762 0.1875	3.5 0.14	84.0 3.31	90.0 3.54	118.0 4.65	69.3	27	0.1093	1.01 2.22
31.000 1.2205	22.225 0.8750	-2.8 -0.11	133.248 5.2460	5.558 0.2188	3.5 0.14	85.0 3.35	91.0 3.58	124.0 4.88	96.2	28.6	0.1197	1.44 3.18
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	91.0 3.58	98.0 3.86	144.0 5.67	151	38.3	0.1416	3.19 7.03
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	91.0 3.58	98.0 3.86	144.0 5.67	151	38.3	0.1416	3.17 6.98
22.500 0.8858	17.500 0.6890	2.3 0.09	132.000 5.1969	4.000 0.1575	2.0 0.08	86.0 3.39	89.0 3.50	129.0 5.08	69.7	37.4	0.1095	1.01 2.22
33.338 1.3125	26.195 1.0313	-4.3 -0.17	138.811 5.4650	5.558 0.2188	3.5 0.14	89.0 3.50	95.0 3.74	130.0 5.12	119	29.2	0.1273	1.90 4.18
29.769 1.1720	22.225 0.8750	-0.8 -0.03	141.961 5.5890	5.537 0.2180	3.5 0.14	89.0 3.50	95.0 3.74	131.0 5.16	105	29.3	0.1252	1.72 3.79
36.098 1.4212	28.575 1.1250	-5.3 -0.21	146.240 5.7575	6.350 0.2500	3.5 0.14	90.0 3.54	96.0 3.78	134.0 5.28	126	32	0.1295	2.26 4.98
56.363 2.2190	41.275 1.6250	-18.5 -0.73	177.698 6.9960	9.525 0.3750	0.8 0.03	93.0 3.66	94.0 3.70	155.0 6.10	198	34.8	0.0937	5.71 12.58
21.433 0.8438	16.670 0.6563	-1.3 -0.05	119.855 4.7187	3.970 0.1563	1.5 0.06	88.0 3.46	90.0 3.54	113.0 4.45	97.2	64.3	0.1079	0.69 1.52
25.400 1.0000	19.845 0.7813	0.5 0.02	130.076 5.1211	4.762 0.1875	3.5 0.14	89.0 3.50	96.0 3.78	123.0 4.84	98.2	41.8	0.1198	1.10 2.41
33.338 1.3125	26.195 1.0313	-4.3 -0.17	138.811 5.4650	5.558 0.2188	0.8 0.03	90.0 3.54	91.0 3.58	130.0 5.12	119	29.2	0.1273	1.86 4.09
33.338 1.3125	26.195 1.0313	-4.3 -0.17	138.811 5.4650	5.558 0.2188	3.5 0.14	90.0 3.54	97.0 3.82	130.0 5.12	119	29.2	0.1273	1.84 4.06

[4] These maximum fillet radii will be cleared by the bearing corners.

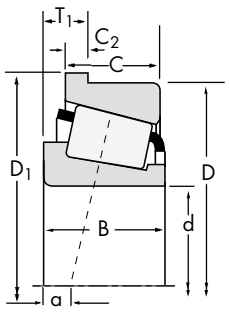
Continued on next page.

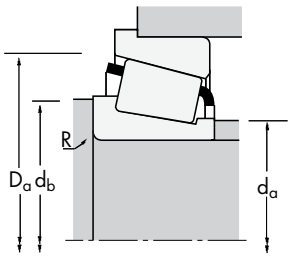
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
82.550 3.2500	136.525 5.3750	13.475 0.5305	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	495	493-B
82.550 3.2500	139.992 5.5115	14.288 0.5625	191000 43000	0.40	1.49	49600 11200	34300 7720	1.45	291000 65400	580	572-B
82.550 3.2500	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	595	592-B
82.550 3.2500	152.400 6.0000	16.667 0.6562	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	663	652-B
82.550 3.2500	161.925 6.3750	17.450 0.6870	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	757	752-B
82.550 3.2500	168.275 6.6250	22.225 0.8750	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	839	832-B
82.550 3.2500	168.275 6.6250	22.225 0.8750	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	842	832-B
83.345 3.2813	125.412 4.9375	10.317 0.4062	109000 24400	0.42	1.44	28100 6320	20000 4500	1.40	178000 39900	27690	27620-B
84.138 3.3125	136.525 5.3750	13.475 0.5305	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	498	493-B
85.000 3.3465	130.000 5.1181	11.560 0.4550	149000 33600	0.44	1.35	38700 8700	29400 6620	1.31	245000 55100	JM716649	JM716610-B
85.725 3.3750	136.525 5.3750	13.475 0.5305	143000 32100	0.44	1.35	37100 8330	28200 6340	1.31	216000 48600	497	493-B
85.725 3.3750	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	596	592-B
85.725 3.3750	152.400 6.0000	16.667 0.6562	229000 51400	0.41	1.47	59300 13300	41500 9330	1.43	335000 75300	665	652-B
85.725 3.3750	161.925 6.3750	17.450 0.6870	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	758	752-B
85.725 3.3750	168.275 6.6250	18.255 0.7187	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	677	672-B
85.725 3.3750	168.275 6.6250	22.225 0.8750	379000 85100	0.30	2.00	98200 22100	50300 11300	1.95	522000 117000	841	832-B
87.312 3.4375	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	596-S	592-B
88.900 3.5000	149.225 5.8750	12.700 0.5000	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42350	42587-B
88.900 3.5000	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	593	592-B
88.900 3.5000	161.925 6.3750	17.450 0.6870	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	766	752-B
88.900 3.5000	161.925 6.3750	17.462 0.6875	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	759	752-B
88.900 3.5000	161.925 6.3750	19.050 0.7500	343000 77200	0.40	1.50	89000 20000	61000 13700	1.46	523000 118000	6580	6535-B
88.900 3.5000	168.275 6.6250	18.255 0.7187	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	679	672-B
88.900 3.5000	180.975 7.1250	17.462 0.6875	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	775	772-B
88.900 3.5000	190.500 7.5000	22.225 0.8750	424000 95300	0.33	1.79	110000 24700	63000 14200	1.74	630000 142000	855	854-B
88.900 3.5000	190.500 7.5000	22.225 0.8750	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221434	HH221410-B
88.900 3.5000	200.000 7.8740	27.361 1.0772	376000 84600	0.63	0.95	97500 21900	106000 23700	0.92	519000 117000	98350	98788-B
90.000 3.5433	135.000 5.3150	10.500 0.4134	110000 24600	0.49	1.21	28400 6390	24000 5410	1.18	155000 34900	JP9049	JP9010-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R [4]	d_a	d_b	D_a	G_1	G_2	Cg	
29.769 1.1720	22.225 0.8750	-0.8 -0.03	141.961 5.5890	5.537 0.2180	3.5 0.14	90.0 3.54	97.0 3.82	131.0 5.16	105	29.3	0.1252	1.67 3.68
36.098 1.4212	28.575 1.1250	-5.3 -0.21	146.240 5.7575	6.350 0.2500	3.5 0.14	91.0 3.58	98.0 3.86	134.0 5.28	126	32	0.1295	2.21 4.86
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	93.0 3.66	100.0 3.94	144.0 5.67	151	36.8	0.1416	3.07 6.78
41.275 1.6250	31.750 1.2500	-7.9 -0.31	159.441 6.2772	7.142 0.2812	3.5 0.14	92.0 3.62	99.0 3.90	141.0 5.55	137	27.3	0.0919	3.21 7.07
48.260 1.9000	38.100 1.5000	-11.9 -0.47	169.748 6.6830	7.925 0.3120	3.5 0.14	94.0 3.70	100.0 3.94	150.0 5.91	177	29.4	0.0945	4.52 9.97
56.363 2.2190	41.275 1.6250	-18.5 -0.73	177.698 6.9960	9.525 0.3750	0.8 0.03	94.0 3.70	95.0 3.74	155.0 6.10	198	34.8	0.0937	5.62 12.38
56.363 2.2190	41.275 1.6250	-18.5 -0.73	177.698 6.9960	9.525 0.3750	3.5 0.14	94.0 3.70	101.0 3.98	155.0 6.10	198	34.8	0.0937	5.60 12.35
25.400 1.0000	19.845 0.7813	0.5 0.02	130.076 5.1211	4.762 0.1875	3.5 0.14	90.0 3.54	96.0 3.78	123.0 4.84	98.2	41.8	0.1198	1.07 2.37
29.769 1.1720	22.225 0.8750	-0.8 -0.03	141.961 5.5890	5.537 0.2180	3.5 0.14	91.0 3.58	98.0 3.86	131.0 5.16	105	29.3	0.1252	1.62 3.57
29.000 1.1417	24.000 0.9449	-0.3 -0.01	135.448 5.3346	5.558 0.2188	3.0 0.12	92.0 3.62	98.0 3.86	127.0 5.00	117	36.6	0.1303	1.40 3.09
29.769 1.1720	22.225 0.8750	-0.8 -0.03	141.961 5.5890	5.537 0.2180	3.5 0.14	93.0 3.66	99.0 3.90	131.0 5.16	105	29.3	0.1252	1.57 3.46
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	96.0 3.78	102.0 4.02	144.0 5.67	151	36.8	0.1416	2.95 6.51
41.275 1.6250	31.750 1.2500	-7.9 -0.31	159.441 6.2772	7.142 0.2812	3.5 0.14	95.0 3.74	102.0 4.02	141.0 5.55	137	27.3	0.0919	3.07 6.77
48.260 1.9000	38.100 1.5000	-11.9 -0.47	169.748 6.6830	7.925 0.3120	3.5 0.14	97.0 3.82	103.0 4.06	150.0 5.91	177	29.4	0.0945	4.37 9.62
41.275 1.6250	30.162 1.1875	-2.8 -0.11	175.336 6.9030	7.142 0.2812	3.5 0.14	99.0 3.90	105.0 4.13	160.0 6.30	182	37.2	0.1056	4.23 9.33
56.363 2.2190	41.275 1.6250	-18.5 -0.73	177.698 6.9960	9.525 0.3750	3.5 0.14	97.0 3.82	104.0 4.09	155.0 6.10	198	34.8	0.0937	5.42 11.95
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	97.0 3.82	103.0 4.06	144.0 5.67	151	38.3	0.1416	2.89 6.38
28.971 1.1406	24.608 0.9688	3.0 0.12	154.681 6.0898	5.558 0.2188	3.0 0.12	98.0 3.86	104.0 4.09	152.0 5.98	130	37.2	0.1386	2.13 4.70
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	98.0 3.86	104.0 4.09	144.0 5.67	151	36.8	0.1416	2.83 6.24
48.260 1.9000	38.100 1.5000	-11.9 -0.47	169.748 6.6830	7.925 0.3120	7.0 0.28	99.0 3.90	113.0 4.45	150.0 5.91	177	29.4	0.0945	4.16 9.16
48.260 1.9000	38.100 1.5000	-11.9 -0.47	169.748 6.6830	7.925 0.3120	3.5 0.14	99.0 3.90	106.0 4.17	150.0 5.91	177	29.4	0.0945	4.20 9.26
55.100 2.1693	42.862 1.6875	-13.2 -0.52	171.450 6.7500	7.938 0.3125	3.5 0.14	102.0 4.01	109.0 4.29	155.0 6.10	199	33.5	0.1037	4.75 10.47
41.275 1.6250	30.162 1.1875	-2.8 -0.11	175.336 6.9030	7.142 0.2812	3.5 0.14	101.0 3.98	107.0 4.21	160.0 6.30	182	37.2	0.1056	4.09 9.02
48.006 1.8900	38.100 1.5000	-8.1 -0.32	188.798 7.4330	7.938 0.3125	4.8 0.19	103.0 4.06	112.0 4.41	168.0 6.61	227	41.3	0.1067	5.89 12.98
57.531 2.2650	44.450 1.7500	-15.2 -0.60	199.923 7.8710	9.525 0.3750	8.0 0.31	103.0 4.06	118.0 4.65	174.0 6.85	264	44.9	0.1072	7.89 17.39
57.531 2.2650	46.038 1.8125	-15.0 -0.59	199.923 7.8710	11.112 0.4375	8.0 0.31	105.0 4.13	120.0 4.72	179.0 7.05	266	28.4	0.1072	8.33 18.36
49.212 1.9375	34.925 1.3750	1.3 0.05	209.550 8.2500	9.525 0.3750	3.5 0.14	112.0 4.41	118.0 4.65	188.0 7.40	203	37.4	0.1197	7.72 17.02
22.500 0.8858	17.500 0.6890	5.6 0.22	142.000 5.5906	4.000 0.1575	2.0 0.08	97.0 3.82	100.0 3.94	133.0 5.24	83.8	46	0.1196	1.14 2.51

[4] These maximum fillet radii will be cleared by the bearing corners.

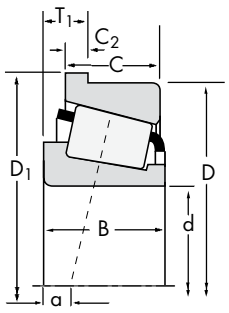
Continued on next page.

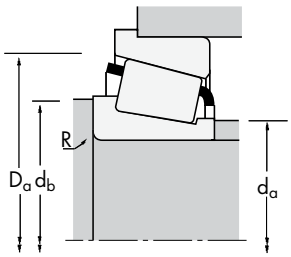
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
90.488 3.5625	161.925 6.3750	17.450 0.6870	303000 68100	0.34	1.76	78500 17700	45900 10300	1.71	441000 99200	760	752-B
92.075 3.6250	142.875 5.6250	15.080 0.5937	182000 41000	0.45	1.34	47300 10600	36300 8160	1.30	307000 69000	47890	47825-B
92.075 3.6250	149.225 5.8750	12.700 0.5000	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42362	42587-B
92.075 3.6250	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	598	592-B
92.075 3.6250	168.275 6.6250	18.255 0.7187	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	681	672-B
93.662 3.6875	149.225 5.8750	12.700 0.5000	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42368	42587-B
93.662 3.6875	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	597	592-B
95.250 3.7500	142.875 5.6250	15.080 0.5937	182000 41000	0.45	1.34	47300 10600	36300 8160	1.30	307000 69000	47896	47825-B
95.250 3.7500	149.225 5.8750	12.700 0.5000	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42375	42587-B
95.250 3.7500	152.400 6.0000	15.875 0.6250	200000 45000	0.44	1.36	51900 11700	39200 8820	1.32	319000 71600	594	592-B
95.250 3.7500	160.000 6.2992	16.667 0.6562	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52375	52630XB
95.250 3.7500	161.925 6.3750	16.667 0.6562	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52375	52637-B
95.250 3.7500	168.275 6.6250	18.255 0.7187	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	683	672-B
95.250 3.7500	171.450 6.7500	17.462 0.6875	315000 70700	0.37	1.63	81500 18300	51200 11500	1.59	474000 107000	77375	77675-B
95.250 3.7500	180.975 7.1250	17.462 0.6875	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	776	772-B
95.250 3.7500	180.975 7.1250	17.462 0.6875	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	777	772-B
95.250 3.7500	190.500 7.5000	22.225 0.8750	424000 95300	0.33	1.79	110000 24700	63000 14200	1.74	630000 142000	864	854-B
95.250 3.7500	190.500 7.5000	22.225 0.8750	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221440	HH221410-B
96.838 3.8125	149.225 5.8750	12.700 0.5000	151000 33900	0.49	1.22	39100 8790	33000 7410	1.19	241000 54300	42381	42587-B
98.425 3.8750	161.925 6.3750	16.667 0.6562	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52387	52637-B
98.425 3.8750	168.275 6.6250	18.255 0.7187	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	685	672-B
98.425 3.8750	180.975 7.1250	17.462 0.6875	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	779	772-B
98.425 3.8750	190.500 7.5000	22.225 0.8750	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221442	HH221410-B
98.425 3.8750	212.725 8.3750	23.812 0.9375	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224332	HH224310-B
99.982 3.9363	190.500 7.5000	22.225 0.8750	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221447	HH221410-B
100.000 3.9370	145.000 5.7087	10.500 0.4134	116000 26100	0.47	1.27	30100 6770	24400 5480	1.24	172000 38700	JP10049	JP10010-B
100.000 3.9370	180.975 7.1250	17.462 0.6875	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	783	772-B
101.600 4.0000	157.162 6.1875	16.667 0.6562	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52400	52618-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R [4]	d_a	d_b	D_a	G_1	G_2	Cg	
48.260 1.9000	38.100 1.5000	-11.9 -0.47	169.748 6.6830	7.925 0.3120	3.5 0.14	101.0 3.98	107.0 4.21	150.0 5.91	177	29.4	0.0945	4.12 9.07
34.925 1.3750	26.195 1.0313	-1.0 -0.04	149.123 5.8710	7.938 0.3125	3.5 0.14	101.0 3.98	107.0 4.21	142.0 5.59	153	38.1	0.1428	2.00 4.41
28.971 1.1406	24.608 0.9688	3.0 0.12	154.681 6.0898	5.558 0.2188	3.5 0.14	101.0 3.98	107.0 4.21	152.0 5.98	130	37.2	0.1386	2.03 4.46
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	101.0 3.98	107.0 4.21	144.0 5.67	151	36.8	0.1416	2.70 5.96
41.275 1.6250	30.162 1.1875	-2.8 -0.11	175.336 6.9030	7.142 0.2812	3.5 0.14	104.0 4.09	110.0 4.33	160.0 6.30	182	37.2	0.1056	3.94 8.70
28.971 1.1406	24.608 0.9688	3.0 0.12	154.681 6.0898	5.558 0.2188	3.0 0.12	102.0 4.02	107.0 4.21	152.0 5.98	130	37.2	0.1386	1.98 4.36
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	102.0 4.02	109.0 4.29	144.0 5.67	151	38.3	0.1416	2.64 5.81
34.925 1.3750	26.195 1.0313	-1.0 -0.04	149.123 5.8710	7.938 0.3125	3.5 0.14	103.0 4.06	110.0 4.33	142.0 5.59	153	38.1	0.1428	1.87 4.13
28.971 1.1406	24.608 0.9688	3.0 0.12	154.681 6.0898	5.558 0.2188	3.0 0.12	103.0 4.06	108.0 4.25	152.0 5.98	130	37.2	0.1386	1.93 4.26
36.322 1.4300	30.162 1.1875	-2.5 -0.10	158.648 6.2460	6.350 0.2500	3.5 0.14	104.0 4.09	110.0 4.33	144.0 5.67	151	36.8	0.1416	2.57 5.66
36.116 1.4219	26.195 1.0313	-0.5 -0.02	166.345 6.5490	6.350 0.2500	3.5 0.14	105.0 4.13	112.0 4.41	155.0 6.10	175	41.7	0.1519	2.91 6.41
36.116 1.4219	26.195 1.0313	-0.5 -0.02	168.173 6.6210	6.350 0.2500	3.5 0.14	105.0 4.13	112.0 4.41	155.0 6.10	175	41.7	0.1519	2.99 6.59
41.275 1.6250	30.162 1.1875	-2.8 -0.11	175.336 6.9030	7.142 0.2812	3.5 0.14	106.0 4.17	113.0 4.45	160.0 6.30	182	37.2	0.1056	3.79 8.36
48.260 1.9000	38.100 1.5000	-9.7 -0.38	179.283 7.0584	7.938 0.3125	3.5 0.14	106.0 4.17	113.0 4.45	161.0 6.34	206	37.7	0.1017	4.72 10.40
48.006 1.8900	38.100 1.5000	-8.1 -0.32	188.798 7.4330	7.938 0.3125	3.5 0.14	107.0 4.21	114.0 4.49	168.0 6.61	227	41.3	0.1067	5.55 12.24
48.006 1.8900	38.100 1.5000	-8.1 -0.32	188.798 7.4330	7.938 0.3125	9.7 0.38	107.0 4.21	126.0 4.96	168.0 6.61	227	41.3	0.1067	5.45 12.03
57.531 2.2650	44.450 1.7500	-15.2 -0.60	199.923 7.8710	9.525 0.3750	8.0 0.31	108.0 4.25	123.0 4.84	174.0 6.85	264	44.9	0.1072	7.47 16.46
57.531 2.2650	46.038 1.8125	-15.0 -0.59	199.923 7.8710	11.112 0.4375	8.0 0.31	110.0 4.33	125.0 4.92	179.0 7.05	266	28.4	0.1072	7.91 17.44
28.971 1.1406	24.608 0.9688	3.0 0.12	154.681 6.0898	5.558 0.2188	3.5 0.14	104.0 4.09	110.0 4.33	152.0 5.98	130	37.2	0.1386	1.86 4.11
36.116 1.4219	26.195 1.0313	-0.5 -0.02	168.173 6.6210	6.350 0.2500	3.5 0.14	108.0 4.25	114.0 4.49	155.0 6.10	175	41.7	0.1519	2.85 6.28
41.275 1.6250	30.162 1.1875	-2.8 -0.11	175.336 6.9030	7.142 0.2812	3.5 0.14	109.0 4.29	116.0 4.57	160.0 6.30	182	37.2	0.1056	3.64 8.02
48.006 1.8900	38.100 1.5000	-8.1 -0.32	188.798 7.4330	7.938 0.3125	3.5 0.14	110.0 4.33	116.0 4.57	168.0 6.61	227	41.3	0.1067	5.37 11.84
57.531 2.2650	46.038 1.8125	-15.0 -0.59	199.923 7.8710	11.112 0.4375	3.5 0.14	113.0 4.45	119.0 4.69	179.0 7.05	266	28.4	0.1072	7.75 17.09
66.675 2.6250	53.975 2.1250	-18.8 -0.74	223.733 8.8084	11.112 0.4375	3.5 0.14	119.0 4.69	123.0 4.84	204.0 8.03	367	47.8	0.1182	12.40 27.34
57.531 2.2650	46.038 1.8125	-15.0 -0.59	199.923 7.8710	11.112 0.4375	6.4 0.25	114.0 4.49	126.0 4.96	179.0 7.05	266	28.4	0.1072	7.61 16.77
22.500 0.8858	17.500 0.6890	6.1 0.24	152.000 5.9843	4.000 0.1575	3.0 0.12	106.0 4.17	112.0 4.41	142.0 5.59	104	40.9	0.1264	1.18 2.61
48.006 1.8900	38.100 1.5000	-8.1 -0.32	188.798 7.4330	7.938 0.3125	3.5 0.14	111.0 4.37	118.0 4.65	168.0 6.61	227	41.3	0.1067	5.28 11.64
36.116 1.4219	26.195 1.0313	-5.1 -0.20	163.512 6.4375	6.350 0.2500	3.5 0.14	111.0 4.37	117.0 4.61	155.0 6.10	175	41.7	0.1519	2.47 5.45

[4] These maximum fillet radii will be cleared by the bearing corners.

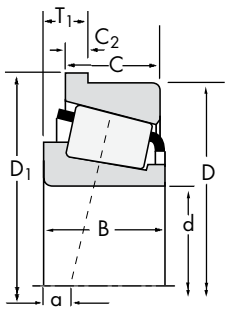
Continued on next page.

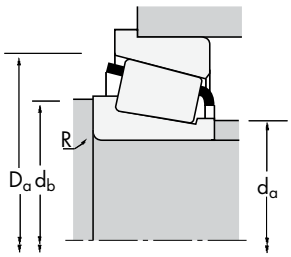
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
101.600 4.0000	160.000 6.2992	16.667 0.6562	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52400	52630XB
101.600 4.0000	161.925 6.3750	16.667 0.6562	207000 46500	0.47	1.26	53600 12100	43600 9800	1.23	343000 77000	52400	52637-B
101.600 4.0000	168.275 6.6250	18.255 0.7187	245000 55100	0.47	1.28	63500 14300	51200 11500	1.24	386000 86700	687	672-B
101.600 4.0000	180.975 7.1250	17.462 0.6875	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	780	772-B
101.600 4.0000	190.500 7.5000	22.225 0.8750	424000 95300	0.33	1.79	110000 24700	63000 14200	1.74	630000 142000	861	854-B
101.600 4.0000	190.500 7.5000	22.225 0.8750	494000 111000	0.33	1.79	128000 28800	73400 16500	1.74	692000 156000	HH221449	HH221410-B
101.600 4.0000	200.000 7.8740	27.361 1.0772	376000 84600	0.63	0.95	97500 21900	106000 23700	0.92	519000 117000	98400	98788-B
101.600 4.0000	212.725 8.3750	23.812 0.9375	530000 119000	0.33	1.84	137000 30900	76600 17200	1.79	786000 177000	941	932-B
104.775 4.1250	180.975 7.1250	17.462 0.6875	320000 72000	0.39	1.56	83100 18700	54800 12300	1.51	495000 111000	782	772-B
104.775 4.1250	190.500 7.5000	20.638 0.8125	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71412	71750-B
107.950 4.2500	165.100 6.5000	15.875 0.6250	210000 47100	0.50	1.21	54400 12200	46300 10400	1.18	355000 79700	56425	56650-B
107.950 4.2500	190.500 7.5000	20.638 0.8125	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71425	71750-B
107.950 4.2500	212.725 8.3750	23.812 0.9375	530000 119000	0.33	1.84	137000 30900	76600 17200	1.79	786000 177000	936	932-B
107.950 4.2500	212.725 8.3750	23.812 0.9375	630000 142000	0.33	1.84	163000 36700	91000 20500	1.79	906000 204000	HH224340	HH224310-B
109.538 4.3125	158.750 6.2500	11.908 0.4688	107000 24000	0.61	0.99	27600 6220	28700 6450	0.96	179000 40100	37431	37625-B
109.992 4.3304	177.800 7.0000	18.258 0.7188	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64433	64700-B
111.125 4.3750	190.500 7.5000	20.638 0.8125	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71437	71750-B
114.300 4.5000	177.800 7.0000	18.258 0.7188	254000 57200	0.52	1.16	65900 14800	58300 13100	1.13	419000 94200	64450	64700-B
114.300 4.5000	190.500 7.5000	20.638 0.8125	337000 75700	0.42	1.44	87300 19600	62200 14000	1.40	543000 122000	71450	71750-B
114.300 4.5000	212.725 8.3750	23.812 0.9375	530000 119000	0.33	1.84	137000 30900	76600 17200	1.79	786000 177000	938	932-B
115.000 4.5276	165.000 6.4961	12.500 0.4921	148000 33200	0.46	1.31	38300 8620	30100 6770	1.27	245000 55100	JLM722948	JLM722912-B
117.475 4.6250	180.975 7.1250	16.667 0.6562	181000 40700	0.50	1.21	46900 10600	39900 8980	1.18	271000 61000	68462	68712-B
120.000 4.7244	180.000 7.0866	16.350 0.6437	229000 51400	0.41	1.45	59300 13300	41900 9430	1.41	377000 84700	JM624649	JM624610-B
120.650 4.7500	160.338 6.3125	8.733 0.3438	97500 21900	0.43	1.38	25300 5680	18800 4230	1.34	206000 46400	L624549	L624510-B
120.650 4.7500	234.950 9.2500	25.400 1.0000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95475	95925-B
123.825 4.8750	182.562 7.1875	12.700 0.5000	248000 55800	0.31	1.97	64300 14500	33600 7550	1.91	493000 111000	48286	48220-B
127.000 5.0000	182.562 7.1875	12.700 0.5000	248000 55800	0.31	1.97	64300 14500	33600 7550	1.91	493000 111000	48290	48220-B
127.000 5.0000	215.900 8.5000	20.638 0.8125	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74500	74850-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R [4]	d_a	d_b	D_a	G_1	G_2	Cg	
36.116 1.4219	26.195 1.0313	-5.1 -0.20	166.345 6.5490	6.350 0.2500	3.5 0.14	111.0 4.37	117.0 4.61	155.0 6.10	175	41.7	0.1519	2.64 5.83
36.116 1.4219	26.195 1.0313	-5.1 -0.20	168.173 6.6210	6.350 0.2500	3.5 0.14	111.0 4.37	117.0 4.61	155.0 6.10	175	41.7	0.1519	2.72 6.01
41.275 1.6250	30.162 1.1875	-2.8 -0.11	175.336 6.9030	7.142 0.2812	3.5 0.14	112.0 4.41	118.0 4.65	160.0 6.30	182	37.2	0.1056	3.48 7.66
48.006 1.8900	38.100 1.5000	-8.1 -0.32	188.798 7.4330	7.938 0.3125	3.5 0.14	113.0 4.45	119.0 4.69	168.0 6.61	227	38.2	0.1067	5.18 11.43
57.531 2.2650	44.450 1.7500	-15.2 -0.60	199.923 7.8710	9.525 0.3750	8.0 0.31	114.0 4.49	129.0 5.08	174.0 6.85	264	44.9	0.1072	7.02 15.48
57.531 2.2650	46.038 1.8125	-15.0 -0.59	199.923 7.8710	11.112 0.4375	8.0 0.31	116.0 4.56	131.0 5.16	179.0 7.05	266	28.4	0.1072	7.46 16.45
49.212 1.9375	34.925 1.3750	1.3 0.05	209.550 8.2500	9.525 0.3750	3.5 0.14	120.5 4.75	128.0 5.04	188.0 7.40	203	37.4	0.1197	6.99 15.40
66.675 2.6250	53.975 2.1250	-19.8 -0.78	223.736 8.8085	11.112 0.4375	7.0 0.28	117.0 4.61	130.0 5.12	199.0 7.83	339	39.7	0.1153	11.31 24.93
48.006 1.8900	38.100 1.5000	-8.1 -0.32	188.798 7.4330	7.938 0.3125	3.5 0.14	116.0 4.57	122.0 4.80	168.0 6.61	227	38.2	0.1067	4.99 11.00
49.212 1.9375	34.925 1.3750	-6.6 -0.26	198.323 7.8080	7.937 0.3125	3.5 0.14	118.0 4.65	124.0 4.88	181.0 7.13	269	45.7	0.1156	5.94 13.09
36.512 1.4375	26.988 1.0625	2.0 0.08	171.348 6.7460	6.350 0.2500	3.5 0.14	117.0 4.61	123.0 4.84	162.0 6.38	191	47.7	0.1584	2.73 6.01
49.212 1.9375	34.925 1.3750	-6.6 -0.26	198.323 7.8080	7.937 0.3125	3.5 0.14	120.0 4.72	126.0 4.96	181.0 7.13	269	45.7	0.1156	5.73 12.64
66.675 2.6250	53.975 2.1250	-19.8 -0.78	223.736 8.8085	11.112 0.4375	8.0 0.31	122.0 4.80	137.0 5.39	199.0 7.83	339	39.7	0.1153	10.74 23.69
66.675 2.6250	53.975 2.1250	-18.8 -0.74	223.733 8.8084	11.112 0.4375	8.0 0.31	126.0 4.96	139.0 5.47	204.0 8.03	367	47.8	0.1182	11.53 25.41
21.438 0.8440	15.875 0.6250	13.7 0.54	163.413 6.4336	4.762 0.1875	3.5 0.14	116.0 4.57	123.0 4.84	153.0 6.02	124	48.7	0.1443	1.38 3.05
41.275 1.6250	30.162 1.1875	1.3 0.05	184.841 7.2772	7.145 0.2813	3.5 0.14	121.0 4.76	128.0 5.04	174.0 6.85	219	45.3	0.1153	3.92 8.65
49.212 1.9375	34.925 1.3750	-6.6 -0.26	198.323 7.8080	7.937 0.3125	3.5 0.14	123.0 4.84	129.0 5.08	181.0 7.13	269	45.7	0.1156	5.52 12.17
41.275 1.6250	30.162 1.1875	1.3 0.05	184.841 7.2772	7.145 0.2813	3.5 0.14	125.0 4.92	131.0 5.16	174.0 6.85	219	45.3	0.1153	3.68 8.11
49.212 1.9375	34.925 1.3750	-6.6 -0.26	198.323 7.8080	7.937 0.3125	3.5 0.14	125.0 4.92	132.0 5.20	181.0 7.13	269	45.7	0.1156	5.31 11.70
66.675 2.6250	53.975 2.1250	-19.8 -0.78	223.736 8.8085	11.112 0.4375	7.0 0.28	128.0 5.04	141.0 5.55	199.0 7.83	339	39.7	0.1153	10.18 22.44
27.000 1.0630	21.000 0.8268	5.6 0.22	172.000 6.7717	5.500 0.2165	3.3 0.13	121.0 4.76	127.0 5.00	160.0 6.30	161	57.2	0.1449	1.83 4.05
31.750 1.2500	25.400 1.0000	5.3 0.21	188.016 7.4022	7.145 0.2813	3.5 0.14	125.0 4.92	132.0 5.20	172.0 6.77	163	51.7	0.1026	2.86 6.31
36.000 1.4173	26.000 1.0236	0.0 0.00	188.000 7.4016	6.580 0.2590	3.5 0.14	128.0 5.04	135.0 5.31	175.0 6.89	227	61.6	0.1084	3.04 6.70
21.433 0.8438	16.670 0.6563	8.4 0.33	164.203 6.4647	3.970 0.1563	1.5 0.06	127.0 5.00	129.0 5.08	157.0 6.18	195	139	0.1509	1.19 2.63
63.500 2.5000	49.212 1.9375	-14.0 -0.55	245.958 9.6834	11.112 0.4375	6.4 0.25	137.0 5.39	149.0 5.87	217.0 8.54	454	59.3	0.1323	12.90 28.43
38.100 1.5000	33.338 1.3125	-5.6 -0.22	188.811 7.4335	6.350 0.2500	3.5 0.14	133.0 5.24	139.0 5.47	177.0 6.97	353	91.3	0.1138	3.63 8.00
38.100 1.5000	33.338 1.3125	-5.6 -0.22	188.811 7.4335	6.350 0.2500	3.5 0.14	135.0 5.31	141.0 5.55	177.0 6.97	353	91.3	0.1138	3.44 7.59
47.625 1.8750	34.925 1.3750	2.3 0.09	223.733 8.8084	7.938 0.3125	3.5 0.14	141.0 5.55	148.0 5.83	209.0 8.23	363	68.5	0.1338	7.19 15.84

[4] These maximum fillet radii will be cleared by the bearing corners.

Continued on next page.

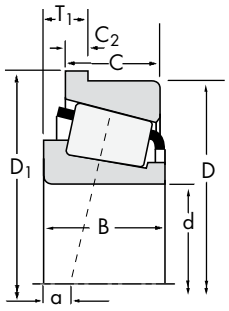
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

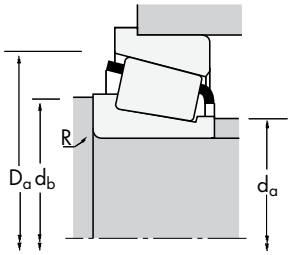
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

B

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
127.000 5.0000	234.950 9.2500	25.400 1.0000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95500	95925-B
130.000 5.1181	185.000 7.2835	13.000 0.5118	181000 40800	0.47	1.27	47000 10600	38100 8560	1.24	283000 63600	JP13049	JP13010-B
130.175 5.1250	196.850 7.7500	15.083 0.5938	340000 76500	0.34	1.74	88200 19800	52000 11700	1.70	625000 141000	67389	67322-B
133.350 5.2500	190.500 7.5000	11.908 0.4688	262000 58900	0.32	1.87	67900 15300	37300 8390	1.82	542000 122000	48385	48320-B
133.350 5.2500	215.900 8.5000	20.638 0.8125	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74525	74850-B
133.350 5.2500	234.950 9.2500	25.400 1.0000	582000 131000	0.37	1.62	151000 33900	95500 21500	1.58	931000 209000	95525	95925-B
136.525 5.3750	215.900 8.5000	20.638 0.8125	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74537	74850-B
136.525 5.3750	254.000 10.0000	30.162 1.1875	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99537	99100-B
139.700 5.5000	215.900 8.5000	20.638 0.8125	354000 79500	0.49	1.23	91700 20600	76500 17200	1.20	614000 138000	74550	74850-B
139.700 5.5000	241.300 9.5000	22.225 0.8750	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231132	HM231115-B
139.700 5.5000	254.000 10.0000	30.162 1.1875	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99550	99100-B
140.000 5.5118	195.000 7.6772	13.000 0.5118	188000 42300	0.50	1.19	48800 11000	42000 9440	1.16	304000 68400	JP14049	JP14010-B
142.875 5.6250	193.675 7.6250	9.525 0.3750	182000 40900	0.37	1.63	47100 10600	29700 6690	1.59	394000 88600	36686	36620-B
142.875 5.6250	200.025 7.8750	12.700 0.5000	265000 59600	0.34	1.78	68800 15500	39600 8900	1.74	560000 126000	48685	48620-B
142.875 5.6250	241.300 9.5000	22.225 0.8750	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231136	HM231115-B
146.050 5.7500	193.675 7.6250	9.525 0.3750	182000 40900	0.37	1.63	47100 10600	29700 6690	1.59	394000 88600	36690	36620-B
146.050 5.7500	241.300 9.5000	22.225 0.8750	477000 107000	0.44	1.36	124000 27800	93600 21000	1.32	810000 182000	82576	82950-B
146.050 5.7500	241.300 9.5000	22.225 0.8750	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231140	HM231115-B
146.050 5.7500	254.000 10.0000	30.162 1.1875	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99575	99100-B
149.225 5.8750	241.300 9.5000	22.225 0.8750	553000 124000	0.32	1.88	143000 32200	78200 17600	1.83	932000 210000	HM231149	HM231115-B
149.225 5.8750	254.000 10.0000	30.162 1.1875	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99587	99100-B
150.000 5.9055	205.000 8.0709	12.000 0.4724	179000 40300	0.46	1.31	46500 10500	36500 8210	1.27	339000 76100	JL730646	JL730612-B
152.400 6.0000	192.088 7.5625	9.970 0.3925	132000 29700	0.42	1.44	34200 7690	24400 5480	1.40	277000 62200	L630349	L630310-B
152.400 6.0000	254.000 10.0000	30.162 1.1875	611000 137000	0.41	1.47	158000 35600	110000 24800	1.43	1030000 231000	99600	99100-B
158.750 6.2500	225.425 8.8750	13.495 0.5313	281000 63100	0.38	1.57	72800 16400	47800 10700	1.52	635000 143000	46780	46720-B
160.325 6.3120	288.925 11.3750	26.988 1.0625	763000 171000	0.32	1.88	198000 44500	108000 24300	1.83	1240000 278000	HM237532	HM237510-B
165.100 6.5000	225.425 8.8750	13.495 0.5313	281000 63100	0.38	1.57	72800 16400	47800 10700	1.52	635000 143000	46790	46720-B
165.100 6.5000	247.650 9.7500	16.670 0.6563	375000 84300	0.44	1.36	97200 21900	73200 16500	1.33	779000 175000	67780	67720-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
63.500 2.5000	49.212 1.9375	-14.0 -0.55	245.958 9.6834	11.112 0.4375	6.4 0.25	142.0 5.59	154.0 6.06	217.0 8.54	454	53.8	0.1323	12.28 27.07
27.000 1.0630	21.000 0.8268	8.9 0.35	192.000 7.5591	5.000 0.1969	3.0 0.12	137.0 5.39	143.0 5.63	188.0 7.40	192	60.3	0.1064	2.24 4.95
46.038 1.8125	38.100 1.5000	-6.4 -0.25	203.891 8.0272	7.145 0.2813	3.5 0.14	141.0 5.55	146.0 5.75	191.0 7.52	384	70.1	0.1220	5.04 11.11
39.688 1.5625	33.338 1.3125	-4.1 -0.16	195.956 7.7148	5.558 0.2188	3.5 0.14	142.0 5.59	148.0 5.83	186.0 7.32	404	95.6	0.1209	3.60 7.94
47.625 1.8750	34.925 1.3750	2.3 0.09	223.733 8.8084	7.938 0.3125	3.5 0.14	146.0 5.75	152.0 5.98	209.0 8.23	363	63.3	0.1338	6.70 14.77
63.500 2.5000	49.212 1.9375	-14.0 -0.55	245.958 9.6834	11.112 0.4375	9.7 0.38	148.0 5.83	166.0 6.54	217.0 8.54	454	53.8	0.1323	11.54 25.44
47.625 1.8750	34.925 1.3750	2.3 0.09	223.733 8.8084	7.938 0.3125	3.5 0.14	148.0 5.83	155.0 6.10	209.0 8.23	363	68.5	0.1338	6.45 14.22
66.675 2.6250	47.625 1.8750	-12.2 -0.48	264.973 10.4320	11.112 0.4375	7.0 0.28	156.0 6.14	167.0 6.57	238.0 9.37	556	73.5	0.1459	14.75 32.53
47.625 1.8750	34.925 1.3750	2.3 0.09	223.733 8.8084	7.938 0.3125	3.5 0.14	151.0 5.94	158.0 6.22	209.0 8.23	363	63.3	0.1338	6.19 13.65
56.642 2.2300	44.450 1.7500	-11.4 -0.45	250.723 9.8710	9.525 0.3750	3.5 0.14	156.0 6.14	160.0 6.30	224.0 8.82	533	85.9	0.1327	10.73 23.65
66.675 2.6250	47.625 1.8750	-12.2 -0.48	264.973 10.4320	11.112 0.4375	7.0 0.28	156.0 6.14	170.0 6.69	238.0 9.37	556	73.5	0.1459	14.37 31.68
27.000 1.0630	21.000 0.8268	11.9 0.47	202.000 7.9528	5.000 0.1969	3.0 0.12	148.0 5.83	153.0 6.02	198.0 7.80	220	68.1	0.1133	2.40 5.30
28.575 1.1250	23.020 0.9063	4.8 0.19	197.541 7.7772	3.970 0.1563	1.5 0.06	151.0 5.94	153.0 6.02	190.0 7.48	366	152	0.1768	2.48 5.46
39.688 1.5625	34.130 1.3437	-3.0 -0.12	205.481 8.0898	5.555 0.2187	3.5 0.14	151.0 5.94	158.0 6.22	194.0 7.64	440	115	0.1261	3.85 8.50
56.642 2.2300	44.450 1.7500	-11.4 -0.45	250.723 9.8710	9.525 0.3750	3.5 0.14	158.0 6.22	162.0 6.38	224.0 8.82	533	85.9	0.1327	10.42 22.96
28.575 1.1250	23.020 0.9063	4.8 0.19	197.541 7.7772	3.970 0.1563	1.5 0.06	153.0 6.02	155.0 6.10	190.0 7.48	366	121	0.1768	2.31 5.10
56.642 2.2300	44.450 1.7500	-3.6 -0.14	250.723 9.8710	9.525 0.3750	3.5 0.14	160.0 6.30	166.0 6.54	226.0 8.90	460	81.1	0.1405	10.34 22.79
56.642 2.2300	44.450 1.7500	-11.4 -0.45	250.723 9.8710	9.525 0.3750	3.5 0.14	160.0 6.30	164.0 6.46	224.0 8.82	533	85.9	0.1327	10.10 22.26
66.675 2.6250	47.625 1.8750	-12.2 -0.48	264.973 10.4320	11.112 0.4375	7.0 0.28	162.0 6.38	175.0 6.89	238.0 9.37	556	73.5	0.1459	13.62 30.03
56.642 2.2300	44.450 1.7500	-11.4 -0.45	250.723 9.8710	9.525 0.3750	3.5 0.14	163.0 6.42	167.0 6.57	224.0 8.82	533	85.9	0.1327	9.77 21.54
66.675 2.6250	47.625 1.8750	-12.2 -0.48	264.973 10.4320	11.112 0.4375	7.0 0.28	165.0 6.50	178.0 7.01	238.0 9.37	556	73.5	0.1459	13.24 29.18
28.575 1.1250	21.438 0.8440	11.4 0.45	210.000 8.2677	4.862 0.1914	3.3 0.13	158.0 6.22	164.0 6.46	200.0 7.87	295	103	0.1763	2.68 5.90
24.000 0.9449	19.000 0.7480	10.2 0.40	197.371 7.7705	3.967 0.1562	2.0 0.08	158.0 6.22	162.0 6.38	190.0 7.48	293	164	0.1698	1.63 3.59
66.675 2.6250	47.625 1.8750	-12.2 -0.48	264.973 10.4320	11.112 0.4375	7.0 0.28	169.5 6.68	181.0 7.13	238.0 9.37	556	66.7	0.1459	12.84 28.31
39.688 1.5625	33.337 1.3125	2.5 0.10	230.881 9.0898	5.557 0.2188	3.5 0.14	169.0 6.65	176.0 6.93	219.0 8.62	572	133	0.1432	5.18 11.42
63.500 2.5000	47.625 1.8750	-11.7 -0.46	299.933 11.8084	11.112 0.4375	7.0 0.28	181.0 7.13	192.0 7.56	279.0 10.98	751	101	0.1168	17.84 39.33
39.688 1.5625	33.337 1.3125	2.5 0.10	230.881 9.0898	5.557 0.2188	3.5 0.14	174.0 6.85	181.0 7.13	219.0 8.62	572	175	0.1432	4.68 10.32
47.625 1.8750	38.100 1.5000	4.8 0.19	254.691 10.0272	7.145 0.2813	3.5 0.14	179.0 7.05	185.0 7.28	241.0 9.49	622	122	0.1214	8.48 18.70

[4] These maximum fillet radii will be cleared by the bearing corners.

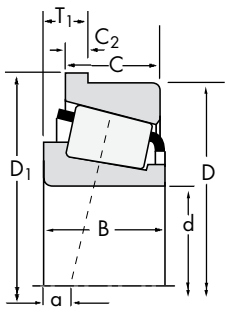
Continued on next page.

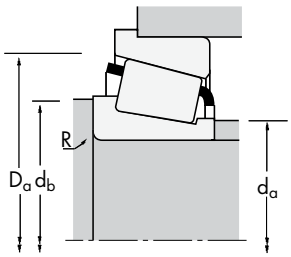
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
165.100 6.5000	254.000 10.0000	22.225 0.8750	389000 87400	0.37	1.62	101000 22700	63800 14300	1.58	644000 145000	86650	86100-B
171.450 6.7500	260.350 10.2500	25.400 1.0000	605000 136000	0.40	1.49	157000 35300	108000 24300	1.45	1180000 265000	HM535349	HM535310-B
174.625 6.8750	288.925 11.3750	26.988 1.0625	611000 137000	0.47	1.28	159000 35600	127000 28600	1.25	1070000 242000	94687	94113-B
174.625 6.8750	288.925 11.3750	26.988 1.0625	763000 171000	0.32	1.88	198000 44500	108000 24300	1.83	1240000 278000	HM237542	HM237510-B
177.800 7.0000	247.650 9.7500	16.670 0.6563	375000 84300	0.44	1.36	97200 21900	73200 16500	1.33	779000 175000	67790	67720-B
177.800 7.0000	288.925 11.3750	26.988 1.0625	611000 137000	0.47	1.28	159000 35600	127000 28600	1.25	1070000 242000	94700	94113-B
179.975 7.0856	317.500 12.5000	28.575 1.1250	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93708	93125-B
190.500 7.5000	266.700 10.5000	16.670 0.6563	386000 86700	0.48	1.26	99900 22500	81700 18400	1.22	835000 188000	67885	67820-B
190.500 7.5000	317.500 12.5000	28.575 1.1250	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93750	93125-B
193.675 7.6250	282.575 11.1250	23.812 0.9375	398000 89400	0.42	1.44	103000 23200	73300 16500	1.41	692000 156000	87762	87111-B
200.025 7.8750	317.500 12.5000	28.575 1.1250	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93787	93125-B
203.200 8.0000	282.575 11.1250	16.670 0.6563	393000 88300	0.51	1.18	102000 22900	88700 19900	1.15	876000 197000	67983	67920-B
203.200 8.0000	317.500 12.5000	28.575 1.1250	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93800	93125-B
206.375 8.1250	282.575 11.1250	16.670 0.6563	393000 88300	0.51	1.18	102000 22900	88700 19900	1.15	876000 197000	67985	67920-B
209.550 8.2500	317.500 12.5000	28.575 1.1250	677000 152000	0.52	1.15	175000 39500	157000 35300	1.12	1290000 290000	93825	93125-B
215.900 8.5000	285.750 11.2500	19.050 0.7500	398000 89500	0.48	1.25	103000 23200	85000 19100	1.21	892000 200000	LM742749	LM742710-B
228.600 9.0000	327.025 12.8750	25.400 1.0000	517000 116000	0.41	1.48	134000 30100	93300 21000	1.44	1070000 240000	8573	8520-B
241.300 9.5000	327.025 12.8750	25.400 1.0000	517000 116000	0.41	1.48	134000 30100	93300 21000	1.44	1070000 240000	8578	8520-B
244.475 9.6250	381.000 15.0000	34.925 1.3750	889000 200000	0.52	1.16	231000 51800	204000 45800	1.13	1690000 381000	EE126097	126150-B
254.000 10.0000	358.775 14.1250	30.162 1.1875	896000 202000	0.33	1.80	232000 52200	132000 29700	1.76	1850000 416000	M249749	M249710-B
254.000 10.0000	403.225 15.8750	38.100 1.5000	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275100	275158-B
266.700 10.5000	355.600 14.0000	22.225 0.8750	688000 155000	0.36	1.67	178000 40100	110000 24700	1.62	1510000 339000	LM451349	LM451310-B
266.700 10.5000	403.225 15.8750	38.100 1.5000	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275105	275158-B
273.050 10.7500	403.225 15.8750	38.100 1.5000	865000 195000	0.40	1.49	224000 50400	154000 34700	1.45	1600000 359000	EE275108	275158-B
276.225 10.8750	349.948 13.7775	18.700 0.7362	326000 73400	0.54	1.11	84600 19000	78000 17500	1.08	750000 169000	L853049	L853011-B
280.192 11.0312	406.400 16.0000	28.575 1.1250	906000 204000	0.39	1.55	235000 52800	155000 34900	1.51	1820000 409000	EE128110	128160-B
280.192 11.0312	406.400 16.0000	28.575 1.1250	851000 191000	0.39	1.55	221000 49600	146000 32800	1.51	1660000 374000	EE128111	128160-B
298.450 11.7500	444.500 17.5000	36.512 1.4375	758000 170000	0.38	1.59	196000 44200	127000 28600	1.55	1390000 312000	EE291175	291750-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
46.038 1.8125	33.338 1.3125	-1.5 -0.06	263.525 10.3750	9.525 0.3750	4.8 0.19	176.0 6.93	185.0 7.28	239.0 9.41	466	112	0.1041	7.96 17.55
66.675 2.6250	52.388 2.0625	-8.6 -0.34	271.374 10.6840	11.112 0.4375	3.5 0.14	188.0 7.40	192.0 7.56	250.0 9.84	750	116	0.1263	12.71 28.02
63.500 2.5000	47.625 1.8750	-0.8 -0.03	299.933 11.8084	11.112 0.4375	7.0 0.28	193.0 7.60	204.0 8.03	272.0 10.71	692	93.8	0.1287	16.36 36.07
63.500 2.5000	47.625 1.8750	-11.7 -0.46	299.933 11.8084	11.112 0.4375	7.0 0.28	191.0 7.52	202.0 7.95	279.0 10.98	751	101	0.1168	15.96 35.20
47.625 1.8750	38.100 1.5000	4.8 0.19	254.691 10.0272	7.145 0.2813	3.5 0.14	188.0 7.40	194.0 7.64	241.0 9.49	622	122	0.1214	7.21 15.89
63.500 2.5000	47.625 1.8750	-0.8 -0.03	299.933 11.8084	11.112 0.4375	7.0 0.28	195.0 7.68	207.0 8.15	272.0 10.71	692	93.8	0.1287	15.92 35.10
63.500 2.5000	46.038 1.8125	7.9 0.31	328.523 12.9340	11.112 0.4375	3.5 0.14	204.0 8.03	209.0 8.23	300.0 11.81	912	126	0.1460	21.69 47.82
46.833 1.8438	38.100 1.5000	10.2 0.40	273.741 10.7772	7.145 0.2813	3.5 0.14	203.0 7.99	209.0 8.23	259.0 10.20	728	147	0.1310	8.07 17.78
63.500 2.5000	46.038 1.8125	7.9 0.31	328.523 12.9340	11.112 0.4375	4.3 0.17	212.0 8.35	218.0 8.58	300.0 11.81	912	126	0.1460	20.15 44.43
47.625 1.8750	36.512 1.4375	3.8 0.15	292.000 11.4960	9.525 0.3750	3.5 0.14	206.0 8.11	211.0 8.31	272.0 10.71	575	131	0.1155	9.47 20.88
63.500 2.5000	46.038 1.8125	7.9 0.31	328.523 12.9340	11.112 0.4375	4.3 0.17	219.0 8.62	225.0 8.86	300.0 11.81	912	126	0.1460	18.70 41.22
46.038 1.8125	36.512 1.4375	16.0 0.63	289.616 11.4022	7.145 0.2813	3.5 0.14	216.0 8.50	222.0 8.74	275.0 10.83	820	172	0.1388	8.80 19.40
63.500 2.5000	46.038 1.8125	7.9 0.31	328.523 12.9340	11.112 0.4375	4.3 0.17	222.0 8.74	227.0 8.94	300.0 11.81	912	126	0.1460	18.20 40.12
46.038 1.8125	36.512 1.4375	16.0 0.63	289.616 11.4022	7.145 0.2813	3.5 0.14	219.0 8.62	224.0 8.82	275.0 10.83	820	172	0.1388	8.43 18.59
63.500 2.5000	46.038 1.8125	7.9 0.31	328.523 12.9340	11.112 0.4375	4.3 0.17	227.0 8.93	233.0 9.17	300.0 11.81	912	126	0.1460	17.18 37.87
46.038 1.8125	34.925 1.3750	14.2 0.56	293.685 11.5624	7.938 0.3125	3.5 0.14	227.0 8.94	233.0 9.17	280.0 11.02	867	225	0.1388	7.81 17.21
52.388 2.0625	36.512 1.4375	7.6 0.30	336.448 13.2460	9.525 0.3750	6.4 0.25	244.0 9.61	255.0 10.04	313.0 12.32	1050	172	0.1401	13.66 30.11
52.388 2.0625	36.512 1.4375	7.6 0.30	336.448 13.2460	9.525 0.3750	6.4 0.25	253.0 9.96	264.0 10.39	313.0 12.32	1050	172	0.1401	11.73 25.86
76.200 3.0000	57.150 2.2500	9.7 0.38	393.598 15.4960	12.700 0.5000	6.4 0.25	266.0 10.47	275.0 10.83	358.0 14.09	1320	169	0.1640	31.86 70.24
71.438 2.8125	53.975 2.1250	-6.9 -0.27	371.475 14.6250	12.700 0.5000	3.5 0.14	270.0 10.63	274.0 10.79	343.0 13.50	1630	168	0.1526	22.21 48.96
69.850 2.7500	46.038 1.8125	2.5 0.10	417.408 16.4334	14.288 0.5625	6.4 0.25	277.0 10.91	287.0 11.30	389.0 15.31	1450	201	0.1555	31.80 70.11
57.150 2.2500	44.450 1.7500	5.1 0.20	365.125 14.3750	9.525 0.3750	3.5 0.14	281.0 11.06	285.0 11.22	344.0 13.54	1550	212	0.1536	15.65 34.51
69.850 2.7500	46.038 1.8125	2.5 0.10	417.408 16.4334	14.288 0.5625	6.4 0.25	287.0 11.30	296.0 11.65	389.0 15.31	1450	201	0.1555	28.96 63.84
69.850 2.7500	46.038 1.8125	2.5 0.10	417.408 16.4334	14.288 0.5625	6.4 0.25	291.0 11.46	301.0 11.85	389.0 15.31	1450	201	0.1555	27.48 60.59
34.925 1.3750	23.812 0.9375	35.1 1.38	357.950 14.0925	6.000 0.2362	3.5 0.14	288.0 11.34	293.0 11.54	342.0 13.46	1060	350	0.1517	7.58 16.72
67.673 2.6643	53.975 2.1250	6.6 0.26	418.998 16.4960	12.700 0.5000	6.8 0.27	307.0 12.09	309.0 12.17	384.0 15.12	1730	255	0.1628	27.79 61.27
67.673 2.6643	53.975 2.1250	6.6 0.26	418.998 16.4960	12.700 0.5000	6.8 0.27	307.0 12.09	309.0 12.17	384.0 15.12	1620	240	0.1592	27.94 61.60
61.912 2.4375	39.688 1.5625	7.6 0.30	457.098 17.9960	12.700 0.5000	8.0 0.31	320.0 12.60	332.0 13.07	428.0 16.85	1580	245	0.1557	30.43 67.09

[4] These maximum fillet radii will be cleared by the bearing corners.

Continued on next page.

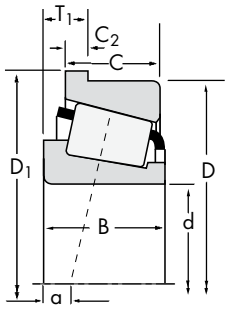
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

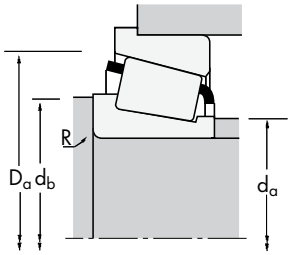
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

B

TSF

SINGLE-ROW





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T_1	C(1)	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
304.800 12.0000	404.950 15.9429	22.225 0.8750	575000 129000	0.36	1.67	149000 33500	91600 20600	1.63	1310000 295000	L357049	L357019-B
304.800 12.0000	406.400 16.0000	25.400 1.0000	754000 170000	0.44	1.36	196000 44000	148000 33200	1.32	1740000 392000	LM757049	LM757010-B
304.800 12.0000	444.500 17.5000	36.512 1.4375	758000 170000	0.38	1.59	196000 44200	127000 28600	1.55	1390000 312000	EE291201	291750-B
317.500 12.5000	444.500 17.5000	36.512 1.4375	758000 170000	0.38	1.59	196000 44200	127000 28600	1.55	1390000 312000	EE291250	291750-B
330.200 13.0000	482.600 19.0000	41.275 1.6250	1230000 276000	0.39	1.54	318000 71400	213000 47800	1.49	2320000 523000	EE526130	526190-B
349.250 13.7500	501.650 19.7500	34.925 1.3750	1320000 298000	0.37	1.63	343000 77200	216000 48500	1.59	2780000 626000	EE333137	333197-B
371.475 14.6250	508.000 20.0000	38.100 1.5000	899000 202000	0.44	1.36	233000 52400	176000 39500	1.33	1870000 420000	EE231462	232000-B
381.000 15.0000	479.425 18.8750	23.812 0.9375	582000 131000	0.50	1.21	151000 33900	128000 28800	1.18	1380000 311000	L865547	L865512-B
381.000 15.0000	522.288 20.5625	38.100 1.5000	1360000 306000	0.39	1.56	353000 79400	233000 52400	1.51	2950000 663000	LM565949	LM565910-B
396.875 15.6250	549.275 21.6250	38.100 1.5000	1400000 316000	0.41	1.47	364000 81800	254000 57100	1.43	3130000 704000	LM567943	LM567910-B
406.400 16.0000	508.000 20.0000	25.400 1.0000	842000 189000	0.37	1.64	218000 49100	137000 30700	1.60	2230000 502000	L467549	L467510-B
406.400 16.0000	549.275 21.6250	38.100 1.5000	1400000 316000	0.41	1.47	364000 81800	254000 57100	1.43	3130000 704000	LM567949	LM567910-B
488.950 19.2500	660.400 26.0000	38.100 1.5000	2030000 455000	0.31	1.95	525000 118000	276000 62000	1.90	4590000 1030000	EE640192	640260-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.

Dimensions, mm (inches)									Factors			Weight kg (lbs.)
Bearing					Shaft			Housing				
					max shaft fillet radius	backing shoulder dia.	backing shoulder dia.	backing shoulder dia.				
B	C	a [3]	D_1	C_2	R[4]	d_a	d_b	D_a	G_1	G_2	Cg	
50.800 2.0000	**38.100** 1.5000	**12.7** 0.50	**419.923** 16.5324	**9.525** 0.3750	**6.4** 0.25	**319.0** 12.56	**329.0** 12.95	**380.0** 14.96	**1750**	**301**	**0.1585**	**17.28** 38.10
63.500 2.5000	**47.625** 1.8750	**16.3** 0.64	**419.100** 16.5000	**9.525** 0.3750	**6.4** 0.25	**322.0** 12.68	**331.0** 13.03	**393.0** 15.47	**1990**	**260**	**0.1775**	**21.93** 48.35
61.912 2.4375	**39.688** 1.5625	**7.6** 0.30	**457.098** 17.9960	**12.700** 0.5000	**8.0** 0.31	**324.0** 12.76	**337.0** 13.27	**428.0** 16.85	**1580**	**245**	**0.1557**	**28.97** 63.87
61.912 2.4375	**39.688** 1.5625	**7.6** 0.30	**457.098** 17.9960	**12.700** 0.5000	**8.0** 0.31	**334.0** 13.15	**346.0** 13.62	**428.0** 16.85	**1580**	**245**	**0.1557**	**25.95** 57.22
80.167 3.1562	**60.325** 2.3750	**4.8** 0.19	**498.373** 19.6210	**15.875** 0.6250	**6.4** 0.25	**351.0** 13.82	**360.0** 14.17	**464.0** 18.27	**2280**	**287**	**0.1790**	**46.44** 102.38
84.138 3.3125	**69.850** 2.7500	**3.6** 0.14	**515.838** 20.3086	**14.288** 0.5625	**6.4** 0.25	**372.0** 14.65	**382.0** 15.04	**486.0** 19.13	**3040**	**337**	**0.1928**	**54.31** 119.74
66.675 2.6250	**50.800** 2.0000	**19.6** 0.77	**522.188** 20.5586	**14.288** 0.5625	**6.4** 0.25	**390.0** 15.35	**400.0** 15.75	**489.0** 19.25	**2390**	**366**	**0.1874**	**37.31** 82.25
47.625 1.8750	**34.925** 1.3750	**42.9** 1.69	**489.737** 19.2810	**9.525** 0.3750	**6.4** 0.25	**395.0** 15.55	**407.0** 16.02	**465.0** 18.31	**2260**	**529**	**0.1897**	**18.86** 41.58
84.138 3.3125	**61.912** 2.4375	**8.9** 0.35	**536.476** 21.1211	**14.288** 0.5625	**6.4** 0.25	**402.0** 15.83	**411.0** 16.18	**507.0** 19.96	**3380**	**378**	**0.2028**	**50.16** 110.59
84.138 3.3125	**61.912** 2.4375	**15.5** 0.61	**563.463** 22.1836	**14.288** 0.5625	**6.4** 0.25	**420.0** 16.54	**430.0** 16.93	**531.0** 20.91	**3800**	**427**	**0.2143**	**58.76** 129.54
61.912 2.4375	**47.625** 1.8750	**20.3** 0.80	**519.013** 20.4336	**11.112** 0.4375	**3.3** 0.13	**423.0** 16.65	**426.0** 16.77	**492.0** 19.37	**3720**	**673**	**0.2038**	**27.21** 59.98
84.138 3.3125	**61.912** 2.4375	**15.5** 0.61	**563.463** 22.1836	**14.288** 0.5625	**6.4** 0.25	**427.0** 16.81	**437.0** 17.20	**531.0** 20.91	**3800**	**427**	**0.2143**	**55.12** 121.52
94.458 3.7188	**69.850** 2.7500	**4.8** 0.19	**676.275** 26.6250	**14.288** 0.5625	**6.4** 0.25	**513.0** 20.20	**522.0** 20.55	**642.0** 25.28	**6320**	**601**	**0.2310**	**86.40** 190.48

[4] These maximum fillet radii will be cleared by the bearing corners.
[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

NOTES

TDO
DOUBLE OUTER RACE

TAPERED ROLLER BEARINGS

- TDO consists of a single piece (double) outer race and two single inner races.
- Configuration offers a wide effective bearing spread to support loads created by overturning moments.
- Bearings can be used at fixed positions or allowed to float in the housing bore to compensate for shaft expansion.

D	CD suffix now replaces the D suffix listed for part numbers in previous publications.
	A groove with oil holes is provided for lubrication in suffix outer race.
CD	Outer races can be pinned to prevent circumferential precession in the housing at floating positions (see the following tables for details).
	This suffix in current part numbers now replaces the D and DC suffixes listed for part numbers in previous publications.
	A groove with oil holes is provided for lubrication in suffix outer races.
DC	Can be pinned to prevent circumferential precession in the housing at floating positions (see the following tables for details).
	Outer races have one lubricant hole. Normally, these are used at floating positions with a fixing pin.

- TDO bearings are usually supplied complete with an inner race spacer as a pre-set assembly.
- To suit the application duty, the built-in setting value needs to be established by your Timken representative before an order is placed.
- The tables list part numbers of plain-ring spacers.
- If a spacer with provision for lubricant passage is required, consult your Timken representative.
- To place an order or obtain a price quotation, specify the bearing and spacer part number.

Example: inner race — outer race

A2047 - A2120D

R800003 spacer

- Double outer race can be used with any single race from the same ‘series.’
- The tables list regularly specified inner race part numbers.
- Please consult a Timken representative for more information.

BEARING DATA TABLES

In the following bearing data tables, part numbers are listed in ascending order of bore, outside diameter and width.

Bearing ratings shown in tables are based on environmental reference conditions. Effects of known operating conditions on bearing performance in an application should be investigated before final bearing selection is made.

Approximate mass is listed for every part number. For weight-critical applications or exact freight cost evaluation purposes, a more accurate value should be obtained from your Timken representative.

B

TDO

DOUBLE OUTER RACE

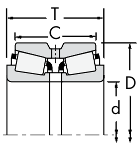
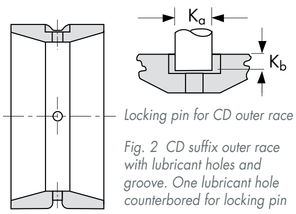
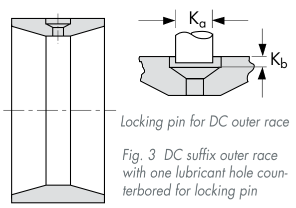


Fig. 1 D suffix outer race with lubricant holes and groove



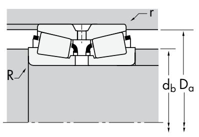
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
11.987 0.4719	30.480 1.2000	25.400 1.0000	21.260 0.8370	18500 4150	0.41	1.67	2.48	2750 618	1910 429	4780 1080	1.44
14.987 0.5901	34.987 1.3775	25.174 0.9911	20.638 0.8125	21200 4770	0.45	1.49	2.22	3160 710	2450 550	5500 1240	1.29
16.993 0.6690	47.000 1.8504	31.750 1.2500	25.212 0.9926	43100 9690	0.36	1.89	2.82	6420 1440	3920 881	11200 2510	1.64
19.050 0.7500	47.000 1.8504	31.750 1.2500	25.212 0.9926	43100 9690	0.36	1.89	2.82	6420 1440	3920 881	11200 2510	1.64
19.050 0.7500	57.150 2.2500	49.212 1.9375	36.512 1.4375	74900 16800	0.59	1.14	1.70	11200 2510	11300 2540	19400 4370	0.99
19.987 0.7869	45.984 1.8104	31.750 1.2500	25.212 0.9926	43100 9690	0.36	1.89	2.82	6420 1440	3920 881	11200 2510	1.64
19.987 0.7869	47.000 1.8504	31.750 1.2500	25.212 0.9926	43100 9690	0.36	1.89	2.82	6420 1440	3920 881	11200 2510	1.64
20.000 0.7874	50.005 1.9687	33.340 1.3126	25.400 1.0000	46900 10500	0.40	1.68	2.50	6990 1570	4810 1080	12200 2730	1.45
23.812 0.9375	71.438 2.8125	42.862 1.6875	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
23.812 0.9375	71.975 2.8336	42.761 1.6835	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
24.384 0.9600	80.962 3.1875	55.562 2.1875	39.688 1.5625	125000 28100	0.67	1.01	1.50	18600 4190	21300 4790	32400 7290	0.87
24.981 0.9835	50.005 1.9687	33.340 1.3126	25.400 1.0000	46900 10500	0.40	1.68	2.50	6990 1570	4810 1080	12200 2730	1.45
24.981 0.9835	62.000 2.4409	39.688 1.5625	36.258 1.4275	69700 15700	0.38	1.77	2.63	10400 2330	6800 1530	18100 4060	1.53
25.000 0.9843	50.005 1.9687	33.340 1.3126	25.400 1.0000	46900 10500	0.40	1.68	2.50	6990 1570	4810 1080	12200 2730	1.45
25.000 0.9843	62.000 2.4409	39.688 1.5625	36.258 1.4275	69700 15700	0.38	1.77	2.63	10400 2330	6800 1530	18100 4060	1.53
25.400 1.0000	50.005 1.9687	33.340 1.3126	25.400 1.0000	46900 10500	0.40	1.68	2.50	6990 1570	4810 1080	12200 2730	1.45
25.400 1.0000	50.005 1.9687	33.340 1.3126	25.400 1.0000	46900 10500	0.40	1.68	2.50	6990 1570	4810 1080	12200 2730	1.45
25.400 1.0000	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
25.400 1.0000	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
25.400 1.0000	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
25.400 1.0000	71.438 2.8125	42.862 1.6875	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
25.400 1.0000	71.975 2.8336	42.761 1.6835	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
28.575 1.1250	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
28.575 1.1250	66.421 2.6150	44.453 1.7501	38.100 1.5000	90100 20200	0.34	1.99	2.96	13400 3010	7790 1750	23300 5250	1.72
28.575 1.1250	69.850 2.7500	66.675 2.6250	57.150 2.2500	135000 30300	0.27	2.47	3.67	20100 4520	9410 2120	35000 7870	2.14
28.575 1.1250	71.438 2.8125	42.862 1.6875	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
28.575 1.1250	71.975 2.8336	42.761 1.6835	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
28.575 1.1250	76.200 3.0000	47.625 1.8750	38.100 1.5000	106000 23800	0.45	1.49	2.21	15800 3550	12300 2750	27500 6170	1.29

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
A2047	A2120D	R800003	0.8 0.03	16.5 0.65	0.0 0.00	28.0 1.10			1.7	3.17	0.0308	0.08 0.19
A4059	A4138D	X6SA4059	0.8 0.03	19.5 0.77	0.6 0.02	31.5 1.24			2.3	4.12	0.0355	0.12 0.26
05066	05185D	X1S-05066	1.5 0.06	24.5 0.96	0.8 0.03	42.5 1.67			5.8	5.55	0.0448	0.28 0.62
05075	05185D	X3S-05075	1.3 0.05	25.0 0.98	0.8 0.03	42.5 1.67			5.8	5.55	0.0448	0.26 0.58
21075	21226D	X1S-21075	1.5 0.06	31.5 1.24	0.8 0.03	51.0 2.01			7	3.55	0.0558	0.65 1.44
05079	05180D		1.5 0.06	26.5 1.04	0.8 0.03	42.0 1.65			5.8	5.55	0.0448	0.26 0.56
05079	05185D	X1S-05079	1.5 0.06	26.5 1.04	0.8 0.03	42.5 1.67			5.8	5.55	0.0448	0.26 0.57
07079	07196D	X1S-07079	1.5 0.06	27.5 1.08	0.6 0.02	46.5 1.83			7.6	7.07	0.0509	0.32 0.70
26093	26282D		2.3 0.09	35.0 1.38	0.4 0.02	65.0 2.56			16.1	10.1	0.0630	0.88 1.94
26093	26284D		2.3 0.09	35.0 1.38	0.8 0.03	65.0 2.56			16.1	10.1	0.0630	0.90 1.98
43096	43319D	X1S-43096	0.8 0.03	40.5 1.59	1.5 0.06	74.0 2.91			16.8	7.57	0.0774	1.43 3.14
07098	07196D	X1S-07097	1.5 0.06	31.0 1.22	0.6 0.02	46.5 1.83			7.6	7.07	0.0509	0.28 0.61
17098	17245D	X1S-17098	1.5 0.06	33.0 1.30	0.8 0.03	57.0 2.24			11.8	7.49	0.0579	0.60 1.33
07097	07196D	X1S-07097	1.5 0.06	31.0 1.22	0.6 0.02	46.5 1.83			7.6	7.07	0.0509	0.28 0.61
17098X	17245D	X1S-17098	1.5 0.06	33.0 1.30	0.8 0.03	57.0 2.24			11.8	7.49	0.0579	0.60 1.33
07100-S	07196D	X1S-07100	1.5 0.06	31.5 1.24	0.6 0.02	46.5 1.83			7.6	7.07	0.0509	0.27 0.60
07100-SA	07196D	X1S-07100	3.3 0.13	35.0 1.38	0.6 0.02	46.5 1.83			7.6	7.07	0.0509	0.27 0.59
15100	15251D		3.5 0.14	38.0 1.50	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.69 1.53
15100-S	15251D	X1S-15101	1.3 0.05	33.5 1.32	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.72 1.59
15101	15251D	X1S-15101	0.8 0.03	32.5 1.28	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.72 1.59
26100	26282D	X1S-26100	1.5 0.06	34.5 1.36	0.4 0.02	65.0 2.56			16.1	10.1	0.0630	0.87 1.91
26100	26284D		1.5 0.06	34.5 1.36	0.8 0.03	65.0 2.56			16.1	10.1	0.0630	0.88 1.95
15112	15251D	X1S-15112	3.5 0.14	40.0 1.57	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.66 1.45
24112	24262D		1.5 0.06	36.0 1.42	0.8 0.03	61.0 2.40			14	8.28	0.0589	0.70 1.54
2578	2524YD		2.3 0.09	39.0 1.54	0.8 0.03	64.0 2.52			23.6	9.63	0.0656	1.19 2.63
26112	26282D		1.5 0.06	37.0 1.46	0.4 0.02	65.0 2.56			16.1	10.1	0.0630	0.83 1.82
26112	26284D		1.5 0.06	37.0 1.46	0.8 0.03	65.0 2.56			16.1	10.1	0.0630	0.84 1.86
02872	02823D	X1S-02872	0.8 0.03	37.5 1.48	0.8 0.03	70.0 2.76			20.6	10.1	0.0740	1.13 2.49

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

B

TDO

DOUBLE OUTER RACE

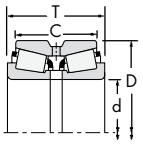
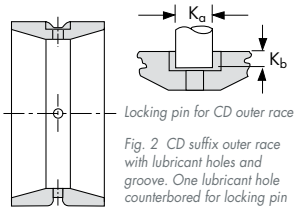
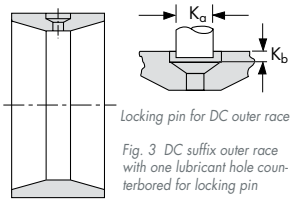


Fig. 1
D suffix outer race with lubricant holes and groove



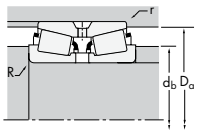
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
28.575 1.1250	80.962 3.1875	55.562 2.1875	39.688 1.5625	125000 28100	0.67	1.01	1.50	18600 4190	21300 4790	32400 7290	0.87
29.987 1.1806	62.000 2.4409	39.688 1.5625	36.258 1.4275	69700 15700	0.38	1.77	2.63	10400 2330	6800 1530	18100 4060	1.53
29.987 1.1806	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
29.987 1.1806	71.438 2.8125	42.862 1.6875	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
29.987 1.1806	71.975 2.8336	42.761 1.6835	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
29.987 1.1806	80.962 3.1875	55.562 2.1875	39.688 1.5625	125000 28100	0.67	1.01	1.50	18600 4190	21300 4790	32400 7290	0.87
30.000 1.1811	69.012 2.7170	46.040 1.8126	38.100 1.5000	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
30.000 1.1811	69.012 2.7170	46.040 1.8126	38.100 1.5000	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
30.162 1.1875	58.738 2.3125	32.542 1.2812	24.608 0.9688	51100 11500	0.47	1.42	2.12	7610 1710	6170 1390	13200 2980	1.23
30.162 1.1875	62.000 2.4409	39.688 1.5625	36.258 1.4275	69700 15700	0.38	1.77	2.63	10400 2330	6800 1530	18100 4060	1.53
30.162 1.1875	66.421 2.6150	44.453 1.7501	38.100 1.5000	90100 20200	0.34	1.99	2.96	13400 3010	7790 1750	23300 5250	1.72
30.162 1.1875	69.850 2.7500	66.675 2.6250	57.150 2.2500	135000 30300	0.27	2.47	3.67	20100 4520	9410 2120	35000 7870	2.14
30.162 1.1875	80.035 3.1510	46.040 1.8126	34.925 1.3750	102000 23000	0.40	1.68	2.50	15200 3430	10500 2360	26500 5970	1.45
30.162 1.1875	80.962 3.1875	55.562 2.1875	39.688 1.5625	125000 28100	0.67	1.01	1.50	18600 4190	21300 4790	32400 7290	0.87
30.213 1.1895	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
30.213 1.1895	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
31.750 1.2500	58.738 2.3125	32.542 1.2812	24.608 0.9688	51100 11500	0.47	1.42	2.12	7610 1710	6170 1390	13200 2980	1.23
31.750 1.2500	63.500 2.5000	44.259 1.7425	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
31.750 1.2500	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
31.750 1.2500	63.500 2.5000	46.038 1.8125	36.512 1.4375	81400 18300	0.35	1.93	2.87	12100 2730	7280 1640	21100 4750	1.67
31.750 1.2500	69.012 2.7170	46.040 1.8126	38.100 1.5000	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
31.750 1.2500	69.850 2.7500	66.675 2.6250	57.150 2.2500	135000 30300	0.27	2.47	3.67	20100 4520	9410 2120	35000 7870	2.14
31.750 1.2500	69.850 2.7500	66.675 2.6250	57.150 2.2500	135000 30300	0.27	2.47	3.67	20100 4520	9410 2120	35000 7870	2.14
31.750 1.2500	76.200 3.0000	47.625 1.8750	38.100 1.5000	106000 23800	0.45	1.49	2.21	15800 3550	12300 2750	27500 6170	1.29
31.750 1.2500	76.200 3.0000	47.625 1.8750	38.100 1.5000	106000 23800	0.45	1.49	2.21	15800 3550	12300 2750	27500 6170	1.29
31.750 1.2500	80.962 3.1875	55.562 2.1875	39.688 1.5625	125000 28100	0.67	1.01	1.50	18600 4190	21300 4790	32400 7290	0.87
31.750 1.2500	82.550 3.2500	66.678 2.6251	55.562 2.1875	169000 37900	0.37	1.85	2.75	25100 5650	15700 3530	43700 9830	1.60
32.004 1.2600	71.438 2.8125	42.862 1.6875	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
43112	43319D	X1S-43112	0.8 0.03	42.5 1.67	1.5 0.06	74.0 2.91			16.8	7.57	0.0774	1.37 3.01
17118	17245D	X1S-17119	1.5 0.06	37.0 1.46	0.8 0.03	57.0 2.24			11.8	7.49	0.0579	0.54 1.18
15117	15251D	X1S-15117	1.3 0.05	36.5 1.44	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.65 1.43
26118	26282D	X2S-26118	1.5 0.06	38.0 1.50	0.4 0.02	65.0 2.56			16.1	10.1	0.0630	0.81 1.78
26118	26284D	X1S-26118	1.5 0.06	38.0 1.50	0.8 0.03	65.0 2.56			16.1	10.1	0.0630	0.84 1.85
43117	43319D		1.5 0.06	44.5 1.75	1.5 0.06	74.0 2.91			16.8	7.57	0.0774	1.31 2.88
14117A	14276D	X1S-14117A	3.5 0.14	43.0 1.69	0.8 0.03	63.0 2.48			18	9.4	0.0668	0.79 1.75
14118	14276D	X1S-14117A	0.8 0.03	37.0 1.46	0.8 0.03	63.0 2.48			18	9.4	0.0668	0.79 1.75
08118	08231D	X1S-08118	3.5 0.14	41.5 1.63	0.4 0.02	55.0 2.17			10.7	10.6	0.0601	0.37 0.81
17119	17245D	X4S-17119	1.5 0.06	37.0 1.46	0.8 0.03	57.0 2.24			11.8	7.49	0.0579	0.53 1.18
24118	24262D	X1S-24118	1.5 0.06	37.5 1.48	0.8 0.03	61.0 2.40			14	8.28	0.0589	0.69 1.53
2558	2524YD		2.3 0.09	40.0 1.57	0.8 0.03	64.0 2.52			23.6	9.63	0.0656	1.16 2.56
28118	28318D		1.5 0.06	40.0 1.57	0.8 0.03	73.0 2.87			20.7	12.5	0.0709	1.10 2.43
43118	43319D	X1S-43118	1.5 0.06	45.0 1.77	1.5 0.06	74.0 2.91			16.8	7.57	0.0774	1.33 2.93
15118	15251D		3.5 0.14	41.5 1.63	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.62 1.37
15119	15251D	X1S-15118	1.5 0.06	37.5 1.48	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.65 1.43
08125	08231D	X6S-08125	1.0 0.04	37.5 1.48	0.4 0.02	55.0 2.17			10.7	10.6	0.0601	0.36 0.79
15123	15251D	X1S-15123	0.0 0.00	42.5 1.67	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.59 1.30
15125	15251D	X1S-15125	3.5 0.14	42.5 1.67	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.61 1.35
15126	15251D	X1S-15126	0.8 0.03	37.0 1.46	0.8 0.03	59.0 2.32			14.6	7.58	0.0606	0.62 1.37
14125A	14276D	X1S-14125A	3.5 0.14	44.5 1.75	0.8 0.03	63.0 2.48			18	9.4	0.0668	0.76 1.68
2580	2524YD	X2S-2580	0.8 0.03	38.5 1.52	0.8 0.03	64.0 2.52			23.6	9.63	0.0656	1.18 2.61
2582	2524YD		3.5 0.14	44.0 1.73	0.8 0.03	64.0 2.52			23.6	9.63	0.0656	1.13 2.48
02875	02823D	X3S-02875	3.5 0.14	45.5 1.79	0.8 0.03	70.0 2.76			20.6	10.1	0.0740	1.05 2.32
02876	02823D		0.8 0.03	40.0 1.57	0.8 0.03	70.0 2.76			20.6	10.1	0.0740	1.06 2.34
43125	43319D	X1S-43125	1.5 0.06	44.0 1.73	1.5 0.06	74.0 2.91			16.8	7.57	0.0774	1.31 2.88
3476	3423D	X1S-3476	1.3 0.05	43.0 1.69	0.8 0.03	75.0 2.95			29.9	11.2	0.0781	1.84 4.05
26126	26282D		1.5 0.06	39.5 1.56	0.4 0.02	65.0 2.56			16.1	10.1	0.0630	0.78 1.71

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

B

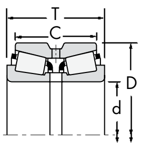
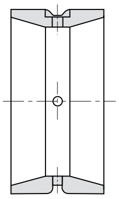
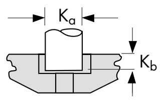


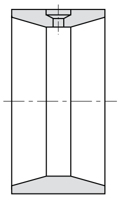
Fig. 1
D suffix outer race with lubricant holes and groove

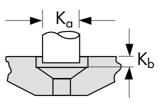




Locking pin for CD outer race

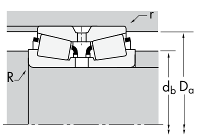
Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin





Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
32.004 1.2600	71.975 2.8336	42.761 1.6835	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
33.338 1.3125	69.012 2.7170	46.040 1.8126	38.100 1.5000	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
33.338 1.3125	69.850 2.7500	66.675 2.6250	57.150 2.2500	135000 30300	0.27	2.47	3.67	20100 4520	9410 2120	35000 7870	2.14
33.338 1.3125	69.850 2.7500	66.675 2.6250	57.150 2.2500	135000 30300	0.27	2.47	3.67	20100 4520	9410 2120	35000 7870	2.14
33.338 1.3125	69.850 2.7500	66.675 2.6250	57.150 2.2500	135000 30300	0.27	2.47	3.67	20100 4520	9410 2120	35000 7870	2.14
33.338 1.3125	69.850 2.7500	66.675 2.6250	57.150 2.2500	135000 30300	0.27	2.47	3.67	20100 4520	9410 2120	35000 7870	2.14
33.338 1.3125	71.438 2.8125	42.862 1.6875	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
33.338 1.3125	71.438 2.8125	42.862 1.6875	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
33.338 1.3125	71.975 2.8336	42.761 1.6835	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
33.338 1.3125	71.975 2.8336	42.761 1.6835	36.512 1.4375	94700 21300	0.36	1.87	2.79	14100 3170	8700 1960	24600 5520	1.62
33.338 1.3125	73.025 2.8750	42.862 1.6875	35.522 1.3985	85700 19300	0.51	1.33	1.98	12800 2870	11100 2500	22200 5000	1.15
33.338 1.3125	80.962 3.1875	55.562 2.1875	39.688 1.5625	125000 28100	0.67	1.01	1.50	18600 4190	21300 4790	32400 7290	0.87
33.338 1.3125	80.962 3.1875	55.562 2.1875	39.688 1.5625	125000 28100	0.67	1.01	1.50	18600 4190	21300 4790	32400 7290	0.87
34.925 1.3750	69.012 2.7170	46.040 1.8126	38.100 1.5000	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
34.925 1.3750	69.012 2.7170	46.040 1.8126	38.100 1.5000	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
34.925 1.3750	76.200 3.0000	47.625 1.8750	38.100 1.5000	106000 23800	0.45	1.49	2.21	15800 3550	12300 2750	27500 6170	1.29
34.925 1.3750	76.200 3.0000	47.625 1.8750	38.100 1.5000	106000 23800	0.45	1.49	2.21	15800 3550	12300 2750	27500 6170	1.29
34.925 1.3750	80.035 3.1510	46.040 1.8126	34.925 1.3750	102000 23000	0.40	1.68	2.50	15200 3430	10500 2360	26500 5970	1.45
34.925 1.3750	80.035 3.1510	57.150 2.2500	44.958 1.7700	126000 28300	0.56	1.20	1.79	18700 4210	18000 4040	32600 7330	1.04
34.925 1.3750	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05
34.975 1.3770	69.012 2.7170	46.040 1.8126	38.100 1.5000	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
34.975 1.3770	80.035 3.1510	46.040 1.8126	34.925 1.3750	102000 23000	0.40	1.68	2.50	15200 3430	10500 2360	26500 5970	1.45
35.000 1.3780	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05
36.512 1.4375	69.012 2.7170	46.035 1.8124	38.100 1.5000	91400 20600	0.40	1.68	2.50	13600 3060	9370 2110	23700 5330	1.45
36.512 1.4375	69.012 2.7170	46.035 1.8124	38.100 1.5000	91400 20600	0.40	1.68	2.50	13600 3060	9370 2110	23700 5330	1.45
36.512 1.4375	82.550 3.2500	66.678 2.6251	55.562 2.1875	169000 37900	0.37	1.85	2.75	25100 5650	15700 3530	43700 9830	1.60
36.512 1.4375	82.931 3.2650	57.150 2.2500	47.625 1.8750	146000 32800	0.33	2.02	3.00	21700 4880	12500 2800	37800 8500	1.74
36.512 1.4375	92.075 3.6250	55.562 2.1875	39.688 1.5625	136000 30500	0.78	0.86	1.29	20200 4540	27000 6070	35200 7910	0.75

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
26126	26284D		1.5 0.06	39.5 1.56	0.8 0.03	65.0 2.56			16.1	10.1	0.0630	0.79 1.75
14131	14276D	X1S-14131	0.8 0.03	40.5 1.59	0.8 0.03	63.0 2.48			18	9.4	0.0668	0.74 1.63
2581	2523D		0.8 0.03	39.5 1.56	0.8 0.03	64.0 2.52			23.6	9.63	0.0656	1.10 2.43
2581	2524YD		0.8 0.03	39.5 1.56	0.8 0.03	64.0 2.52			23.6	9.63	0.0656	1.10 2.43
2585	2523D	X1S-2585	3.5 0.14	45.0 1.77	0.8 0.03	64.0 2.52			23.6	9.63	0.0656	1.13 2.49
2585	2524YD		3.5 0.14	45.0 1.77	0.8 0.03	64.0 2.52			23.6	9.63	0.0656	1.09 2.41
26131	26282D	X1S-26131	3.5 0.14	44.5 1.75	0.4 0.02	65.0 2.56			16.1	10.1	0.0630	0.76 1.67
26132	26282D		1.5 0.06	40.5 1.59	0.4 0.02	65.0 2.56			16.1	10.1	0.0630	0.76 1.67
26131	26284D	X1S-26131	3.5 0.14	44.5 1.75	0.8 0.03	65.0 2.56			16.1	10.1	0.0630	0.78 1.71
26132	26284D		1.5 0.06	40.5 1.59	0.8 0.03	65.0 2.56			16.1	10.1	0.0630	0.77 1.71
25132	25289D	X1S-25132	2.3 0.09	43.5 1.71	0.8 0.03	66.5 2.62			14.6	13.4	0.0681	0.87 1.93
43131	43319D	X1S-43131	3.5 0.14	51.0 2.01	1.5 0.06	74.0 2.91			16.8	7.57	0.0774	1.26 2.78
43132	43319D	X1S-43131	2.0 0.08	48.0 1.89	1.5 0.06	74.0 2.91			16.8	7.57	0.0774	1.27 2.80
14137A	14276D	X2S-14137	1.5 0.06	43.0 1.69	0.8 0.03	63.0 2.48			18	9.4	0.0668	0.71 1.57
14138A	14276D	X2S-14137	3.5 0.14	47.0 1.85	0.8 0.03	63.0 2.48			18	9.4	0.0668	0.71 1.57
02877	02823D	X1S-02877	3.5 0.14	48.5 1.91	0.8 0.03	70.0 2.76			20.6	10.1	0.0740	1.00 2.21
02878	02823D	X1S-02877	0.8 0.03	42.5 1.67	0.8 0.03	70.0 2.76			20.6	10.1	0.0740	1.02 2.24
28137	28318D	X1S-28138	1.5 0.06	43.5 1.71	0.8 0.03	73.0 2.87			20.7	12.5	0.0709	1.05 2.31
27875	27820D	X2S-27875	0.8 0.03	45.5 1.79	0.8 0.03	75.0 2.95			24.6	12.6	0.0839	1.30 2.87
449	432D		0.8 0.03	44.0 1.73	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	2.28 5.02
14139	14276D	X2S-14137	1.3 0.05	42.5 1.67	0.8 0.03	63.0 2.48			18	9.4	0.0668	0.71 1.57
28138	28318D		1.5 0.06	43.5 1.71	0.8 0.03	73.0 2.87			20.7	12.5	0.0709	1.02 2.25
441	432D		3.5 0.14	50.0 1.97	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	2.26 4.99
13682	13621D		3.5 0.14	48.0 1.89	0.8 0.03	65.0 2.56			20.7	12.2	0.0713	0.66 1.45
13682	13621DC	X1S-13682	3.5 0.14	48.0 1.89	0.8 0.03	65.0 2.56	6.1 0.24	2.3 0.09	20.7	12.2	0.0713	0.71 1.56
3479	3423D	X2S-3479	0.8 0.03	45.5 1.79	0.8 0.03	75.0 2.95			29.9	11.2	0.0781	1.71 3.77
25570	25520D	X1S-25570	3.5 0.14	51.0 2.01	0.8 0.03	77.0 3.03			35.2	14.3	0.0801	1.53 3.36
44143	44363D	X1S-44143	2.3 0.09	54.0 2.13	1.5 0.06	85.0 3.35			22.9	8.71	0.0899	1.72 3.78

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

B

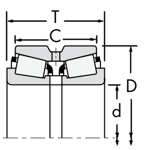
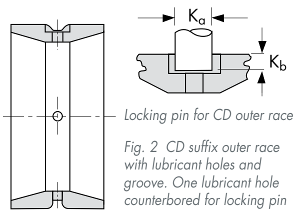
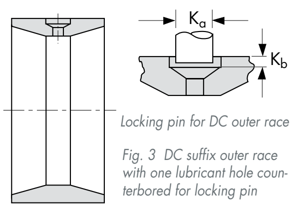


Fig. 1 D suffix outer race with lubricant holes and groove



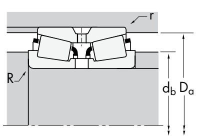
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
38.100 1.5000	63.500 2.5000	38.100 1.5000	31.750 1.2500	43800 9840	0.35	1.95	2.90	6520 1470	3860 869	11300 2550	1.69
38.100 1.5000	69.012 2.7170	46.035 1.8124	38.100 1.5000	91400 20600	0.40	1.68	2.50	13600 3060	9370 2110	23700 5330	1.45
38.100 1.5000	69.012 2.7170	46.035 1.8124	38.100 1.5000	91400 20600	0.40	1.68	2.50	13600 3060	9370 2110	23700 5330	1.45
38.100 1.5000	69.012 2.7170	46.035 1.8124	38.100 1.5000	91400 20600	0.40	1.68	2.50	13600 3060	9370 2110	23700 5330	1.45
38.100 1.5000	80.035 3.1510	46.040 1.8126	34.925 1.3750	102000 23000	0.40	1.68	2.50	15200 3430	10500 2360	26500 5970	1.45
38.100 1.5000	80.035 3.1510	46.040 1.8126	34.925 1.3750	102000 23000	0.40	1.68	2.50	15200 3430	10500 2360	26500 5970	1.45
38.100 1.5000	80.035 3.1510	57.150 2.2500	44.958 1.7700	126000 28300	0.56	1.20	1.79	18700 4210	18000 4040	32600 7330	1.04
38.100 1.5000	80.035 3.1510	57.150 2.2500	44.958 1.7700	126000 28300	0.56	1.20	1.79	18700 4210	18000 4040	32600 7330	1.04
38.100 1.5000	82.550 3.2500	66.678 2.6251	55.562 2.1875	169000 37900	0.37	1.85	2.75	25100 5650	15700 3530	43700 9830	1.60
38.100 1.5000	82.931 3.2650	57.150 2.2500	47.625 1.8750	146000 32800	0.33	2.02	3.00	21700 4880	12500 2800	37800 8500	1.74
38.100 1.5000	92.075 3.6250	55.562 2.1875	39.688 1.5625	136000 30500	0.78	0.86	1.29	20200 4540	27000 6070	35200 7910	0.75
38.100 1.5000	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05
38.100 1.5000	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05
38.100 1.5000	95.250 3.7500	63.500 2.5000	52.385 2.0624	209000 47000	0.33	2.05	3.05	31100 7000	17600 3950	54200 12200	1.77
38.100 1.5000	95.250 3.7500	65.088 2.5625	44.450 1.7500	161000 36300	0.74	0.91	1.36	24000 5410	30500 6850	41900 9410	0.79
38.100 1.5000	111.125 4.3750	79.375 3.1250	63.500 2.5000	277000 62400	0.30	2.28	3.39	41300 9290	21000 4720	71900 16200	1.97
38.481 1.5150	63.500 2.5000	38.100 1.5000	31.750 1.2500	43800 9840	0.35	1.95	2.90	6520 1470	3860 869	11300 2550	1.69
39.688 1.5625	92.075 3.6250	55.562 2.1875	39.688 1.5625	136000 30500	0.78	0.86	1.29	20200 4540	27000 6070	35200 7910	0.75
39.688 1.5625	92.075 3.6250	55.562 2.1875	39.688 1.5625	136000 30500	0.78	0.86	1.29	20200 4540	27000 6070	35200 7910	0.75
39.980 1.5740	80.035 3.1510	43.459 1.7110	34.925 1.3750	102000 23000	0.40	1.68	2.50	15200 3430	10500 2360	26500 5970	1.45
39.980 1.5740	80.035 3.1510	46.040 1.8126	34.925 1.3750	102000 23000	0.40	1.68	2.50	15200 3430	10500 2360	26500 5970	1.45
40.000 1.5748	80.035 3.1510	46.040 1.8126	34.925 1.3750	102000 23000	0.40	1.68	2.50	15200 3430	10500 2360	26500 5970	1.45
40.000 1.5748	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
40.000 1.5748	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
40.000 1.5748	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
40.000 1.5748	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
40.000 1.5748	92.075 3.6250	55.562 2.1875	39.688 1.5625	136000 30500	0.78	0.86	1.29	20200 4540	27000 6070	35200 7910	0.75
40.000 1.5748	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
13889	13835D	X1S-13889	1.5 0.06	45.0 1.77	0.4 0.02	60.0 2.36			14.8	23.3	0.0601	0.42 0.93
13685	13621DC	X1S-13687	3.5 0.14	49.5 1.95	0.8 0.03	65.0 2.56	6.1 0.24	2.3 0.09	20.7	10.9	0.0713	0.68 1.49
13685	13621D	X2S-13687	3.5 0.14	49.5 1.95	0.8 0.03	65.0 2.56			20.7	10.9	0.0713	0.65 1.44
13687	13621D	X1S-13687	2.0 0.08	46.5 1.83	0.8 0.03	65.0 2.56			20.7	10.9	0.0713	0.66 1.46
28150	28318D	X4S-28150	1.5 0.06	45.5 1.79	0.8 0.03	73.0 2.87			20.7	12.5	0.0709	0.98 2.17
28151	28318D		3.5 0.14	50.0 1.97	0.8 0.03	73.0 2.87			20.7	12.5	0.0709	0.95 2.10
27880	27820D	X1S-27880	0.8 0.03	48.0 1.89	0.8 0.03	75.0 2.95			24.6	12.6	0.0839	1.22 2.69
27881	27820D	X1S-27881	3.5 0.14	53.0 2.09	0.8 0.03	75.0 2.95			24.6	12.6	0.0839	1.21 2.66
3490	3423D	X1S-3490	3.5 0.14	52.0 2.05	0.8 0.03	75.0 2.95			29.9	11.2	0.0781	1.65 3.64
25572	25520D	X1S-25572	0.8 0.03	46.0 1.81	0.8 0.03	77.0 3.03			35.2	14.3	0.0801	1.48 3.26
44150	44363D	X1S-44150	2.3 0.09	55.0 2.17	1.5 0.06	85.0 3.35			22.9	8.71	0.0899	1.67 3.69
440	432D		0.8 0.03	46.5 1.83	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	2.19 4.83
444	432D		3.5 0.14	52.0 2.05	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	2.18 4.80
33880	33821D	X1S-33880	3.5 0.14	54.0 2.13	0.8 0.03	90.0 3.54			52.5	18.5	0.0910	2.25 4.97
53150	53376D	X2S-53150	1.5 0.06	55.0 2.17	0.8 0.03	89.0 3.50			26.7	9.63	0.0930	2.11 4.64
542	533D	X1S-542	3.5 0.14	55.0 2.17	1.5 0.06	100.0 3.94			64.3	16.1	0.0938	3.98 8.77
13890	13835D	X1S-13890	0.4 0.02	43.0 1.69	0.4 0.02	60.0 2.36			14.8	23.3	0.0601	0.41 0.91
44156	44363D	X1S-44156	2.3 0.09	56.0 2.20	1.5 0.06	85.0 3.35			22.9	8.71	0.0899	1.60 3.53
44158	44363D		3.5 0.14	58.0 2.28	1.5 0.06	85.0 3.35			22.9	8.71	0.0899	1.59 3.51
28156	28318D		2.3 0.09	49.0 1.93	0.8 0.03	73.0 2.87			20.7	12.5	0.0709	0.90 1.98
28159	28318D	X1S-28158	3.5 0.14	52.0 2.05	0.8 0.03	73.0 2.87			20.7	12.5	0.0709	0.94 2.07
28158	28318D	X2S-28158	1.5 0.06	47.5 1.87	0.8 0.03	73.0 2.87			20.7	12.5	0.0709	0.95 2.09
350	353D		4.0 0.16	54.0 2.13	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.46 3.23
350	353DC	X1S-357	4.0 0.16	54.0 2.13	0.8 0.03	82.0 3.23	7.9 0.31	3.8 0.15	30	12.2	0.0732	1.52 3.35
350A	353D	X1S-357	0.8 0.03	47.5 1.87	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.54 3.39
357	353D	X1S-357	2.3 0.09	51.0 2.01	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.53 3.38
44157	44363D		2.3 0.09	56.0 2.20	1.5 0.06	85.0 3.35			22.9	8.71	0.0899	1.59 3.51
442-S	432D		3.5 0.14	54.0 2.13	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	2.12 4.68

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

B

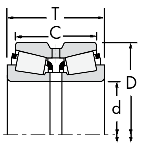
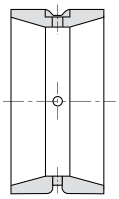
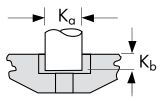


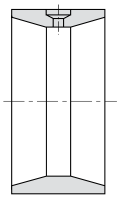
Fig. 1
D suffix outer race with lubricant holes and groove

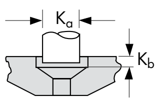




Locking pin for CD outer race

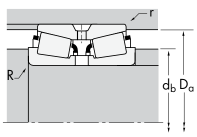
Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin





Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic [(1)]	Factors [(5)]			Dynamic [(2)]			Factors [(5)]
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
41.275 1.6250	76.200 3.0000	49.212 1.9375	39.688 1.5625	122000 27400	0.39	1.72	2.56	18100 4080	12200 2740	31600 7100	1.49
41.275 1.6250	76.200 3.0000	49.212 1.9375	39.688 1.5625	122000 27400	0.39	1.72	2.56	18100 4080	12200 2740	31600 7100	1.49
41.275 1.6250	90.000 3.5433	50.010 1.9689	42.070 1.6563	138000 31100	0.32	2.11	3.14	20600 4640	11300 2540	35900 8070	1.83
41.275 1.6250	92.075 3.6250	55.562 2.1875	39.688 1.5625	136000 30500	0.78	0.86	1.29	20200 4540	27000 6070	35200 7910	0.75
41.275 1.6250	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05
41.275 1.6250	95.250 3.7500	65.088 2.5625	44.450 1.7500	161000 36300	0.74	0.91	1.36	24000 5410	30500 6850	41900 9410	0.79
41.275 1.6250	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
41.275 1.6250	111.125 4.3750	79.375 3.1250	63.500 2.5000	277000 62400	0.30	2.28	3.39	41300 9290	21000 4720	71900 16200	1.97
42.850 1.6870	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
42.862 1.6875	82.550 3.2500	44.450 1.7500	34.925 1.3750	105000 23700	0.43	1.57	2.34	15700 3530	11500 2600	27300 6140	1.36
42.862 1.6875	82.931 3.2650	57.150 2.2500	47.625 1.8750	146000 32800	0.33	2.02	3.00	21700 4880	12500 2800	37800 8500	1.74
44.450 1.7500	79.375 3.1250	41.272 1.6249	33.338 1.3125	83800 18800	0.37	1.80	2.69	12500 2810	7990 1800	21700 4890	1.56
44.450 1.7500	82.931 3.2650	57.150 2.2500	47.625 1.8750	146000 32800	0.33	2.02	3.00	21700 4880	12500 2800	37800 8500	1.74
44.450 1.7500	82.931 3.2650	57.150 2.2500	47.625 1.8750	146000 32800	0.33	2.02	3.00	21700 4880	12500 2800	37800 8500	1.74
44.450 1.7500	82.931 3.2650	57.150 2.2500	47.625 1.8750	146000 32800	0.33	2.02	3.00	21700 4880	12500 2800	37800 8500	1.74
44.450 1.7500	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
44.450 1.7500	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
44.450 1.7500	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
44.450 1.7500	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
44.450 1.7500	93.264 3.6718	65.088 2.5625	52.388 2.0625	197000 44300	0.34	1.99	2.97	29300 6590	17000 3820	51000 11500	1.73
44.450 1.7500	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05
44.450 1.7500	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05
44.450 1.7500	95.250 3.7500	63.500 2.5000	52.385 2.0624	209000 47000	0.33	2.05	3.05	31100 7000	17600 3950	54200 12200	1.77
44.450 1.7500	95.250 3.7500	65.088 2.5625	44.450 1.7500	161000 36300	0.74	0.91	1.36	24000 5410	30500 6850	41900 9410	0.79
44.450 1.7500	95.250 3.7500	65.088 2.5625	44.450 1.7500	161000 36300	0.74	0.91	1.36	24000 5410	30500 6850	41900 9410	0.79
44.450 1.7500	95.250 3.7500	65.088 2.5625	44.450 1.7500	161000 36300	0.74	0.91	1.36	24000 5410	30500 6850	41900 9410	0.79
44.450 1.7500	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
44.450 1.7500	111.125 4.3750	79.375 3.1250	63.500 2.5000	277000 62400	0.30	2.28	3.39	41300 9290	21000 4720	71900 16200	1.97

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
24780	24720D		3.5 0.14	54.0 2.13	0.8 0.03	72.0 2.83			26.4	12.5	0.0767	0.93 2.04
24780	24720XD		3.5 0.14	54.0 2.13	0.8 0.03	72.0 2.83			26.4	12.5	0.0767	0.91 2.00
365A	363D	X1S-365A	3.5 0.14	55.0 2.17	0.8 0.03	84.0 3.31			33.8	14	0.0773	1.41 3.11
44162	44363D	X2S-44162	2.3 0.09	57.0 2.24	1.5 0.06	85.0 3.35			22.9	8.71	0.0899	1.59 3.51
447	432D	X1S-447	3.5 0.14	55.0 2.17	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	2.11 4.65
53162	53376D		1.5 0.06	57.0 2.24	0.8 0.03	89.0 3.50			26.7	9.63	0.0930	1.96 4.32
464	452D	X1S-464	2.3 0.09	56.0 2.20	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	3.08 6.79
541	533D		3.5 0.14	58.0 2.28	1.5 0.06	100.0 3.94			64.3	16.1	0.0938	3.86 8.51
461	452D		0.8 0.03	54.0 2.13	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.97 6.56
22168	22325D	X2S-22168	2.3 0.09	52.0 2.05	0.8 0.03	76.0 2.99			23.7	14.4	0.0758	1.01 2.24
25578	25520D	X1S-25578	2.3 0.09	53.0 2.09	0.8 0.03	77.0 3.03			35.2	14.3	0.0801	1.33 2.93
18685	18620D	X2S-18685	2.8 0.11	54.0 2.13	0.8 0.03	74.0 2.91			23.9	17.7	0.0725	0.78 1.73
25580	25520DC	X1S-25581	3.5 0.14	57.0 2.24	0.8 0.03	77.0 3.03	9.4 0.37	2.3 0.09	35.2	14.3	0.0801	1.31 2.88
25580	25520D	X3S-25580	3.5 0.14	57.0 2.24	0.8 0.03	77.0 3.03			35.2	14.3	0.0801	1.31 2.88
25581	25520D	X1S-25581	0.5 0.02	51.0 2.01	0.8 0.03	77.0 3.03			35.2	14.3	0.0801	1.32 2.92
355	353D	X3S-355	2.3 0.09	54.0 2.13	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.41 3.10
355A	353D	X2S-355	0.8 0.03	51.0 2.01	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.41 3.11
355X	353D		3.5 0.14	56.0 2.20	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.37 3.01
355X	353DC	X3S-355	3.5 0.14	56.0 2.20	0.8 0.03	82.0 3.23	7.9 0.31	3.8 0.15	30	12.2	0.0732	1.37 3.01
3782	3729D	X1S-3782	3.5 0.14	58.0 2.28	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	2.06 4.53
435	432D	R800002	0.8 0.03	52.0 2.05	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	2.00 4.41
438	432D	R800002	3.5 0.14	57.0 2.24	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	1.98 4.37
33885	33821D	X1S-33885	0.8 0.03	53.0 2.09	0.8 0.03	90.0 3.54			52.5	18.5	0.0910	2.12 4.66
53176	53376D		1.3 0.05	59.0 2.32	0.8 0.03	89.0 3.50			26.7	9.63	0.0930	1.90 4.18
53177	53376D	X2S-53176	3.5 0.14	63.0 2.48	0.8 0.03	89.0 3.50			26.7	9.63	0.0930	1.88 4.15
53178	53376D	X2S-53176	2.0 0.08	60.0 2.36	0.8 0.03	89.0 3.50			26.7	9.63	0.0930	1.89 4.18
460	452D		3.5 0.14	60.0 2.36	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.91 6.42
535	533D		3.5 0.14	60.0 2.36	1.5 0.06	100.0 3.94			64.3	16.1	0.0938	3.74 8.24

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

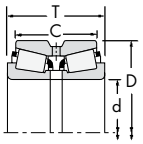
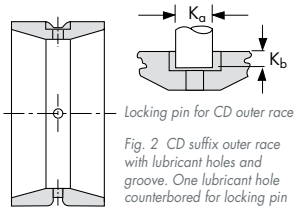
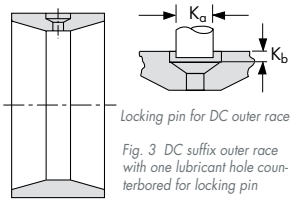


Fig. 1
D suffix outer race with lubricant holes and groove



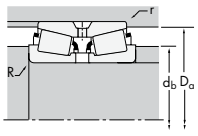
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic(1)		Factors(5)		Dynamic(2)			Factors(5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
44.450 1.7500	112.712 4.4375	65.088 2.5625	46.038 1.8125	172000 38600	0.88	0.76	1.14	25500 5740	38600 8690	44500 10000	0.66
44.983 1.7710	82.931 3.2650	57.150 2.2500	47.625 1.8750	146000 32800	0.33	2.02	3.00	21700 4880	12500 2800	37800 8500	1.74
44.983 1.7710	93.264 3.6718	65.088 2.5625	52.388 2.0625	197000 44300	0.34	1.99	2.97	29300 6590	17000 3820	51000 11500	1.73
45.000 1.7717	90.000 3.5433	50.010 1.9689	42.070 1.6563	138000 31100	0.32	2.11	3.14	20600 4640	11300 2540	35900 8070	1.83
45.000 1.7717	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
45.000 1.7717	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
45.000 1.7717	100.000 3.9370	50.800 2.0000	39.690 1.5626	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
45.618 1.7960	82.931 3.2650	57.150 2.2500	47.625 1.8750	146000 32800	0.33	2.02	3.00	21700 4880	12500 2800	37800 8500	1.74
46.038 1.8125	79.375 3.1250	41.272 1.6249	33.338 1.3125	83800 18800	0.37	1.80	2.69	12500 2810	7990 1800	21700 4890	1.56
46.038 1.8125	79.375 3.1250	41.272 1.6249	33.338 1.3125	83800 18800	0.37	1.80	2.69	12500 2810	7990 1800	21700 4890	1.56
46.038 1.8125	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
46.038 1.8125	90.119 3.5480	50.795 1.9998	44.450 1.7500	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
46.038 1.8125	95.250 3.7500	61.915 2.4376	50.800 2.0000	205000 46000	0.28	2.37	3.53	30500 6850	14800 3330	53000 11900	2.05
47.625 1.8750	90.000 3.5433	50.010 1.9689	42.070 1.6563	138000 31100	0.32	2.11	3.14	20600 4640	11300 2540	35900 8070	1.83
47.625 1.8750	90.000 3.5433	50.010 1.9689	42.070 1.6563	138000 31100	0.32	2.11	3.14	20600 4640	11300 2540	35900 8070	1.83
47.625 1.8750	93.264 3.6718	65.088 2.5625	52.388 2.0625	197000 44300	0.34	1.99	2.97	29300 6590	17000 3820	51000 11500	1.73
47.625 1.8750	93.264 3.6718	65.088 2.5625	52.388 2.0625	197000 44300	0.34	1.99	2.97	29300 6590	17000 3820	51000 11500	1.73
47.625 1.8750	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
47.625 1.8750	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
47.625 1.8750	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
47.625 1.8750	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
47.625 1.8750	109.982 4.3300	63.500 2.5000	42.865 1.6876	172000 38600	0.88	0.76	1.14	25500 5740	38600 8690	44500 10000	0.66
47.625 1.8750	111.125 4.3750	79.375 3.1250	63.500 2.5000	277000 62400	0.30	2.28	3.39	41300 9290	21000 4720	71900 16200	1.97
47.625 1.8750	112.712 4.4375	65.088 2.5625	46.038 1.8125	172000 38600	0.88	0.76	1.14	25500 5740	38600 8690	44500 10000	0.66
47.625 1.8750	117.475 4.6250	73.025 2.8750	53.975 2.1250	240000 54000	0.63	1.08	1.60	35800 8040	38300 8620	62300 14000	0.93
47.625 1.8750	123.825 4.8750	77.788 3.0625	55.562 2.1875	266000 59800	0.74	0.92	1.36	39600 8910	50000 11200	69000 15500	0.79
49.212 1.9375	93.264 3.6718	65.088 2.5625	52.388 2.0625	197000 44300	0.34	1.99	2.97	29300 6590	17000 3820	51000 11500	1.73
49.212 1.9375	111.125 4.3750	79.375 3.1250	63.500 2.5000	277000 62400	0.30	2.28	3.39	41300 9290	21000 4720	71900 16200	1.97

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
55175	55444D	X2S-55176	3.5 0.14	67.0 2.64	1.5 0.06	105.0 4.13			36.8	13.2	0.1085	3.03 6.67
25584	25520D	X1S-25584	1.5 0.06	53.0 2.09	0.8 0.03	77.0 3.03			35.2	14.3	0.0801	1.30 2.87
3776	3729D	X1S-3776	3.5 0.14	59.0 2.32	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	2.03 4.47
367	363D	X3S-367	2.0 0.08	55.0 2.17	0.8 0.03	84.0 3.31			33.8	14	0.0773	1.34 2.95
358	353D	X2S-358	1.5 0.06	53.0 2.09	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.40 3.08
358A	353D	X1S-358	3.5 0.14	57.0 2.24	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.39 3.06
376X	372D		2.0 0.08	56.0 2.20	0.8 0.03	90.0 3.54			37.6	15.4	0.0816	1.76 3.88
25590	25520D	X1S-25590	3.5 0.14	58.0 2.28	0.8 0.03	77.0 3.03			35.2	14.3	0.0801	1.27 2.80
18690	18620DC	X1S-18690	2.8 0.11	56.0 2.20	0.8 0.03	74.0 2.91	4.6 0.18	2.3 0.09	23.9	17.7	0.0725	0.74 1.64
18690	18620D	X2S-18690	2.8 0.11	56.0 2.20	0.8 0.03	74.0 2.91			23.9	17.7	0.0725	0.74 1.64
359A	353D		3.5 0.14	57.0 2.24	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.33 2.92
359-S	353D	X1S-359-S	2.3 0.09	55.0 2.17	0.8 0.03	82.0 3.23			30	12.2	0.0732	1.36 3.01
436	432D	X1S-436	3.5 0.14	59.0 2.32	0.8 0.03	87.0 3.43			42.5	11.3	0.0805	1.95 4.29
369A	363D	X1S-369A	3.5 0.14	60.0 2.36	0.8 0.03	84.0 3.31			33.8	14	0.0773	1.26 2.78
369-S	363D	X1S-369A	2.3 0.09	57.0 2.24	0.8 0.03	84.0 3.31			33.8	14	0.0773	1.27 2.79
3778	3729D		6.4 0.25	67.0 2.64	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	1.88 4.13
3779	3729D	X1S-3779	3.5 0.14	61.0 2.40	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	1.94 4.27
386A	384ED	X1S-386A	0.8 0.03	56.0 2.20	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.75 3.85
386A	384D	X2S-386A	0.8 0.03	56.0 2.20	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.84 4.05
463	452D		4.8 0.19	65.0 2.56	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.79 6.15
467	452D	X1S-467	0.8 0.03	57.0 2.24	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.89 6.37
55187	55433D	X2S-55187	3.5 0.14	69.0 2.72	0.5 0.02	105.0 4.13			36.8	13.2	0.1085	2.77 6.11
536	533D		3.5 0.14	62.0 2.44	1.5 0.06	100.0 3.94			64.3	16.1	0.0938	3.60 7.94
55187	55444D	X1S-55187	3.5 0.14	69.0 2.72	1.5 0.06	105.0 4.13			36.8	13.2	0.1085	2.91 6.41
66187	66462D	X1S-66187	3.5 0.14	69.0 2.72	0.8 0.03	111.0 4.37			50.2	16.4	0.0751	3.77 8.31
72187	72488D	X1S-72187	3.5 0.14	72.0 2.83	1.5 0.06	115.0 4.53			47.7	14.1	0.0772	4.36 9.60
3781	3729D	X1S-366	3.5 0.14	62.0 2.44	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	1.88 4.14
545	533D		3.5 0.14	64.0 2.52	1.5 0.06	100.0 3.94			64.3	16.1	0.0938	3.53 7.79

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

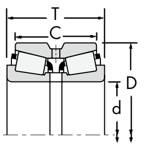
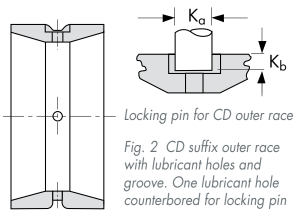
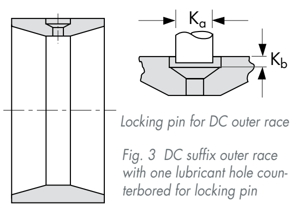


Fig. 1 D suffix outer race with lubricant holes and groove



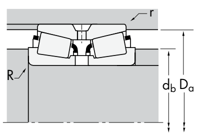
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
49.975	109.982	63.500	42.865	172000	0.88	0.76	1.14	25500	38600	44500	0.66
1.9675	4.3300	2.5000	1.6876	38600				5740	8690	10000	
49.975	112.712	65.088	46.038	172000	0.88	0.76	1.14	25500	38600	44500	0.66
1.9675	4.4375	2.5625	1.8125	38600				5740	8690	10000	
49.982	111.125	79.375	63.500	277000	0.30	2.28	3.39	41300	21000	71900	1.97
1.9678	4.3750	3.1250	2.5000	62400				9290	4720	16200	
50.000	90.000	50.010	42.070	138000	0.32	2.11	3.14	20600	11300	35900	1.83
1.9685	3.5433	1.9689	1.6563	31100				4640	2540	8070	
50.000	90.000	50.010	42.070	138000	0.32	2.11	3.14	20600	11300	35900	1.83
1.9685	3.5433	1.9689	1.6563	31100				4640	2540	8070	
50.000	90.000	50.010	42.070	138000	0.32	2.11	3.14	20600	11300	35900	1.83
1.9685	3.5433	1.9689	1.6563	31100				4640	2540	8070	
50.000	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
1.9685	4.3307	2.0625	1.8125	35800				5340	3670	9290	
50.800	80.962	42.865	34.925	98000	0.36	1.90	2.83	14600	8880	25400	1.64
2.0000	3.1875	1.6876	1.3750	22000				3280	2000	5710	
50.800	89.985	50.400	49.949	138000	0.32	2.11	3.14	20600	11300	35900	1.83
2.0000	3.5427	1.9843	1.9665	31100				4640	2540	8070	
50.800	90.000	50.010	42.070	138000	0.32	2.11	3.14	20600	11300	35900	1.83
2.0000	3.5433	1.9689	1.6563	31100				4640	2540	8070	
50.800	90.000	50.010	42.070	138000	0.32	2.11	3.14	20600	11300	35900	1.83
2.0000	3.5433	1.9689	1.6563	31100				4640	2540	8070	
50.800	90.000	50.010	42.070	138000	0.32	2.11	3.14	20600	11300	35900	1.83
2.0000	3.5433	1.9689	1.6563	31100				4640	2540	8070	
50.800	93.264	65.088	52.388	197000	0.34	1.99	2.97	29300	17000	51000	1.73
2.0000	3.6718	2.5625	2.0625	44300				6590	3820	11500	
50.800	93.264	65.088	52.388	197000	0.34	1.99	2.97	29300	17000	51000	1.73
2.0000	3.6718	2.5625	2.0625	44300				6590	3820	11500	
50.800	93.264	65.088	52.388	197000	0.34	1.99	2.97	29300	17000	51000	1.73
2.0000	3.6718	2.5625	2.0625	44300				6590	3820	11500	
50.800	93.264	65.088	52.388	197000	0.34	1.99	2.97	29300	17000	51000	1.73
2.0000	3.6718	2.5625	2.0625	44300				6590	3820	11500	
50.800	93.264	65.088	52.388	197000	0.34	1.99	2.97	29300	17000	51000	1.73
2.0000	3.6718	2.5625	2.0625	44300				6590	3820	11500	
50.800	95.250	63.500	52.385	209000	0.33	2.05	3.05	31100	17600	54200	1.77
2.0000	3.7500	2.5000	2.0624	47000				7000	3950	12200	
50.800	95.250	63.500	52.385	209000	0.33	2.05	3.05	31100	17600	54200	1.77
2.0000	3.7500	2.5000	2.0624	47000				7000	3950	12200	
50.800	100.000	49.200	39.675	147000	0.35	1.91	2.84	21800	13200	38000	1.65
2.0000	3.9370	1.9370	1.5620	33000				4910	2980	8550	
50.800	100.000	49.200	39.675	147000	0.35	1.91	2.84	21800	13200	38000	1.65
2.0000	3.9370	1.9370	1.5620	33000				4910	2980	8550	
50.800	100.000	52.388	42.862	147000	0.35	1.91	2.84	21800	13200	38000	1.65
2.0000	3.9370	2.0625	1.6875	33000				4910	2980	8550	
50.800	107.950	65.090	53.975	219000	0.34	2.01	3.00	32600	18700	56700	1.74
2.0000	4.2500	2.5626	2.1250	49200				7320	4200	12700	
50.800	107.950	65.090	53.975	219000	0.34	2.01	3.00	32600	18700	56700	1.74
2.0000	4.2500	2.5626	2.1250	49200				7320	4200	12700	
50.800	109.982	63.500	42.865	172000	0.88	0.76	1.14	25500	38600	44500	0.66
2.0000	4.3300	2.5000	1.6876	38600				5740	8690	10000	
50.800	109.982	63.500	42.865	206000	0.88	0.76	1.14	30600	46300	53300	0.66
2.0000	4.3300	2.5000	1.6876	46200				6880	10400	12000	
50.800	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.0000	4.3307	2.0625	1.8125	35800				5340	3670	9290	
50.800	112.712	65.088	46.038	172000	0.88	0.76	1.14	25500	38600	44500	0.66
2.0000	4.4375	2.5625	1.8125	38600				5740	8690	10000	

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
55197	55433D	X1S-55197	2.0 0.08	68.0 2.68	0.5 0.02	105.0 4.13			36.8	13.2	0.1085	2.69 5.93
55197	55444D	X2S-55197	2.0 0.08	68.0 2.68	1.5 0.06	105.0 4.13			36.8	13.2	0.1085	2.83 6.24
546	533D		3.5 0.14	65.0 2.56	1.5 0.06	100.0 3.94			64.3	16.1	0.0938	3.50 7.71
365	363D	X1S-366	2.0 0.08	58.0 2.28	0.8 0.03	84.0 3.31			33.8	14	0.0773	1.20 2.64
366	363DC	X1S-366	2.3 0.09	59.0 2.32	0.8 0.03	84.0 3.31	7.9 0.31	2.3 0.09	33.8	14	0.0773	1.24 2.73
366	363D	X3S-368	2.3 0.09	59.0 2.32	0.8 0.03	84.0 3.31			33.8	14	0.0773	1.20 2.64
396	394D	X2S-396	0.8 0.03	61.0 2.40	0.8 0.03	104.5 4.11			56	21.4	0.0984	2.31 5.09
L305649	L305610D	L305649XC	1.5 0.06	58.0 2.28	0.8 0.03	77.0 3.03			38.8	27.8	0.0841	0.78 1.73
368A	362XD	X5S-368A	3.5 0.14	62.0 2.44	0.5 0.02	86.5 3.40			33.8	12.7	0.0773	1.27 2.79
368	363D	X3S-368	1.5 0.06	58.0 2.28	0.8 0.03	84.0 3.31			33.8	14	0.0773	1.18 2.60
368A	363DC	X3S-368	3.5 0.14	62.0 2.44	0.8 0.03	84.0 3.31	7.9 0.31	2.3 0.09	33.8	12.7	0.0773	1.21 2.66
368A	363D	X2S-368A	3.5 0.14	62.0 2.44	0.8 0.03	84.0 3.31			33.8	12.7	0.0773	1.17 2.57
3775	3729DC		0.8 0.03	58.0 2.28	0.8 0.03	88.0 3.46	9.4 0.37	2.3 0.09	49.9	14.5	0.0903	1.81 3.99
3775	3729D	X3S-3775	0.8 0.03	58.0 2.28	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	1.84 4.06
3780	3729DC	X1S-3780	3.5 0.14	64.0 2.52	0.8 0.03	88.0 3.46	9.4 0.37	2.3 0.09	49.9	14.5	0.0903	1.82 4.02
3780	3729D	X1S-3780	3.5 0.14	64.0 2.52	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	1.82 4.02
3784	3729D	X1S-3780	6.4 0.25	70.0 2.76	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	1.78 3.93
33889	33821DC	X1S-33889	3.5 0.14	64.0 2.52	0.8 0.03	90.0 3.54	10.9 0.43	2.3 0.09	52.5	18.5	0.0910	1.85 4.08
33889	33821D	X1S-33889	3.5 0.14	64.0 2.52	0.8 0.03	90.0 3.54			52.5	18.5	0.0910	1.85 4.08
385A	384EDC	X2S-385A	2.3 0.09	61.0 2.40	0.8 0.03	93.0 3.66	7.9 0.31	3.0 0.12	42	15.7	0.0859	1.62 3.58
385A	384ED	X2S-385A	2.3 0.09	61.0 2.40	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.62 3.58
385A	384D	X1S-385A	2.3 0.09	61.0 2.40	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.76 3.89
455	452D	X2S-455	0.8 0.03	60.0 2.36	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.77 6.10
455-S	452D	X1S-455	3.5 0.14	65.0 2.56	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.75 6.07
55200	55433D	X4S-55200	3.5 0.14	71.0 2.80	0.5 0.02	105.0 4.13			36.8	13.2	0.1085	2.68 5.90
55200C	55433D	X4S-55200	3.5 0.14	71.0 2.80	0.5 0.02	105.0 4.13			48.7	15.4	0.1198	2.85 6.29
398	394D	X1S-398	0.8 0.03	62.0 2.44	0.8 0.03	104.5 4.11			56	21.4	0.0984	2.29 5.04
55200	55444D	X3S-55200	3.5 0.14	71.0 2.80	1.5 0.06	105.0 4.13			36.8	13.2	0.1085	2.79 6.15

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

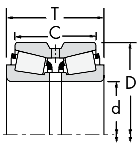
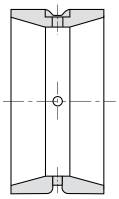
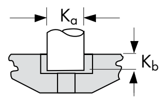


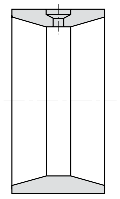
Fig. 1
D suffix outer race with lubricant holes and groove

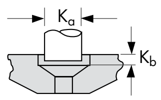




Locking pin for CD outer race

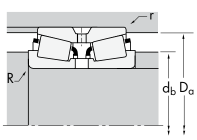
Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin





Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic [1]	Factors [5]			Dynamic [2]			Factors [5]
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
50.800 2.0000	117.475 4.6250	73.025 2.8750	53.975 2.1250	240000 54000	0.63	1.08	1.60	35800 8040	38300 8620	62300 14000	0.93
50.800 2.0000	123.825 4.8750	77.785 3.0624	55.562 2.1875	291000 65500	0.74	0.92	1.36	43400 9760	54800 12300	75600 17000	0.79
50.800 2.0000	123.825 4.8750	79.375 3.1250	63.500 2.5000	307000 69100	0.35	1.95	2.90	45800 10300	27100 6100	79700 17900	1.69
51.592 2.0312	90.000 3.5433	50.010 1.9689	42.070 1.6563	138000 31100	0.32	2.11	3.14	20600 4640	11300 2540	35900 8070	1.83
52.388 2.0625	93.264 3.6718	65.088 2.5625	52.388 2.0625	197000 44300	0.34	1.99	2.97	29300 6590	17000 3820	51000 11500	1.73
52.388 2.0625	95.250 3.7500	63.500 2.5000	52.385 2.0624	209000 47000	0.33	2.05	3.05	31100 7000	17600 3950	54200 12200	1.77
52.388 2.0625	95.250 3.7500	63.500 2.5000	52.385 2.0624	209000 47000	0.33	2.05	3.05	31100 7000	17600 3950	54200 12200	1.77
52.388 2.0625	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
52.388 2.0625	109.982 4.3300	63.500 2.5000	42.865 1.6876	172000 38600	0.88	0.76	1.14	25500 5740	38600 8690	44500 10000	0.66
52.388 2.0625	111.125 4.3750	79.375 3.1250	63.500 2.5000	277000 62400	0.30	2.28	3.39	41300 9290	21000 4720	71900 16200	1.97
52.388 2.0625	112.712 4.4375	65.088 2.5625	46.038 1.8125	172000 38600	0.88	0.76	1.14	25500 5740	38600 8690	44500 10000	0.66
53.975 2.1250	95.250 3.7500	63.500 2.5000	52.385 2.0624	209000 47000	0.33	2.05	3.05	31100 7000	17600 3950	54200 12200	1.77
53.975 2.1250	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
53.975 2.1250	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
53.975 2.1250	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
53.975 2.1250	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
53.975 2.1250	111.125 4.3750	79.375 3.1250	63.500 2.5000	277000 62400	0.30	2.28	3.39	41300 9290	21000 4720	71900 16200	1.97
53.975 2.1250	117.475 4.6250	73.025 2.8750	53.975 2.1250	240000 54000	0.63	1.08	1.60	35800 8040	38300 8620	62300 14000	0.93
53.975 2.1250	123.825 4.8750	79.375 3.1250	63.500 2.5000	307000 69100	0.35	1.95	2.90	45800 10300	27100 6100	79700 17900	1.69
53.975 2.1250	136.525 5.3750	95.250 3.7500	76.200 3.0000	376000 84500	0.36	1.86	2.78	55900 12600	34700 7790	97400 21900	1.61
53.975 2.1250	139.700 5.5000	77.790 3.0626	51.803 2.0395	322000 72300	0.87	0.78	1.16	47900 10800	71000 16000	83400 18800	0.67
54.987 2.1649	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
55.000 2.1654	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
55.000 2.1654	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
55.000 2.1654	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
55.000 2.1654	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
55.000 2.1654	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
55.000 2.1654	120.000 4.7244	65.090 2.5626	53.975 2.1250	231000 52000	0.38	1.75	2.61	34400 7740	22700 5100	59900 13500	1.52

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
66200	66462D	X4S-55200	3.5 0.14	71.0 2.80	0.8 0.03	111.0 4.37			50.2	16.4	0.0751	3.65 8.05
72200C	72488D		3.5 0.14	77.0 3.03	1.5 0.06	115.0 4.53			57.4	13.5	0.0825	4.34 9.56
555	552D	X1S-555	2.3 0.09	66.0 2.60	1.5 0.06	115.0 4.53			91	21.1	0.1108	4.77 10.51
368-S	363D	X1S-368-S	2.0 0.08	59.0 2.32	0.8 0.03	84.0 3.31			33.8	14	0.0773	1.15 2.54
3767	3729D	X1S-3767	2.3 0.09	63.0 2.48	0.8 0.03	88.0 3.46			49.9	14.5	0.0903	1.77 3.90
33890	33821D	X1S-33890	1.5 0.06	61.0 2.40	0.8 0.03	90.0 3.54			52.5	18.5	0.0910	1.82 4.00
33891	33821D	X1S-33890	3.5 0.14	66.0 2.60	0.8 0.03	90.0 3.54			52.5	18.5	0.0910	1.80 3.97
468	452D	X1S-468	1.5 0.06	62.0 2.44	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.64 5.82
55206	55433D	X2S-55206	3.5 0.14	72.0 2.83	0.5 0.02	105.0 4.13			36.8	13.2	0.1085	2.60 5.73
540	533D		3.5 0.14	67.0 2.64	1.5 0.06	100.0 3.94			64.3	16.1	0.0938	3.39 7.46
55206	55444D	X1S-55206	3.5 0.14	72.0 2.83	1.5 0.06	105.0 4.13			36.8	13.2	0.1085	2.71 5.98
33895	33821D	X2S-33895	1.5 0.06	63.0 2.48	0.8 0.03	90.0 3.54			52.5	18.5	0.0910	1.74 3.85
389A	384ED	X2S-389A	0.8 0.03	61.0 2.40	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.55 3.41
389A	384D	X1S-389A	0.8 0.03	61.0 2.40	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.66 3.65
456	452DC		3.5 0.14	68.0 2.68	0.8 0.03	100.0 3.94	10.9 0.43	3.8 0.15	58.6	17.1	0.0946	2.57 5.66
456	452D	X1S-456	3.5 0.14	68.0 2.68	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.61 5.76
539	533D	X2S-539	3.5 0.14	68.0 2.68	1.5 0.06	100.0 3.94			64.3	16.1	0.0938	3.35 7.37
66212	66462D	X1S-66212	3.5 0.14	73.0 2.87	0.8 0.03	111.0 4.37			50.2	16.4	0.0751	3.57 7.87
557-S	552D	X1S-557-S	3.5 0.14	71.0 2.80	1.5 0.06	115.0 4.53			91	21.1	0.1108	4.64 10.22
636	632D		3.5 0.14	73.0 2.87	1.5 0.06	125.0 4.92			106	21	0.0814	6.71 14.80
78215C	78549D	X1S-78215	3.5 0.14	84.0 3.31	1.5 0.06	131.0 5.16			71.3	17.6	0.0926	5.84 12.87
466	452D	X1S-466	2.3 0.09	66.0 2.60	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.58 5.70
385	384EDC	X4S-385	2.3 0.09	65.0 2.56	0.8 0.03	93.0 3.66	7.9 0.31	3.0 0.12	42	15.7	0.0859	1.50 3.32
385	384ED	X4S-385	2.3 0.09	65.0 2.56	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.50 3.32
385X	384ED	X4S-385	3.5 0.14	67.0 2.64	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.49 3.30
385	384D	X1S-385	2.3 0.09	65.0 2.56	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.61 3.55
385X	384D	X1S-385	3.5 0.14	67.0 2.64	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.60 3.53
475	472DC	X1S-475	0.8 0.03	67.0 2.64	0.8 0.03	114.0 4.49	14.2 0.56	3.0 0.12	77.2	23	0.1083	3.65 8.05

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

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TDO

DOUBLE OUTER RACE

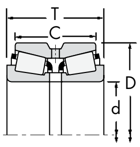
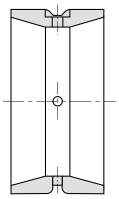
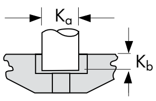


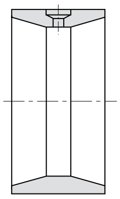
Fig. 1
D suffix outer race with lubricant holes and groove

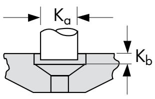




Locking pin for CD outer race

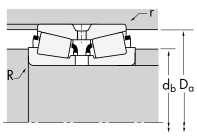
Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin





Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
55.000 2.1654	120.000 4.7244	65.090 2.5626	53.975 2.1250	231000 52000	0.38	1.75	2.61	34400 7740	22700 5100	59900 13500	1.52
55.562 2.1875	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
55.562 2.1875	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
55.575 2.1880	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	92.075 3.6250	42.070 1.6563	34.130 1.3437	101000 22700	0.39	1.74	2.59	15100 3380	10000 2250	26200 5890	1.50
57.150 2.2500	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	100.000 3.9370	105.131 4.1390	95.606 3.7640	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.150 2.2500	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
57.150 2.2500	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
57.150 2.2500	107.950 4.2500	65.090 2.5626	53.975 2.1250	219000 49200	0.34	2.01	3.00	32600 7320	18700 4200	56700 12700	1.74
57.150 2.2500	110.000 4.3307	52.388 2.0625	46.038 1.8125	159000 35800	0.40	1.68	2.50	23700 5340	16300 3670	41300 9290	1.45
57.150 2.2500	114.287 4.4995	58.738 2.3125	46.038 1.8125	178000 40000	0.49	1.38	2.06	26500 5960	22100 4980	46200 10400	1.20
57.150 2.2500	117.475 4.6250	73.025 2.8750	53.975 2.1250	240000 54000	0.63	1.08	1.60	35800 8040	38300 8620	62300 14000	0.93
57.150 2.2500	123.825 4.8750	77.785 3.0624	55.562 2.1875	291000 65500	0.74	0.92	1.36	43400 9760	54800 12300	75600 17000	0.79
57.150 2.2500	123.825 4.8750	79.375 3.1250	63.500 2.5000	307000 69100	0.35	1.95	2.90	45800 10300	27100 6100	79700 17900	1.69
57.150 2.2500	136.525 5.3750	95.250 3.7500	76.200 3.0000	376000 84500	0.36	1.86	2.78	55900 12600	34700 7790	97400 21900	1.61
57.150 2.2500	139.700 5.5000	77.788 3.0625	51.803 2.0395	276000 62000	0.87	0.78	1.16	41100 9230	60900 13700	71500 16100	0.67
57.531 2.2650	100.000 3.9370	49.200 1.9370	39.675 1.5620	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
57.531 2.2650	100.000 3.9370	52.388 2.0625	42.862 1.6875	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
475	472D	X1S-475	0.8 0.03	67.0 2.64	0.8 0.03	114.0 4.49			77.2	23	0.1083	3.65 8.05
466-S	452DC		2.3 0.09	66.0 2.60	0.8 0.03	100.0 3.94	10.9 0.43	3.8 0.15	58.6	17.1	0.0946	2.52 5.55
466-S	452D	X1S-466-S	2.3 0.09	66.0 2.60	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.56 5.65
389	384ED	X2S-389	2.3 0.09	65.0 2.56	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.49 3.29
L507949	L507914D	L507949XS	1.5 0.06	65.0 2.56	0.8 0.03	86.0 3.39			46.1	36.9	0.0914	1.08 2.38
387	384ED	X2S-387	2.3 0.09	66.0 2.60	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.44 3.18
387A	384EDC	X1S-387	3.5 0.14	69.0 2.72	0.8 0.03	93.0 3.66	7.9 0.31	3.0 0.12	42	15.7	0.0859	1.43 3.16
387A	384ED	X1S-387	3.5 0.14	69.0 2.72	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.43 3.16
387AS	384ED	X1S-387	5.0 0.20	72.0 2.83	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.41 3.11
387-S	384ED	X1S-387	0.8 0.03	63.0 2.48	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.45 3.20
387	384D	X1S-387A	2.3 0.09	66.0 2.60	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.54 3.40
387A	384D	X1S-387A	3.5 0.14	69.0 2.72	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.53 3.38
387AS	384D	X1S-387A	5.0 0.20	72.0 2.83	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.51 3.33
387-S	384DC	X1S-387A	0.8 0.03	63.0 2.48	0.8 0.03	93.0 3.66	7.9 0.31	3.0 0.12	42	15.7	0.0859	1.55 3.42
387-S	384D	X1S-387A	0.8 0.03	63.0 2.48	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.55 3.42
387A	384XD	X4S-387A	3.5 0.14	69.0 2.72	0.8 0.03	94.0 3.70			42	15.7	0.0859	2.90 6.40
462	452DC	X2S-462	2.3 0.09	67.0 2.64	0.8 0.03	100.0 3.94	10.9 0.43	3.8 0.15	58.6	17.1	0.0946	2.51 5.53
462	452D	X2S-469	2.3 0.09	67.0 2.64	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.51 5.53
469	452D	X2S-469	3.5 0.14	70.0 2.76	0.8 0.03	100.0 3.94			58.6	17.1	0.0946	2.50 5.50
390	394D	X2S-390	2.3 0.09	70.0 2.76	0.8 0.03	104.5 4.11			56	21.4	0.0984	2.12 4.68
29665	29622D	X1S-29665	3.5 0.14	75.0 2.95	0.8 0.03	109.0 4.29			77.7	43.3	0.1170	2.71 5.97
66225	66462D	X1S-66225	3.5 0.14	76.0 2.99	0.8 0.03	111.0 4.37			50.2	16.4	0.0751	3.34 7.37
72225C	72488D	X1S-72225	3.5 0.14	81.0 3.19	1.5 0.06	115.0 4.53			57.4	13.5	0.0825	4.15 9.15
555-S	552D	X1S-555-S	3.5 0.14	73.0 2.87	1.5 0.06	115.0 4.53			91	21.1	0.1108	4.47 9.86
635	632D	X1S-635	3.5 0.14	75.0 2.95	1.5 0.06	125.0 4.92			106	21	0.0814	6.77 14.93
78225	78549D	X2S-78225	3.5 0.14	83.0 3.27	1.5 0.06	131.0 5.16			62.6	19.1	0.0884	5.41 11.92
388A	384ED	X2S-388A	3.5 0.14	69.0 2.72	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.46 3.21
388A	384D	X1S-388A	3.5 0.14	69.0 2.72	0.8 0.03	93.0 3.66			42	15.7	0.0859	1.51 3.34

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

B

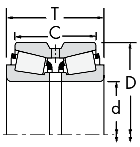
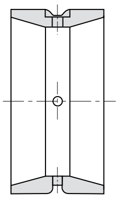
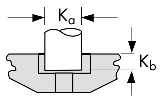


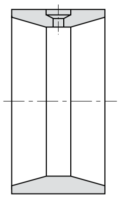
Fig. 1 D suffix outer race with lubricant holes and groove

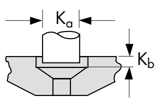




Locking pin for CD outer race

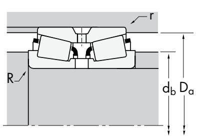
Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin





Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
59.972	129.982	69.850	47.625	249000	0.67	1.01	1.51	37100	42300	64600	0.88
2.3611	5.1174	2.7500	1.8750	56000				8340	9500	14500	
59.977	100.000	55.560	44.450	171000	0.43	1.59	2.36	25500	18500	44300	1.37
2.3613	3.9370	2.1874	1.7500	38400				5720	4170	9960	
59.987	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.3617	4.8750	3.1250	2.5000	69100				10300	6100	17900	
60.000	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.3622	4.3307	2.0625	1.8125	35800				5340	3670	9290	
60.000	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.3622	4.3307	2.0625	1.8125	35800				5340	3670	9290	
60.000	120.000	65.090	53.975	231000	0.38	1.75	2.61	34400	22700	59900	1.52
2.3622	4.7244	2.5626	2.1250	52000				7740	5100	13500	
60.000	129.982	69.850	47.625	249000	0.67	1.01	1.51	37100	42300	64600	0.88
2.3622	5.1174	2.7500	1.8750	56000				8340	9500	14500	
60.325	100.000	55.560	44.450	171000	0.43	1.59	2.36	25500	18500	44300	1.37
2.3750	3.9370	2.1874	1.7500	38400				5720	4170	9960	
60.325	100.000	55.560	44.450	171000	0.43	1.59	2.36	25500	18500	44300	1.37
2.3750	3.9370	2.1874	1.7500	38400				5720	4170	9960	
60.325	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.3750	4.8750	3.1250	2.5000	69100				10300	6100	17900	
60.325	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.3750	4.8750	3.1250	2.5000	69100				10300	6100	17900	
60.325	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.3750	4.8750	3.1250	2.5000	69100				10300	6100	17900	
60.325	136.525	95.250	76.200	376000	0.36	1.86	2.78	55900	34700	97400	1.61
2.3750	5.3750	3.7500	3.0000	84500				12600	7790	21900	
61.912	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.4375	4.3307	2.0625	1.8125	35800				5340	3670	9290	
61.912	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.4375	4.8750	3.1250	2.5000	69100				10300	6100	17900	
61.976	100.000	53.975	44.450	171000	0.43	1.59	2.36	25500	18500	44300	1.37
2.4400	3.9370	2.1250	1.7500	38400				5720	4170	9960	
62.738	100.000	55.560	44.450	171000	0.43	1.59	2.36	25500	18500	44300	1.37
2.4700	3.9370	2.1874	1.7500	38400				5720	4170	9960	
62.738	100.000	55.560	44.450	171000	0.43	1.59	2.36	25500	18500	44300	1.37
2.4700	3.9370	2.1874	1.7500	38400				5720	4170	9960	
63.500	94.458	42.860	34.925	108000	0.42	1.59	2.37	16100	11700	28000	1.38
2.5000	3.7188	1.6874	1.3750	24300				3620	2630	6300	
63.500	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.5000	4.3307	2.0625	1.8125	35800				5340	3670	9290	
63.500	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.5000	4.3307	2.0625	1.8125	35800				5340	3670	9290	
63.500	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.5000	4.3307	2.0625	1.8125	35800				5340	3670	9290	
63.500	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.5000	4.3307	2.0625	1.8125	35800				5340	3670	9290	
63.500	112.712	55.562	42.862	178000	0.46	1.47	2.19	26400	20800	46000	1.27
2.5000	4.4375	2.1875	1.6875	39900				5950	4670	10400	
63.500	117.475	66.675	53.975	223000	0.44	1.55	2.31	33200	24800	57800	1.34
2.5000	4.6250	2.6250	2.1250	50100				7470	5570	13000	
63.500	120.000	65.090	53.975	231000	0.38	1.75	2.61	34400	22700	59900	1.52
2.5000	4.7244	2.5626	2.1250	52000				7740	5100	13500	
63.500	120.000	65.090	53.975	231000	0.38	1.75	2.61	34400	22700	59900	1.52
2.5000	4.7244	2.5626	2.1250	52000				7740	5100	13500	
63.500	120.000	65.090	53.975	231000	0.38	1.75	2.61	34400	22700	59900	1.52
2.5000	4.7244	2.5626	2.1250	52000				7740	5100	13500	

(1) Based on 1×10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90×10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
66589	66522D	X1S-66585	0.8 0.03	74.0 2.91	0.8 0.03	118.0 4.65			57	18.3	0.0797	3.94 8.68
28980	28921D	X2S-28980	3.5 0.14	73.0 2.87	0.8 0.03	96.0 3.78			60.1	24.5	0.1032	1.66 3.67
558-S	552D	X1S-558-S	3.5 0.14	75.0 2.95	1.5 0.06	115.0 4.53			91	21.1	0.1108	4.31 9.50
397	394DC	X1S-397	0.8 0.03	69.0 2.72	0.8 0.03	104.5 4.11	9.4 0.37	2.3 0.09	56	21.4	0.0984	2.01 4.43
397	394D	X1S-397	0.8 0.03	69.0 2.72	0.8 0.03	104.5 4.11			56	21.4	0.0984	2.01 4.43
476	472D	X1S-476	2.0 0.08	73.0 2.87	0.8 0.03	114.0 4.49			77.2	23	0.1083	3.42 7.54
66585	66522D	X1S-66585	3.5 0.14	79.0 3.11	0.8 0.03	118.0 4.65			57	18.3	0.0797	3.92 8.64
28985	28921DC	X2S-28985	3.5 0.14	73.0 2.87	0.8 0.03	96.0 3.78	7.9 0.31	2.3 0.09	60.1	24.5	0.1032	1.65 3.64
28985	28921D	X3S-28985	3.5 0.14	73.0 2.87	0.8 0.03	96.0 3.78			60.1	24.5	0.1032	1.65 3.64
558	552DC	X1S-558	2.3 0.09	73.0 2.87	1.5 0.06	115.0 4.53	14.2 0.56	4.6 0.18	91	21.1	0.1108	4.31 9.49
558	552D	X1S-558	2.3 0.09	73.0 2.87	1.5 0.06	115.0 4.53			91	21.1	0.1108	4.31 9.49
558A	552D	X1S-558	3.5 0.14	76.0 2.99	1.5 0.06	115.0 4.53			91	21.1	0.1108	4.29 9.47
637	632D	X1S-637	3.5 0.14	78.0 3.07	1.5 0.06	125.0 4.92			106	21	0.0814	6.55 14.44
392	394D	X1S-392	0.8 0.03	70.0 2.76	0.8 0.03	104.5 4.11			56	21.4	0.0984	1.97 4.35
554	552D	X2S-554	3.5 0.14	77.0 3.03	1.5 0.06	115.0 4.53			91	21.1	0.1108	4.17 9.19
28990	28921D		2.0 0.08	72.0 2.83	0.8 0.03	96.0 3.78			60.1	24.5	0.1032	1.58 3.49
28995	28921DC	X1S-28995	3.5 0.14	75.0 2.95	0.8 0.03	96.0 3.78	7.9 0.31	2.3 0.09	60.1	24.5	0.1032	1.55 3.42
28995	28921D	X2S-28995	3.5 0.14	75.0 2.95	0.8 0.03	96.0 3.78			60.1	24.5	0.1032	1.55 3.42
L610549	L610510D	L610549XB	1.5 0.06	71.0 2.80	0.8 0.03	91.0 3.58			56.7	43.6	0.1006	0.97 2.15
390A	394DC	X1S-395	1.5 0.06	73.0 2.87	0.8 0.03	104.5 4.11	9.4 0.37	2.3 0.09	56	21.4	0.0984	1.90 4.18
390A	394D	X1S-395	1.5 0.06	73.0 2.87	0.8 0.03	104.5 4.11			56	21.4	0.0984	1.90 4.18
395	394DC	X1S-395	3.5 0.14	77.0 3.03	0.8 0.03	104.5 4.11	9.4 0.37	2.3 0.09	56	21.4	0.0984	1.88 4.14
395	394D	X3S-395	3.5 0.14	77.0 3.03	0.8 0.03	104.5 4.11			56	21.4	0.0984	1.88 4.14
29586	29526D	R800008	1.5 0.06	73.0 2.87	0.8 0.03	105.0 4.13			70.3	25.8	0.1112	2.19 4.83
33251	33462D	X2S-33251	0.8 0.03	73.0 2.87	0.8 0.03	112.0 4.41			84.2	25.9	0.1162	3.18 7.02
477	472D	X4S-477	0.8 0.03	73.0 2.87	0.8 0.03	114.0 4.49			77.2	23	0.1083	3.28 7.23
483	472DC	X3S-477	3.5 0.14	78.0 3.07	0.8 0.03	114.0 4.49	14.2 0.56	3.0 0.12	77.2	23	0.1083	3.26 7.19
483	472D	X3S-477	3.5 0.14	78.0 3.07	0.8 0.03	114.0 4.49			77.2	23	0.1083	3.26 7.19

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

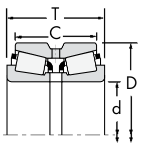
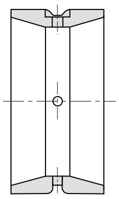
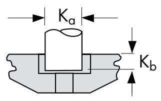


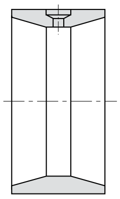
Fig. 1 D suffix outer race with lubricant holes and groove

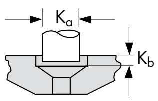




Locking pin for CD outer race

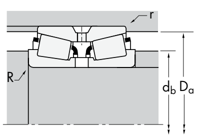
Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin





Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
63.500	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.5000	4.8750	3.1250	2.5000	69100				10300	6100	17900	
63.500	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.5000	4.8750	3.1250	2.5000	69100				10300	6100	17900	
63.500	127.000	80.962	65.088	317000	0.36	1.86	2.76	47100	29400	82100	1.61
2.5000	5.0000	3.1875	2.5625	71200				10600	6600	18500	
63.500	136.525	95.250	76.200	376000	0.36	1.86	2.78	55900	34700	97400	1.61
2.5000	5.3750	3.7500	3.0000	84500				12600	7790	21900	
63.500	139.700	77.788	51.803	276000	0.87	0.78	1.16	41100	60900	71500	0.67
2.5000	5.5000	3.0625	2.0395	62000				9230	13700	16100	
63.500	155.575	101.600	85.725	512000	0.33	2.08	3.09	76300	42500	133000	1.80
2.5000	6.1250	4.0000	3.3750	115000				17100	9550	29900	
64.960	152.400	95.250	76.200	398000	0.41	1.65	2.46	59300	41500	103000	1.43
2.5575	6.0000	3.7500	3.0000	89500				13300	9330	23200	
64.960	155.575	101.600	85.725	512000	0.33	2.08	3.09	76300	42500	133000	1.80
2.5575	6.1250	4.0000	3.3750	115000				17100	9550	29900	
64.963	127.000	80.962	65.088	317000	0.36	1.86	2.76	47100	29400	82100	1.61
2.5576	5.0000	3.1875	2.5625	71200				10600	6600	18500	
64.987	139.700	77.788	51.803	276000	0.87	0.78	1.16	41100	60900	71500	0.67
2.5586	5.5000	3.0625	2.0395	62000				9230	13700	16100	
65.000	120.000	65.090	53.975	231000	0.38	1.75	2.61	34400	22700	59900	1.52
2.5591	4.7244	2.5626	2.1250	52000				7740	5100	13500	
66.675	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.6250	4.3307	2.0625	1.8125	35800				5340	3670	9290	
66.675	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.6250	4.3307	2.0625	1.8125	35800				5340	3670	9290	
66.675	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.6250	4.3307	2.0625	1.8125	35800				5340	3670	9290	
66.675	117.475	66.675	53.975	223000	0.44	1.55	2.31	33200	24800	57800	1.34
2.6250	4.6250	2.6250	2.1250	50100				7470	5570	13000	
66.675	120.000	65.090	53.975	231000	0.38	1.75	2.61	34400	22700	59900	1.52
2.6250	4.7244	2.5626	2.1250	52000				7740	5100	13500	
66.675	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.6250	4.8750	3.1250	2.5000	69100				10300	6100	17900	
66.675	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.6250	4.8750	3.1250	2.5000	69100				10300	6100	17900	
66.675	136.525	95.250	76.200	376000	0.36	1.86	2.78	55900	34700	97400	1.61
2.6250	5.3750	3.7500	3.0000	84500				12600	7790	21900	
68.262	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.6875	4.3307	2.0625	1.8125	35800				5340	3670	9290	
68.262	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.6875	4.3307	2.0625	1.8125	35800				5340	3670	9290	
68.262	110.000	52.388	46.038	159000	0.40	1.68	2.50	23700	16300	41300	1.45
2.6875	4.3307	2.0625	1.8125	35800				5340	3670	9290	
68.262	120.000	65.090	53.975	231000	0.38	1.75	2.61	34400	22700	59900	1.52
2.6875	4.7244	2.5626	2.1250	52000				7740	5100	13500	
68.262	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.6875	4.8750	3.1250	2.5000	69100				10300	6100	17900	
68.262	123.825	79.375	63.500	307000	0.35	1.95	2.90	45800	27100	79700	1.69
2.6875	4.8750	3.1250	2.5000	69100				10300	6100	17900	
68.262	127.000	80.962	65.088	317000	0.36	1.86	2.76	47100	29400	82100	1.61
2.6875	5.0000	3.1875	2.5625	71200				10600	6600	18500	
68.262	136.525	95.250	76.200	376000	0.36	1.86	2.78	55900	34700	97400	1.61
2.6875	5.3750	3.7500	3.0000	84500				12600	7790	21900	
68.262	161.925	105.562	70.637	480000	0.71	0.95	1.42	71400	86700	124000	0.82
2.6875	6.3750	4.1560	2.7810	108000				16100	19500	28000	

(1) Based on 1×10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90×10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
559	552DC	X2S-559	3.5 0.14	78.0 3.07	1.5 0.06	115.0 4.53	14.2 0.56	4.6 0.18	91	21.1	0.1108	4.25 9.38
559	552D	X2S-559	3.5 0.14	78.0 3.07	1.5 0.06	115.0 4.53			91	21.1	0.1108	4.25 9.38
565	563D	X1S-565	3.5 0.14	80.0 3.15	1.5 0.06	119.0 4.69			101	24	0.1167	4.53 9.99
639	632D	X2S-639	3.5 0.14	81.0 3.19	1.5 0.06	125.0 4.92			106	21	0.0814	6.31 13.92
78250	78549D	X1S-78250	2.3 0.09	85.0 3.35	1.5 0.06	131.0 5.16			62.6	19.1	0.0884	5.10 11.24
745-S	742D	X2S-745-S	3.5 0.14	84.0 3.31	1.5 0.06	143.0 5.63			160	26.3	0.0898	9.86 21.74
656	654DC	X1S-656	3.5 0.14	85.0 3.35	1.5 0.06	141.0 5.55	17.3 0.68	5.3 0.21	137	27.3	0.0919	8.33 18.36
747-S	742D	X1S-747-S	3.5 0.14	85.0 3.35	1.5 0.06	143.0 5.63			160	26.3	0.0898	9.72 21.43
569	563D	X1S-569	3.5 0.14	81.0 3.19	1.5 0.06	119.0 4.69			101	24	0.1167	4.44 9.79
78255X	78549D	X1S-78255X	3.5 0.14	89.0 3.50	1.5 0.06	131.0 5.16			62.6	19.1	0.0884	4.99 11.00
478	472D	X2S-478	2.3 0.09	77.0 3.03	0.8 0.03	114.0 4.49			77.2	23	0.1083	3.18 7.02
395A	394D	X1S-395-S	0.8 0.03	73.0 2.87	0.8 0.03	104.5 4.11			56	21.4	0.0984	1.76 3.89
395-S	394DC	X1S-395-S	3.5 0.14	79.0 3.11	0.8 0.03	104.5 4.11	9.4 0.37	2.3 0.09	56	21.4	0.0984	1.76 3.87
395-S	394D	X3S-395-S	3.5 0.14	79.0 3.11	0.8 0.03	104.5 4.11			56	21.4	0.0984	1.76 3.87
33262	33462D	X1S-33262	3.5 0.14	81.0 3.19	0.8 0.03	112.0 4.41			84.2	25.9	0.1162	2.96 6.52
479	472D	X1S-479	2.3 0.09	78.0 3.07	0.8 0.03	114.0 4.49			77.2	23	0.1083	3.10 6.83
560	552DC	X2S-560	3.5 0.14	81.0 3.19	1.5 0.06	115.0 4.53	14.2 0.56	4.6 0.18	91	21.1	0.1108	3.90 8.61
560	552D	X3S-560	3.5 0.14	81.0 3.19	1.5 0.06	115.0 4.53			91	21.1	0.1108	3.90 8.61
641	632D	X1S-641	3.5 0.14	83.0 3.27	1.5 0.06	125.0 4.92			106	21	0.0814	6.08 13.40
399A	394D	X4S-399A	2.3 0.09	78.0 3.07	0.8 0.03	104.5 4.11			56	21.4	0.0984	1.69 3.72
399AS	394DC	X1S-399A	5.0 0.20	83.0 3.27	0.8 0.03	104.5 4.11	9.4 0.37	2.3 0.09	56	21.4	0.0984	1.65 3.64
399AS	394D	X4S-399A	5.0 0.20	83.0 3.27	0.8 0.03	104.5 4.11			56	21.4	0.0984	1.65 3.64
480	472D	X2S-480	3.5 0.14	82.0 3.23	0.8 0.03	114.0 4.49			77.2	23	0.1083	3.00 6.62
560-S	552DC	X1S-560-S	3.5 0.14	83.0 3.27	1.5 0.06	115.0 4.53	14.2 0.56	4.6 0.18	91	21.1	0.1108	3.79 8.35
560-S	552D	X1S-560-S	3.5 0.14	83.0 3.27	1.5 0.06	115.0 4.53			91	21.1	0.1108	3.79 8.35
570	563D	X1S-570	3.5 0.14	83.0 3.27	1.5 0.06	119.0 4.69			101	24	0.1167	4.23 9.31
642	632D	X1S-642	3.5 0.14	85.0 3.35	1.5 0.06	125.0 4.92			106	21	0.0814	5.93 13.08
9278	9220D	X1S-9278	3.5 0.14	97.0 3.82	0.8 0.03	153.0 6.03			102	18.4	0.0984	9.41 20.76

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

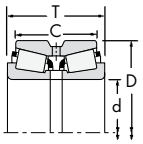
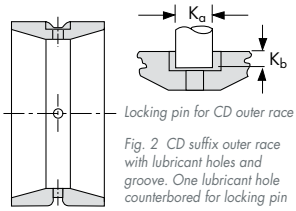
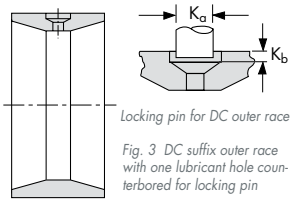


Fig. 1 D suffix outer race with lubricant holes and groove



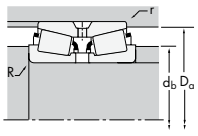
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
69.850 2.7500	114.287 4.4995	58.738 2.3125	46.038 1.8125	178000 40000	0.49	1.38	2.06	26500 5960	22100 4980	46200 10400	1.20
69.850 2.7500	114.287 4.4995	58.738 2.3125	46.038 1.8125	178000 40000	0.49	1.38	2.06	26500 5960	22100 4980	46200 10400	1.20
69.850 2.7500	117.475 4.6250	66.675 2.6250	53.975 2.1250	223000 50100	0.44	1.55	2.31	33200 7470	24800 5570	57800 13000	1.34
69.850 2.7500	117.475 4.6250	66.675 2.6250	53.975 2.1250	223000 50100	0.44	1.55	2.31	33200 7470	24800 5570	57800 13000	1.34
69.850 2.7500	120.000 4.7244	65.090 2.5626	53.975 2.1250	231000 52000	0.38	1.75	2.61	34400 7740	22700 5100	59900 13500	1.52
69.850 2.7500	120.000 4.7244	71.438 2.8125	58.738 2.3125	288000 64800	0.36	1.87	2.79	42900 9650	26500 5950	74700 16800	1.62
69.850 2.7500	127.000 5.0000	80.962 3.1875	65.088 2.5625	317000 71200	0.36	1.86	2.76	47100 10600	29400 6600	82100 18500	1.61
69.850 2.7500	136.525 5.3750	95.250 3.7500	76.200 3.0000	376000 84500	0.36	1.86	2.78	55900 12600	34700 7790	97400 21900	1.61
69.850 2.7500	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
69.850 2.7500	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
69.850 2.7500	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
69.850 2.7500	171.450 6.7500	125.412 4.9375	100.012 3.9375	659000 148000	0.30	2.26	3.36	98200 22100	50300 11300	171000 38400	1.95
69.914 2.7525	177.800 7.0000	109.538 4.3125	74.612 2.9375	494000 111000	0.76	0.88	1.31	73500 16500	96200 21600	128000 28800	0.76
69.952 2.7540	121.442 4.7812	52.390 2.0626	38.100 1.5000	165000 37000	0.45	1.50	2.23	24500 5510	18900 4260	42700 9600	1.30
70.000 2.7559	120.000 4.7244	65.090 2.5626	53.975 2.1250	231000 52000	0.38	1.75	2.61	34400 7740	22700 5100	59900 13500	1.52
70.000 2.7559	120.000 4.7244	65.090 2.5626	53.975 2.1250	231000 52000	0.38	1.75	2.61	34400 7740	22700 5100	59900 13500	1.52
70.637 2.7810	114.287 4.4995	58.738 2.3125	46.038 1.8125	178000 40000	0.49	1.38	2.06	26500 5960	22100 4980	46200 10400	1.20
70.637 2.7810	114.287 4.4995	58.738 2.3125	46.038 1.8125	178000 40000	0.49	1.38	2.06	26500 5960	22100 4980	46200 10400	1.20
71.438 2.8125	117.475 4.6250	66.675 2.6250	53.975 2.1250	223000 50100	0.44	1.55	2.31	33200 7470	24800 5570	57800 13000	1.34
71.438 2.8125	120.000 4.7244	71.438 2.8125	58.738 2.3125	288000 64800	0.36	1.87	2.79	42900 9650	26500 5950	74700 16800	1.62
71.438 2.8125	127.000 5.0000	80.962 3.1875	65.088 2.5625	317000 71200	0.36	1.86	2.76	47100 10600	29400 6600	82100 18500	1.61
71.438 2.8125	127.000 5.0000	80.962 3.1875	65.088 2.5625	317000 71200	0.36	1.86	2.76	47100 10600	29400 6600	82100 18500	1.61
71.438 2.8125	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
71.438 2.8125	136.525 5.3750	95.250 3.7500	76.200 3.0000	376000 84500	0.36	1.86	2.78	55900 12600	34700 7790	97400 21900	1.61
71.438 2.8125	136.525 5.3750	95.250 3.7500	76.200 3.0000	376000 84500	0.36	1.86	2.78	55900 12600	34700 7790	97400 21900	1.61
73.025 2.8750	114.287 4.4995	58.738 2.3125	46.038 1.8125	178000 40000	0.49	1.38	2.06	26500 5960	22100 4980	46200 10400	1.20
73.025 2.8750	114.287 4.4995	58.738 2.3125	46.038 1.8125	178000 40000	0.49	1.38	2.06	26500 5960	22100 4980	46200 10400	1.20
73.025 2.8750	117.475 4.6250	66.675 2.6250	53.975 2.1250	223000 50100	0.44	1.55	2.31	33200 7470	24800 5570	57800 13000	1.34

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
29675	29622DC	X1S-29675	1.5 0.06	80.0 3.15	0.8 0.03	109.0 4.29	7.9 0.31	2.3 0.09	77.7	43.3	0.1170	2.25 4.96
29675	29622D	X2S-29675	1.5 0.06	80.0 3.15	0.8 0.03	109.0 4.29			77.7	43.3	0.1170	2.25 4.96
33275	33462DC	X3S-33275	3.5 0.14	84.0 3.31	0.8 0.03	112.0 4.41	10.9 0.43	3.8 0.15	84.2	25.9	0.1162	2.80 6.16
33275	33462D	X4S-33275	3.5 0.14	84.0 3.31	0.8 0.03	112.0 4.41			84.2	25.9	0.1162	2.80 6.16
482	472D	X3S-482	3.5 0.14	83.0 3.27	0.8 0.03	114.0 4.49			77.2	23	0.1083	2.92 6.44
47487	47420D	X1S-47487	3.5 0.14	84.0 3.31	0.8 0.03	114.0 4.49			98.4	26.3	0.1153	3.12 6.87
566	563D	X3S-566	3.5 0.14	85.0 3.35	1.5 0.06	119.0 4.69			101	24	0.1167	4.16 9.16
643	632D	X2S-643	3.5 0.14	86.0 3.39	1.5 0.06	125.0 4.92			106	21	0.0814	5.82 12.84
655	654D	X1S-655	3.5 0.14	88.0 3.46	1.5 0.06	141.0 5.55			137	27.3	0.0919	8.08 17.81
744A	742D	X1S-744A	5.0 0.20	91.0 3.58	1.5 0.06	143.0 5.63			160	26.3	0.0898	9.31 20.53
745A	742D	X1S-745A	3.5 0.14	88.0 3.46	1.5 0.06	143.0 5.63			160	26.3	0.0898	9.15 20.17
835	834D	X1S-835	3.5 0.14	91.0 3.58	0.8 0.03	155.0 6.10			198	34.8	0.0937	14.37 31.68
9382	9320D	X1S-9382	3.5 0.14	101.0 3.98	2.3 0.09	164.0 6.46			118	18.6	0.1053	12.79 28.19
34274	34478D	X1S-34274	2.0 0.08	81.0 3.19	0.8 0.03	116.0 4.57			69.3	27	0.1093	2.26 4.99
484	472DC	X2S-484	2.0 0.08	80.0 3.15	0.8 0.03	114.0 4.49	14.2 0.56	3.0 0.12	77.2	23	0.1083	2.92 6.44
484	472D	X2S-484	2.0 0.08	80.0 3.15	0.8 0.03	114.0 4.49			77.2	23	0.1083	2.92 6.44
29680	29622DC	X1S-29680	1.3 0.05	80.0 3.15	0.8 0.03	109.0 4.29	7.9 0.31	2.3 0.09	77.7	43.3	0.1170	2.20 4.84
29680	29622D	X1S-29680	1.3 0.05	80.0 3.15	0.8 0.03	109.0 4.29			77.7	43.3	0.1170	2.20 4.84
33281	33462D	X1S-33281	3.5 0.14	85.0 3.35	0.8 0.03	112.0 4.41			84.2	24.4	0.1162	2.72 5.99
47490	47420D	X1S-47490	3.5 0.14	86.0 3.39	0.8 0.03	114.0 4.49			98.4	26.3	0.1153	3.02 6.65
567A	563D	X1S-567A	3.5 0.14	86.0 3.39	1.5 0.06	119.0 4.69			101	24	0.1167	4.02 8.86
567-S	563D	X1S-567A	6.4 0.25	92.0 3.62	1.5 0.06	119.0 4.69			101	24	0.1167	3.97 8.75
495-S	493D	X1S-495-S	3.5 0.14	88.0 3.46	0.8 0.03	130.0 5.12			105	29.3	0.1252	4.40 9.70
644	632D	X1S-645	3.5 0.14	87.0 3.43	1.5 0.06	125.0 4.92			106	21	0.0814	5.72 12.60
645	632D	X1S-645	6.4 0.25	93.0 3.66	1.5 0.06	125.0 4.92			106	21	0.0814	5.65 12.45
29685	29622DC	X1S-29685	3.5 0.14	86.0 3.39	0.8 0.03	109.0 4.29	7.9 0.31	2.3 0.09	77.7	43.3	0.1170	2.09 4.60
29685	29622D	X2S-29685	3.5 0.14	86.0 3.39	0.8 0.03	109.0 4.29			77.7	43.3	0.1170	2.09 4.60
33287	33462DC	X3S-33287	3.5 0.14	87.0 3.43	0.8 0.03	112.0 4.41	10.9 0.43	3.8 0.15	84.2	24.4	0.1162	2.62 5.78

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

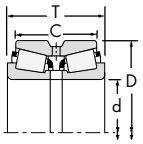
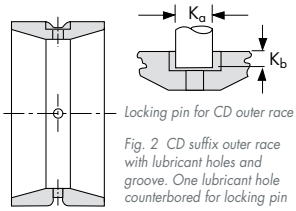
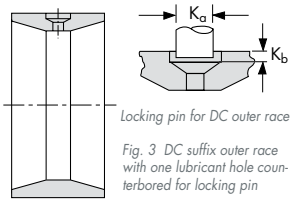


Fig. 1 D suffix outer race with lubricant holes and groove



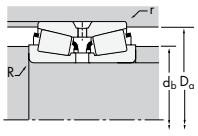
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
73.025 2.8750	117.475 4.6250	66.675 2.6250	53.975 2.1250	223000 50100	0.44	1.55	2.31	33200 7470	24800 5570	57800 13000	1.34
73.025 2.8750	120.000 4.7244	79.908 3.1460	67.285 2.6490	223000 50100	0.44	1.55	2.31	33200 7470	24800 5570	57800 13000	1.34
73.025 2.8750	127.000 5.0000	80.962 3.1875	65.088 2.5625	317000 71200	0.36	1.86	2.76	47100 10600	29400 6600	82100 18500	1.61
73.025 2.8750	127.000 5.0000	80.962 3.1875	65.088 2.5625	317000 71200	0.36	1.86	2.76	47100 10600	29400 6600	82100 18500	1.61
73.025 2.8750	139.992 5.5115	82.550 3.2500	66.675 2.6250	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
73.025 2.8750	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
73.025 2.8750	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
73.817 2.9062	114.287 4.4995	58.738 2.3125	46.038 1.8125	178000 40000	0.49	1.38	2.06	26500 5960	22100 4980	46200 10400	1.20
73.817 2.9062	127.000 5.0000	80.962 3.1875	65.088 2.5625	317000 71200	0.36	1.86	2.76	47100 10600	29400 6600	82100 18500	1.61
74.612 2.9375	139.992 5.5115	82.550 3.2500	66.675 2.6250	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
74.976 2.9518	121.442 4.7812	52.390 2.0626	38.100 1.5000	165000 37000	0.45	1.50	2.23	24500 5510	18900 4260	42700 9600	1.30
76.200 3.0000	109.538 4.3125	42.860 1.6874	34.925 1.3750	112000 25100	0.50	1.34	2.00	16600 3730	14300 3210	28900 6500	1.16
76.200 3.0000	121.442 4.7812	52.390 2.0626	38.100 1.5000	165000 37000	0.45	1.50	2.23	24500 5510	18900 4260	42700 9600	1.30
76.200 3.0000	121.442 4.7812	52.390 2.0626	38.100 1.5000	165000 37000	0.45	1.50	2.23	24500 5510	18900 4260	42700 9600	1.30
76.200 3.0000	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
76.200 3.0000	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
76.200 3.0000	139.992 5.5115	82.550 3.2500	66.675 2.6250	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
76.200 3.0000	139.992 5.5115	82.550 3.2500	66.675 2.6250	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
76.200 3.0000	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
76.200 3.0000	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
76.200 3.0000	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
76.200 3.0000	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
76.200 3.0000	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
76.200 3.0000	161.925 6.3750	104.775 4.1250	85.725 3.3750	528000 119000	0.34	1.98	2.95	78500 17700	45900 10300	137000 30700	1.71
76.200 3.0000	161.925 6.3750	105.562 4.1560	70.637 2.7810	480000 108000	0.71	0.95	1.42	71400 16100	86700 19500	124000 28000	0.82
76.200 3.0000	171.450 6.7500	125.412 4.9375	100.012 3.9375	659000 148000	0.30	2.26	3.36	98200 22100	50300 11300	171000 38400	1.95
76.200 3.0000	171.450 6.7500	125.412 4.9375	100.012 3.9375	659000 148000	0.30	2.26	3.36	98200 22100	50300 11300	171000 38400	1.95
76.200 3.0000	177.800 7.0000	109.538 4.3125	74.612 2.9375	494000 111000	0.76	0.88	1.31	73500 16500	96200 21600	128000 28800	0.76

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
33287	33462D	X3S-33287	3.5 0.14	87.0 3.43	0.8 0.03	112.0 4.41			84.2	24.4	0.1162	2.62 5.78
33287	33472DC	X1S-33287	3.5 0.14	87.0 3.43	0.8 0.03	113.0 4.45	10.9 0.43	3.8 0.15	84.2	24.4	0.1162	3.32 7.32
567	563D	X5S-567	3.5 0.14	88.0 3.46	1.5 0.06	119.0 4.69			101	24	0.1167	3.92 8.64
567X	563D	X2S-567	4.8 0.19	90.0 3.54	1.5 0.06	119.0 4.69			101	24	0.1167	3.93 8.66
576	572D	X1S-576	3.5 0.14	90.0 3.54	0.8 0.03	133.0 5.24			126	32	0.1295	5.47 12.05
657	654D	X1S-657	3.5 0.14	91.0 3.58	1.5 0.06	141.0 5.55			137	27.3	0.0919	7.81 17.21
744	742D	X2S-744	3.5 0.14	91.0 3.58	1.5 0.06	143.0 5.63			160	26.3	0.0898	9.05 19.95
29688	29622D	X1S-29688	1.5 0.06	83.0 3.27	0.8 0.03	109.0 4.29			77.7	43.3	0.1170	2.05 4.51
568	563D	X2S-568	0.8 0.03	83.0 3.27	1.5 0.06	119.0 4.69			101	24	0.1167	3.89 8.57
577	572D	X1S-577	3.5 0.14	91.0 3.58	0.8 0.03	133.0 5.24			126	32	0.1295	5.40 11.91
34294	34478D	X1S-34294	2.0 0.08	85.0 3.35	0.8 0.03	116.0 4.57			69.3	27	0.1093	2.03 4.47
L814749	L814710D	L814749XA	1.5 0.06	84.0 3.31	0.8 0.03	105.0 4.13			76	59.6	0.1164	1.26 2.78
34300	34478D	X5S-34300	2.0 0.08	86.0 3.39	0.8 0.03	116.0 4.57			69.3	27	0.1093	1.98 4.37
34301	34478D	X2S-34301	3.5 0.14	89.0 3.50	0.8 0.03	116.0 4.57			69.3	27	0.1093	1.96 4.32
495A	493DC	X1S-495A	3.5 0.14	92.0 3.62	0.8 0.03	130.0 5.12	12.4 0.49	4.6 0.18	105	29.3	0.1252	4.07 8.98
495A	493D	X2S-495A	3.5 0.14	92.0 3.62	0.8 0.03	130.0 5.12			105	29.3	0.1252	4.07 8.98
575	572DC	X1S-575	3.5 0.14	92.0 3.62	0.8 0.03	133.0 5.24	15.7 0.62	4.6 0.18	126	32	0.1295	5.27 11.61
575	572D	X2S-575	3.5 0.14	92.0 3.62	0.8 0.03	133.0 5.24			126	32	0.1295	5.27 11.61
590A	592D	X1S-590A	3.5 0.14	95.0 3.74	0.8 0.03	144.0 5.67			151	38.3	0.1416	6.81 15.01
659	654DC	X1S-659	3.5 0.14	93.0 3.66	1.5 0.06	141.0 5.55	17.3 0.68	5.3 0.21	137	27.3	0.0919	7.53 16.61
659	654D	X1S-659	3.5 0.14	93.0 3.66	1.5 0.06	141.0 5.55			137	27.3	0.0919	7.53 16.61
748-S	742DC	X2S-748-S	3.5 0.14	93.0 3.66	1.5 0.06	143.0 5.63	19.0 0.75	6.4 0.25	160	26.3	0.0898	8.75 19.30
748-S	742D	X3S-748-S	3.5 0.14	93.0 3.66	1.5 0.06	143.0 5.63			160	26.3	0.0898	8.75 19.30
755	752D	X2S-755	3.5 0.14	95.0 3.74	1.5 0.06	150.0 5.91			177	29.4	0.0945	10.10 22.26
9285	9220D	X4S-9285	3.5 0.14	103.0 4.06	0.8 0.03	153.0 6.03			102	18.4	0.0984	8.66 19.09
837	834D	X1S-843	0.8 0.03	90.0 3.54	0.8 0.03	155.0 6.10			198	34.8	0.0937	13.52 29.80
843	834D	X1S-843	6.4 0.25	101.0 3.98	0.8 0.03	155.0 6.10			198	34.8	0.0937	13.48 29.72
9380	9320D	X1S-9380	3.5 0.14	105.0 4.13	2.3 0.09	164.0 6.46			118	18.6	0.1053	12.15 26.80

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

B

TDO

DOUBLE OUTER RACE

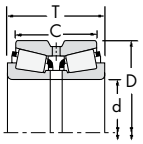
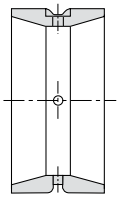
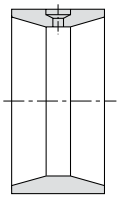


Fig. 1
D suffix outer race with lubricant holes and groove



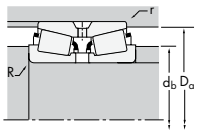
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
76.200 3.0000	177.800 7.0000	115.888 4.5625	74.612 2.9375	494000 111000	0.76	0.88	1.31	73500 16500	96200 21600	128000 28800	0.76
76.200 3.0000	190.500 7.5000	127.000 5.0000	104.775 4.1250	860000 193000	0.33	2.02	3.00	128000 28800	73400 16500	223000 50100	1.74
77.788 3.0625	121.442 4.7812	52.390 2.0626	38.100 1.5000	165000 37000	0.45	1.50	2.23	24500 5510	18900 4260	42700 9600	1.30
77.788 3.0625	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
77.788 3.0625	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
79.375 3.1250	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
79.375 3.1250	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
79.375 3.1250	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
79.375 3.1250	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
79.985 3.1490	139.992 5.5115	82.550 3.2500	66.675 2.6250	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
79.985 3.1490	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
80.000 3.1496	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
80.000 3.1496	200.025 7.8750	115.888 4.5625	80.216 3.1581	655000 147000	0.63	1.07	1.59	97500 21900	106000 23700	170000 38200	0.92
80.962 3.1875	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
80.962 3.1875	139.992 5.5115	82.550 3.2500	66.675 2.6250	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
80.962 3.1875	152.400 6.0000	88.900 3.5000	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
80.962 3.1875	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
82.550 3.2500	115.888 4.5625	47.625 1.8750	39.690 1.5626	145000 32700	0.31	2.19	3.26	21700 4870	11400 2570	37700 8470	1.90
82.550 3.2500	115.888 4.5625	47.625 1.8750	39.690 1.5626	145000 32700	0.31	2.19	3.26	21700 4870	11400 2570	37700 8470	1.90
82.550 3.2500	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
82.550 3.2500	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
82.550 3.2500	139.992 5.5115	82.550 3.2500	66.675 2.6250	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
82.550 3.2500	139.992 5.5115	82.550 3.2500	66.675 2.6250	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
82.550 3.2500	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
82.550 3.2500	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
82.550 3.2500	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
82.550 3.2500	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
82.550 3.2500	161.925 6.3750	104.775 4.1250	85.725 3.3750	528000 119000	0.34	1.98	2.95	78500 17700	45900 10300	137000 30700	1.71

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
9378	9320D	X1S-9378	3.5 0.14	105.0 4.13	2.3 0.09	164.0 6.46			118	18.6	0.1053	12.69 27.98
HH221430	HH221410D	HH221430XA	3.5 0.14	101.0 3.98	1.5 0.06	179.0 7.05			266	28.4	0.1072	18.92 41.71
34306	34478D	X4S-34306	3.5 0.14	90.0 3.54	0.8 0.03	116.0 4.57			69.3	27	0.1093	1.87 4.12
495AS	493DC	X1S-495AS	3.5 0.14	93.0 3.66	0.8 0.03	130.0 5.12	12.4 0.49	4.6 0.18	105	29.3	0.1252	3.99 8.80
495AS	493D	X1S-495AS	3.5 0.14	93.0 3.66	0.8 0.03	130.0 5.12			105	29.3	0.1252	3.99 8.80
595A	592D	X1S-595A	3.5 0.14	98.0 3.86	0.8 0.03	144.0 5.67			151	38.3	0.1416	6.54 14.42
661	654D		3.5 0.14	96.0 3.78	1.5 0.06	141.0 5.55			137	27.3	0.0919	7.07 15.58
661	654DC	X2S-661	3.5 0.14	96.0 3.78	1.5 0.06	141.0 5.55	17.3 0.68	5.3 0.21	137	27.3	0.0919	7.24 15.95
750	742D		3.5 0.14	96.0 3.78	1.5 0.06	143.0 5.63			160	26.3	0.0898	8.33 18.37
578	572D	X1S-578	3.5 0.14	95.0 3.74	0.8 0.03	133.0 5.24			126	32	0.1295	4.96 10.94
590	592D	X1S-590	3.5 0.14	98.0 3.86	0.8 0.03	144.0 5.67			151	38.3	0.1416	6.53 14.41
748	742D	X1S-748	3.0 0.12	96.0 3.78	1.5 0.06	143.0 5.63			160	26.3	0.0898	8.36 18.44
98316	98789D	X1S-98316	3.5 0.14	111.0 4.37	2.3 0.09	188.0 7.40			203	37.4	0.1197	17.29 38.11
496	493D	X2S-496	3.5 0.14	95.0 3.74	0.8 0.03	130.0 5.12			105	29.3	0.1252	3.76 8.29
581	572D	X1S-581	3.5 0.14	96.0 3.78	0.8 0.03	133.0 5.24			126	32	0.1295	4.88 10.75
662	654D	X1S-662	3.5 0.14	98.0 3.86	1.5 0.06	141.0 5.55			137	27.3	0.0919	6.77 14.93
740	742D		5.0 0.20	101.0 3.98	1.5 0.06	143.0 5.63			160	26.3	0.0898	8.16 17.98
L116149	L116110DC	L116149XA	1.5 0.06	90.0 3.54	0.8 0.03	111.0 4.37	6.1 0.24	2.3 0.09	97.2	64.3	0.1079	1.43 3.15
L116149	L116110D	L116149XC	1.5 0.06	90.0 3.54	0.8 0.03	111.0 4.37			97.2	64.3	0.1079	1.43 3.15
495	493DC	X1S-495	3.5 0.14	97.0 3.82	0.8 0.03	130.0 5.12	12.4 0.49	4.6 0.18	105	29.3	0.1252	3.65 8.04
495	493D	X3S-495	3.5 0.14	97.0 3.82	0.8 0.03	130.0 5.12			105	29.3	0.1252	3.65 8.04
580	572D	X2S-580	3.5 0.14	98.0 3.86	0.8 0.03	133.0 5.24			126	32	0.1295	4.76 10.50
582	572D	X1S-580	6.8 0.27	104.0 4.09	0.8 0.03	133.0 5.24			126	32	0.1295	4.68 10.32
595	592DC	X1S-595	3.5 0.14	100.0 3.94	0.8 0.03	144.0 5.67	14.2 0.56	5.3 0.21	151	36.8	0.1416	6.42 14.14
595	592D	X2S-595	3.5 0.14	100.0 3.94	0.8 0.03	144.0 5.67			151	36.8	0.1416	6.42 14.14
663	654D	X4S-663	3.5 0.14	99.0 3.90	1.5 0.06	141.0 5.55			137	27.3	0.0919	6.94 15.29
749A	742D	X2S-749A	3.5 0.14	99.0 3.90	1.5 0.06	143.0 5.63			160	26.3	0.0898	8.12 17.90
757	752D	X2S-757	3.5 0.14	100.0 3.94	1.5 0.06	150.0 5.91			177	29.4	0.0945	9.43 20.78

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

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TDO

DOUBLE OUTER RACE

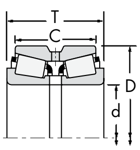
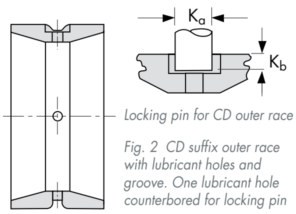
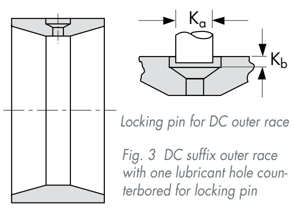


Fig. 1
D suffix outer race with lubricant holes and groove



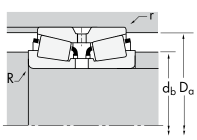
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic [1]	Factors [5]			Dynamic [2]			Factors [5]
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
82.550 3.2500	171.450 6.7500	125.412 4.9375	100.012 3.9375	659000 148000	0.30	2.26	3.36	98200 22100	50300 11300	171000 38400	1.95
83.345 3.2813	125.412 4.9375	55.560 2.1874	44.450 1.7500	189000 42500	0.42	1.62	2.42	28100 6320	20000 4500	49000 11000	1.40
84.138 3.3125	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
84.138 3.3125	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
84.138 3.3125	177.800 7.0000	109.538 4.3125	74.612 2.9375	494000 111000	0.76	0.88	1.31	73500 16500	96200 21600	128000 28800	0.76
85.000 3.3465	200.025 7.8750	115.888 4.5625	80.216 3.1581	655000 147000	0.63	1.07	1.59	97500 21900	106000 23700	170000 38200	0.92
85.026 3.3475	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
85.026 3.3475	155.575 6.1250	101.600 4.0000	85.725 3.3750	512000 115000	0.33	2.08	3.09	76300 17100	42500 9550	133000 29900	1.80
85.725 3.3750	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
85.725 3.3750	136.525 5.3750	69.850 2.7500	53.975 2.1250	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
85.725 3.3750	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
85.725 3.3750	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
85.725 3.3750	152.400 6.0000	95.250 3.7500	76.200 3.0000	398000 89500	0.41	1.65	2.46	59300 13300	41500 9330	103000 23200	1.43
85.725 3.3750	161.925 6.3750	104.775 4.1250	85.725 3.3750	528000 119000	0.34	1.98	2.95	78500 17700	45900 10300	137000 30700	1.71
85.725 3.3750	168.275 6.6250	92.075 3.6250	69.850 2.7500	427000 95900	0.47	1.43	2.14	63500 14300	51200 11500	111000 24900	1.24
85.725 3.3750	171.450 6.7500	125.412 4.9375	100.012 3.9375	659000 148000	0.30	2.26	3.36	98200 22100	50300 11300	171000 38400	1.95
87.312 3.4375	123.825 4.8750	50.797 1.9999	42.862 1.6875	149000 33600	0.33	2.05	3.05	22200 5000	12600 2820	38700 8700	1.77
87.312 3.4375	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
87.312 3.4375	190.500 7.5000	127.000 5.0000	104.775 4.1250	860000 193000	0.33	2.02	3.00	128000 28800	73400 16500	223000 50100	1.74
87.312 3.4375	190.500 7.5000	127.000 5.0000	104.775 4.1250	860000 193000	0.33	2.02	3.00	128000 28800	73400 16500	223000 50100	1.74
87.960 3.4630	149.225 5.8750	66.672 2.6249	52.388 2.0625	263000 59000	0.49	1.37	2.04	39100 8790	33000 7410	68100 15300	1.19
88.900 3.5000	123.825 4.8750	50.797 1.9999	42.862 1.6875	149000 33600	0.33	2.05	3.05	22200 5000	12600 2820	38700 8700	1.77
88.900 3.5000	123.825 4.8750	50.797 1.9999	42.862 1.6875	149000 33600	0.33	2.05	3.05	22200 5000	12600 2820	38700 8700	1.77
88.900 3.5000	149.225 5.8750	66.672 2.6249	52.388 2.0625	263000 59000	0.49	1.37	2.04	39100 8790	33000 7410	68100 15300	1.19
88.900 3.5000	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
88.900 3.5000	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
88.900 3.5000	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
88.900 3.5000	161.925 6.3750	104.775 4.1250	85.725 3.3750	528000 119000	0.34	1.98	2.95	78500 17700	45900 10300	137000 30700	1.71

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
842	834D	X1S-842	3.5 0.14	101.0 3.98	0.8 0.03	155.0 6.10			198	34.8	0.0937	12.90 28.45
27690	27620DA	X2S-27690	3.5 0.14	96.0 3.78	0.8 0.03	0.0 0.00	14.2 0.56	2.3 0.09	98.2	41.8	0.1198	2.30 5.08
498	493D	X4S-498	3.5 0.14	98.0 3.86	0.8 0.03	130.0 5.12			105	29.3	0.1252	3.53 7.79
664	654D	X1S-664	3.5 0.14	100.0 3.94	1.5 0.06	141.0 5.55			137	27.3	0.0919	6.80 15.00
9386H	9320D	X2S-9385	3.5 0.14	111.0 4.37	2.3 0.09	164.0 6.46			118	18.6	0.1053	11.28 24.87
98335	98789D	X1S-98335	3.5 0.14	115.0 4.53	2.3 0.09	188.0 7.40			203	37.4	0.1197	16.86 37.17
749	742DC	X2S-749	3.5 0.14	101.0 3.98	1.5 0.06	143.0 5.63	19.0 0.75	6.4 0.25	160	26.3	0.0898	7.90 17.41
749	742D	X3S-749	3.5 0.14	101.0 3.98	1.5 0.06	143.0 5.63			160	26.3	0.0898	7.90 17.41
497	493DC	X3S-497	3.5 0.14	99.0 3.90	0.8 0.03	130.0 5.12	12.4 0.49	4.6 0.18	105	29.3	0.1252	3.43 7.56
497	493D	X3S-497	3.5 0.14	99.0 3.90	0.8 0.03	130.0 5.12			105	29.3	0.1252	3.43 7.56
596	592DC	X1S-596	3.5 0.14	102.0 4.02	0.8 0.03	144.0 5.67	14.2 0.56	5.3 0.21	151	36.8	0.1416	6.10 13.46
596	592D	X1S-596	3.5 0.14	102.0 4.02	0.8 0.03	144.0 5.67			151	36.8	0.1416	6.10 13.46
665	654D	X1S-665	3.5 0.14	102.0 4.02	1.5 0.06	141.0 5.55			137	27.3	0.0919	6.68 14.72
758	752D	X2S-758	3.5 0.14	103.0 4.06	1.5 0.06	150.0 5.91			177	29.4	0.0945	9.06 19.98
677	672D	X1S-677	3.5 0.14	105.0 4.13	0.8 0.03	160.0 6.30			182	37.2	0.1056	9.18 20.23
841	834D	X2S-841	3.5 0.14	104.0 4.09	0.8 0.03	155.0 6.10			198	34.8	0.0937	12.58 27.73
L217847	L217810D	L217847XA	1.5 0.06	96.0 3.78	0.8 0.03	119.0 4.69			111	74.7	0.1152	1.78 3.92
596-S	592D	X2S-596	3.5 0.14	103.0 4.06	0.8 0.03	144.0 5.67			151	38.3	0.1416	5.99 13.20
HH221432	HH221410DC	HH221432XA	8.0 0.31	118.0 4.65	1.5 0.06	179.0 7.05	22.1 0.87	5.3 0.21	266	28.4	0.1072	17.58 38.76
HH221432	HH221410D	HH221432XA	8.0 0.31	118.0 4.65	1.5 0.06	179.0 7.05			266	28.4	0.1072	17.58 38.76
42346	42587D	X1S-42346	3.0 0.12	103.0 4.06	0.8 0.03	143.0 5.63			130	37.2	0.1386	4.57 10.06
L217849	L217810DC	L217849XA	1.5 0.06	97.0 3.82	0.8 0.03	119.0 4.69	7.9 0.31	2.3 0.09	111	74.7	0.1152	1.69 3.72
L217849	L217810D	L217849XB	1.5 0.06	97.0 3.82	0.8 0.03	119.0 4.69			111	74.7	0.1152	1.69 3.72
42350	42587D	X1S-42350	3.0 0.12	104.0 4.09	0.8 0.03	143.0 5.63			130	37.2	0.1386	4.50 9.93
593	592DC	X1S-593	3.5 0.14	104.0 4.09	0.8 0.03	144.0 5.67	14.2 0.56	5.3 0.21	151	36.8	0.1416	5.84 12.88
593	592D	X2S-593	3.5 0.14	104.0 4.09	0.8 0.03	144.0 5.67			151	36.8	0.1416	5.84 12.88
593A	592D	X1S-593	6.4 0.25	110.0 4.33	0.8 0.03	144.0 5.67			151	36.8	0.1416	5.78 12.74
759	752D	X8S-759	3.5 0.14	106.0 4.17	1.5 0.06	150.0 5.91			177	29.4	0.0945	8.71 19.19

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

B

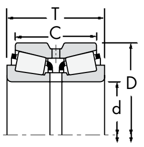
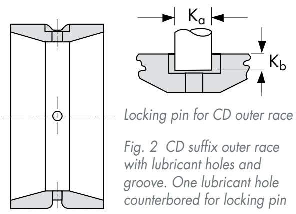
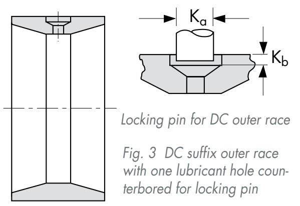


Fig. 1 D suffix outer race with lubricant holes and groove



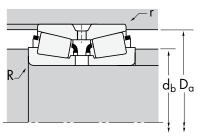
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
88.900	161.925	104.775	85.725	528000	0.34	1.98	2.95	78500	45900	137000	1.71
3.5000	6.3750	4.1250	3.3750	119000				17700	10300	30700	
88.900	168.275	92.075	69.850	427000	0.47	1.43	2.14	63500	51200	111000	1.24
3.5000	6.6250	3.6250	2.7500	95900				14300	11500	24900	
88.900	168.275	92.075	69.850	427000	0.47	1.43	2.14	63500	51200	111000	1.24
3.5000	6.6250	3.6250	2.7500	95900				14300	11500	24900	
88.900	171.450	125.412	100.012	659000	0.30	2.26	3.36	98200	50300	171000	1.95
3.5000	6.7500	4.9375	3.9375	148000				22100	11300	38400	
88.900	180.975	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
3.5000	7.1250	4.1250	3.3750	125000				18700	12300	32500	
88.900	190.500	127.000	104.775	860000	0.33	2.02	3.00	128000	73400	223000	1.74
3.5000	7.5000	5.0000	4.1250	193000				28800	16500	50100	
88.900	200.025	115.888	80.216	655000	0.63	1.07	1.59	97500	106000	170000	0.92
3.5000	7.8750	4.5625	3.1581	147000				21900	23700	38200	
89.891	171.450	125.412	100.012	659000	0.30	2.26	3.36	98200	50300	171000	1.95
3.5390	6.7500	4.9375	3.9375	148000				22100	11300	38400	
89.916	189.967	85.852	54.102	462000	0.87	0.78	1.16	68800	102000	120000	0.67
3.5400	7.4790	3.3800	2.1300	104000				15500	22900	26900	
89.980	161.900	69.850	44.450	327000	0.73	0.92	1.37	48700	61100	84900	0.80
3.5425	6.3740	2.7500	1.7500	73600				11000	13700	19100	
90.488	161.925	104.775	85.725	528000	0.34	1.98	2.95	78500	45900	137000	1.71
3.5625	6.3750	4.1250	3.3750	119000				17700	10300	30700	
92.075	149.225	66.672	52.388	263000	0.49	1.37	2.04	39100	33000	68100	1.19
3.6250	5.8750	2.6249	2.0625	59000				8790	7410	15300	
92.075	149.225	66.672	52.388	263000	0.49	1.37	2.04	39100	33000	68100	1.19
3.6250	5.8750	2.6249	2.0625	59000				8790	7410	15300	
92.075	152.400	82.550	63.500	348000	0.44	1.53	2.27	51900	39200	90300	1.32
3.6250	6.0000	3.2500	2.5000	78300				11700	8820	20300	
92.075	152.400	82.550	63.500	348000	0.44	1.53	2.27	51900	39200	90300	1.32
3.6250	6.0000	3.2500	2.5000	78300				11700	8820	20300	
92.075	152.400	82.550	63.500	348000	0.44	1.53	2.27	51900	39200	90300	1.32
3.6250	6.0000	3.2500	2.5000	78300				11700	8820	20300	
92.075	152.400	82.550	63.500	348000	0.44	1.53	2.27	51900	39200	90300	1.32
3.6250	6.0000	3.2500	2.5000	78300				11700	8820	20300	
92.075	168.275	92.075	69.850	427000	0.47	1.43	2.14	63500	51200	111000	1.24
3.6250	6.6250	3.6250	2.7500	95900				14300	11500	24900	
92.075	180.975	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
3.6250	7.1250	4.1250	3.3750	125000				18700	12300	32500	
93.662	149.225	66.672	52.388	263000	0.49	1.37	2.04	39100	33000	68100	1.19
3.6875	5.8750	2.6249	2.0625	59000				8790	7410	15300	
93.662	152.400	82.550	63.500	348000	0.44	1.53	2.27	51900	39200	90300	1.32
3.6875	6.0000	3.2500	2.5000	78300				11700	8820	20300	
95.250	130.175	47.622	39.688	154000	0.35	1.93	2.88	22900	13700	39900	1.67
3.7500	5.1250	1.8749	1.5625	34600				5150	3080	8960	
95.250	136.525	68.260	57.150	225000	0.28	2.38	3.54	33500	16300	58300	2.06
3.7500	5.3750	2.6874	2.2500	50600				7530	3660	13100	
95.250	149.225	66.672	52.388	263000	0.49	1.37	2.04	39100	33000	68100	1.19
3.7500	5.8750	2.6249	2.0625	59000				8790	7410	15300	
95.250	149.225	66.672	52.388	263000	0.49	1.37	2.04	39100	33000	68100	1.19
3.7500	5.8750	2.6249	2.0625	59000				8790	7410	15300	
95.250	149.225	66.672	52.388	263000	0.49	1.37	2.04	39100	33000	68100	1.19
3.7500	5.8750	2.6249	2.0625	59000				8790	7410	15300	
95.250	152.400	82.550	63.500	348000	0.44	1.53	2.27	51900	39200	90300	1.32
3.7500	6.0000	3.2500	2.5000	78300				11700	8820	20300	
95.250	152.400	82.550	63.500	348000	0.44	1.53	2.27	51900	39200	90300	1.32
3.7500	6.0000	3.2500	2.5000	78300				11700	8820	20300	

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
766	752D		7.0 0.28	113.0 4.45	1.5 0.06	150.0 5.91			177	29.4	0.0945	8.52 18.78
679	672DC	X1S-679	3.5 0.14	107.0 4.21	0.8 0.03	160.0 6.30	15.7 0.62	4.6 0.18	182	37.2	0.1056	8.86 19.52
679	672D	X2S-679	3.5 0.14	107.0 4.21	0.8 0.03	160.0 6.30			182	37.2	0.1056	8.86 19.52
850	834D	X2S-850	3.5 0.14	106.0 4.17	0.8 0.03	155.0 6.10			198	34.8	0.0937	12.21 26.91
775	774D	X2S-775	4.8 0.19	112.0 4.41	1.5 0.06	168.0 6.61			227	41.3	0.1067	12.13 26.73
HH221434	HH221410D	HH221434XB	8.0 0.31	120.0 4.72	1.5 0.06	179.0 7.05			266	28.4	0.1072	17.36 38.27
98350	98789D	X3S-98350	3.5 0.14	118.0 4.65	2.3 0.09	188.0 7.40			203	37.4	0.1197	16.33 36.00
850A	834D	X1S-850A	3.5 0.14	107.0 4.21	0.8 0.03	155.0 6.10			198	34.8	0.0937	12.08 26.64
HM921343	HM921310D	HM921343XA	3.5 0.14	117.0 4.61	1.5 0.06	181.0 7.13			137	32	0.1143	10.44 23.02
M919048	M919010D	M919049XC	3.5 0.14	109.0 4.29	1.5 0.06	154.0 6.06			102	30.7	0.0990	5.40 11.90
760	752D	X1S-760	3.5 0.14	107.0 4.21	1.5 0.06	150.0 5.91			177	29.4	0.0945	8.56 18.87
42362	42587DC	X1S-42362	3.5 0.14	107.0 4.21	0.8 0.03	143.0 5.63	10.9 0.43	3.8 0.15	130	37.2	0.1386	4.28 9.44
42362	42587D	X3S-42362	3.5 0.14	107.0 4.21	0.8 0.03	143.0 5.63			130	37.2	0.1386	4.28 9.44
598	592DC	X1S-598	3.5 0.14	107.0 4.21	0.8 0.03	144.0 5.67	14.2 0.56	5.3 0.21	151	36.8	0.1416	5.55 12.24
598	592D	X3S-598	3.5 0.14	107.0 4.21	0.8 0.03	144.0 5.67			151	36.8	0.1416	5.55 12.24
598X	592DC	X1S-598	3.5 0.14	107.0 4.21	0.8 0.03	144.0 5.67	14.2 0.56	5.3 0.21	151	38.3	0.1416	5.54 12.22
598X	592D	X1S-598	3.5 0.14	107.0 4.21	0.8 0.03	144.0 5.67			151	38.3	0.1416	5.54 12.22
681	672D	X1S-681	3.5 0.14	110.0 4.33	0.8 0.03	160.0 6.30			182	37.2	0.1056	8.53 18.80
778	774D	X1S-778	3.5 0.14	111.0 4.37	1.5 0.06	168.0 6.61			227	41.3	0.1067	11.73 25.85
42368	42587D	X1S-42368	3.0 0.12	107.0 4.21	0.8 0.03	143.0 5.63			130	37.2	0.1386	4.17 9.20
597	592D	X1S-597	3.5 0.14	109.0 4.29	0.8 0.03	144.0 5.67			151	38.3	0.1416	5.41 11.93
L319249	L319210D	L319249XB	1.5 0.06	103.0 4.06	0.8 0.03	125.0 4.92			125	90.7	0.1220	1.75 3.87
LM119348	LM119311D	LM119348XA	2.3 0.09	105.0 4.13	0.8 0.03	131.0 5.16			149	69	0.1213	2.98 6.57
42375	42587D	X1S-42376	3.0 0.12	108.0 4.25	0.8 0.03	143.0 5.63			130	37.2	0.1386	4.05 8.92
42376	42587DC	X1S-42376	3.5 0.14	109.0 4.29	0.8 0.03	143.0 5.63	10.9 0.43	3.8 0.15	130	37.2	0.1386	3.94 8.69
42376	42587D	X1S-42376	3.5 0.14	109.0 4.29	0.8 0.03	143.0 5.63			130	37.2	0.1386	4.02 8.87
594	592DC	X2S-594	3.5 0.14	110.0 4.33	0.8 0.03	144.0 5.67	14.2 0.56	5.3 0.21	151	36.8	0.1416	5.26 11.61
594	592D	X3S-594	3.5 0.14	110.0 4.33	0.8 0.03	144.0 5.67			151	36.8	0.1416	5.26 11.61

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

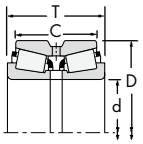
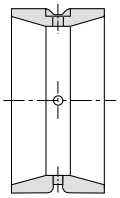
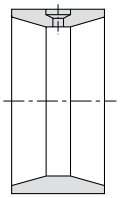


Fig. 1
D suffix outer race with lubricant holes and groove



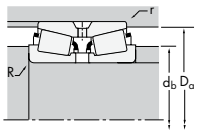
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
95.250 3.7500	152.400 6.0000	82.550 3.2500	63.500 2.5000	348000 78300	0.44	1.53	2.27	51900 11700	39200 8820	90300 20300	1.32
95.250 3.7500	161.925 6.3750	82.547 3.2499	61.912 2.4375	360000 81000	0.47	1.42	2.12	53600 12100	43600 9800	93400 21000	1.23
95.250 3.7500	168.275 6.6250	92.075 3.6250	69.850 2.7500	427000 95900	0.47	1.43	2.14	63500 14300	51200 11500	111000 24900	1.24
95.250 3.7500	168.275 6.6250	92.075 3.6250	69.850 2.7500	427000 95900	0.47	1.43	2.14	63500 14300	51200 11500	111000 24900	1.24
95.250 3.7500	180.975 7.1250	104.775 4.1250	85.725 3.3750	558000 125000	0.39	1.75	2.61	83100 18700	54800 12300	145000 32500	1.51
95.250 3.7500	180.975 7.1250	104.775 4.1250	85.725 3.3750	558000 125000	0.39	1.75	2.61	83100 18700	54800 12300	145000 32500	1.51
95.250 3.7500	190.500 7.5000	127.000 5.0000	104.775 4.1250	860000 193000	0.33	2.02	3.00	128000 28800	73400 16500	223000 50100	1.74
96.838 3.8125	149.225 5.8750	66.672 2.6249	52.388 2.0625	263000 59000	0.49	1.37	2.04	39100 8790	33000 7410	68100 15300	1.19
96.838 3.8125	149.225 5.8750	66.672 2.6249	52.388 2.0625	263000 59000	0.49	1.37	2.04	39100 8790	33000 7410	68100 15300	1.19
98.425 3.8750	161.925 6.3750	82.547 3.2499	61.912 2.4375	360000 81000	0.47	1.42	2.12	53600 12100	43600 9800	93400 21000	1.23
98.425 3.8750	168.275 6.6250	92.075 3.6250	69.850 2.7500	427000 95900	0.47	1.43	2.14	63500 14300	51200 11500	111000 24900	1.24
98.425 3.8750	168.275 6.6250	92.075 3.6250	69.850 2.7500	427000 95900	0.47	1.43	2.14	63500 14300	51200 11500	111000 24900	1.24
98.425 3.8750	180.000 7.0866	104.775 4.1250	85.725 3.3750	558000 125000	0.39	1.75	2.61	83100 18700	54800 12300	145000 32500	1.51
98.425 3.8750	180.975 7.1250	104.775 4.1250	85.725 3.3750	558000 125000	0.39	1.75	2.61	83100 18700	54800 12300	145000 32500	1.51
98.425 3.8750	190.500 7.5000	127.000 5.0000	104.775 4.1250	860000 193000	0.33	2.02	3.00	128000 28800	73400 16500	223000 50100	1.74
98.425 3.8750	212.725 8.3750	142.875 5.6250	117.475 4.6250	1100000 246000	0.33	2.07	3.09	163000 36700	91000 20500	284000 63900	1.79
99.975 3.9360	212.725 8.3750	142.875 5.6250	117.475 4.6250	1100000 246000	0.33	2.07	3.09	163000 36700	91000 20500	284000 63900	1.79
99.980 3.9362	196.850 7.7500	103.378 4.0700	74.422 2.9300	608000 137000	0.61	1.11	1.66	90500 20300	93900 21100	158000 35400	0.96
99.982 3.9363	190.500 7.5000	127.000 5.0000	104.775 4.1250	860000 193000	0.33	2.02	3.00	128000 28800	73400 16500	223000 50100	1.74
100.000 3.9370	180.000 7.0866	104.775 4.1250	85.725 3.3750	558000 125000	0.39	1.75	2.61	83100 18700	54800 12300	145000 32500	1.51
100.000 3.9370	180.975 7.1250	104.775 4.1250	85.725 3.3750	558000 125000	0.39	1.75	2.61	83100 18700	54800 12300	145000 32500	1.51
100.000 3.9370	190.500 7.5000	127.000 5.0000	101.600 4.0000	738000 166000	0.33	2.02	3.00	110000 24700	63000 14200	191000 43000	1.74
100.000 3.9370	200.025 7.8750	115.888 4.5625	80.216 3.1581	655000 147000	0.63	1.07	1.59	97500 21900	106000 23700	170000 38200	0.92
100.012 3.9375	161.925 6.3750	82.547 3.2499	61.912 2.4375	360000 81000	0.47	1.42	2.12	53600 12100	43600 9800	93400 21000	1.23
101.600 4.0000	146.050 5.7500	49.210 1.9374	38.895 1.5313	219000 49100	0.39	1.74	2.59	32500 7320	21600 4860	56700 12700	1.51
101.600 4.0000	146.050 5.7500	49.212 1.9375	39.688 1.5625	155000 34800	0.39	1.72	2.56	23100 5180	15500 3480	40100 9020	1.49
101.600 4.0000	161.925 6.3750	82.547 3.2499	61.912 2.4375	360000 81000	0.47	1.42	2.12	53600 12100	43600 9800	93400 21000	1.23
101.600 4.0000	161.925 6.3750	82.547 3.2499	61.912 2.4375	360000 81000	0.47	1.42	2.12	53600 12100	43600 9800	93400 21000	1.23

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
594A	592D	X2S-594	5.0 0.20	113.0 4.45	0.8 0.03	144.0 5.67			151	36.8	0.1416	5.23 11.53
52375	52637D	X2S-52375	3.5 0.14	112.0 4.41	0.8 0.03	154.0 6.06			175	41.7	0.1519	6.50 14.33
683	672DC	X1S-683	3.5 0.14	113.0 4.45	0.8 0.03	160.0 6.30	15.7 0.62	4.6 0.18	182	37.2	0.1056	8.19 18.06
683	672D	X2S-683	3.5 0.14	113.0 4.45	0.8 0.03	160.0 6.30			182	37.2	0.1056	8.19 18.06
776	774D	X2S-776	3.5 0.14	114.0 4.49	1.5 0.06	168.0 6.61			227	41.3	0.1067	11.37 25.06
777	774D		9.7 0.38	126.0 4.96	1.5 0.06	168.0 6.61			227	41.3	0.1067	10.97 24.19
HH221440	HH221410D	HH221440XA	8.0 0.31	125.0 4.92	1.5 0.06	179.0 7.05			266	28.4	0.1072	16.44 36.24
42381	42587DC	X1S-42381	3.5 0.14	110.0 4.33	0.8 0.03	143.0 5.63	10.9 0.43	3.8 0.15	130	37.2	0.1386	3.91 8.62
42381	42587D	X2S-42381	3.5 0.14	110.0 4.33	0.8 0.03	143.0 5.63			130	37.2	0.1386	3.91 8.62
52387	52637D	X3S-52387	3.5 0.14	114.0 4.49	0.8 0.03	154.0 6.06			175	41.7	0.1519	6.18 13.62
685	672DC	X1S-685	3.5 0.14	116.0 4.57	0.8 0.03	160.0 6.30	15.7 0.62	4.6 0.18	182	37.2	0.1056	7.90 17.41
685	672D	X3S-685	3.5 0.14	116.0 4.57	0.8 0.03	160.0 6.30			182	37.2	0.1056	7.90 17.41
779	773D	X4S-779	3.5 0.14	116.0 4.57	0.8 0.03	168.0 6.61			227	41.3	0.1067	10.86 23.94
779	774D	X3S-779	3.5 0.14	116.0 4.57	1.5 0.06	168.0 6.61			227	41.3	0.1067	10.98 24.21
HH221442	HH221410D	HH221442XB	3.5 0.14	119.0 4.69	1.5 0.06	179.0 7.05			266	28.4	0.1072	16.09 35.46
HH224332	HH224310CD	HH224332XA	3.5 0.14	123.0 4.84	1.5 0.06	201.5 7.94	25.4 1.00	7.9 0.31	367	47.8	0.1182	23.31 51.40
HH224334	HH224310CD	HH224334XA	3.5 0.14	124.0 4.88	1.5 0.06	201.5 7.94	25.4 1.00	7.9 0.31	367	43.4	0.1182	23.13 51.00
HM821547	HM821511D	HM821547XB	3.5 0.14	123.0 4.84	1.5 0.06	187.0 7.36			166	24.2	0.1100	12.48 27.52
HH221447	HH221410D	HH221447XC	6.4 0.25	126.0 4.96	1.5 0.06	179.0 7.05			266	28.4	0.1072	15.77 34.77
783	773D	X3S-783	3.5 0.14	118.0 4.65	0.8 0.03	168.0 6.61			227	41.3	0.1067	10.68 23.54
783	774D	X3S-783	3.5 0.14	118.0 4.65	1.5 0.06	168.0 6.61			227	41.3	0.1067	10.78 23.77
863X	854DC	X1S-863X	6.0 0.24	124.0 4.88	1.5 0.06	174.0 6.85	22.1 0.87	6.4 0.25	264	44.9	0.1072	15.05 33.19
98394X	98789D	X1S-98394X	3.5 0.14	126.0 4.96	2.3 0.09	188.0 7.40			203	37.4	0.1197	14.94 32.93
52393	52637D	X2S-52393	3.5 0.14	116.0 4.57	0.8 0.03	154.0 6.06			175	41.7	0.1519	6.02 13.27
LM520349	LM520310D	LM520349XA	1.5 0.06	110.0 4.33	0.8 0.03	140.0 5.51			121	58.7	0.1249	2.43 5.37
L521945	L521910D	L521945XA	1.5 0.06	112.0 4.41	0.8 0.03	141.0 5.55			152	108	0.1346	2.54 5.60
52400	52637DC	X1S-52400	3.5 0.14	117.0 4.61	0.8 0.03	154.0 6.06	14.2 0.56	5.3 0.21	175	41.7	0.1519	5.89 12.99
52400	52637D	X7S-52400	3.5 0.14	117.0 4.61	0.8 0.03	154.0 6.06			175	41.7	0.1519	5.89 12.99

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

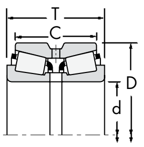
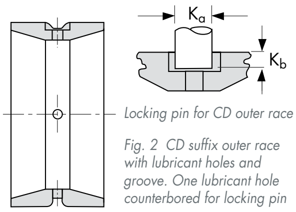
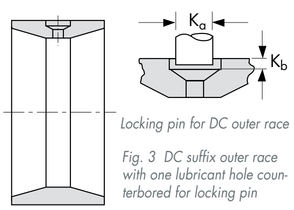


Fig. 1
D suffix outer race with lubricant holes and groove



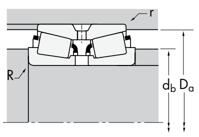
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
101.600	161.925	82.547	61.912	360000	0.47	1.42	2.12	53600	43600	93400	1.23
4.0000	6.3750	3.2499	2.4375	81000				12100	9800	21000	
101.600	168.275	92.075	69.850	427000	0.47	1.43	2.14	63500	51200	111000	1.24
4.0000	6.6250	3.6250	2.7500	95900				14300	11500	24900	
101.600	168.275	92.075	69.850	427000	0.47	1.43	2.14	63500	51200	111000	1.24
4.0000	6.6250	3.6250	2.7500	95900				14300	11500	24900	
101.600	180.000	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.0000	7.0866	4.1250	3.3750	125000				18700	12300	32500	
101.600	180.000	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.0000	7.0866	4.1250	3.3750	125000				18700	12300	32500	
101.600	180.975	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.0000	7.1250	4.1250	3.3750	125000				18700	12300	32500	
101.600	190.500	127.000	101.600	738000	0.33	2.02	3.00	110000	63000	191000	1.74
4.0000	7.5000	5.0000	4.0000	166000				24700	14200	43000	
101.600	190.500	127.000	104.775	860000	0.33	2.02	3.00	128000	73400	223000	1.74
4.0000	7.5000	5.0000	4.1250	193000				28800	16500	50100	
101.600	190.500	127.000	104.775	860000	0.33	2.02	3.00	128000	73400	223000	1.74
4.0000	7.5000	5.0000	4.1250	193000				28800	16500	50100	
101.600	200.025	115.888	80.216	655000	0.63	1.07	1.59	97500	106000	170000	0.92
4.0000	7.8750	4.5625	3.1581	147000				21900	23700	38200	
101.600	200.025	115.888	80.216	655000	0.63	1.07	1.59	97500	106000	170000	0.92
4.0000	7.8750	4.5625	3.1581	147000				21900	23700	38200	
101.600	212.725	142.875	117.475	922000	0.33	2.07	3.09	137000	76600	239000	1.79
4.0000	8.3750	5.6250	4.6250	207000				30900	17200	53700	
101.600	212.725	142.875	117.475	1100000	0.33	2.07	3.09	163000	91000	284000	1.79
4.0000	8.3750	5.6250	4.6250	246000				36700	20500	63900	
101.600	214.312	115.888	84.138	758000	0.67	1.00	1.49	113000	130000	196000	0.87
4.0000	8.4375	4.5625	3.3125	170000				25400	29300	44200	
104.775	180.000	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.1250	7.0866	4.1250	3.3750	125000				18700	12300	32500	
104.775	180.000	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.1250	7.0866	4.1250	3.3750	125000				18700	12300	32500	
104.775	180.000	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.1250	7.0866	4.1250	3.3750	125000				18700	12300	32500	
104.775	180.975	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.1250	7.1250	4.1250	3.3750	125000				18700	12300	32500	
104.775	180.975	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.1250	7.1250	4.1250	3.3750	125000				18700	12300	32500	
104.775	180.975	104.775	85.725	558000	0.39	1.75	2.61	83100	54800	145000	1.51
4.1250	7.1250	4.1250	3.3750	125000				18700	12300	32500	
104.775	190.500	106.362	80.962	586000	0.42	1.62	2.42	87300	62200	152000	1.40
4.1250	7.5000	4.1875	3.1875	132000				19600	14000	34200	
106.362	165.100	82.550	63.500	365000	0.50	1.36	2.02	54400	46300	94600	1.18
4.1875	6.5000	3.2500	2.5000	82100				12200	10400	21300	
107.950	146.050	49.212	39.688	155000	0.39	1.72	2.56	23100	15500	40100	1.49
4.2500	5.7500	1.9375	1.5625	34800				5180	3480	9020	
107.950	146.050	49.212	39.688	155000	0.39	1.72	2.56	23100	15500	40100	1.49
4.2500	5.7500	1.9375	1.5625	34800				5180	3480	9020	
107.950	158.750	53.978	39.688	186000	0.61	1.11	1.66	27600	28700	48100	0.96
4.2500	6.2500	2.1251	1.5625	41700				6220	6450	10800	
107.950	159.987	74.612	58.738	316000	0.40	1.68	2.50	47000	32300	81800	1.45
4.2500	6.2987	2.9375	2.3125	70900				10600	7270	18400	
107.950	165.100	82.550	63.500	365000	0.50	1.36	2.02	54400	46300	94600	1.18
4.2500	6.5000	3.2500	2.5000	82100				12200	10400	21300	
107.950	190.500	106.362	80.962	586000	0.42	1.62	2.42	87300	62200	152000	1.40
4.2500	7.5000	4.1875	3.1875	132000				19600	14000	34200	

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
52401	52637D	X1S-52400	8.0 0.31	126.0 4.96	0.8 0.03	154.0 6.06			175	41.7	0.1519	5.89 12.99
687	672DC	X1S-687	3.5 0.14	118.0 4.65	0.8 0.03	160.0 6.30	15.7 0.62	4.6 0.18	182	37.2	0.1056	7.64 16.85
687	672D	X3S-687	3.5 0.14	118.0 4.65	0.8 0.03	160.0 6.30			182	37.2	0.1056	7.64 16.85
780	773DC	X1S-780	3.5 0.14	119.0 4.69	0.8 0.03	168.0 6.61	19.0 0.75	6.4 0.25	227	38.2	0.1067	10.69 23.56
780	773D	X2S-780	3.5 0.14	119.0 4.69	0.8 0.03	168.0 6.61			227	38.2	0.1067	10.69 23.56
780	774D	X1S-780	3.5 0.14	119.0 4.69	1.5 0.06	168.0 6.61			227	38.2	0.1067	10.63 23.44
861	854DC	X3S-861	8.0 0.31	129.0 5.08	1.5 0.06	174.0 6.85	22.1 0.87	6.4 0.25	264	44.9	0.1072	14.75 32.52
HH221449	HH221410DC	HH221449XA	8.0 0.31	131.0 5.16	1.5 0.06	179.0 7.05	22.1 0.87	5.3 0.21	266	28.4	0.1072	15.47 34.11
HH221449	HH221410D	HH221449XB	8.0 0.31	131.0 5.16	1.5 0.06	179.0 7.05			266	28.4	0.1072	15.47 34.11
98400	98789DC	X1S-98400	3.5 0.14	128.0 5.04	2.3 0.09	188.0 7.40	17.3 0.68	8.6 0.34	203	37.4	0.1197	14.67 32.35
98400	98789D	X2S-98400	3.5 0.14	128.0 5.04	2.3 0.09	188.0 7.40			203	37.4	0.1197	14.67 32.34
941	932CD	X2S-941	7.0 0.28	130.0 5.12	1.5 0.06	193.0 7.60	22.1 0.87	8.6 0.34	339	39.7	0.1153	22.54 49.69
HH224335	HH224310CD	HH224335XB	7.0 0.28	132.0 5.20	1.5 0.06	201.5 7.94	25.4 1.00	7.9 0.31	367	43.4	0.1182	22.75 50.15
H924033	H924010D	H924033XA	3.5 0.14	132.0 5.20	1.5 0.06	205.0 8.07			246	32.2	0.1299	19.23 42.39
782	773D	X3S-782	3.5 0.14	122.0 4.80	0.8 0.03	168.0 6.61			227	38.2	0.1067	10.26 22.62
786	773D	X1S-786	6.4 0.25	128.0 5.04	0.8 0.03	168.0 6.61			227	38.2	0.1067	10.02 22.10
787	773D	X3S-782	7.0 0.28	129.0 5.08	0.8 0.03	168.0 6.61			227	41.3	0.1067	10.16 22.39
782	774DC	X3S-782	3.5 0.14	122.0 4.80	1.5 0.06	168.0 6.61	19.0 0.75	6.4 0.25	227	38.2	0.1067	10.51 23.18
782	774D	X3S-782	3.5 0.14	122.0 4.80	1.5 0.06	168.0 6.61			227	38.2	0.1067	10.20 22.49
786	774DC	X3S-782	6.4 0.25	128.0 5.04	1.5 0.06	168.0 6.61	19.0 0.75	6.4 0.25	227	38.2	0.1067	10.44 23.01
71412	71751D	X2S-71412	3.5 0.14	124.0 4.88	1.5 0.06	181.0 7.13			269	45.7	0.1156	12.40 27.34
56418	56650D	X2S-56418	3.5 0.14	122.0 4.80	0.8 0.03	159.0 6.26			191	47.7	0.1584	5.95 13.12
L521949	L521910DC	L521949XA	1.5 0.06	116.0 4.57	0.8 0.03	141.0 5.55	7.9 0.31	3.0 0.12	152	108	0.1346	2.20 4.84
L521949	L521910D	L521949XA	1.5 0.06	116.0 4.57	0.8 0.03	141.0 5.55			152	108	0.1346	2.20 4.84
37425	37626D	X1S-37425	3.5 0.14	122.0 4.80	0.8 0.03	152.0 5.98			124	57	0.1443	3.21 7.07
LM522546	LM522510D	LM522546XB	3.5 0.14	122.0 4.80	0.8 0.03	154.0 6.06			232	63.3	0.1576	5.07 11.19
56425	56650D	X2S-56425	3.5 0.14	123.0 4.84	0.8 0.03	159.0 6.26			191	47.7	0.1584	5.80 12.78
71425	71751DC	X2S-71425	3.5 0.14	126.0 4.96	1.5 0.06	181.0 7.13	17.3 0.68	5.3 0.21	269	45.7	0.1156	11.87 26.18

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

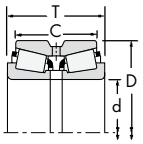
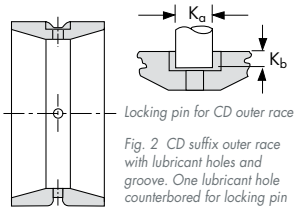
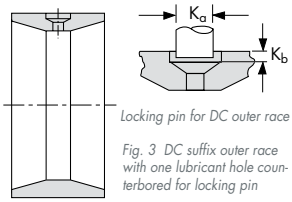


Fig. 1 D suffix outer race with lubricant holes and groove



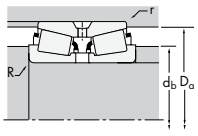
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
107.950 4.2500	190.500 7.5000	106.362 4.1875	80.962 3.1875	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40
107.950 4.2500	212.725 8.3750	142.875 5.6250	117.475 4.6250	922000 207000	0.33	2.07	3.09	137000 30900	76600 17200	239000 53700	1.79
107.950 4.2500	212.725 8.3750	142.875 5.6250	117.475 4.6250	1100000 246000	0.33	2.07	3.09	163000 36700	91000 20500	284000 63900	1.79
109.538 4.3125	158.750 6.2500	53.978 2.1251	39.688 1.5625	186000 41700	0.61	1.11	1.66	27600 6220	28700 6450	48100 10800	0.96
109.538 4.3125	158.750 6.2500	53.978 2.1251	39.688 1.5625	186000 41700	0.61	1.11	1.66	27600 6220	28700 6450	48100 10800	0.96
109.952 4.3288	190.500 7.5000	106.362 4.1875	80.962 3.1875	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40
110.000 4.3301	214.312 8.4375	115.888 4.5625	84.138 3.3125	758000 170000	0.67	1.00	1.49	113000 25400	130000 29300	196000 44200	0.87
109.987 4.3302	159.987 6.2987	74.612 2.9375	58.738 2.3125	316000 70900	0.40	1.68	2.50	47000 10600	32300 7270	81800 18400	1.45
109.987 4.3302	159.987 6.2987	74.612 2.9375	58.738 2.3125	316000 70900	0.40	1.68	2.50	47000 10600	32300 7270	81800 18400	1.45
109.992 4.3304	177.800 7.0000	92.075 3.6250	69.850 2.7500	443000 99600	0.52	1.31	1.95	65900 14800	58300 13100	115000 25800	1.13
110.000 4.3307	212.725 8.3750	142.875 5.6250	117.475 4.6250	922000 207000	0.33	2.07	3.09	137000 30900	76600 17200	239000 53700	1.79
111.125 4.3750	190.500 7.5000	106.362 4.1875	80.962 3.1875	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40
111.125 4.3750	214.312 8.4375	115.888 4.5625	84.138 3.3125	758000 170000	0.67	1.00	1.49	113000 25400	130000 29300	196000 44200	0.87
111.125 4.3750	241.300 9.5000	158.750 6.2500	107.950 4.2500	1080000 243000	0.73	0.92	1.37	161000 36200	202000 45400	281000 63100	0.80
114.300 4.5000	152.400 6.0000	47.625 1.8750	38.100 1.5000	161000 36200	0.41	1.63	2.43	23900 5380	16900 3810	41700 9370	1.41
114.300 4.5000	177.800 7.0000	92.075 3.6250	69.850 2.7500	443000 99600	0.52	1.31	1.95	65900 14800	58300 13100	115000 25800	1.13
114.300 4.5000	177.800 7.0000	92.075 3.6250	69.850 2.7500	443000 99600	0.52	1.31	1.95	65900 14800	58300 13100	115000 25800	1.13
114.300 4.5000	190.500 7.5000	106.362 4.1875	80.962 3.1875	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40
114.300 4.5000	190.500 7.5000	106.362 4.1875	80.962 3.1875	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40
114.300 4.5000	212.725 8.3750	142.875 5.6250	117.475 4.6250	922000 207000	0.33	2.07	3.09	137000 30900	76600 17200	239000 53700	1.79
114.300 4.5000	212.725 8.3750	142.875 5.6250	117.475 4.6250	1100000 246000	0.33	2.07	3.09	163000 36700	91000 20500	284000 63900	1.79
114.300 4.5000	228.600 9.0000	115.888 4.5625	84.138 3.3125	798000 179000	0.74	0.92	1.36	119000 26700	150000 33700	207000 46500	0.79
114.975 4.5266	177.800 7.0000	92.075 3.6250	69.850 2.7500	443000 99600	0.52	1.31	1.95	65900 14800	58300 13100	115000 25800	1.13
114.975 4.5266	212.725 8.3750	142.875 5.6250	117.475 4.6250	1100000 246000	0.33	2.07	3.09	163000 36700	91000 20500	284000 63900	1.79
115.087 4.5310	190.500 7.5000	106.362 4.1875	80.962 3.1875	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40
119.062 4.6875	194.873 7.6722	125.255 4.9313	131.351 5.1713	662000 149000	0.26	2.55	3.80	98600 22200	44600 10000	172000 38600	2.21
119.062 4.6875	195.262 7.6875	136.779 5.3850	142.875 5.6250	662000 149000	0.26	2.55	3.80	98600 22200	44600 10000	172000 38600	2.21
119.957 4.7227	194.873 7.6722	125.255 4.9313	131.351 5.1713	662000 149000	0.26	2.55	3.80	98600 22200	44600 10000	172000 38600	2.21

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
71425	71751D	X5S-71425	3.5 0.14	126.0 4.96	1.5 0.06	181.0 7.13			269	45.7	0.1156	11.87 26.18
936	932CD	X3S-936	8.0 0.31	137.0 5.39	1.5 0.06	193.0 7.60	22.1 0.87	8.6 0.34	339	39.7	0.1153	21.49 47.37
HH224340	HH224310CD	HH224340XA	8.0 0.31	139.0 5.47	1.5 0.06	201.5 7.94	25.4 1.00	7.9 0.31	367	47.8	0.1182	21.55 47.51
37431	37626DC	X1S-37431	3.5 0.14	123.0 4.84	0.8 0.03	152.0 5.98	7.9 0.31	3.8 0.15	124	48.7	0.1443	3.13 6.91
37431	37626D	X1S-37431	3.5 0.14	123.0 4.84	0.8 0.03	152.0 5.98			124	48.7	0.1443	3.13 6.91
71432	71751D	X1S-71432	3.5 0.14	128.0 5.04	1.5 0.06	181.0 7.13			269	45.7	0.1156	12.02 26.50
H924043	H924010D	H924043XA	3.5 0.14	139.0 5.47	1.5 0.06	205.0 8.07			246	32.2	0.1299	17.81 39.27
LM522548	LM522510D	LM522549XA	8.0 0.31	133.0 5.24	0.8 0.03	154.0 6.06			232	63.3	0.1576	4.72 10.41
LM522549	LM522510D	LM522549XB	3.5 0.14	124.0 4.88	0.8 0.03	154.0 6.06			232	63.3	0.1576	4.87 10.73
64433	64700D	X1S-64433	3.5 0.14	128.0 5.04	0.8 0.03	172.0 6.77			219	45.3	0.1153	8.31 18.31
942	932CD	X1S-64433	6.4 0.25	136.0 5.35	1.5 0.06	193.0 7.60	22.1 0.87	8.6 0.34	339	39.7	0.1153	21.09 46.50
71437	71751D	X2S-71437	3.5 0.14	129.0 5.08	1.5 0.06	181.0 7.13			269	45.7	0.1156	11.50 25.35
H924045	H924010D	H924045XB	3.5 0.14	139.0 5.47	1.5 0.06	205.0 8.07			246	32.2	0.1299	17.78 39.20
HH924349	HH924310D	HH924349XA	6.4 0.25	157.0 6.18	1.5 0.06	226.0 8.90			306	37.3	0.1432	30.71 67.70
L623149	L623110D	L623149XA	1.5 0.06	123.0 4.84	0.8 0.03	147.0 5.79			171	102	0.1422	2.16 4.75
64450	64700DC	X1S-64450	3.5 0.14	131.0 5.16	0.8 0.03	172.0 6.77	17.3 0.68	5.3 0.21	219	45.3	0.1153	7.82 17.24
64450	64700D	X5S-64450	3.5 0.14	131.0 5.16	0.8 0.03	172.0 6.77			219	45.3	0.1153	7.81 17.21
71450	71751DC	X3S-71450	3.5 0.14	132.0 5.20	1.5 0.06	181.0 7.13	17.3 0.68	5.3 0.21	269	45.7	0.1156	11.08 24.43
71450	71751D	X4S-71450	3.5 0.14	132.0 5.20	1.5 0.06	181.0 7.13			269	45.7	0.1156	11.08 24.43
938	932CD	X4S-938	7.0 0.28	141.0 5.55	1.5 0.06	193.0 7.60	22.1 0.87	8.6 0.34	339	39.7	0.1153	20.24 44.62
HH224346	HH224310CD	HH224346XB	7.0 0.28	143.0 5.63	1.5 0.06	201.5 7.94	25.4 1.00	7.9 0.31	367	47.8	0.1182	20.38 44.92
HM926740	HM926710D	HM926740XC	3.5 0.14	146.0 5.75	2.3 0.09	219.0 8.63			295	39	0.1416	20.75 45.74
64452A	64700D	X1S-64452	9.0 0.35	143.0 5.63	0.8 0.03	172.0 6.77			219	45.3	0.1153	7.54 16.62
HH224349	HH224310CD	HH224349XA	7.0 0.28	144.0 5.67	1.5 0.06	201.5 7.94	25.4 1.00	7.9 0.31	367	47.8	0.1182	20.26 44.67
71453	71751D	X2S-71453	3.5 0.14	133.0 5.24	1.5 0.06	181.0 7.13			269	45.7	0.1156	10.91 24.04
HM124646	HM124616XD	HM124646XC	1.5 0.06	131.0 5.16	1.0 0.04	183.0 7.20			340	69.2	0.1076	14.54 32.06
HM124646	HM124618XD		1.5 0.06	131.0 5.16	1.0 0.04	183.0 7.20			340	69.2	0.1076	15.17 33.44
HM124649	HM124616XD		3.0 0.12	134.0 5.28	1.0 0.04	183.0 7.20			340	69.2	0.1076	14.14 31.16

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

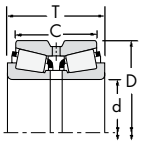
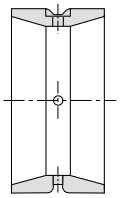
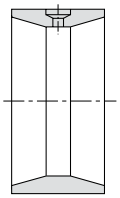


Fig. 1
D suffix outer race with lubricant holes and groove



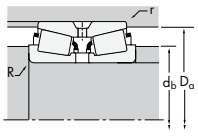
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
119.957 4.7227	195.262 7.6875	136.779 5.3850	142.875 5.6250	662000 149000	0.26	2.55	3.80	98600 22200	44600 10000	172000 38600	2.21
119.964 4.7230	215.900 8.5000	106.362 4.1875	80.962 3.1875	616000 138000	0.49	1.38	2.06	91700 20600	76500 17200	160000 35900	1.20
119.975 4.7234	174.625 6.8750	77.788 3.0625	61.912 2.4375	394000 88600	0.33	2.03	3.02	58700 13200	33400 7510	102000 23000	1.76
119.975 4.7234	174.625 6.8750	77.788 3.0625	61.912 2.4375	394000 88600	0.33	2.03	3.02	58700 13200	33400 7510	102000 23000	1.76
120.650 4.7500	161.925 6.3750	63.500 2.5000	53.975 2.1250	170000 38200	0.43	1.55	2.31	25300 5680	18800 4230	44000 9890	1.34
120.650 4.7500	169.975 6.6919	58.738 2.3125	49.212 1.9375	230000 51700	0.33	2.03	3.02	34300 7710	19500 4390	59700 13400	1.76
120.650 4.7500	174.625 6.8750	77.788 3.0625	61.912 2.4375	394000 88600	0.33	2.03	3.02	58700 13200	33400 7510	102000 23000	1.76
120.650 4.7500	182.562 7.1875	85.728 3.3751	73.025 2.8750	432000 97100	0.31	2.21	3.29	64300 14500	33600 7550	112000 25200	1.91
120.650 4.7500	182.562 7.1875	85.728 3.3751	73.025 2.8750	432000 97100	0.31	2.21	3.29	64300 14500	33600 7550	112000 25200	1.91
120.650 4.7500	206.375 8.1250	107.950 4.2500	82.550 3.2500	610000 137000	0.46	1.47	2.19	90800 20400	71300 16000	158000 35500	1.27
120.650 4.7500	234.950 9.2500	142.875 5.6250	114.300 4.5000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
123.825 4.8750	182.562 7.1875	85.728 3.3751	73.025 2.8750	432000 97100	0.31	2.21	3.29	64300 14500	33600 7550	112000 25200	1.91
123.825 4.8750	182.562 7.1875	85.728 3.3751	73.025 2.8750	432000 97100	0.31	2.21	3.29	64300 14500	33600 7550	112000 25200	1.91
124.943 4.9190	234.950 9.2500	142.875 5.6250	114.300 4.5000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
125.298 4.9330	228.600 9.0000	115.888 4.5625	84.138 3.3125	798000 179000	0.74	0.92	1.36	119000 26700	150000 33700	207000 46500	0.79
126.987 4.9995	207.962 8.1875	146.304 5.7600	152.400 6.0000	717000 161000	0.26	2.55	3.80	107000 24000	48400 10900	186000 41800	2.21
127.000 5.0000	169.975 6.6919	58.738 2.3125	49.212 1.9375	230000 51700	0.33	2.03	3.02	34300 7710	19500 4390	59700 13400	1.76
127.000 5.0000	182.562 7.1875	85.728 3.3751	73.025 2.8750	432000 97100	0.31	2.21	3.29	64300 14500	33600 7550	112000 25200	1.91
127.000 5.0000	182.562 7.1875	85.728 3.3751	73.025 2.8750	432000 97100	0.31	2.21	3.29	64300 14500	33600 7550	112000 25200	1.91
127.000 5.0000	196.850 7.7500	101.600 4.0000	85.725 3.3750	593000 133000	0.34	1.96	2.92	88200 19800	52000 11700	154000 34500	1.70
127.000 5.0000	196.850 7.7500	101.600 4.0000	85.725 3.3750	593000 133000	0.34	1.96	2.92	88200 19800	52000 11700	154000 34500	1.70
127.000 5.0000	200.025 7.8750	101.600 4.0000	85.725 3.3750	593000 133000	0.34	1.96	2.92	88200 19800	52000 11700	154000 34500	1.70
127.000 5.0000	215.900 8.5000	106.362 4.1875	80.962 3.1875	616000 138000	0.49	1.38	2.06	91700 20600	76500 17200	160000 35900	1.20
127.000 5.0000	228.600 9.0000	115.888 4.5625	84.138 3.3125	606000 136000	0.74	0.92	1.36	90200 20300	114000 25600	157000 35300	0.79
127.000 5.0000	228.600 9.0000	115.888 4.5625	84.138 3.3125	798000 179000	0.74	0.92	1.36	119000 26700	150000 33700	207000 46500	0.79
127.000 5.0000	228.600 9.0000	115.888 4.5625	84.138 3.3125	798000 179000	0.74	0.92	1.36	119000 26700	150000 33700	207000 46500	0.79
127.000 5.0000	234.950 9.2500	142.875 5.6250	114.300 4.5000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
127.792 5.0312	228.600 9.0000	115.888 4.5625	84.138 3.3125	798000 179000	0.74	0.92	1.36	119000 26700	150000 33700	207000 46500	0.79

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
HM124649	HM124618XD		3.0 0.12	134.0 5.28	1.0 0.04	183.0 7.20			340	69.2	0.1076	15.00 33.06
74472	74851CD	X1S-74472	3.5 0.14	142.0 5.59	1.5 0.06	208.0 8.19	19.0 0.75	7.1 0.28	363	68.5	0.1338	15.93 35.13
M224748	M224710DC	M224748XA	3.5 0.14	134.0 5.28	0.8 0.03	168.0 6.61	14.2 0.56	3.8 0.15	279	86.6	0.1575	5.72 12.62
M224748	M224710D	M224748XB	3.5 0.14	134.0 5.28	0.8 0.03	168.0 6.61			279	86.6	0.1575	5.72 12.62
L624549	L624514D	L624549XB	1.5 0.06	129.0 5.08	0.8 0.03	156.0 6.14			195	139	0.1509	3.22 7.11
L225842	L225812D	L225842XA	1.5 0.06	131.0 5.16	1.0 0.04	164.0 6.46			253	134	0.1511	3.92 8.65
M224749	M224710D	M224749XC	3.5 0.14	135.0 5.31	0.8 0.03	168.0 6.61			279	86.6	0.1575	5.64 12.44
48282	48220DC	X1S-48282	3.5 0.14	137.0 5.39	0.8 0.03	176.0 6.93	17.3 0.68	3.8 0.15	353	91.3	0.1138	7.88 17.38
48282	48220D	X1S-48282	3.5 0.14	137.0 5.39	0.8 0.03	176.0 6.93			353	91.3	0.1138	7.88 17.38
795	792CD	X4S-795	3.3 0.13	139.0 5.47	0.8 0.03	198.0 7.80	19.0 0.75	7.9 0.31	326	56.2	0.1269	13.68 30.17
95475	95927CD	X2S-95475	6.4 0.25	149.0 5.87	1.5 0.06	217.0 8.54	22.1 0.87	8.6 0.34	454	59.3	0.1323	26.72 58.90
48286	48220DC	X1S-48286	3.5 0.14	139.0 5.47	0.8 0.03	176.0 6.93	17.3 0.68	3.8 0.15	353	91.3	0.1138	7.59 16.73
48286	48220D	X2S-48286	3.5 0.14	139.0 5.47	0.8 0.03	176.0 6.93			353	91.3	0.1138	7.59 16.73
95491	95927CD	X2S-95491	6.4 0.25	152.0 5.98	1.5 0.06	217.0 8.54	22.1 0.87	8.6 0.34	454	59.3	0.1323	25.64 56.53
HM926745	HM926710D	HM926745XA	3.5 0.14	154.0 6.06	2.3 0.09	219.0 8.63			295	39	0.1416	18.84 41.53
HM127440	HM127415XD		1.5 0.06	140.0 5.51	1.0 0.04	198.0 7.79			423	85.4	0.1156	17.67 38.95
L225849	L225812D	L225849XA	1.5 0.06	136.0 5.35	1.0 0.04	164.0 6.46			253	106	0.1511	3.46 7.63
48290	48220DC	X1S-48290	3.5 0.14	141.0 5.55	0.8 0.03	176.0 6.93	17.3 0.68	3.8 0.15	353	91.3	0.1138	7.12 15.70
48290	48220D	X2S-48290	3.5 0.14	141.0 5.55	0.8 0.03	176.0 6.93			353	91.3	0.1138	7.12 15.70
67388	67322DC	X1S-67388	3.5 0.14	144.0 5.67	0.8 0.03	190.0 7.48	19.0 0.75	4.6 0.18	384	70.1	0.1220	10.65 23.48
67388	67322D	X3S-67388	3.5 0.14	144.0 5.67	0.8 0.03	190.0 7.48			384	70.1	0.1220	10.65 23.48
67388	67325D	X1S-67388	3.5 0.14	144.0 5.67	0.8 0.03	191.0 7.52			384	70.1	0.1220	11.72 25.83
74500	74851CD	X2S-74500	3.5 0.14	148.0 5.83	1.5 0.06	208.0 8.19	19.0 0.75	7.1 0.28	363	68.5	0.1338	14.89 32.83
97500	97901D	X1S-97500	3.5 0.14	151.0 5.94	2.3 0.09	213.0 8.38			237	44.6	0.1311	17.45 38.47
HM926747	HM926710DC	HM926747XA	3.5 0.14	156.0 6.14	2.3 0.09	219.0 8.63	19.0 0.75	8.6 0.34	295	39	0.1416	18.59 40.98
HM926747	HM926710D	HM926747XC	3.5 0.14	156.0 6.14	2.3 0.09	219.0 8.63			295	39	0.1416	18.59 40.98
95500	95927CD	X8S-95500	6.4 0.25	154.0 6.06	1.5 0.06	217.0 8.54	22.1 0.87	8.6 0.34	454	53.8	0.1323	25.49 56.19
HM926749	HM926710D	HM926749XE	3.5 0.14	156.0 6.14	2.3 0.09	219.0 8.63			295	39	0.1416	18.47 40.72

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

B

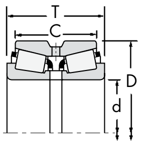
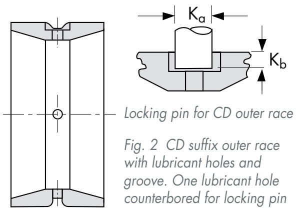
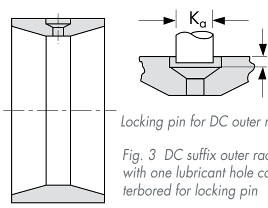


Fig. 1
D suffix outer race with lubricant holes and groove



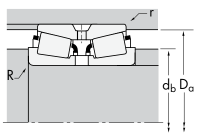
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
128.588	206.375	107.950	82.550	610000	0.46	1.47	2.19	90800	71300	158000	1.27
5.0625	8.1250	4.2500	3.2500	137000				20400	16000	35500	
129.967	229.873	150.002	160.000	816000	0.26	2.55	3.80	122000	55000	212000	2.21
5.1168	9.0501	5.9056	6.2992	183000				27300	12400	47600	
129.967	229.873	150.043	160.000	914000	0.26	2.55	3.80	136000	61600	237000	2.21
5.1168	9.0501	5.9072	6.2992	206000				30600	13900	53300	
129.967	229.873	150.043	160.000	816000	0.26	2.55	3.80	122000	55000	212000	2.21
5.1168	9.0501	5.9072	6.2992	183000				27300	12400	47600	
129.975	234.950	142.875	114.300	1010000	0.37	1.83	2.72	151000	95500	263000	1.58
5.1171	9.2500	5.6250	4.5000	228000				33900	21500	59100	
130.000	206.375	107.950	82.550	610000	0.46	1.47	2.19	90800	71300	158000	1.27
5.1181	8.1250	4.2500	3.2500	137000				20400	16000	35500	
130.175	196.850	101.600	85.725	593000	0.34	1.96	2.92	88200	52000	154000	1.70
5.1250	7.7500	4.0000	3.3750	133000				19800	11700	34500	
130.175	196.850	101.600	85.725	593000	0.34	1.96	2.92	88200	52000	154000	1.70
5.1250	7.7500	4.0000	3.3750	133000				19800	11700	34500	
130.175	200.025	101.600	85.725	593000	0.34	1.96	2.92	88200	52000	154000	1.70
5.1250	7.8750	4.0000	3.3750	133000				19800	11700	34500	
130.175	206.375	107.950	82.550	610000	0.46	1.47	2.19	90800	71300	158000	1.27
5.1250	8.1250	4.2500	3.2500	137000				20400	16000	35500	
131.750	207.962	146.304	152.400	717000	0.26	2.55	3.80	107000	48400	186000	2.21
5.1870	8.1875	5.7600	6.0000	161000				24000	10900	41800	
133.350	177.008	57.150	47.625	237000	0.35	1.94	2.89	35300	21000	61500	1.68
5.2500	6.9688	2.2500	1.8750	53300				7940	4730	13800	
133.350	190.500	85.725	73.025	456000	0.32	2.10	3.13	67900	37300	118000	1.82
5.2500	7.5000	3.3750	2.8750	103000				15300	8390	26600	
133.350	190.500	85.725	73.025	456000	0.32	2.10	3.13	67900	37300	118000	1.82
5.2500	7.5000	3.3750	2.8750	103000				15300	8390	26600	
133.350	196.850	101.600	85.725	593000	0.34	1.96	2.92	88200	52000	154000	1.70
5.2500	7.7500	4.0000	3.3750	133000				19800	11700	34500	
133.350	196.850	101.600	85.725	593000	0.34	1.96	2.92	88200	52000	154000	1.70
5.2500	7.7500	4.0000	3.3750	133000				19800	11700	34500	
133.350	196.850	101.600	85.725	593000	0.34	1.96	2.92	88200	52000	154000	1.70
5.2500	7.7500	4.0000	3.3750	133000				19800	11700	34500	
133.350	200.025	101.600	85.725	593000	0.34	1.96	2.92	88200	52000	154000	1.70
5.2500	7.8750	4.0000	3.3750	133000				19800	11700	34500	
133.350	215.900	106.362	80.962	616000	0.49	1.38	2.06	91700	76500	160000	1.20
5.2500	8.5000	4.1875	3.1875	138000				20600	17200	35900	
133.350	234.950	142.875	114.300	1010000	0.37	1.83	2.72	151000	95500	263000	1.58
5.2500	9.2500	5.6250	4.5000	228000				33900	21500	59100	
133.350	234.950	142.875	114.300	1010000	0.37	1.83	2.72	151000	95500	263000	1.58
5.2500	9.2500	5.6250	4.5000	228000				33900	21500	59100	
136.525	190.500	85.725	73.025	456000	0.32	2.10	3.13	67900	37300	118000	1.82
5.3750	7.5000	3.3750	2.8750	103000				15300	8390	26600	
136.525	190.500	85.725	73.025	456000	0.32	2.10	3.13	67900	37300	118000	1.82
5.3750	7.5000	3.3750	2.8750	103000				15300	8390	26600	
136.525	215.900	106.362	80.962	616000	0.49	1.38	2.06	91700	76500	160000	1.20
5.3750	8.5000	4.1875	3.1875	138000				20600	17200	35900	
136.525	228.600	123.825	98.425	839000	0.42	1.60	2.39	125000	90000	218000	1.39
5.3750	9.0000	4.8750	3.8750	189000				28100	20200	48900	
136.525	254.000	149.225	111.125	1060000	0.41	1.66	2.47	158000	110000	276000	1.43
5.3750	10.0000	5.8750	4.3750	239000				35600	24800	62000	
136.525	254.000	152.400	114.300	1060000	0.41	1.66	2.47	158000	110000	276000	1.43
5.3750	10.0000	6.0000	4.5000	239000				35600	24800	62000	
139.700	215.900	106.362	80.962	616000	0.49	1.38	2.06	91700	76500	160000	1.20
5.5000	8.5000	4.1875	3.1875	138000				20600	17200	35900	

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
799	792CD	X1S-799	3.3 0.13	146.0 5.75	0.8 0.03	198.0 7.80	19.0 0.75	7.9 0.31	326	61.9	0.1269	12.42 27.39
H127747	H127715D		1.5 0.06	145.0 5.71	1.0 0.04	0.0 0.00			419	95.3	0.1151	26.62 58.69
H127746	H127715AD		1.5 0.06	145.0 5.71	10.0 0.00	0.0 0.00			470	106	0.1198	26.51 58.44
H127747	H127715AD		1.5 0.06	145.0 5.71	10.0 0.00	0.0 0.00			419	95.3	0.1151	26.02 57.37
95512	95927CD	X1S-95512	6.4 0.25	157.0 6.18	1.5 0.06	217.0 8.54	22.1 0.87	8.6 0.34	454	59.3	0.1323	24.71 54.47
797	792CD	X3S-797	3.5 0.14	148.0 5.83	0.8 0.03	198.0 7.80	19.0 0.75	7.9 0.31	326	61.9	0.1269	12.12 26.72
67389	67322DC	X1S-67389	3.5 0.14	146.0 5.75	0.8 0.03	190.0 7.48	19.0 0.75	4.6 0.18	384	70.1	0.1220	10.16 22.39
67389	67322D	X3S-67389	3.5 0.14	146.0 5.75	0.8 0.03	190.0 7.48			384	70.1	0.1220	10.16 22.39
67389	67325D	X1S-67389	3.5 0.14	146.0 5.75	0.8 0.03	191.0 7.52			384	70.1	0.1220	11.23 24.75
799A	792CD	X1S-799A	3.5 0.14	148.0 5.83	0.8 0.03	198.0 7.80	19.0 0.75	7.9 0.31	326	61.9	0.1269	12.15 26.78
HM127446	HM127415XD		1.5 0.06	144.0 5.67	1.0 0.04	198.0 7.79			423	85.4	0.1156	16.80 37.04
L327249	L327210D	L327249XB	1.5 0.06	142.0 5.59	0.8 0.03	171.0 6.73			280	156	0.1585	3.66 8.06
48385	48320DC	X1S-48385	3.5 0.14	148.0 5.83	0.8 0.03	184.0 7.24	17.3 0.68	3.8 0.15	404	95.6	0.1209	7.46 16.44
48385	48320D	X2S-48385	3.5 0.14	148.0 5.83	0.8 0.03	184.0 7.24			404	95.6	0.1209	7.46 16.44
67390	67322DC	X1S-67390	3.5 0.14	149.0 5.87	0.8 0.03	190.0 7.48	19.0 0.75	4.6 0.18	384	70.1	0.1220	9.66 21.29
67390	67322D	X2S-67390	3.5 0.14	149.0 5.87	0.8 0.03	190.0 7.48			384	70.1	0.1220	9.66 21.29
67391	67322D	X1S-67390	8.0 0.31	157.0 6.18	0.8 0.03	190.0 7.48			384	70.1	0.1220	9.63 21.23
67390	67325D	X2S-67390	3.5 0.14	149.0 5.87	0.8 0.03	191.0 7.52			384	70.1	0.1220	10.72 23.64
74525	74851CD	X4S-74525	3.5 0.14	152.0 5.98	1.5 0.06	208.0 8.19	19.0 0.75	7.1 0.28	363	63.3	0.1338	13.91 30.67
95525	95927CD	X3S-95525	9.7 0.38	166.0 6.54	1.5 0.06	217.0 8.54	22.1 0.87	8.6 0.34	454	53.8	0.1323	23.61 52.05
95528	95927CD	X1S-95525	4.8 0.19	157.0 6.18	1.5 0.06	217.0 8.54	22.1 0.87	8.6 0.34	454	59.3	0.1323	23.85 52.58
48393	48320DC	X1S-48393	3.5 0.14	151.0 5.94	0.8 0.03	184.0 7.24	17.3 0.68	3.8 0.15	404	95.6	0.1209	7.01 15.45
48393	48320D	X2S-48393	3.5 0.14	151.0 5.94	0.8 0.03	184.0 7.24			404	95.6	0.1209	7.01 15.45
74537	74851CD	X1S-74537	3.5 0.14	155.0 6.10	1.5 0.06	208.0 8.19	19.0 0.75	7.1 0.28	363	68.5	0.1338	13.28 29.27
896	892CD	X2S-896	3.5 0.14	156.0 6.14	1.5 0.06	216.0 8.50	22.1 0.87	7.1 0.28	430	78.2	0.1355	18.81 41.47
99537	99102CD	X1S-99537	7.0 0.28	167.0 6.57	1.5 0.06	238.0 9.37	22.1 0.87	7.9 0.31	556	73.5	0.1459	30.70 67.67
99537	99101D	X2S-99537	7.0 0.28	167.0 6.57	1.5 0.06	238.0 9.37			556	73.5	0.1459	32.18 70.95
74550	74851CD	X3S-74550	3.5 0.14	158.0 6.22	1.5 0.06	208.0 8.19	19.0 0.75	7.1 0.28	363	63.3	0.1338	12.81 28.24

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

B

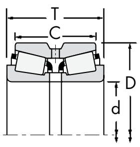
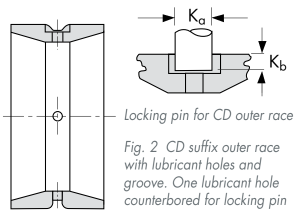
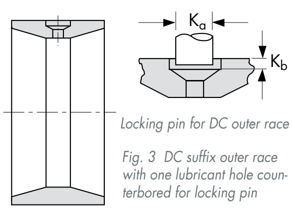


Fig. 1
D suffix outer race with lubricant holes and groove



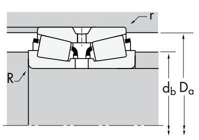
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)	Factors (5)			Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
139.700 5.5000	215.900 8.5000	106.362 4.1875	80.962 3.1875	616000 138000	0.49	1.38	2.06	91700 20600	76500 17200	160000 35900	1.20
139.700 5.5000	222.250 8.7500	75.700 2.9803	53.975 2.1250	398000 89500	0.44	1.54	2.30	59300 13300	44400 9970	103000 23200	1.34
139.700 5.5000	228.600 9.0000	123.825 4.8750	98.425 3.8750	839000 189000	0.42	1.60	2.39	125000 28100	90000 20200	218000 48900	1.39
139.700 5.5000	228.600 9.0000	123.825 4.8750	98.425 3.8750	839000 189000	0.42	1.60	2.39	125000 28100	90000 20200	218000 48900	1.39
139.700 5.5000	236.538 9.3125	131.762 5.1875	106.362 4.1875	962000 216000	0.32	2.12	3.15	143000 32200	78200 17600	249000 56100	1.83
139.700 5.5000	241.300 9.5000	131.762 5.1875	106.362 4.1875	962000 216000	0.32	2.12	3.15	143000 32200	78200 17600	249000 56100	1.83
139.700 5.5000	254.000 10.0000	149.225 5.8750	111.125 4.3750	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
139.700 5.5000	254.000 10.0000	152.400 6.0000	114.300 4.5000	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
139.700 5.5000	307.975 12.1250	200.025 7.8750	155.575 6.1250	1970000 442000	0.33	2.07	3.08	293000 65900	164000 36800	510000 115000	1.79
139.700 5.5000	307.975 12.1250	200.025 7.8750	155.575 6.1250	1970000 442000	0.33	2.07	3.08	293000 65900	164000 36800	510000 115000	1.79
142.875 5.6250	193.675 7.6250	65.085 2.5624	53.975 2.1250	317000 71200	0.37	1.83	2.73	47100 10600	29700 6690	82100 18500	1.59
142.875 5.6250	200.025 7.8750	87.315 3.4376	73.025 2.8750	462000 104000	0.34	2.01	2.99	68800 15500	39600 8900	120000 26900	1.74
142.875 5.6250	200.025 7.8750	87.315 3.4376	73.025 2.8750	462000 104000	0.34	2.01	2.99	68800 15500	39600 8900	120000 26900	1.74
142.875 5.6250	200.025 7.8750	87.315 3.4376	73.025 2.8750	462000 104000	0.34	2.01	2.99	68800 15500	39600 8900	120000 26900	1.74
142.875 5.6250	222.250 8.7500	75.700 2.9803	53.975 2.1250	398000 89500	0.44	1.54	2.30	59300 13300	44400 9970	103000 23200	1.34
142.875 5.6250	241.300 9.5000	131.762 5.1875	106.362 4.1875	962000 216000	0.32	2.12	3.15	143000 32200	78200 17600	249000 56100	1.83
144.450 5.6870	220.662 8.6875	155.839 6.1354	163.510 6.4374	751000 169000	0.26	2.55	3.80	112000 25100	50600 11400	195000 43800	2.21
146.050 5.7500	193.675 7.6250	65.085 2.5624	53.975 2.1250	317000 71200	0.37	1.83	2.73	47100 10600	29700 6690	82100 18500	1.59
146.050 5.7500	193.675 7.6250	65.085 2.5624	53.975 2.1250	317000 71200	0.37	1.83	2.73	47100 10600	29700 6690	82100 18500	1.59
146.050 5.7500	236.538 9.3125	131.762 5.1875	106.362 4.1875	962000 216000	0.32	2.12	3.15	143000 32200	78200 17600	249000 56100	1.83
146.050 5.7500	241.300 9.5000	131.762 5.1875	106.362 4.1875	830000 187000	0.44	1.53	2.27	124000 27800	93600 21000	215000 48400	1.32
146.050 5.7500	241.300 9.5000	131.762 5.1875	106.362 4.1875	962000 216000	0.32	2.12	3.15	143000 32200	78200 17600	249000 56100	1.83
146.050 5.7500	244.475 9.6250	107.950 4.2500	79.375 3.1250	648000 146000	0.35	1.92	2.86	96400 21700	58100 13100	168000 37700	1.66
146.050 5.7500	254.000 10.0000	149.225 5.8750	111.125 4.3750	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
146.050 5.7500	254.000 10.0000	152.400 6.0000	114.300 4.5000	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
146.050 5.7500	268.288 10.5625	160.338 6.3125	125.412 4.9375	1260000 284000	0.39	1.74	2.59	188000 42300	125000 28100	328000 73700	1.51
146.050 5.7500	304.800 12.0000	135.733 5.3438	97.633 3.8438	1250000 281000	0.33	2.03	3.02	186000 41800	106000 23800	324000 72800	1.76
149.225 5.8750	236.538 9.3125	131.762 5.1875	106.362 4.1875	962000 216000	0.32	2.12	3.15	143000 32200	78200 17600	249000 56100	1.83

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
74550A	74851CD	X1S-74550	6.4 0.25	166.0 6.54	1.5 0.06	208.0 8.19	19.0 0.75	7.1 0.28	363	63.3	0.1338	12.79 28.19
73551	73876CD	X2S-73551	3.5 0.14	156.0 6.14	2.3 0.09	207.0 8.15	10.9 0.43	6.4 0.25	244	82	0.1122	9.36 20.64
898	892CD	X5S-898	3.5 0.14	160.0 6.30	1.5 0.06	216.0 8.50	22.1 0.87	7.1 0.28	430	78.2	0.1355	18.09 39.89
898A	892CD	X4S-898	6.4 0.25	165.0 6.50	1.5 0.06	216.0 8.50	22.1 0.87	7.1 0.28	430	78.2	0.1355	17.99 39.67
HM231132	HM231111CD	HM231132XA	3.5 0.14	160.0 6.30	1.5 0.06	224.0 8.82	22.1 0.87	7.9 0.31	533	85.9	0.1327	21.68 47.79
HM231132	HM231116D		3.5 0.14	160.0 6.30	1.5 0.06	224.0 8.82			533	85.9	0.1327	22.53 49.68
99550	99102CD	X5S-99550	7.0 0.28	170.0 6.69	1.5 0.06	238.0 9.37	22.1 0.87	7.9 0.31	556	73.5	0.1459	30.10 66.35
99550	99101D	X8S-99550	7.0 0.28	170.0 6.69	1.5 0.06	238.0 9.37			556	73.5	0.1459	31.24 68.86
HH234031	HH234011CD	HH234032XB	9.7 0.38	180.0 7.09	2.3 0.09	285.5 11.24	28.4 1.12	10.2 0.40	718	62.1	0.1157	65.45 144.29
HH234032	HH234011CD	HH234032XC	9.7 0.38	180.0 7.09	2.3 0.09	285.5 11.24	28.4 1.12	10.2 0.40	718	62.1	0.1157	62.85 138.55
36686	36620D	X1S-48685	1.5 0.06	153.0 6.02	0.8 0.03	188.0 7.40			366	152	0.1768	5.27 11.62
48684	48620D	X1S-48685	8.0 0.31	166.0 6.54	0.8 0.03	193.0 7.60			440	115	0.1261	7.76 17.10
48685	48620DC	X1S-48685	3.5 0.14	158.0 6.22	0.8 0.03	193.0 7.60	17.3 0.68	4.6 0.18	440	115	0.1261	7.94 17.51
48685	48620D	X4S-48685	3.5 0.14	158.0 6.22	0.8 0.03	193.0 7.60			440	115	0.1261	7.94 17.51
73562	73876CD	X2S-73562	3.5 0.14	159.0 6.26	2.3 0.09	207.0 8.15	10.9 0.43	6.4 0.25	244	82	0.1122	8.95 19.74
HM231136	HM231116D	HM231136XA	3.5 0.14	162.0 6.38	1.5 0.06	224.0 8.82			533	85.9	0.1327	22.53 49.66
HM129848	HM129814XD		1.5 0.06	156.0 6.14	1.0 0.04	211.0 8.30			494	101	0.1215	19.07 42.03
36690	36620DC	X1S-36690	1.5 0.06	155.0 6.10	0.8 0.03	188.0 7.40	10.9 0.43	3.8 0.15	366	121	0.1768	4.94 10.88
36690	36620D	X2S-36690	1.5 0.06	155.0 6.10	0.8 0.03	188.0 7.40			366	121	0.1768	4.93 10.87
HM231140	HM231111CD	HM231140XE	3.5 0.14	164.0 6.46	1.5 0.06	224.0 8.82	22.1 0.87	7.9 0.31	533	85.9	0.1327	20.26 44.66
82576	82951CD	X1S-82576	3.5 0.14	166.0 6.54	1.5 0.06	226.0 8.90	22.1 0.87	8.6 0.34	460	81.1	0.1405	21.82 48.11
HM231140	HM231116D	HM231140XA	3.5 0.14	164.0 6.46	1.5 0.06	224.0 8.82			533	85.9	0.1327	21.83 48.12
81575	81963CD	X1S-81575	3.5 0.14	166.0 6.54	1.5 0.06	229.0 9.02	19.0 0.75	7.9 0.31	413	98.4	0.1250	17.51 38.61
99575	99102CD	X4S-99575	7.0 0.28	175.0 6.89	1.5 0.06	238.0 9.37	22.1 0.87	7.9 0.31	556	73.5	0.1459	28.51 62.84
99575	99101D	X5S-99575	7.0 0.28	175.0 6.89	1.5 0.06	238.0 9.37			556	73.5	0.1459	29.64 65.35
EE107057	107105CD	X4S-107057	6.4 0.25	176.0 6.93	1.5 0.06	249.5 9.82	28.4 1.12	10.2 0.40	606	76.3	0.1163	36.36 80.17
EE750576	751204D	X3S-750576	3.3 0.13	167.0 6.57	1.5 0.06	268.0 10.55			431	54.4	0.0974	38.56 85.01
HM231148	HM231111CD	HM231149XB	6.4 0.25	172.0 6.77	1.5 0.06	224.0 8.82	22.1 0.87	7.9 0.31	533	85.9	0.1327	19.50 42.99

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

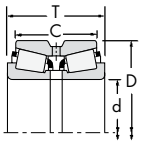
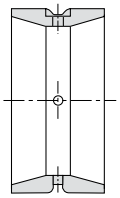
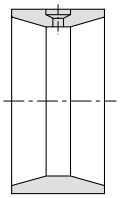


Fig. 1 D suffix outer race with lubricant holes and groove



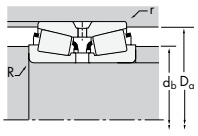
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
149.225 5.8750	236.538 9.3125	131.762 5.1875	106.362 4.1875	962000 216000	0.32	2.12	3.15	143000 32200	78200 17600	249000 56100	1.83
149.225 5.8750	241.300 9.5000	131.762 5.1875	106.362 4.1875	962000 216000	0.32	2.12	3.15	143000 32200	78200 17600	249000 56100	1.83
149.225 5.8750	254.000 10.0000	149.225 5.8750	111.125 4.3750	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
149.225 5.8750	254.000 10.0000	152.400 6.0000	114.300 4.5000	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
149.967 5.9042	249.872 9.8375	153.764 6.0537	160.000 6.2992	1020000 230000	0.26	2.55	3.80	152000 34300	69100 15500	266000 59700	2.21
150.000 5.9055	244.475 9.6250	107.950 4.2500	79.375 3.1250	648000 146000	0.35	1.92	2.86	96400 21700	58100 13100	168000 37700	1.66
150.812 5.9375	244.475 9.6250	107.950 4.2500	79.375 3.1250	648000 146000	0.35	1.92	2.86	96400 21700	58100 13100	168000 37700	1.66
152.400 6.0000	203.200 8.0000	92.075 3.6250	79.375 3.1250	457000 103000	0.35	1.94	2.89	68000 15300	40400 9090	118000 26600	1.68
152.400 6.0000	244.475 9.6250	107.950 4.2500	79.375 3.1250	648000 146000	0.35	1.92	2.86	96400 21700	58100 13100	168000 37700	1.66
152.400 6.0000	254.000 10.0000	149.225 5.8750	111.125 4.3750	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
152.400 6.0000	254.000 10.0000	152.400 6.0000	114.300 4.5000	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
152.400 6.0000	268.288 10.5625	160.338 6.3125	125.412 4.9375	1260000 284000	0.39	1.74	2.59	188000 42300	125000 28100	328000 73700	1.51
152.400 6.0000	307.975 12.1250	200.025 7.8750	146.050 5.7500	1700000 382000	0.33	2.07	3.08	253000 56800	141000 31700	440000 98900	1.79
152.400 6.0000	307.975 12.1250	200.025 7.8750	155.575 6.1250	1970000 442000	0.33	2.07	3.08	293000 65900	164000 36800	510000 115000	1.79
152.400 6.0000	307.975 12.1250	200.025 7.8750	155.575 6.1250	1970000 442000	0.33	2.07	3.08	293000 65900	164000 36800	510000 115000	1.79
158.750 6.2500	225.425 8.8750	85.725 3.3750	69.850 2.7500	489000 110000	0.38	1.76	2.62	72800 16400	47800 10700	127000 28500	1.52
159.951 6.2973	244.475 9.6250	107.950 4.2500	79.375 3.1250	648000 146000	0.35	1.92	2.86	96400 21700	58100 13100	168000 37700	1.66
159.951 6.2973	244.475 9.6250	107.950 4.2500	79.375 3.1250	648000 146000	0.35	1.92	2.86	96400 21700	58100 13100	168000 37700	1.66
160.325 6.3120	288.925 11.3750	142.875 5.6250	111.125 4.3750	1330000 299000	0.32	2.12	3.15	198000 44500	108000 24300	344000 77400	1.83
165.087 6.4995	276.225 10.8750	181.023 7.1269	185.725 7.3120	1180000 265000	0.26	2.55	3.80	175000 39400	79300 17800	305000 68600	2.21
165.100 6.5000	215.900 8.5000	58.740 2.3126	47.625 1.8750	288000 64800	0.36	1.85	2.76	42900 9640	26800 6010	74700 16800	1.60
165.100 6.5000	225.425 8.8750	85.725 3.3750	69.850 2.7500	489000 110000	0.38	1.76	2.62	72800 16400	47800 10700	127000 28500	1.52
165.100 6.5000	247.650 9.7500	103.188 4.0625	84.138 3.3125	653000 147000	0.44	1.54	2.29	97200 21900	73200 16500	169000 38100	1.33
165.100 6.5000	288.925 11.3750	142.875 5.6250	111.125 4.3750	1060000 239000	0.47	1.44	2.15	159000 35600	127000 28600	276000 62000	1.25
165.100 6.5000	288.925 11.3750	142.875 5.6250	111.125 4.3750	1330000 299000	0.32	2.12	3.15	198000 44500	108000 24300	344000 77400	1.83
165.100 6.5000	288.925 11.3750	142.875 5.6250	111.125 4.3750	1330000 299000	0.32	2.12	3.15	198000 44500	108000 24300	344000 77400	1.83
165.100 6.5000	298.450 11.7500	142.875 5.6250	111.125 4.3750	1060000 239000	0.47	1.44	2.15	159000 35600	127000 28600	276000 62000	1.25
166.687 6.5625	225.425 8.8750	85.725 3.3750	69.850 2.7500	489000 110000	0.38	1.76	2.62	72800 16400	47800 10700	127000 28500	1.52

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
HM231149	HM231111CD	HM231149XB	3.5 0.14	167.0 6.57	1.5 0.06	224.0 8.82	22.1 0.87	7.9 0.31	533	85.9	0.1327	19.61 43.22
HM231149	HM231116D	HM231149XA	3.5 0.14	167.0 6.57	1.5 0.06	224.0 8.82			533	85.9	0.1327	21.17 46.68
99587	99102CD	X3S-99587	7.0 0.28	178.0 7.01	1.5 0.06	238.0 9.37	22.1 0.87	7.9 0.31	556	73.5	0.1459	27.83 61.35
99587	99101D		7.0 0.28	178.0 7.01	1.5 0.06	238.0 9.37			556	73.5	0.1459	28.18 62.11
HM133436	HM133413XD		3.0 0.12	169.0 6.65	1.0 0.04	239.0 9.41			669	103	0.1344	30.05 66.24
81590	81963CD	X1S-81590	3.5 0.14	169.0 6.65	1.5 0.06	229.0 9.02	19.0 0.75	7.9 0.31	413	98.4	0.1250	16.87 37.20
81593	81963CD	X1S-81593	3.5 0.14	169.0 6.65	1.5 0.06	229.0 9.02	19.0 0.75	7.9 0.31	413	98.4	0.1250	16.69 36.78
LM330448	LM330410D	LM330448XA	3.3 0.13	166.0 6.54	0.8 0.03	197.0 7.76			456	135	0.1289	7.60 16.75
81600	81963CD	X4S-81600	3.5 0.14	171.0 6.73	1.5 0.06	229.0 9.02	19.0 0.75	7.9 0.31	413	98.4	0.1250	16.88 37.21
99600	99102CD	X7S-99600	7.0 0.28	181.0 7.13	1.5 0.06	238.0 9.37	22.1 0.87	7.9 0.31	556	66.7	0.1459	26.93 59.37
99600	99101D	X4S-99600	7.0 0.28	181.0 7.13	1.5 0.06	238.0 9.37			556	66.7	0.1459	28.13 62.02
EE107060	107105CD	X3S-107060	6.4 0.25	181.0 7.13	1.5 0.06	249.5 9.82	28.4 1.12	10.2 0.40	606	76.3	0.1163	34.63 76.35
EE450601	451215CD	X7S-450601	9.7 0.38	189.0 7.44	2.3 0.09	275.0 10.82	28.4 1.12	11.7 0.46	747	76.3	0.1176	59.88 132.01
HH234048	HH234011CD	HH234048XA	9.7 0.38	191.0 7.52	2.3 0.09	285.5 11.24	28.4 1.12	10.2 0.40	718	62.1	0.1157	60.93 134.32
HH234049	HH234011CD	HH234049XA	9.7 0.38	191.0 7.52	2.3 0.09	285.5 11.24	28.4 1.12	10.2 0.40	718	62.1	0.1157	58.33 128.58
46780	46720CD	X2S-46780	3.5 0.14	176.0 6.93	0.8 0.03	218.0 8.58	15.7 0.62	5.3 0.21	572	133	0.1432	10.71 23.60
81629	81963CD		3.5 0.14	176.0 6.93	1.5 0.06	229.0 9.02	19.0 0.75	7.9 0.31	413	98.4	0.1250	14.91 32.87
81630	81963CD	X1S-81630	3.5 0.14	176.0 6.93	1.5 0.06	229.0 9.02	19.0 0.75	7.9 0.31	413	98.4	0.1250	15.09 33.27
HM237532	HM237510CD	HM237532XC	7.0 0.28	192.0 7.56	1.5 0.06	271.5 10.68	22.1 0.87	8.6 0.34	751	101	0.1168	36.92 81.40
HM136940	HM136916XD		1.5 0.06	183.0 7.20	1.0 0.04	261.5 10.30			828	112	0.1135	40.98 90.35
L433749	L433710D	L433749XA	1.5 0.06	174.0 6.85	0.8 0.03	209.0 8.23			365	168	0.1748	5.11 11.27
46790	46720CD	X2S-46790	3.5 0.14	181.0 7.13	0.8 0.03	218.0 8.58	15.7 0.62	5.3 0.21	572	175	0.1432	9.69 21.36
67780	67720CD	X2S-67780	3.5 0.14	185.0 7.28	0.8 0.03	240.0 9.45	19.0 0.75	7.1 0.28	622	122	0.1214	17.18 37.87
94649	94114CD	X5S-94650	7.0 0.28	197.0 7.76	1.5 0.06	272.0 10.71	22.1 0.87	10.2 0.40	692	93.8	0.1287	36.66 80.81
HM237535	HM237510CD	HM237535XC	7.0 0.28	195.0 7.68	1.5 0.06	271.5 10.68	22.1 0.87	8.6 0.34	751	101	0.1168	35.86 79.05
HM237536	HM237510CD	HM237535XB	7.0 0.28	195.0 7.68	1.5 0.06	271.5 10.68	22.1 0.87	8.6 0.34	751	101	0.1168	35.83 78.98
94649	94118D	X3S-94650	7.0 0.28	197.0 7.76	1.5 0.06	272.0 10.71			692	93.8	0.1287	41.10 90.61
46792	46720CD	X2S-46792	3.5 0.14	182.0 7.17	0.8 0.03	218.0 8.58	15.7 0.62	5.3 0.21	572	154	0.1432	9.39 20.69

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Continued on next page.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

B

TDO

DOUBLE OUTER RACE

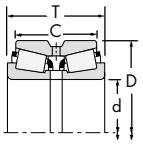
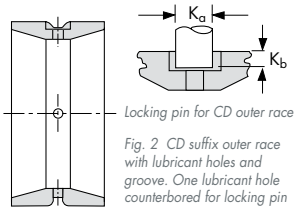
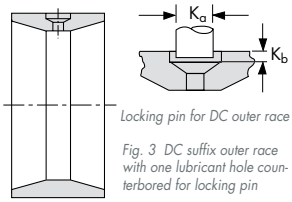


Fig. 1
D suffix outer race with lubricant holes and groove



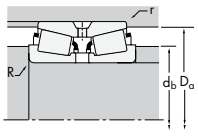
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
168.275 6.6250	247.650 9.7500	103.188 4.0625	84.138 3.3125	653000 147000	0.44	1.54	2.29	97200 21900	73200 16500	169000 38100	1.33
170.000 6.6929	254.000 10.0000	101.600 4.0000	76.200 3.0000	763000 172000	0.32	2.12	3.15	114000 25500	62000 13900	198000 44500	1.83
174.625 6.8750	247.650 9.7500	103.188 4.0625	84.138 3.3125	653000 147000	0.44	1.54	2.29	97200 21900	73200 16500	169000 38100	1.33
174.625 6.8750	247.650 9.7500	103.188 4.0625	84.138 3.3125	653000 147000	0.44	1.54	2.29	97200 21900	73200 16500	169000 38100	1.33
174.625 6.8750	288.925 11.3750	142.875 5.6250	111.125 4.3750	1060000 239000	0.47	1.44	2.15	159000 35600	127000 28600	276000 62000	1.25
174.625 6.8750	288.925 11.3750	142.875 5.6250	111.125 4.3750	1330000 299000	0.32	2.12	3.15	198000 44500	108000 24300	344000 77400	1.83
177.787 6.9995	276.225 10.8750	181.023 7.1269	185.725 7.3120	1180000 265000	0.26	2.55	3.80	175000 39400	79300 17800	305000 68600	2.21
177.800 7.0000	227.012 8.9375	66.672 2.6249	52.388 2.0625	337000 75800	0.44	1.53	2.28	50200 11300	37900 8510	87400 19600	1.33
177.800 7.0000	247.650 9.7500	103.188 4.0625	84.138 3.3125	653000 147000	0.44	1.54	2.29	97200 21900	73200 16500	169000 38100	1.33
177.800 7.0000	288.925 11.3750	142.875 5.6250	111.125 4.3750	1060000 239000	0.47	1.44	2.15	159000 35600	127000 28600	276000 62000	1.25
177.800 7.0000	288.925 11.3750	142.875 5.6250	111.125 4.3750	1330000 299000	0.32	2.12	3.15	198000 44500	108000 24300	344000 77400	1.83
177.800 7.0000	298.450 11.7500	142.875 5.6250	111.125 4.3750	1060000 239000	0.47	1.44	2.15	159000 35600	127000 28600	276000 62000	1.25
177.800 7.0000	320.675 12.6250	185.738 7.3125	138.112 5.4375	1790000 402000	0.32	2.12	3.15	267000 59900	145000 32700	464000 104000	1.83
179.975 7.0856	317.500 12.5000	146.050 5.7500	111.125 4.3750	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
184.150 7.2500	266.700 10.5000	103.188 4.0625	84.138 3.3125	671000 151000	0.48	1.41	2.11	99900 22500	81700 18400	174000 39100	1.22
187.325 7.3750	266.700 10.5000	103.188 4.0625	84.138 3.3125	671000 151000	0.48	1.41	2.11	99900 22500	81700 18400	174000 39100	1.22
187.325 7.3750	269.875 10.6250	119.062 4.6875	93.663 3.6875	884000 199000	0.33	2.03	3.02	132000 29600	74900 16800	229000 51500	1.76
187.325 7.3750	282.575 11.1250	107.950 4.2500	79.375 3.1250	692000 156000	0.42	1.62	2.42	103000 23200	73300 16500	180000 40400	1.41
187.325 7.3750	320.675 12.6250	185.738 7.3125	138.112 5.4375	1790000 402000	0.32	2.12	3.15	267000 59900	145000 32700	464000 104000	1.83
190.500 7.5000	266.700 10.5000	103.188 4.0625	84.138 3.3125	671000 151000	0.48	1.41	2.11	99900 22500	81700 18400	174000 39100	1.22
190.500 7.5000	282.575 11.1250	107.950 4.2500	79.375 3.1250	692000 156000	0.42	1.62	2.42	103000 23200	73300 16500	180000 40400	1.41
190.500 7.5000	282.575 11.1250	107.950 4.2500	79.375 3.1250	692000 156000	0.42	1.62	2.42	103000 23200	73300 16500	180000 40400	1.41
190.500 7.5000	317.500 12.5000	146.050 5.7500	111.125 4.3750	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
190.500 7.5000	368.300 14.5000	193.675 7.6250	136.525 5.3750	1880000 423000	0.40	1.68	2.50	280000 63000	193000 43300	488000 110000	1.45
192.088 7.5625	266.700 10.5000	103.188 4.0625	84.138 3.3125	671000 151000	0.48	1.41	2.11	99900 22500	81700 18400	174000 39100	1.22
193.675 7.6250	282.575 11.1250	107.950 4.2500	79.375 3.1250	692000 156000	0.42	1.62	2.42	103000 23200	73300 16500	180000 40400	1.41
193.675 7.6250	282.575 11.1250	107.950 4.2500	79.375 3.1250	692000 156000	0.42	1.62	2.42	103000 23200	73300 16500	180000 40400	1.41
196.850 7.7500	254.000 10.0000	61.910 2.4374	47.625 1.8750	340000 76400	0.40	1.70	2.53	50600 11400	34400 7730	88100 19800	1.47

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
67782	67720CD	X1S-67782	3.5 0.14	187.0 7.36	0.8 0.03	240.0 9.45	19.0 0.75	7.1 0.28	622	122	0.1214	16.39 36.13
M235149	M235113CD	M235149XB	4.8 0.19	189.0 7.44	1.5 0.06	240.0 9.45	19.0 0.75	7.9 0.31	531	107	0.1037	15.37 33.89
67786	67720CD	X1S-67787	8.0 0.31	200.0 7.87	0.8 0.03	240.0 9.45	19.0 0.75	7.1 0.28	622	122	0.1214	14.89 32.82
67787	67720CD	X2S-67787	3.5 0.14	192.0 7.56	0.8 0.03	240.0 9.45	19.0 0.75	7.1 0.28	622	122	0.1214	15.11 33.31
94687	94114CD	X1S-94687	7.0 0.28	204.0 8.03	1.5 0.06	272.0 10.71	22.1 0.87	10.2 0.40	692	93.8	0.1287	34.02 74.99
HM237542	HM237510CD	HM237542XB	7.0 0.28	202.0 7.95	1.5 0.06	271.5 10.68	22.1 0.87	8.6 0.34	751	101	0.1168	33.15 73.07
HM136948	HM136916XD		1.5 0.06	192.0 7.56	1.0 0.04	261.5 10.30			828	112	0.1135	36.99 81.54
36990	36920CD	X2S-36990	1.5 0.06	188.0 7.40	0.8 0.03	221.0 8.70	10.9 0.43	4.6 0.18	515	241	0.1434	6.14 13.53
67790	67720CD	X2S-67790	3.5 0.14	194.0 7.64	0.8 0.03	240.0 9.45	19.0 0.75	7.1 0.28	622	122	0.1214	14.41 31.78
94700	94114CD	X6S-94700	7.0 0.28	207.0 8.15	1.5 0.06	272.0 10.71	22.1 0.87	10.2 0.40	692	93.8	0.1287	32.98 72.72
HM237545	HM237510CD	HM237545XC	7.0 0.28	205.0 8.07	1.5 0.06	271.5 10.68	22.1 0.87	8.6 0.34	751	101	0.1168	32.16 70.91
94700	94118D	X6S-94700	7.0 0.28	207.0 8.15	1.5 0.06	272.0 10.71			692	93.8	0.1287	36.71 80.93
H239640	H239612CD	H239640XB	3.5 0.14	202.0 7.95	1.5 0.06	300.5 11.84	28.4 1.12	10.2 0.40	906	90.3	0.1242	56.99 125.63
93708	93127CD	X1S-93708	3.5 0.14	209.0 8.23	1.5 0.06	300.0 11.81	22.1 0.87	10.2 0.40	912	126	0.1460	47.28 104.23
67883	67820CD	X2S-67883	3.5 0.14	204.0 8.03	0.8 0.03	259.0 10.20	22.1 0.87	7.1 0.28	728	147	0.1310	18.17 40.07
67884	67820CD	X3S-67884	3.5 0.14	206.0 8.11	0.8 0.03	259.0 10.20	22.1 0.87	7.1 0.28	728	147	0.1310	17.45 38.47
M238849	M238810CD	M238849XB	3.5 0.14	205.0 8.07	1.5 0.06	256.0 10.08	19.0 0.75	7.9 0.31	788	118	0.1201	20.36 44.89
87737	87112D	X1S-87737	3.5 0.14	207.0 8.15	1.5 0.06	266.5 10.50			575	131	0.1155	20.89 46.05
H239649	H239612CD	H239649XB	5.5 0.22	214.0 8.43	1.5 0.06	300.5 11.84	28.4 1.12	10.2 0.40	906	90.3	0.1242	52.92 116.66
67885	67820CD	X2S-67885	3.5 0.14	209.0 8.23	0.8 0.03	259.0 10.20	22.1 0.87	7.1 0.28	728	147	0.1310	16.69 36.81
87750	87112DC	X1S-87750	3.5 0.14	209.0 8.23	1.5 0.06	266.5 10.50	17.3 0.68	5.3 0.21	575	131	0.1155	20.68 45.59
87750	87112D	X1S-87750	3.5 0.14	209.0 8.23	1.5 0.06	266.5 10.50			575	131	0.1155	20.16 44.45
93750	93127CD	X4S-93750	4.3 0.17	218.0 8.58	1.5 0.06	300.0 11.81	22.1 0.87	10.2 0.40	912	126	0.1460	43.76 96.48
EE420751	421451CD	X2S-420750	6.4 0.25	227.0 8.94	1.5 0.06	334.5 13.16	25.4 1.00	11.7 0.46	1150	128	0.1450	84.09 185.38
67887	67820CD	X1S-67887	10.5 0.41	223.0 8.78	0.8 0.03	259.0 10.20	22.1 0.87	7.1 0.28	728	147	0.1310	15.89 35.04
87762	87112DC	X1S-87762	3.5 0.14	211.0 8.31	1.5 0.06	266.5 10.50	17.3 0.68	5.3 0.21	575	131	0.1155	19.88 43.82
87762	87112D	X1S-87762	3.5 0.14	211.0 8.31	1.5 0.06	266.5 10.50			575	131	0.1155	19.36 42.68
L540049	L540010D	L540049XA	1.5 0.06	207.0 8.15	0.8 0.03	247.0 9.72			504	226	0.1371	7.12 15.70

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Continued on next page.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

B

TDO

DOUBLE OUTER RACE

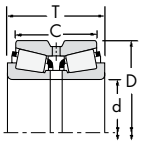
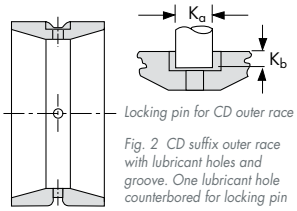
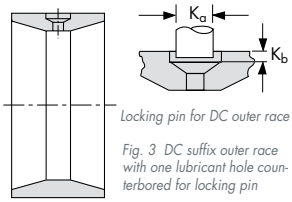


Fig. 1
D suffix outer race with lubricant holes and groove



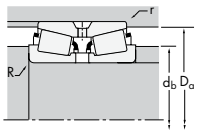
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
196.850 7.7500	257.175 10.1250	85.725 3.3750	66.675 2.6250	513000 115000	0.45	1.51	2.25	76400 17200	58400 13100	133000 29900	1.31
196.850 7.7500	317.500 12.5000	146.050 5.7500	111.125 4.3750	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
200.025 7.8750	292.100 11.5000	125.415 4.9376	101.600 4.0000	1020000 230000	0.33	2.03	3.02	152000 34300	86800 19500	265000 59700	1.76
200.025 7.8750	317.500 12.5000	146.050 5.7500	111.125 4.3750	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
200.025 7.8750	384.175 15.1250	238.125 9.3750	193.675 7.6250	2860000 643000	0.33	2.03	3.02	426000 95700	242000 54500	741000 167000	1.76
203.200 8.0000	276.225 10.8750	90.485 3.5624	73.025 2.8750	707000 159000	0.32	2.12	3.15	105000 23700	57500 12900	183000 41200	1.83
203.200 8.0000	282.575 11.1250	101.600 4.0000	82.550 3.2500	684000 154000	0.51	1.33	1.97	102000 22900	88700 19900	177000 39800	1.15
203.200 8.0000	292.100 11.5000	109.538 4.3125	84.138 3.3125	914000 205000	0.40	1.69	2.51	136000 30600	93300 21000	237000 53200	1.46
203.200 8.0000	292.100 11.5000	125.415 4.9376	101.600 4.0000	1020000 230000	0.33	2.03	3.02	152000 34300	86800 19500	265000 59700	1.76
203.200 8.0000	301.625 11.8750	125.453 4.9391	140.005 5.5120	1020000 230000	0.33	2.03	3.02	152000 34300	86800 19500	265000 59700	1.76
203.200 8.0000	301.625 11.8750	125.453 4.9391	140.005 5.5120	1020000 230000	0.33	2.03	3.02	152000 34300	86800 19500	265000 59700	1.76
203.200 8.0000	317.500 12.5000	127.000 5.0000	88.900 3.5000	901000 203000	0.31	2.15	3.21	134000 30200	72000 16200	234000 52500	1.86
203.200 8.0000	317.500 12.5000	146.050 5.7500	111.125 4.3750	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
203.200 8.0000	368.300 14.5000	193.675 7.6250	136.525 5.3750	1880000 423000	0.40	1.68	2.50	280000 63000	193000 43300	488000 110000	1.45
204.788 8.0625	292.100 11.5000	125.415 4.9376	101.600 4.0000	1020000 230000	0.33	2.03	3.02	152000 34300	86800 19500	265000 59700	1.76
206.375 8.1250	282.575 11.1250	101.600 4.0000	82.550 3.2500	684000 154000	0.51	1.33	1.97	102000 22900	88700 19900	177000 39800	1.15
206.375 8.1250	317.500 12.5000	127.000 5.0000	88.900 3.5000	901000 203000	0.31	2.15	3.21	134000 30200	72000 16200	234000 52500	1.86
206.375 8.1250	336.550 13.2500	211.138 8.3125	169.862 6.6875	2180000 491000	0.33	2.03	3.02	325000 73100	185000 41600	566000 127000	1.76
209.550 8.2500	282.575 11.1250	101.600 4.0000	82.550 3.2500	684000 154000	0.51	1.33	1.97	102000 22900	88700 19900	177000 39800	1.15
209.550 8.2500	317.500 12.5000	146.050 5.7500	111.125 4.3750	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
209.550 8.2500	317.500 12.5000	146.050 5.7500	111.125 4.3750	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
209.550 8.2500	355.600 14.0000	152.400 6.0000	111.125 4.3750	1220000 275000	0.59	1.14	1.70	182000 41000	184000 41400	317000 71300	0.99
212.725 8.3750	285.750 11.2500	98.425 3.8750	76.200 3.0000	693000 156000	0.48	1.40	2.09	103000 23200	85000 19100	180000 40400	1.21
215.900 8.5000	285.750 11.2500	98.425 3.8750	76.200 3.0000	646000 145000	0.48	1.40	2.09	96200 21600	79200 17800	167000 37600	1.21
215.900 8.5000	285.750 11.2500	98.425 3.8750	76.200 3.0000	693000 156000	0.48	1.40	2.09	103000 23200	85000 19100	180000 40400	1.21
215.900 8.5000	406.400 16.0000	195.262 7.6875	147.638 5.8125	2510000 565000	0.39	1.72	2.55	374000 84200	252000 56700	652000 147000	1.48
220.663 8.6875	314.325 12.3750	131.762 5.1875	106.362 4.1875	1190000 267000	0.33	2.03	3.02	177000 39700	101000 22600	308000 69200	1.76
225.425 8.8750	400.050 15.7500	187.325 7.3750	136.525 5.3750	1920000 431000	0.44	1.54	2.29	286000 64200	215000 48300	497000 112000	1.33

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
LM739749	LM739710CD	LM739749XA	3.5 0.14	213.0 8.39	0.8 0.03	251.0 9.88	14.2 0.56	6.4 0.25	762	232	0.1296	11.08 24.43
93775	93127CD	X1S-93775	4.3 0.17	223.0 8.78	1.5 0.06	300.0 11.81	22.1 0.87	10.2 0.40	912	126	0.1460	41.54 91.58
M241543	M241510CD	M241543XA	3.5 0.14	219.0 8.62	1.5 0.06	279.0 10.98	19.0 0.75	8.6 0.34	954	128	0.1279	26.09 57.52
93787	93127CD	X3S-93787	4.3 0.17	225.0 8.86	1.5 0.06	300.0 11.81	22.1 0.87	10.2 0.40	912	126	0.1460	40.58 89.46
H247535	H247510CD	H247535XA	6.4 0.25	241.0 9.49	1.5 0.06	362.0 14.26	28.4 1.12	11.7 0.46	1960	148	0.1638	123.53 272.34
LM241149	LM241110D	LM241149XA	3.5 0.14	220.0 8.66	0.8 0.03	267.0 10.51			774	182	0.1170	14.52 32.02
67983	67920CD	X2S-67983	3.5 0.14	222.0 8.74	0.8 0.03	275.0 10.83	19.0 0.75	7.1 0.28	820	172	0.1388	18.66 41.14
M541349	M541310CD	M541349XA	3.5 0.14	221.0 8.70	0.8 0.03	281.0 11.06	19.0 0.75	7.9 0.31	752	147	0.1253	21.43 47.24
M241547	M241510CD	X2S-67983	3.5 0.14	221.0 8.70	1.5 0.06	279.0 10.98	19.0 0.75	8.6 0.34	954	128	0.1279	25.12 55.37
M241547C	M241513D	M241547XA	3.5 0.14	221.0 8.70	0.8 0.03	290.0 11.42			954	128	0.1279	31.06 68.46
M241547	M241513XD	M241547XA	3.5 0.14	221.0 8.70	0.8 0.03	286.5 11.28			954	128	0.1279	31.73 69.95
EE132083	132126D	X1S-132081	4.0 0.16	225.0 8.86	1.5 0.06	293.0 11.54			798	125	0.1174	34.36 75.74
93800	93127CD	X5S-93800	4.3 0.17	227.0 8.94	1.5 0.06	300.0 11.81	22.1 0.87	10.2 0.40	912	126	0.1460	39.58 87.26
EE420801	421451CD	X3S-420801	3.3 0.13	230.0 9.06	1.5 0.06	334.5 13.16	25.4 1.00	11.7 0.46	1150	128	0.1450	78.57 173.20
M241549	M241510CD	M241549XA	3.5 0.14	223.0 8.78	1.5 0.06	279.0 10.98	19.0 0.75	8.6 0.34	954	128	0.1279	24.60 54.24
67985	67920CD	X2S-67985	3.5 0.14	224.0 8.82	0.8 0.03	275.0 10.83	19.0 0.75	7.1 0.28	820	172	0.1388	17.87 39.39
EE132084	132126D	X2S-132084	4.0 0.16	227.0 8.94	1.5 0.06	293.0 11.54			798	125	0.1174	33.32 73.45
H242649	H242610CD	H242649XB	3.3 0.13	231.0 9.09	1.5 0.06	318.0 12.51	28.4 1.12	10.2 0.40	1400	135	0.1465	68.93 151.97
67989	67920CD	X1S-67989	3.5 0.14	227.0 8.94	0.8 0.03	275.0 10.83	19.0 0.75	7.1 0.28	820	172	0.1388	17.21 37.95
93825	93127CD	X3S-93825	4.3 0.17	233.0 9.17	1.5 0.06	300.0 11.81	22.1 0.87	10.2 0.40	912	126	0.1460	37.26 82.14
93825A	93127CD	X1S-93825	12.7 0.50	250.0 9.84	1.5 0.06	300.0 11.81	22.1 0.87	10.2 0.40	912	126	0.1460	36.49 80.45
96825	96140CD	X1S-96825	7.0 0.28	246.0 9.69	1.5 0.06	334.0 13.15	25.4 1.00	9.4 0.37	1140	160	0.1626	57.19 126.08
LM742745	LM742710CD	LM742745XB	3.5 0.14	230.0 9.06	0.8 0.03	279.0 10.98	17.3 0.68	7.1 0.28	867	225	0.1388	16.55 36.48
LM742748	LM742710CD		3.5 0.14	233.0 9.17	0.8 0.03	279.0 10.98	17.3 0.68	7.1 0.28	808	211	0.1354	15.50 34.18
LM742749	LM742710CD	LM742749XC	3.5 0.14	233.0 9.17	0.8 0.03	279.0 10.98	17.3 0.68	7.1 0.28	867	225	0.1388	15.74 34.70
EE820085	820161CD	X1S-820085	6.4 0.25	251.0 9.88	1.5 0.06	372.0 14.65	28.4 1.12	11.7 0.46	1330	112	0.1509	102.16 225.21
M244249	M244210CD	M244249XA	6.4 0.25	245.0 9.65	1.5 0.06	300.0 11.81	22.1 0.87	9.4 0.37	1150	141	0.1360	31.22 68.83
EE430888	431576CD	X1S-430888	1.5 0.06	251.0 9.88	1.5 0.06	364.0 14.34	28.4 1.12	11.7 0.46	1350	143	0.1572	90.91 200.41

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

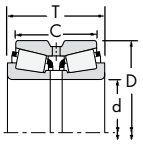
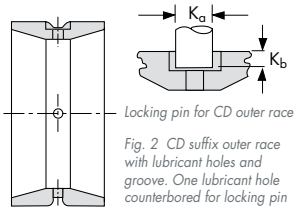
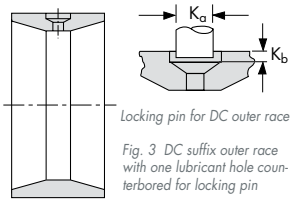


Fig. 1
D suffix outer race with lubricant holes and groove



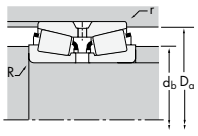
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
228.397 8.9920	431.800 17.0000	196.850 7.7500	111.125 4.3750	1900000 426000	0.88	0.76	1.14	282000 63500	427000 96000	492000 111000	0.66
228.460 8.9945	431.800 17.0000	196.850 7.7500	111.125 4.3750	1900000 426000	0.88	0.76	1.14	282000 63500	427000 96000	492000 111000	0.66
228.600 9.0000	327.025 12.8750	114.300 4.5000	82.550 3.2500	900000 202000	0.41	1.66	2.47	134000 30100	93300 21000	233000 52500	1.44
228.600 9.0000	355.600 14.0000	152.400 6.0000	111.125 4.3750	1220000 275000	0.59	1.14	1.70	182000 41000	184000 41400	317000 71300	0.99
228.600 9.0000	355.600 14.0000	152.400 6.0000	111.125 4.3750	1360000 306000	0.33	2.04	3.04	202000 45500	114000 25700	352000 79200	1.77
228.600 9.0000	355.600 14.0000	152.400 6.0000	114.300 4.5000	1620000 365000	0.47	1.43	2.12	242000 54300	196000 44000	421000 94600	1.24
228.600 9.0000	358.775 14.1250	152.400 6.0000	117.475 4.6250	1560000 351000	0.33	2.03	3.02	232000 52200	132000 29700	405000 91000	1.76
228.600 9.0000	400.050 15.7500	187.325 7.3750	136.525 5.3750	1920000 431000	0.44	1.54	2.29	286000 64200	215000 48300	497000 112000	1.33
228.600 9.0000	400.050 15.7500	187.325 7.3750	136.525 5.3750	1920000 431000	0.44	1.54	2.29	286000 64200	215000 48300	497000 112000	1.33
228.600 9.0000	488.950 19.2500	254.000 10.0000	152.400 6.0000	3050000 686000	0.94	0.72	1.07	455000 102000	730000 164000	792000 178000	0.62
231.775 9.1250	358.775 14.1250	152.400 6.0000	117.475 4.6250	1560000 351000	0.33	2.03	3.02	232000 52200	132000 29700	405000 91000	1.76
234.950 9.2500	311.150 12.2500	98.425 3.8750	73.025 2.8750	753000 169000	0.36	1.86	2.77	112000 25200	69600 15600	195000 43900	1.61
234.950 9.2500	327.025 12.8750	114.300 4.5000	82.550 3.2500	866000 195000	0.41	1.66	2.47	129000 29000	89700 20200	224000 50500	1.44
234.950 9.2500	327.025 12.8750	114.300 4.5000	82.550 3.2500	900000 202000	0.41	1.66	2.47	134000 30100	93300 21000	233000 52500	1.44
234.950 9.2500	355.600 14.0000	152.400 6.0000	111.125 4.3750	1220000 275000	0.59	1.14	1.70	182000 41000	184000 41400	317000 71300	0.99
234.950 9.2500	384.175 15.1250	238.125 9.3750	193.675 7.6250	3020000 680000	0.33	2.03	3.02	450000 101000	256000 57600	784000 176000	1.76
234.950 9.2500	384.175 15.1250	238.125 9.3750	193.675 7.6250	2860000 643000	0.33	2.03	3.02	426000 95700	242000 54500	741000 167000	1.76
237.330 9.3437	358.775 14.1250	152.400 6.0000	117.475 4.6250	1560000 351000	0.33	2.03	3.02	232000 52200	132000 29700	405000 91000	1.76
241.300 9.5000	327.025 12.8750	114.300 4.5000	82.550 3.2500	900000 202000	0.41	1.66	2.47	134000 30100	93300 21000	233000 52500	1.44
241.300 9.5000	349.148 13.7460	127.000 5.0000	101.600 4.0000	1130000 253000	0.35	1.91	2.85	168000 37700	101000 22800	292000 65700	1.65
241.300 9.5000	368.300 14.5000	120.650 4.7500	85.725 3.3750	956000 215000	0.36	1.86	2.77	142000 32000	88500 19900	248000 55700	1.61
241.300 9.5000	406.400 16.0000	155.575 6.1250	107.950 4.2500	1510000 339000	0.40	1.68	2.50	224000 50400	154000 34700	391000 87800	1.45
241.300 9.5000	406.400 16.0000	215.900 8.5000	184.150 7.2500	2780000 625000	0.33	2.03	3.02	414000 93100	236000 53000	721000 162000	1.76
244.475 9.6250	380.898 14.9960	171.450 6.7500	127.000 5.0000	1550000 348000	0.52	1.31	1.95	231000 51800	204000 45800	402000 90300	1.13
244.475 9.6250	381.000 15.0000	171.450 6.7500	127.000 5.0000	1550000 348000	0.52	1.31	1.95	231000 51800	204000 45800	402000 90300	1.13
247.650 9.7500	368.300 14.5000	120.650 4.7500	85.725 3.3750	956000 215000	0.36	1.86	2.77	142000 32000	88500 19900	248000 55700	1.61
247.650 9.7500	381.000 15.0000	158.750 6.2500	123.825 4.8750	1710000 384000	0.33	2.03	3.02	255000 57200	145000 32600	443000 99600	1.76
249.250 9.8130	380.898 14.9960	171.450 6.7500	127.000 5.0000	1550000 348000	0.52	1.31	1.95	231000 51800	204000 45800	402000 90300	1.13

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
EE113089	113171D	X1S-113089	6.4 0.25	274.0 10.79	3.3 0.13	397.5 15.64			967	98.1	0.1723	104.99 231.46
EE113091	113171D	X1S-113091	6.4 0.25	274.0 10.79	3.3 0.13	397.5 15.64			967	98.1	0.1723	104.99 231.46
8573	8520CD	X3S-8573	6.4 0.25	255.0 10.04	1.5 0.06	313.0 12.32	19.0 0.75	7.9 0.31	1050	172	0.1401	28.35 62.49
96900	96140CD	X5S-96900	7.0 0.28	260.0 10.24	1.5 0.06	334.0 13.15	25.4 1.00	9.4 0.37	1140	160	0.1626	49.51 109.14
EE130902	131401CD	X1S-130902	6.8 0.27	257.0 10.12	1.5 0.06	330.0 12.99	22.1 0.87	8.6 0.34	1160	168	0.1358	48.30 106.48
HM746646	HM746610CD	HM746646XC	6.4 0.25	258.0 10.16	1.5 0.06	339.0 13.34	25.4 1.00	9.4 0.37	1190	149	0.1542	55.05 121.37
M249732	M249710CD	M249732XA	3.5 0.14	256.0 10.08	1.5 0.06	343.0 13.50	25.4 1.00	8.6 0.34	1630	168	0.1526	56.44 124.42
EE430900	431576CD	X3S-430900	10.5 0.41	271.0 10.67	1.5 0.06	364.0 14.34	28.4 1.12	11.7 0.46	1350	143	0.1572	88.47 195.04
EE430902	431576CD	X2S-430900	19.8 0.78	290.0 11.42	1.5 0.06	364.0 14.34	28.4 1.12	11.7 0.46	1350	143	0.1572	86.76 191.28
HH949549	HH949510DC	HH949549XA	6.4 0.25	297.0 11.69	1.5 0.06	456.0 17.95	28.4 1.12	11.7 0.46	1300	91.5	0.1931	197.00 434.31
M249734	M249710CD	M249734XB	6.4 0.25	263.0 10.35	1.5 0.06	343.0 13.50	25.4 1.00	8.6 0.34	1630	168	0.1526	54.98 121.22
LM446349	LM446310D	LM446349XA	3.5 0.14	252.0 9.92	0.8 0.03	301.0 11.85			1010	243	0.1328	18.37 40.49
8574	8520CD	X1S-8575	6.4 0.25	259.0 10.20	1.5 0.06	313.0 12.32	19.0 0.75	7.9 0.31	1010	166	0.1382	26.12 57.59
8575	8520CD	X2S-8575	6.4 0.25	259.0 10.20	1.5 0.06	313.0 12.32	19.0 0.75	7.9 0.31	1050	172	0.1401	26.16 57.67
96925	96140CD	X1S-96925	7.0 0.28	265.0 10.43	1.5 0.06	334.0 13.15	25.4 1.00	9.4 0.37	1140	160	0.1626	46.71 102.98
H247548	H247510CD	H247549XB	6.4 0.25	269.0 10.59	1.5 0.06	362.0 14.26	28.4 1.12	11.7 0.46	2080	156	0.1671	101.24 223.20
H247549	H247510CD	H247549XB	6.4 0.25	269.0 10.59	1.5 0.06	362.0 14.26	28.4 1.12	11.7 0.46	1960	148	0.1638	102.18 225.26
M249736	M249710CD	M249736XA	6.4 0.25	267.0 10.51	1.5 0.06	343.0 13.50	25.4 1.00	8.6 0.34	1630	168	0.1526	51.88 114.37
8578	8520CD	X2S-8578	6.4 0.25	264.0 10.39	1.5 0.06	313.0 12.32	19.0 0.75	7.9 0.31	1050	172	0.1401	24.10 53.12
EE127095	127136CD	X2S-127095	6.4 0.25	267.0 10.51	1.5 0.06	329.0 12.95	22.1 0.87	9.4 0.37	1180	164	0.1392	34.96 77.06
EE170950	171451CD	X1S-170951	6.4 0.25	269.0 10.59	1.5 0.06	337.0 13.27	19.0 0.75	10.2 0.40	1070	172	0.1354	39.99 88.17
EE275095	275161D	X3S-275095	6.4 0.25	278.0 10.94	1.5 0.06	378.0 14.89			1450	201	0.1555	73.44 161.91
H249148	H249111CD	H249148XB	6.4 0.25	273.0 10.75	1.5 0.06	385.0 15.16	28.4 1.12	11.7 0.46	1710	135	0.1556	104.29 229.92
EE126097	126149D		6.4 0.25	275.0 10.83	1.5 0.06	358.0 14.09			1320	169	0.1640	63.77 140.58
EE126097	126151CD	X1S-126097	6.4 0.25	275.0 10.83	1.5 0.06	358.0 14.09	28.4 1.12	11.7 0.46	1320	169	0.1640	65.08 143.47
EE170975	171451CD	X1S-170975	6.4 0.25	274.0 10.79	1.5 0.06	337.0 13.27	19.0 0.75	10.2 0.40	1070	172	0.1354	37.53 82.73
M252337	M252310CD	LM249748XA	6.4 0.25	280.0 11.02	1.5 0.06	363.5 14.32	28.4 1.12	10.2 0.40	1840	226	0.1588	62.36 137.48
EE126098	126149D	X1S-126098	6.4 0.25	279.0 10.98	1.5 0.06	358.0 14.09			1320	169	0.1640	62.71 138.24

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Continued on next page.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

TDO

DOUBLE OUTER RACE

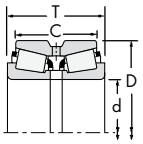
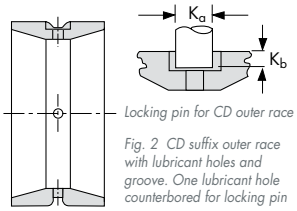
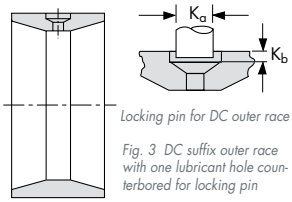


Fig. 1
D suffix outer race with lubricant holes and groove



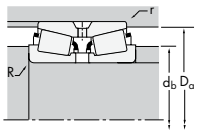
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic[1]		Factors[5]		Dynamic[2]			Factors[5]
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
249.250 9.8130	381.000 15.0000	171.450 6.7500	127.000 5.0000	1550000 348000	0.52	1.31	1.95	231000 51800	204000 45800	402000 90300	1.13
254.000 10.0000	323.850 12.7500	63.500 2.5000	50.800 2.0000	258000 57900	0.35	1.95	2.90	38400 8630	22800 5120	66800 15000	1.69
254.000 10.0000	347.662 13.6875	95.250 3.7500	69.850 2.7500	912000 205000	0.33	2.03	3.02	136000 30500	77300 17400	236000 53200	1.76
254.000 10.0000	358.775 14.1250	152.400 6.0000	117.475 4.6250	1560000 351000	0.33	2.03	3.02	232000 52200	132000 29700	405000 91000	1.76
254.000 10.0000	365.125 14.3750	130.175 5.1250	98.425 3.8750	1160000 261000	0.37	1.80	2.69	173000 38800	111000 24900	301000 67600	1.56
254.000 10.0000	406.400 16.0000	155.575 6.1250	107.950 4.2500	1510000 339000	0.40	1.68	2.50	224000 50400	154000 34700	391000 87800	1.45
254.000 10.0000	422.275 16.6250	173.038 6.8125	128.588 5.0625	2230000 502000	0.33	2.03	3.02	332000 74700	189000 42500	578000 130000	1.76
254.000 10.0000	422.275 16.6250	173.038 6.8125	128.588 5.0625	2300000 517000	0.33	2.03	3.02	343000 77000	195000 43900	597000 134000	1.76
254.000 10.0000	422.275 16.6250	178.592 7.0312	139.700 5.5000	2230000 502000	0.33	2.03	3.02	332000 74700	189000 42500	578000 130000	1.76
254.000 10.0000	422.275 16.6250	178.592 7.0312	139.700 5.5000	2300000 517000	0.33	2.03	3.02	343000 77000	195000 43900	597000 134000	1.76
254.000 10.0000	431.724 16.9970	173.038 6.8125	128.588 5.0625	2230000 502000	0.33	2.03	3.02	332000 74700	189000 42500	578000 130000	1.76
254.000 10.0000	431.724 16.9970	173.038 6.8125	128.588 5.0625	2300000 517000	0.33	2.03	3.02	343000 77000	195000 43900	597000 134000	1.76
254.000 10.0000	533.400 21.0000	276.225 10.8750	165.100 6.5000	3650000 820000	0.94	0.72	1.07	543000 122000	872000 196000	946000 213000	0.62
260.350 10.2500	365.125 14.3750	130.175 5.1250	98.425 3.8750	1160000 261000	0.37	1.80	2.69	173000 38800	111000 24900	301000 67600	1.56
260.350 10.2500	400.050 15.7500	155.580 6.1252	107.950 4.2500	1410000 318000	0.39	1.71	2.55	210000 47300	142000 31900	366000 82300	1.48
260.350 10.2500	419.100 16.5000	184.150 7.2500	136.525 5.3750	1920000 431000	0.60	1.12	1.66	286000 64200	296000 66500	497000 112000	0.97
260.350 10.2500	419.100 16.5000	184.150 7.2500	136.525 5.3750	1920000 431000	0.60	1.12	1.66	286000 64200	296000 66500	497000 112000	0.97
260.350 10.2500	422.275 16.6250	173.038 6.8125	128.588 5.0625	2230000 502000	0.33	2.03	3.02	332000 74700	189000 42500	578000 130000	1.76
260.350 10.2500	422.275 16.6250	178.592 7.0312	139.700 5.5000	2230000 502000	0.33	2.03	3.02	332000 74700	189000 42500	578000 130000	1.76
260.350 10.2500	422.275 16.6250	178.592 7.0312	139.700 5.5000	2300000 517000	0.33	2.03	3.02	343000 77000	195000 43900	597000 134000	1.76
260.350 10.2500	431.724 16.9970	173.038 6.8125	128.588 5.0625	2230000 502000	0.33	2.03	3.02	332000 74700	189000 42500	578000 130000	1.76
260.350 10.2500	431.724 16.9970	173.038 6.8125	128.588 5.0625	2300000 517000	0.33	2.03	3.02	343000 77000	195000 43900	597000 134000	1.76
263.525 10.3750	355.600 14.0000	127.000 5.0000	101.600 4.0000	1200000 269000	0.36	1.87	2.79	178000 40100	110000 24700	310000 69800	1.62
266.700 10.5000	323.850 12.7500	63.500 2.5000	50.800 2.0000	258000 57900	0.35	1.95	2.90	38400 8630	22800 5120	66800 15000	1.69
266.700 10.5000	323.850 12.7500	63.500 2.5000	50.800 2.0000	258000 57900	0.35	1.95	2.90	38400 8630	22800 5120	66800 15000	1.69
266.700 10.5000	355.600 14.0000	127.000 5.0000	101.600 4.0000	1200000 269000	0.36	1.87	2.79	178000 40100	110000 24700	310000 69800	1.62
266.700 10.5000	393.700 15.5000	157.162 6.1875	109.538 4.3125	1510000 339000	0.40	1.68	2.50	224000 50400	154000 34700	391000 87800	1.45
266.700 10.5000	406.400 16.0000	155.575 6.1250	107.950 4.2500	1510000 339000	0.40	1.68	2.50	224000 50400	154000 34700	391000 87800	1.45

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
EE126098	126151CD	X1S-126098	6.4 0.25	279.0 10.98	1.5 0.06	358.0 14.09	28.4 1.12	11.7 0.46	1320	169	0.1640	62.59 137.99
29875	29820D	X2S-29875	1.5 0.06	267.0 10.51	0.8 0.03	312.0 12.28			907	657	0.1567	11.03 24.31
LM249748	LM249710CD	LM249748XA	3.5 0.14	272.0 10.71	1.5 0.06	333.0 13.11	15.7 0.62	7.1 0.28	1000	166	0.1287	22.69 50.02
M249749	M249710CD	M249749XC	3.5 0.14	274.0 10.79	1.5 0.06	343.0 13.50	25.4 1.00	8.6 0.34	1630	168	0.1526	44.80 98.76
EE134100	134144CD	X1S-134100	6.4 0.25	281.0 11.06	1.5 0.06	347.0 13.66	22.1 0.87	10.2 0.40	1330	187	0.1474	38.97 85.91
EE275100	275161D	X2S-275100	6.4 0.25	287.0 11.30	1.5 0.06	378.0 14.89			1450	201	0.1555	68.38 150.76
HM252343	HM252311D	HM252343XA	6.8 0.27	287.0 11.30	1.5 0.06	399.5 15.73			1500	148	0.1482	84.11 185.43
HM252344	HM252311D	HM252343XA	6.8 0.27	287.0 11.30	1.5 0.06	399.5 15.73			1550	152	0.1498	84.43 186.13
HM252343	HM252310CD	HM252343XC	6.8 0.27	287.0 11.30	1.5 0.06	399.5 15.73	28.4 1.12	11.7 0.46	1500	148	0.1482	85.43 188.34
HM252344	HM252310CD	HM252343XB	6.8 0.27	287.0 11.30	1.5 0.06	399.5 15.73	28.4 1.12	11.7 0.46	1550	152	0.1498	90.24 198.95
HM252343	HM252315D	HM252343XA	6.8 0.27	287.0 11.30	1.5 0.06	398.5 15.68			1500	148	0.1482	90.46 199.44
HM252344	HM252315D		6.8 0.27	287.0 11.30	1.5 0.06	398.5 15.68			1550	152	0.1498	89.42 197.14
HH953749	HH953710D	HH953749XA	6.4 0.25	328.0 12.91	1.5 0.06	495.5 19.51			1670	104	0.2101	252.22 556.05
EE134102	134144CD	X1S-134102	6.4 0.25	286.0 11.26	1.5 0.06	347.0 13.66	22.1 0.87	10.2 0.40	1330	187	0.1474	36.45 80.36
EE221026	221576CD	X1S-221025	9.7 0.38	296.0 11.65	1.5 0.06	371.5 14.63	22.1 0.87	10.2 0.40	1320	207	0.1497	59.70 131.62
EE435102	435165DC		6.4 0.25	295.0 11.61	1.5 0.06	395.0 15.56	28.4 1.12	10.2 0.40	1480	123	0.1787	87.65 193.23
EE435102	435165D	X2S-435102	6.4 0.25	295.0 11.61	1.5 0.06	395.0 15.56			1480	123	0.1787	88.83 195.83
HM252348	HM252311D	HM252347XB	6.8 0.27	292.0 11.50	1.5 0.06	399.5 15.73			1500	148	0.1482	81.33 179.29
HM252348	HM252310CD	HM252349XB	6.8 0.27	292.0 11.50	1.5 0.06	399.5 15.73	28.4 1.12	11.7 0.46	1500	148	0.1482	82.22 181.26
HM252349	HM252310CD	HM252349XC	6.8 0.27	292.0 11.50	1.5 0.06	399.5 15.73	28.4 1.12	11.7 0.46	1550	152	0.1498	86.70 191.14
HM252348	HM252315D	HM252347XB	6.8 0.27	292.0 11.50	1.5 0.06	398.5 15.68			1500	148	0.1482	87.68 193.30
HM252349	HM252315D	HM252347XB	6.8 0.27	292.0 11.50	1.5 0.06	398.5 15.68			1550	152	0.1498	87.67 193.27
LM451345	LM451310CD	LM451345XA	3.5 0.14	283.0 11.14	1.5 0.06	343.0 13.50	22.1 0.87	8.6 0.34	1550	212	0.1536	32.91 72.55
29880	29820DC	X1S-29880	1.5 0.06	277.0 10.91	0.8 0.03	312.0 12.28	10.9 0.43	5.3 0.21	907	657	0.1567	9.05 19.95
29880	29820D	X1S-29880	1.5 0.06	277.0 10.91	0.8 0.03	312.0 12.28			907	657	0.1567	9.04 19.93
LM451349	LM451310CD	LM451349XB	3.5 0.14	285.0 11.22	1.5 0.06	343.0 13.50	22.1 0.87	8.6 0.34	1550	212	0.1536	31.73 69.96
EE275105	275156CD	X1S-275105	6.4 0.25	296.0 11.65	1.5 0.06	378.0 14.89	25.4 1.00	9.4 0.37	1450	201	0.1555	55.21 121.71
EE275105	275161D	X2S-275105	6.4 0.25	296.0 11.65	1.5 0.06	378.0 14.89			1450	201	0.1555	62.05 136.80

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDO

DOUBLE OUTER RACE

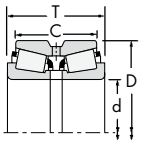
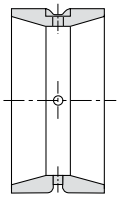
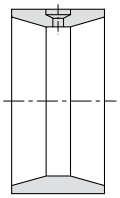


Fig. 1 D suffix outer race with lubricant holes and groove



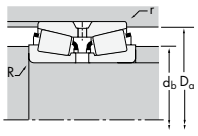
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
269.875 10.6250	381.000 15.0000	158.750 6.2500	123.825 4.8750	1710000 384000	0.33	2.03	3.02	255000 57200	145000 32600	443000 99600	1.76
273.050 10.7500	393.700 15.5000	157.162 6.1875	109.538 4.3125	1510000 339000	0.40	1.68	2.50	224000 50400	154000 34700	391000 87800	1.45
273.050 10.7500	406.400 16.0000	155.575 6.1250	107.950 4.2500	1510000 339000	0.40	1.68	2.50	224000 50400	154000 34700	391000 87800	1.45
279.400 11.0000	469.900 18.5000	200.025 7.8750	149.225 5.8750	2400000 540000	0.38	1.79	2.66	357000 80300	231000 52000	622000 140000	1.55
279.982 11.0229	380.898 14.9960	139.700 5.5000	107.950 4.2500	1230000 277000	0.43	1.56	2.33	184000 41300	136000 30500	320000 71800	1.35
280.192 11.0312	406.400 16.0000	120.650 4.7500	85.725 3.3750	1030000 231000	0.41	1.65	2.46	153000 34400	107000 24000	266000 59900	1.43
280.192 11.0312	406.400 16.0000	149.225 5.8750	117.475 4.6250	1580000 355000	0.39	1.75	2.60	235000 52800	155000 34900	409000 92000	1.51
280.192 11.0312	406.400 16.0000	149.225 5.8750	117.475 4.6250	1480000 333000	0.39	1.75	2.60	221000 49600	146000 32800	384000 86400	1.51
285.750 11.2500	358.775 14.1250	76.200 3.0000	53.975 2.1250	440000 98900	0.49	1.37	2.04	65500 14700	55200 12400	114000 25600	1.19
285.750 11.2500	501.650 19.7500	203.200 8.0000	120.650 4.7500	2330000 523000	0.83	0.81	1.20	346000 77900	495000 111000	603000 136000	0.70
288.925 11.3750	406.400 16.0000	165.100 6.5000	130.175 5.1250	2030000 457000	0.34	2.00	2.97	302000 68000	175000 39300	526000 118000	1.73
292.100 11.5000	469.900 18.5000	200.025 7.8750	149.225 5.8750	2400000 540000	0.38	1.79	2.66	357000 80300	231000 52000	622000 140000	1.55
299.975 11.8100	495.300 19.5000	301.625 11.8750	247.650 9.7500	4900000 1100000	0.33	2.03	3.02	729000 164000	415000 93300	1270000 285000	1.76
300.038 11.8125	422.275 16.6250	174.625 6.8750	136.525 5.3750	2210000 498000	0.34	2.00	2.99	330000 74100	190000 42700	574000 129000	1.73
304.800 12.0000	393.700 15.5000	107.950 4.2500	82.550 3.2500	1000000 225000	0.36	1.88	2.80	149000 33500	91600 20600	259000 58300	1.63
304.800 12.0000	444.500 17.5000	146.050 5.7500	98.425 3.8750	1320000 297000	0.38	1.79	2.66	196000 44200	127000 28600	342000 76900	1.55
317.500 12.5000	444.500 17.5000	146.050 5.7500	98.425 3.8750	1320000 297000	0.38	1.79	2.66	196000 44200	127000 28600	342000 76900	1.55
330.200 13.0000	482.600 19.0000	177.800 7.0000	127.000 5.0000	2130000 480000	0.39	1.73	2.57	318000 71400	213000 47800	553000 124000	1.49
333.375 13.1250	469.900 18.5000	190.500 7.5000	152.400 6.0000	2730000 614000	0.33	2.02	3.00	407000 91400	233000 52400	708000 159000	1.74
339.949 13.3838	589.949 23.2263	340.002 13.3859	278.000 10.9449	6660000 1500000	0.33	2.03	3.02	992000 223000	565000 127000	1730000 388000	1.76
342.900 13.5000	457.098 17.9960	142.875 5.6250	101.600 4.0000	1400000 316000	0.71	0.95	1.41	209000 47000	255000 57400	364000 81900	0.82
346.075 13.6250	482.600 19.0000	133.350 5.2500	88.900 3.5000	935000 210000	0.50	1.35	2.01	139000 31300	119000 26800	242000 54500	1.17
346.075 13.6250	488.950 19.2500	200.025 7.8750	158.750 6.2500	2770000 624000	0.33	2.02	3.00	413000 92900	237000 53200	719000 162000	1.74
346.075 13.6250	488.950 19.2500	200.025 7.8750	158.750 6.2500	2950000 663000	0.33	2.02	3.00	439000 98700	252000 56600	765000 172000	1.74
349.250 13.7500	514.350 20.2500	193.675 7.6250	152.400 6.0000	2300000 518000	0.37	1.84	2.74	343000 77200	216000 48500	598000 134000	1.59
354.012 13.9375	482.600 19.0000	133.350 5.2500	88.900 3.5000	935000 210000	0.50	1.35	2.01	139000 31300	119000 26800	242000 54500	1.17
355.600 14.0000	444.500 17.5000	136.525 5.3750	111.125 4.3750	1250000 281000	0.31	2.20	3.27	186000 41900	98000 22000	324000 72900	1.90
355.600 14.0000	501.650 19.7500	155.575 6.1250	107.950 4.2500	1570000 352000	0.44	1.53	2.28	233000 52400	176000 39500	406000 91200	1.33

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
M252349	M252310CD	M252349XC	6.4 0.25	296.0 11.65	1.5 0.06	363.5 14.32	28.4 1.12	10.2 0.40	1840	226	0.1588	52.17 115.01
EE275108	275156CD	X1S-275108	6.4 0.25	301.0 11.85	1.5 0.06	378.0 14.89	25.4 1.00	9.4 0.37	1450	201	0.1555	51.95 114.53
EE275108	275161D	X2S-275108	6.4 0.25	301.0 11.85	1.5 0.06	378.0 14.89			1450	201	0.1555	58.76 129.55
EE722110	722186CD	X2S-722110	9.7 0.38	321.0 12.64	1.5 0.06	433.0 17.04	28.4 1.12	11.7 0.46	1890	143	0.1669	120.44 265.52
LM654642	LM654610CD	LM654642XC	3.5 0.14	302.0 11.89	1.5 0.06	368.0 14.49	22.1 0.87	10.2 0.40	1920	265	0.1744	43.44 95.78
EE101103	101601CD	X2S-101103	6.8 0.27	309.0 12.17	1.5 0.06	376.0 14.80	19.0 0.75	10.2 0.40	1380	227	0.1527	45.04 99.30
EE128110	128160CD	X2S-128111	6.8 0.27	309.0 12.17	1.5 0.06	384.0 15.12	25.4 1.00	9.4 0.37	1730	255	0.1628	55.92 123.28
EE128111	128160CD	X2S-128111	6.8 0.27	309.0 12.17	1.5 0.06	384.0 15.12	25.4 1.00	9.4 0.37	1620	240	0.1592	56.22 123.95
545112	545142CD	X2S-545112	3.5 0.14	302.0 11.89	1.5 0.06	345.0 13.58	14.2 0.56	7.9 0.31	1020	477	0.1446	15.27 33.66
EE147112	147198DC	X1S-147112	6.4 0.25	329.0 12.95	3.3 0.13	468.0 18.43	28.4 1.12	11.7 0.46	1490	138	0.1954	145.20 320.10
M255449	M255410CD	M255449XB	6.4 0.25	316.0 12.44	1.5 0.06	388.0 15.27	28.4 1.12	10.9 0.43	2300	287	0.1722	62.80 138.46
EE722115	722186CD	X2S-722115	9.7 0.38	330.0 12.99	1.5 0.06	433.0 17.04	28.4 1.12	11.7 0.46	1890	143	0.1669	111.31 245.38
HH258248	HH258210CD	HH258248XB	6.4 0.25	342.0 13.46	1.5 0.06	467.5 18.40	28.4 1.12	14.2 0.56	3850	220	0.2048	229.00 504.84
HM256849	HM256810CD	HM256849XC	6.4 0.25	328.0 12.91	1.5 0.06	403.5 15.88	28.4 1.12	11.7 0.46	2550	282	0.1779	72.15 159.06
L357049	L357010CD	L357049XA	6.4 0.25	329.0 12.95	1.5 0.06	380.0 14.96	19.0 0.75	7.9 0.31	1750	301	0.1585	29.83 65.76
EE291201	291751CD	X1S-291201	8.0 0.31	337.0 13.27	1.5 0.06	414.0 16.30	22.1 0.87	11.7 0.46	1580	245	0.1557	62.62 138.05
EE291250	291751CD	X1S-291250	8.0 0.31	346.0 13.62	1.5 0.06	414.0 16.30	22.1 0.87	11.7 0.46	1580	245	0.1557	55.13 121.55
EE526130	526191CD	X1S-526132	6.4 0.25	360.0 14.17	1.5 0.06	454.0 17.87	28.4 1.12	11.7 0.46	2280	287	0.1790	92.08 203.00
HM261049	HM261010CD	HM261049XC	6.4 0.25	363.0 14.29	1.5 0.06	449.5 17.69	28.4 1.12	11.7 0.46	3310	324	0.1935	95.17 209.80
HH264149	HH264110CD	HH264149XA	14.0 0.55	402.0 15.83	3.5 0.14	552.0 21.73	28.4 1.12	15.0 0.59	5000	238	0.2228	378.88 835.26
LM961548	LM961511D	LM961548XB	3.3 0.13	367.0 14.45	1.5 0.06	443.0 17.44			2280	300	0.2146	59.66 131.52
EE161363	161901CD	X1S-161362	7.0 0.28	379.0 14.92	1.5 0.06	455.0 17.91	22.1 0.87	11.7 0.46	1730	299	0.1741	61.90 136.45
HM262748	HM262710CD	HM262749XC	6.4 0.25	377.0 14.84	1.5 0.06	467.0 18.39	28.4 1.12	11.7 0.46	3430	322	0.1956	110.39 243.37
HM262749	HM262710CD	HM262749XC	6.4 0.25	377.0 14.84	1.5 0.06	467.0 18.39	28.4 1.12	11.7 0.46	3650	342	0.1999	114.34 252.06
EE333137	333203CD	X1S-333137	6.4 0.25	382.0 15.04	1.5 0.06	478.5 18.83	28.4 1.12	11.7 0.46	3040	337	0.1928	123.32 271.86
EE161394	161901CD	X1S-161393	7.0 0.28	385.0 15.16	1.5 0.06	455.0 17.91	22.1 0.87	11.7 0.46	1730	299	0.1741	58.34 128.62
L163149	L163110CD	L163149XE	3.5 0.14	374.0 14.72	1.5 0.06	430.0 16.93	22.1 0.87	9.4 0.37	3210	621	0.1838	46.06 101.53
EE231400	231976CD	X2S-161400	6.4 0.25	388.0 15.28	1.5 0.06	481.0 18.94	22.1 0.87	11.7 0.46	2390	366	0.1874	81.86 180.48

(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

(7) Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

B

TDO

DOUBLE OUTER RACE

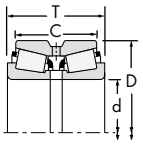
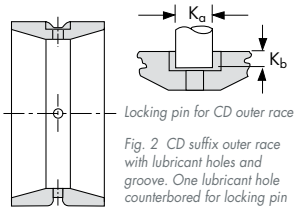
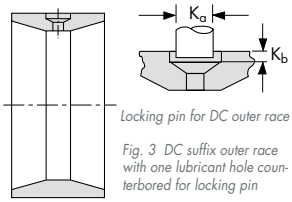


Fig. 1 D suffix outer race with lubricant holes and groove



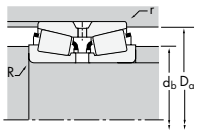
Locking pin for CD outer race

Fig. 2 CD suffix outer race with lubricant holes and groove. One lubricant hole counterbored for locking pin



Locking pin for DC outer race

Fig. 3 DC suffix outer race with one lubricant hole counterbored for locking pin



Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors (5)		Dynamic (2)			Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
355.600 14.0000	514.350 20.2500	155.575 6.1250	107.950 4.2500	1570000 352000	0.44	1.53	2.28	233000 52400	176000 39500	406000 91200	1.33
355.600 14.0000	514.350 20.2500	193.675 7.6250	152.400 6.0000	2300000 518000	0.37	1.84	2.74	343000 77200	216000 48500	598000 134000	1.59
361.950 14.2500	477.838 18.8125	138.112 5.4375	103.188 4.0625	1730000 389000	0.47	1.43	2.12	257000 57900	208000 46900	448000 101000	1.24
368.250 14.4980	523.875 20.6250	214.312 8.4375	169.862 6.6875	3380000 760000	0.33	2.03	3.02	504000 113000	287000 64500	877000 197000	1.76
371.475 14.6250	501.650 19.7500	155.575 6.1250	107.950 4.2500	1570000 352000	0.44	1.53	2.28	233000 52400	176000 39500	406000 91200	1.33
371.475 14.6250	514.350 20.2500	155.575 6.1250	107.950 4.2500	1570000 352000	0.44	1.53	2.28	233000 52400	176000 39500	406000 91200	1.33
381.000 15.0000	590.550 23.2500	244.475 9.6250	193.675 7.6250	4250000 955000	0.33	2.03	3.02	633000 142000	360000 81000	1100000 248000	1.76
385.762 15.1875	514.350 20.2500	177.800 7.0000	139.700 5.5000	2310000 519000	0.42	1.61	2.40	344000 77300	246000 55400	599000 135000	1.40
393.700 15.5000	539.750 21.2500	142.875 5.6250	101.600 4.0000	1620000 363000	0.48	1.42	2.11	241000 54100	196000 44100	419000 94200	1.23
393.700 15.5000	558.800 22.0000	146.050 5.7500	104.775 4.1250	1620000 363000	0.48	1.42	2.11	241000 54100	196000 44100	419000 94200	1.23
406.400 16.0000	539.750 21.2500	142.875 5.6250	101.600 4.0000	1620000 363000	0.48	1.42	2.11	241000 54100	196000 44100	419000 94200	1.23
406.400 16.0000	558.800 22.0000	146.050 5.7500	104.775 4.1250	1620000 363000	0.48	1.42	2.11	241000 54100	196000 44100	419000 94200	1.23
406.400 16.0000	762.000 30.0000	368.300 14.5000	222.250 8.7500	7140000 1610000	0.94	0.72	1.07	1060000 239000	1710000 384000	1850000 416000	0.62
415.925 16.3750	590.550 23.2500	244.475 9.6250	193.675 7.6250	4250000 955000	0.33	2.03	3.02	633000 142000	360000 81000	1100000 248000	1.76
430.212 16.9375	603.250 23.7500	159.639 6.2850	104.775 4.1250	1680000 377000	0.52	1.29	1.92	250000 56100	224000 50400	435000 97700	1.11
431.800 17.0000	603.250 23.7500	159.639 6.2850	104.775 4.1250	1680000 377000	0.52	1.29	1.92	250000 56100	224000 50400	435000 97700	1.11
431.902 17.0040	685.698 26.9960	365.125 14.3750	295.275 11.6250	7920000 1780000	0.32	2.08	3.09	1180000 265000	656000 147000	2050000 462000	1.80
457.200 18.0000	596.900 23.5000	165.100 6.5000	120.650 4.7500	2100000 473000	0.40	1.67	2.48	313000 70500	217000 48800	546000 123000	1.44
457.200 18.0000	730.148 28.7460	254.000 10.0000	177.800 7.0000	4820000 1080000	0.39	1.72	2.56	718000 161000	483000 109000	1250000 281000	1.49
488.950 19.2500	634.873 24.9950	180.975 7.1250	136.525 5.3750	2770000 622000	0.47	1.43	2.12	412000 92700	334000 75000	718000 161000	1.24
549.275 21.6250	692.150 27.2500	174.625 6.8750	136.525 5.3750	2590000 583000	0.38	1.79	2.67	386000 86800	249000 55900	672000 151000	1.55
558.800 22.0000	736.600 29.0000	165.100 6.5000	114.300 4.5000	2390000 537000	0.51	1.33	1.98	356000 80000	310000 69600	619000 139000	1.15
558.800 22.0000	736.600 29.0000	225.425 8.8750	177.800 7.0000	4390000 987000	0.35	1.95	2.90	653000 147000	387000 87100	1140000 256000	1.69
711.200 28.0000	914.400 36.0000	190.500 7.5000	139.700 5.5000	3550000 798000	0.38	1.77	2.64	529000 119000	344000 77400	920000 207000	1.54
723.900 28.5000	914.400 36.0000	187.325 7.3750	139.700 5.5000	3550000 798000	0.38	1.77	2.64	529000 119000	344000 77400	920000 207000	1.54
723.900 28.5000	977.900 38.5000	187.325 7.3750	139.700 5.5000	3550000 798000	0.38	1.77	2.64	529000 119000	344000 77400	920000 207000	1.54
723.900 28.5000	1003.300 39.5000	187.325 7.3750	139.700 5.5000	3550000 798000	0.38	1.77	2.64	529000 119000	344000 77400	920000 207000	1.54
1784.350 70.2500	2006.600 79.0000	241.300 9.5000	177.800 7.0000	8250000 1850000	0.44	1.54	2.29	1230000 276000	924000 208000	2140000 481000	1.33

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.

(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.

(3) These maximum fillet radii will be cleared by the bearing corners.

(4) If a spacer with provision for lubricant passage is required, consult your Timken representative.

Part Number			Dimensions, mm (inches)						Factors			Weight kg (lbs.)
			Shaft		Housing		Pin					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.						
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	K_a	K_b	G_1	G_2	Cg	
EE231400	232026D	X1S-231401	6.4 0.25	388.0 15.28	1.5 0.06	481.0 18.94			2390	366	0.1874	92.55 204.04
EE333140	333203CD	X1S-333140	6.4 0.25	387.0 15.24	1.5 0.06	478.5 18.83	28.4 1.12	11.7 0.46	3040	337	0.1928	117.25 258.50
LM763848	LM763811DC	LM763848XA	3.3 0.13	383.0 15.08	1.5 0.06	461.5 18.16	22.1 0.87	7.1 0.28	2600	418	0.1980	59.39 130.93
HM265049	HM265010CD	HM265049XC	6.4 0.25	400.0 15.75	1.5 0.06	498.5 19.63	28.4 1.12	11.7 0.46	4300	372	0.2106	140.91 310.64
EE231462	231976CD	X2S-231462	6.4 0.25	400.0 15.75	1.5 0.06	481.0 18.94	22.1 0.87	11.7 0.46	2390	366	0.1874	72.19 159.14
EE231462	232026D	X1S-231462	6.4 0.25	400.0 15.75	1.5 0.06	481.0 18.94			2390	366	0.1874	82.88 182.71
M268730	M268710CD	M268730XA	6.4 0.25	425.0 16.73	1.5 0.06	562.0 22.13	28.4 1.12	14.2 0.56	5750	421	0.2319	236.50 521.39
LM665949	LM665910CD	LM665949XB	6.4 0.25	415.0 16.34	1.5 0.06	495.0 19.49	28.4 1.12	12.7 0.50	3740	480	0.2155	93.50 206.14
EE234154	234213CD	X3S-234154	6.4 0.25	426.0 16.77	1.5 0.06	515.5 20.30	22.1 0.87	12.7 0.50	2780	448	0.2018	83.95 185.07
EE234154	234221D	X1S-234154	6.4 0.25	426.0 16.77	1.5 0.06	515.5 20.30			2780	448	0.2018	99.47 219.28
EE234160	234213CD	X1S-234160	6.4 0.25	435.0 17.13	1.5 0.06	515.5 20.30	22.1 0.87	12.7 0.50	2780	448	0.2018	75.19 165.77
EE234160	234221D	X3S-234160	6.4 0.25	435.0 17.13	1.5 0.06	515.5 20.30			2780	448	0.2018	90.77 200.11
H969249	H969210D	H969249XA	12.7 0.50	513.0 20.20	3.3 0.13	719.5 28.32			4610	207	0.2945	649.84 1432.63
M268749	M268710CD	M268749XE	6.4 0.25	451.0 17.76	1.5 0.06	562.0 22.13	28.4 1.12	14.2 0.56	5750	421	0.2319	205.00 451.94
EE241693	242377CD	X2S-241693	6.4 0.25	465.0 18.31	1.5 0.06	561.0 22.09	22.1 0.87	13.5 0.53	3350	551	0.2207	121.97 268.90
EE241701	242377CD	X2S-241701	6.4 0.25	466.0 18.35	1.5 0.06	561.0 22.09	22.1 0.87	13.5 0.53	3350	551	0.2207	121.18 267.15
EE650170	650270D	X1S-650170	6.4 0.25	477.0 18.78	3.3 0.13	648.5 25.53			7670	341	0.2542	484.91 1069.04
EE244180	244236CD	X1S-244180	9.7 0.38	494.0 19.45	1.5 0.06	570.5 22.47	28.4 1.12	11.7 0.46	4410	627	0.2233	105.26 232.06
EE671801	672875D	X1S-671801	9.7 0.38	507.0 19.96	1.5 0.06	680.5 26.79			4970	343	0.2315	366.55 808.08
LM772748	LM772710CD	LM772748XB	6.4 0.25	522.0 20.55	1.5 0.06	612.0 24.09	28.4 1.12	14.2 0.56	5450	602	0.2525	134.20 295.86
L476549	L476510CD	L476549XA	6.4 0.25	579.0 22.80	1.5 0.06	666.0 26.22	28.4 1.12	14.2 0.56	7260	889	0.2567	142.18 313.45
EE542220	542291CD	X2S-542220	6.4 0.25	594.0 23.39	3.3 0.13	705.0 27.76	25.4 1.00	13.5 0.53	5730	782	0.2604	166.76 367.63
LM377449	LM377410CD	LM377449XB	6.4 0.25	594.0 23.39	1.5 0.06	708.0 27.87	28.4 1.12	16.5 0.65	9310	907	0.2735	245.75 541.77
EE755280	755361CD	X1S-755280	6.4 0.25	750.0 29.53	3.3 0.13	877.0 34.53	28.4 1.12	15.7 0.62	11100	1280	0.2952	292.59 645.04
EE755285	755361CD	X2S-755285	5.5 0.22	756.0 29.76	3.3 0.13	877.0 34.53	28.4 1.12	15.7 0.62	11100	1280	0.2952	269.33 593.76
EE755285	755365CD		5.5 0.22	756.0 29.76	3.3 0.13	900.0 35.43	28.4 1.12	19.8 0.78	11100	1280	0.2952	344.62 759.74
EE755285	755367CD	X1S-755285	5.5 0.22	756.0 29.76	3.3 0.13	912.0 35.91	28.4 1.12	19.8 0.78	11100	1280	0.2952	396.42 873.94
LL789849	LL789810D	LL789849XA	12.7 0.50	1840.0 72.44	3.3 0.13	1966.0 77.40			93400	10400	0.6160	937.57 2066.96

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.
[7] Compound radius on inner race. Details on drawing for bearing.

NOTES

TDI
DOUBLE INNER RACE

TAPERED ROLLER BEARINGS

- TDI style consists of a single piece (double) inner race plus two single outer races.
- Normally supplied complete with an outer race spacer as a pre-set assembly.
- To suit the application duty, the built-in setting value needs to be established by your Timken representative before an order is placed.
- Groove and holes in the outer race spacer allow for lubricant passage from the bearing housing.
- To obtain a price quotation, specify the bearing and spacer part numbers.

Example: inner race — outer race

17116D - 17244

Y3S - 17244 spacer

BEARING DATA TABLES

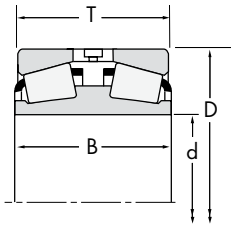
In the following bearing data tables, part numbers are listed in ascending order of bore, outside diameter and width.

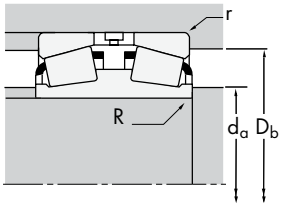
Bearing ratings shown in tables are based on environmental reference conditions. Effects of known operating conditions on bearing performance in an application should be investigated before final bearing selection is made.

Approximate mass is listed for every part number. For weight-critical applications or exact freight cost evaluation purposes, a more accurate value should be obtained from your Timken representative.

TDI

DOUBLE INNER RACE





Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic[1]		Factors[5]		Dynamic[2]			Factors[5]
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
25.400 1.0000	51.994 2.0470	30.079 1.1842	36.512 1.4375	46900 10500	0.40	1.68	2.50	6990 1570	4810 1080	12200 2730	1.45
30.162 1.1875	62.000 2.4409	33.797 1.3306	34.925 1.3750	69700 15700	0.38	1.77	2.63	10400 2330	6800 1530	18100 4060	1.53
31.750 1.2500	69.012 2.7170	39.705 1.5632	39.182 1.5426	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
31.750 1.2500	69.012 2.7170	39.705 1.5632	39.182 1.5426	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
31.750 1.2500	72.085 2.8380	44.785 1.7632	39.182 1.5426	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
33.338 1.3125	69.012 2.7170	39.705 1.5632	39.182 1.5426	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
33.338 1.3125	69.012 2.7170	39.705 1.5632	39.182 1.5426	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
33.338 1.3125	72.085 2.8380	44.785 1.7632	39.182 1.5426	88000 19800	0.38	1.77	2.63	13100 2950	8570 1930	22800 5130	1.53
36.512 1.4375	68.262 2.6875	36.810 1.4492	38.100 1.5000	81700 18400	0.44	1.52	2.26	12200 2740	9260 2080	21200 4760	1.31
36.512 1.4375	71.438 2.8125	36.810 1.4492	38.100 1.5000	81700 18400	0.44	1.52	2.26	12200 2740	9260 2080	21200 4760	1.31
36.512 1.4375	72.000 2.8346	39.096 1.5392	38.100 1.5000	81700 18400	0.44	1.52	2.26	12200 2740	9260 2080	21200 4760	1.31
42.862 1.6875	80.962 3.1875	34.925 1.3750	31.750 1.2500	81900 18400	0.53	1.28	1.90	12200 2740	11000 2480	21200 4770	1.11
42.862 1.6875	85.000 3.3465	50.262 1.9788	52.375 2.0620	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
42.862 1.6875	90.119 3.5480	54.991 2.1650	52.375 2.0620	132000 29700	0.31	2.20	3.28	19600 4420	10300 2320	34200 7690	1.91
44.450 1.7500	80.962 3.1875	34.925 1.3750	31.750 1.2500	81900 18400	0.53	1.28	1.90	12200 2740	11000 2480	21200 4770	1.11
47.625 1.8750	93.264 3.6718	50.013 1.9690	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
47.625 1.8750	96.838 3.8125	53.188 2.0940	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
47.625 1.8750	100.000 3.9370	58.735 2.3124	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
49.212 1.9375	93.264 3.6718	50.013 1.9690	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
49.212 1.9375	96.838 3.8125	53.188 2.0940	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
49.212 1.9375	100.000 3.9370	58.735 2.3124	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
50.800 2.0000	88.900 3.5000	41.275 1.6250	61.112 2.4060	138000 31100	0.32	2.11	3.14	20600 4640	11300 2540	35900 8070	1.83
50.800 2.0000	93.264 3.6718	50.013 1.9690	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
50.800 2.0000	96.838 3.8125	53.188 2.0940	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
50.800 2.0000	100.000 3.9370	58.735 2.3124	53.188 2.0940	142000 31900	0.34	1.99	2.97	21100 4750	12200 2750	36800 8260	1.73
54.987 2.1649	140.030 5.5130	66.091 2.6020	65.989 2.5980	276000 62000	0.87	0.78	1.16	41100 9230	60900 13700	71500 16100	0.67
55.562 2.1875	96.838 3.8125	51.298 2.0196	53.188 2.0940	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65
55.562 2.1875	100.000 3.9370	51.298 2.0196	53.188 2.0940	147000 33000	0.35	1.91	2.84	21800 4910	13200 2980	38000 8550	1.65

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) A groove and holes in the outer race spacer allow for lubricant passage from the bearing housing.

Part Number			Dimensions, mm (inches)				Factors			Weight kg (lbs.)
			Shaft		Housing					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.				
Inner	Outer	Spacer [4]	R[3]	d_a	r[3]	D_b	G_1	G_2	Cg	
07100D	07204		0.8 0.03	30.0 1.18	1.3 0.05	45.0 1.77	7.6	6.99	0.0509	0.30 0.67
17116D	17244		0.8 0.03	35.5 1.40	1.5 0.06	54.0 2.13	11.8	7.49	0.0579	0.46 1.02
14126D	14274		1.5 0.06	40.0 1.57	3.3 0.13	59.0 2.32	18	9.4	0.0668	0.70 1.54
14126D	14276	Y2S-14276	1.5 0.06	40.0 1.57	1.3 0.05	60.0 2.36	18	9.4	0.0668	0.71 1.57
14126D	14283		1.5 0.06	40.0 1.57	2.3 0.09	60.0 2.36	18	9.4	0.0668	0.86 1.90
14134D	14274		1.5 0.06	41.0 1.61	3.3 0.13	59.0 2.32	18	9.4	0.0668	0.67 1.48
14134D	14276		1.5 0.06	41.0 1.61	1.3 0.05	60.0 2.36	18	9.4	0.0668	0.69 1.51
14134D	14283		1.5 0.06	41.0 1.61	2.3 0.09	60.0 2.36	18	9.4	0.0668	0.84 1.85
19145D	19268		0.8 0.03	42.5 1.67	1.5 0.06	61.0 2.40	17.5	11.5	0.0694	0.60 1.32
19145D	19281		0.8 0.03	42.5 1.67	1.0 0.04	63.0 2.48	17.5	11.5	0.0694	0.66 1.46
19145D	19283		0.8 0.03	42.5 1.67	1.5 0.06	63.0 2.48	17.5	11.5	0.0694	0.72 1.58
13169D	13318	Y2S-13318	0.8 0.03	50.0 1.97	1.5 0.06	72.0 2.83	23	15.4	0.0799	0.74 1.64
358D	354A		1.5 0.06	51.0 2.01	1.3 0.05	77.0 3.03	30	12.2	0.0732	1.27 2.79
358D	352		1.5 0.06	51.0 2.01	2.3 0.09	78.0 3.07	30	12.2	0.0732	1.56 3.44
13176D	13318	Y1S-13318	0.1 0.01	50.0 1.97	1.5 0.06	72.0 2.83	23	15.4	0.0799	0.72 1.58
376DE	374		0.8 0.03	55.0 2.17	1.3 0.05	85.0 3.35	37.6	15.4	0.0816	1.52 3.35
376DE	372A		0.8 0.03	55.0 2.17	1.5 0.06	86.0 3.39	37.6	15.4	0.0816	1.73 3.82
376DE	372		0.8 0.03	55.0 2.17	2.0 0.08	86.0 3.39	37.6	15.4	0.0816	2.01 4.43
378DE	374		0.8 0.03	56.0 2.20	1.3 0.05	85.0 3.35	37.6	15.4	0.0816	1.47 3.25
378DE	372A		0.8 0.03	56.0 2.20	1.5 0.06	86.0 3.39	37.6	15.4	0.0816	1.69 3.72
378DE	372		0.8 0.03	56.0 2.20	2.0 0.08	86.0 3.39	37.6	15.4	0.0816	1.96 4.33
368D	362A		0.8 0.03	57.0 2.24	1.3 0.05	81.0 3.19	33.8	12.5	0.0773	1.22 2.68
375D	374	Y1S-374	0.8 0.03	57.0 2.24	1.3 0.05	85.0 3.35	37.6	15.4	0.0816	1.40 3.09
375D	372A	Y1S-372A	0.8 0.03	57.0 2.24	1.5 0.06	86.0 3.39	37.6	15.4	0.0816	1.61 3.56
375D	372		0.8 0.03	57.0 2.24	2.0 0.08	86.0 3.39	37.6	15.4	0.0816	1.89 4.17
78216D	78551		2.3 0.09	79.0 3.11	2.3 0.09	117.0 4.61	62.6	19.1	0.0884	5.19 11.45
389DE	382A	Y2S-382A	0.8 0.03	62.0 2.44	0.8 0.03	89.0 3.50	42	15.7	0.0859	2.04 4.50
389DE	383A		0.8 0.03	62.0 2.44	2.0 0.08	89.0 3.50	42	15.7	0.0859	1.59 3.49

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

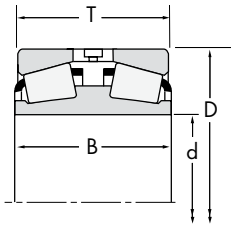
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

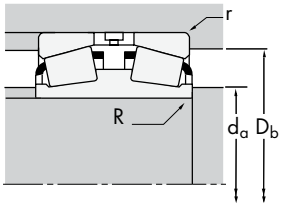
[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDI

DOUBLE INNER RACE





Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)		Factors (5)		Dynamic (2)		Dynamic (2)	Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
61.912 2.4375	110.000 4.3307	55.550 2.1870	55.550 2.1870	159000 35800	0.40	1.68	2.50	23700 5340	16300 3670	41300 9290	1.45
61.912 2.4375	110.000 4.3307	55.550 2.1870	55.550 2.1870	159000 35800	0.40	1.68	2.50	23700 5340	16300 3670	41300 9290	1.45
63.500 2.5000	112.712 4.4375	60.325 2.3750	60.325 2.3750	269000 60500	0.34	1.99	2.96	40100 9010	23300 5230	69800 15700	1.72
63.500 2.5000	136.525 5.3750	66.091 2.6020	65.989 2.5980	276000 62000	0.87	0.78	1.16	41100 9230	60900 13700	71500 16100	0.67
63.500 2.5000	140.030 5.5130	66.091 2.6020	65.989 2.5980	276000 62000	0.87	0.78	1.16	41100 9230	60900 13700	71500 16100	0.67
64.987 2.5586	136.525 5.3750	66.091 2.6020	65.989 2.5980	276000 62000	0.87	0.78	1.16	41100 9230	60900 13700	71500 16100	0.67
64.987 2.5586	140.030 5.5130	66.091 2.6020	65.989 2.5980	276000 62000	0.87	0.78	1.16	41100 9230	60900 13700	71500 16100	0.67
80.962 3.1875	133.350 5.2500	60.325 2.3750	59.538 2.3440	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
80.962 3.1875	136.525 5.3750	60.325 2.3750	59.538 2.3440	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
80.962 3.1875	139.992 5.5115	80.962 3.1875	80.134 3.1549	333000 75000	0.40	1.67	2.49	49600 11200	34300 7720	86400 19400	1.45
84.138 3.3125	133.350 5.2500	76.200 3.0000	75.413 2.9690	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
84.138 3.3125	136.525 5.3750	76.200 3.0000	75.413 2.9690	249000 56000	0.44	1.52	2.26	37100 8330	28200 6340	64600 14500	1.31
85.725 3.3750	123.825 4.8750	41.278 1.6251	44.450 1.7500	149000 33600	0.33	2.05	3.05	22200 5000	12600 2820	38700 8700	1.77
85.725 3.3750	127.000 5.0000	41.278 1.6251	44.450 1.7500	149000 33600	0.33	2.05	3.05	22200 5000	12600 2820	38700 8700	1.77
88.900 3.5000	161.925 6.3750	101.549 3.9980	107.950 4.2500	528000 119000	0.34	1.98	2.95	78500 17700	45900 10300	137000 30700	1.71
88.900 3.5000	168.275 6.6250	101.549 3.9980	107.950 4.2500	528000 119000	0.34	1.98	2.95	78500 17700	45900 10300	137000 30700	1.71
92.075 3.6250	148.430 5.8437	57.150 2.2500	57.942 2.2812	263000 59000	0.49	1.37	2.04	39100 8790	33000 7410	68100 15300	1.19
92.075 3.6250	149.225 5.8750	63.500 2.5000	57.942 2.2812	263000 59000	0.49	1.37	2.04	39100 8790	33000 7410	68100 15300	1.19
95.250 3.7500	136.525 5.3750	57.150 2.2500	57.150 2.2500	225000 50600	0.28	2.38	3.54	33500 7530	16300 3660	58300 13100	2.06
95.250 3.7500	190.500 7.5000	117.475 4.6250	127.000 5.0000	860000 193000	0.33	2.02	3.00	128000 28800	73400 16500	223000 50100	1.74
98.425 3.8750	180.975 7.1250	101.600 4.0000	102.362 4.0300	558000 125000	0.39	1.75	2.61	83100 18700	54800 12300	145000 32500	1.51
101.600 4.0000	157.162 6.1875	80.167 3.1562	79.375 3.1250	360000 81000	0.47	1.42	2.12	53600 12100	43600 9800	93400 21000	1.23
101.600 4.0000	161.925 6.3750	80.167 3.1562	79.375 3.1250	360000 81000	0.47	1.42	2.12	53600 12100	43600 9800	93400 21000	1.23
101.600 4.0000	161.925 6.3750	86.517 3.4062	79.375 3.1250	360000 81000	0.47	1.42	2.12	53600 12100	43600 9800	93400 21000	1.23
101.600 4.0000	190.500 7.5000	117.475 4.6250	127.000 5.0000	738000 166000	0.33	2.02	3.00	110000 24700	63000 14200	191000 43000	1.74
104.775 4.1250	180.975 7.1250	101.600 4.0000	102.362 4.0300	558000 125000	0.39	1.75	2.61	83100 18700	54800 12300	145000 32500	1.51
107.950 4.2500	190.500 7.5000	98.425 3.8750	101.600 4.0000	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40
107.950 4.2500	191.976 7.5581	98.425 3.8750	101.600 4.0000	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) A groove and holes in the outer race spacer allow for lubricant passage from the bearing housing.

Part Number			Dimensions, mm (inches)				Factors			Weight kg (lbs.)
			Shaft		Housing					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.				
Inner	Outer	Spacer [4]	R[3]	d_a	r[3]	D_b	G_1	G_2	Cg	
399D	394A		0.8 0.03	70.0 2.76	1.3 0.05	101.0 3.98	56	21.4	0.0984	2.04 4.50
399D	394AS		0.8 0.03	70.0 2.76	3.3 0.13	99.0 3.90	56	21.4	0.0984	2.01 4.44
39585D	39520	Y8S-39520	0.8 0.03	72.0 2.83	3.3 0.13	101.0 3.98	84.3	23.7	0.1074	2.59 5.70
78251D	78537	Y2S-78537	2.3 0.09	79.0 3.11	3.3 0.13	115.0 4.53	62.6	19.1	0.0884	4.49 9.90
78251D	78551	Y1S-78551	2.3 0.09	79.0 3.11	2.3 0.09	117.0 4.61	62.6	19.1	0.0884	4.76 10.50
78255D	78537	Y1S-78537	1.5 0.06	79.0 3.11	3.3 0.13	115.0 4.53	62.6	19.1	0.0884	4.48 9.89
78255D	78551	Y3S-78551	1.5 0.06	79.0 3.11	2.3 0.09	117.0 4.61	62.6	19.1	0.0884	4.75 10.48
496D	492A	Y2S-492A	1.5 0.06	91.0 3.58	3.3 0.13	120.0 4.72	105	29.3	0.1252	3.37 7.43
496D	493	Y4S-493	1.5 0.06	91.0 3.58	3.3 0.13	122.0 4.80	105	29.3	0.1252	3.52 7.77
581D	572	Y5S-572	1.5 0.06	92.0 3.62	3.3 0.13	125.0 4.92	126	32	0.1295	5.22 11.51
498D	492A	Y3S-492A	0.8 0.03	92.0 3.62	3.3 0.13	120.0 4.72	105	29.3	0.1252	3.68 8.11
498D	493	Y5S-493	0.8 0.03	92.0 3.62	3.3 0.13	122.0 4.80	105	29.3	0.1252	3.95 8.70
L217845D	L217810	L217810EA	0.8 0.03	93.0 3.66	1.5 0.06	116.0 4.57	111	74.7	0.1152	1.72 3.80
L217845D	L217813	L217813EA	0.8 0.03	93.0 3.66	1.5 0.06	117.0 4.61	111	74.7	0.1152	1.94 4.28
767D	752	Y7S-752	1.5 0.06	101.5 3.99	3.3 0.13	144.0 5.67	177	32.4	0.0945	8.76 19.32
767D	753		1.5 0.06	101.5 3.99	3.3 0.13	147.0 5.79	177	32.4	0.0945	9.66 21.30
42362D	42584	Y3S-42584	1.5 0.06	103.0 4.06	3.0 0.12	134.0 5.28	130	37.2	0.1386	3.84 8.48
42362D	42587		1.5 0.06	103.0 4.06	3.3 0.13	134.0 5.28	130	37.2	0.1386	4.15 9.14
LM119348D	LM119311	LM119311EA	0.8 0.03	102.0 4.02	2.3 0.09	126.0 4.96	149	69	0.1213	2.71 5.97
HH221440D	HH221410		6.4 0.25	116.0 4.56	3.3 0.13	171.0 6.73	266	30.7	0.1072	15.16 33.42
779D	772	Y5S-772	1.5 0.06	112.0 4.41	3.3 0.13	161.0 6.34	227	41.3	0.1067	11.34 25.01
52400D	52618	Y23S-52618	1.5 0.06	112.5 4.43	3.3 0.13	142.0 5.59	175	41.7	0.1519	5.27 11.61
52400D	52637		1.5 0.06	112.5 4.43	3.3 0.13	144.0 5.67	175	41.7	0.1519	7.48 16.50
52400D	52638	Y1S-52638	1.5 0.06	112.5 4.43	3.3 0.13	143.0 5.63	175	41.7	0.1519	6.28 13.83
868D	854		1.5 0.06	116.0 4.57	3.3 0.13	170.0 6.69	264	44.9	0.1072	23.29 51.35
782D	772	Y6S-772	1.5 0.06	118.0 4.64	3.3 0.13	161.0 6.34	227	41.3	0.1067	10.53 23.20
71426D	71750		1.5 0.06	122.0 4.80	3.3 0.13	171.0 6.73	269	45.7	0.1156	12.30 27.11
71426D	71753		1.5 0.06	122.0 4.80	3.3 0.13	172.0 6.77	269	45.7	0.1156	12.93 28.50

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.
[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

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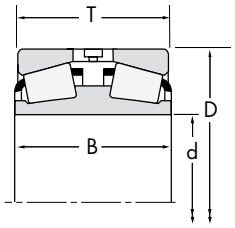
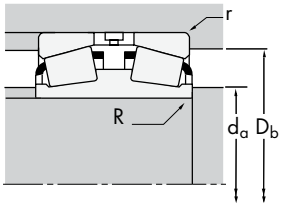
DOUBLE INNER RACE





Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic[1]		Factors[5]		Dynamic[2]		Dynamic[2]	Factors[5]
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
107.950 4.2500	212.725 8.3750	142.875 5.6250	152.400 6.0000	922000 207000	0.33	2.07	3.09	137000 30900	76600 17200	239000 53700	1.79
114.300 4.5000	190.500 7.5000	98.425 3.8750	101.600 4.0000	586000 132000	0.42	1.62	2.42	87300 19600	62200 14000	152000 34200	1.40
114.300 4.5000	212.725 8.3750	142.875 5.6250	152.400 6.0000	1100000 246000	0.33	2.07	3.09	163000 36700	91000 20500	284000 63900	1.79
114.300 4.5000	234.950 9.2500	139.700 5.5000	152.400 6.0000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
114.300 4.5000	247.650 9.7500	139.700 5.5000	152.400 6.0000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
120.650 4.7500	174.625 6.8750	66.678 2.6251	68.262 2.6875	394000 88600	0.33	2.03	3.02	58700 13200	33400 7510	102000 23000	1.76
120.650 4.7500	234.950 9.2500	139.700 5.5000	152.400 6.0000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
120.650 4.7500	247.650 9.7500	139.700 5.5000	152.400 6.0000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
127.000 5.0000	196.850 7.7500	92.075 3.6250	92.075 3.6250	593000 133000	0.34	1.96	2.92	88200 19800	52000 11700	154000 34500	1.70
127.000 5.0000	228.600 9.0000	160.338 6.3125	151.244 5.9545	606000 136000	0.74	0.92	1.36	90200 20300	114000 25600	157000 35300	0.79
127.000 5.0000	234.950 9.2500	139.700 5.5000	152.400 6.0000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
127.000 5.0000	247.650 9.7500	139.700 5.5000	152.400 6.0000	1010000 228000	0.37	1.83	2.72	151000 33900	95500 21500	263000 59100	1.58
130.005 5.1183	215.900 8.5000	123.825 4.8750	123.825 4.8750	616000 138000	0.49	1.38	2.06	91700 20600	76500 17200	160000 35900	1.20
130.005 5.1183	217.488 8.5625	123.825 4.8750	123.825 4.8750	616000 138000	0.49	1.38	2.06	91700 20600	76500 17200	160000 35900	1.20
130.175 5.1250	215.900 8.5000	101.600 4.0000	101.600 4.0000	616000 138000	0.49	1.38	2.06	91700 20600	76500 17200	160000 35900	1.20
130.175 5.1250	217.488 8.5625	101.600 4.0000	101.600 4.0000	616000 138000	0.49	1.38	2.06	91700 20600	76500 17200	160000 35900	1.20
133.350 5.2500	196.850 7.7500	92.075 3.6250	92.075 3.6250	593000 133000	0.34	1.96	2.92	88200 19800	52000 11700	154000 34500	1.70
133.350 5.2500	203.200 8.0000	92.075 3.6250	92.075 3.6250	593000 133000	0.34	1.96	2.92	88200 19800	52000 11700	154000 34500	1.70
136.525 5.3750	190.500 7.5000	77.788 3.0625	77.788 3.0625	456000 103000	0.32	2.10	3.13	67900 15300	37300 8390	118000 26600	1.82
136.525 5.3750	225.425 8.8750	120.650 4.7500	120.650 4.7500	1040000 234000	0.33	2.03	3.02	155000 34900	88400 19900	270000 60800	1.76
149.225 5.8750	236.538 9.3125	106.362 4.1875	105.346 4.1475	830000 187000	0.44	1.53	2.27	124000 27800	93600 21000	215000 48400	1.32
149.225 5.8750	241.300 9.5000	106.362 4.1875	105.346 4.1475	830000 187000	0.44	1.53	2.27	124000 27800	93600 21000	215000 48400	1.32
149.225 5.8750	254.000 10.0000	120.650 4.7500	120.650 4.7500	1060000 239000	0.41	1.66	2.47	158000 35600	110000 24800	276000 62000	1.43
152.400 6.0000	244.475 9.6250	87.312 3.4375	92.075 3.6250	648000 146000	0.35	1.92	2.86	96400 21700	58100 13100	168000 37700	1.66
155.575 6.1250	247.650 9.7500	122.238 4.8125	122.238 4.8125	1080000 243000	0.37	1.83	2.73	161000 36100	101000 22800	280000 62900	1.59
165.100 6.5000	225.425 8.8750	79.375 3.1250	76.200 3.0000	489000 110000	0.38	1.76	2.62	72800 16400	47800 10700	127000 28500	1.52
174.625 6.8750	288.925 11.3750	123.825 4.8750	123.825 4.8750	1330000 299000	0.32	2.12	3.15	198000 44500	108000 24300	344000 77400	1.83
177.800 7.0000	247.650 9.7500	90.488 3.5625	90.488 3.5625	653000 147000	0.44	1.54	2.29	97200 21900	73200 16500	169000 38100	1.33

[1] Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
[2] Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
[3] These maximum fillet radii will be cleared by the bearing corners.
[4] A groove and holes in the outer race spacer allow for lubricant passage from the bearing housing.

Part Number			Dimensions, mm (inches)				Factors			Weight kg (lbs.)
			Shaft		Housing					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.				
Inner	Outer	Spacer [4]	R[3]	d_a	r[3]	D_b	G_1	G_2	Cg	
946D	932	Y9S-932	3.3 0.13	128.0 5.04	3.3 0.13	187.0 7.36	339	43.8	0.1153	22.36 49.30
71450D	71750	Y7S-71750	1.5 0.06	128.0 5.04	3.3 0.13	171.0 6.73	269	49.5	0.1156	11.00 24.25
HH224346DD	HH224310	HH224310EA	3.3 0.13	133.0 5.24	3.3 0.13	192.0 7.56	367	47.8	0.1182	21.93 48.35
95451D	95925		13.2 0.52	153.0 6.03	3.3 0.13	209.0 8.23	454	59.3	0.1323	28.51 62.84
95451D	95975		13.2 0.52	153.0 6.03	3.3 0.13	214.0 8.43	454	59.3	0.1323	34.69 76.47
M224749D	M224710	M224710EA	0.8 0.03	129.0 5.08	1.5 0.06	162.0 6.38	279	86.6	0.1575	5.82 12.83
95474D	95925		6.4 0.25	149.0 5.87	3.3 0.13	209.0 8.23	454	59.3	0.1323	27.14 59.83
95474D	95975		6.4 0.25	149.0 5.87	3.3 0.13	214.0 8.43	454	59.3	0.1323	33.32 73.46
67388D	67322	Y1S-67322	1.5 0.06	140.0 5.51	3.3 0.13	180.0 7.09	384	70.1	0.1220	10.63 23.44
97500D	97900	Y3S-97900	1.5 0.06	144.0 5.67	3.3 0.13	197.0 7.76	237	44.6	0.1311	24.43 53.85
95499D	95925	Y4S-95925	5.0 0.20	152.0 5.98	3.3 0.13	209.0 8.23	454	59.3	0.1323	25.94 57.18
95499D	95975		5.0 0.20	152.0 5.98	3.3 0.13	214.0 8.43	454	59.3	0.1323	31.93 70.38
74510D	74850	Y5S-74850	1.5 0.06	146.0 5.75	3.3 0.13	196.0 7.72	363	68.5	0.1338	17.54 38.66
74510D	74856		1.5 0.06	146.0 5.75	3.3 0.13	197.0 7.76	363	68.5	0.1338	17.32 38.18
74512D	74850	Y7S-74850	1.5 0.06	146.0 5.75	3.3 0.13	196.0 7.72	363	68.5	0.1338	15.05 33.17
74512D	74856		1.5 0.06	146.0 5.75	3.3 0.13	197.0 7.76	363	68.5	0.1338	15.44 34.04
67390D	67322	Y1S-67322	1.5 0.06	145.0 5.71	3.3 0.13	180.0 7.09	384	70.1	0.1220	9.69 21.37
67390D	67320		1.5 0.06	145.0 5.71	3.3 0.13	183.0 7.20	384	70.1	0.1220	12.12 26.72
48393D	48320		1.5 0.06	144.0 5.67	3.3 0.13	177.0 6.97	404	105	0.1209	6.86 15.11
H228649D	H228610	H228610EB	1.5 0.06	152.0 5.98	3.3 0.13	203.0 7.99	540	76.7	0.1358	19.61 43.22
82587D	82931	Y1S-82931	1.5 0.06	165.0 6.50	3.3 0.13	213.0 8.39	460	81.1	0.1405	17.53 38.65
82587D	82950	Y5S-82950	1.5 0.06	165.0 6.50	3.3 0.13	215.0 8.46	460	81.1	0.1405	19.15 42.22
99587D	99100	Y18S-99100	1.5 0.06	167.0 6.57	3.3 0.13	227.0 8.94	556	73.5	0.1459	25.91 57.12
81601D	81962	Y1S-81963	1.5 0.06	166.0 6.54	3.3 0.13	225.0 8.86	413	98.4	0.1250	14.89 32.82
H432549D	H432510	H432510EA	1.5 0.06	172.0 6.77	3.3 0.13	224.0 8.82	658	97.7	0.1178	23.65 52.15
46790D	46720	Y5S-46720	0.8 0.03	175.0 6.89	3.3 0.13	209.0 8.23	572	175	0.1432	9.38 20.68
HM237542D	HM237510	HM237510EA	1.5 0.06	191.0 7.52	3.3 0.13	266.0 10.47	751	101	0.1168	31.74 69.98
67790D	67720	Y2S-67720	1.5 0.06	190.0 7.48	3.3 0.13	229.0 9.02	622	122	0.1214	13.31 29.35

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

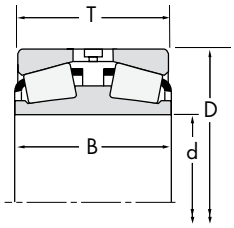
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

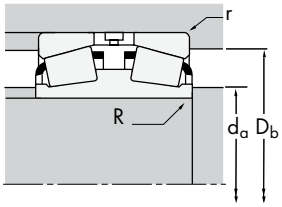
[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDI

DOUBLE INNER RACE





Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic[1]		Factors[5]		Dynamic[2]		Dynamic[2]	Factors[5]
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
177.800 7.0000	279.400 11.0000	112.710 4.4374	112.712 4.4375	911000 205000	0.52	1.29	1.92	136000 30500	122000 27400	236000 53100	1.11
177.800 7.0000	288.925 11.3750	123.825 4.8750	123.825 4.8750	1060000 239000	0.47	1.44	2.15	159000 35600	127000 28600	276000 62000	1.25
177.800 7.0000	288.925 11.3750	123.825 4.8750	123.825 4.8750	1330000 299000	0.32	2.12	3.15	198000 44500	108000 24300	344000 77400	1.83
177.800 7.0000	288.925 11.3750	158.750 6.2500	158.750 6.2500	1330000 299000	0.32	2.12	3.15	198000 44500	108000 24300	344000 77400	1.83
177.800 7.0000	304.800 12.0000	109.438 4.3086	114.300 4.5000	1030000 231000	0.36	1.87	2.79	153000 34500	94500 21200	267000 60000	1.62
187.325 7.3750	319.964 12.5970	168.275 6.6250	161.925 6.3750	1790000 402000	0.32	2.12	3.15	267000 59900	145000 32700	464000 104000	1.83
187.325 7.3750	320.675 12.6250	168.275 6.6250	161.925 6.3750	1790000 402000	0.32	2.12	3.15	267000 59900	145000 32700	464000 104000	1.83
190.500 7.5000	317.500 12.5000	133.350 5.2500	133.350 5.2500	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
190.500 7.5000	317.500 12.5000	142.875 5.6250	133.350 5.2500	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
190.500 7.5000	365.049 14.3720	158.750 6.2500	152.400 6.0000	1880000 423000	0.40	1.68	2.50	280000 63000	193000 43300	488000 110000	1.45
190.500 7.5000	368.300 14.5000	158.750 6.2500	152.400 6.0000	1880000 423000	0.40	1.68	2.50	280000 63000	193000 43300	488000 110000	1.45
199.975 7.8730	317.500 12.5000	133.350 5.2500	133.350 5.2500	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
199.975 7.8730	317.500 12.5000	142.875 5.6250	133.350 5.2500	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
203.200 8.0000	317.500 12.5000	123.825 4.8750	123.825 4.8750	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
203.200 8.0000	317.500 12.5000	133.350 5.2500	133.350 5.2500	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
203.200 8.0000	317.500 12.5000	142.875 5.6250	133.350 5.2500	1180000 265000	0.52	1.29	1.92	175000 39500	157000 35300	306000 68700	1.12
203.200 8.0000	365.049 14.3720	158.750 6.2500	152.400 6.0000	1880000 423000	0.40	1.68	2.50	280000 63000	193000 43300	488000 110000	1.45
203.200 8.0000	368.300 14.5000	158.750 6.2500	152.400 6.0000	1880000 423000	0.40	1.68	2.50	280000 63000	193000 43300	488000 110000	1.45
206.375 8.1250	282.575 11.1250	87.312 3.4375	87.312 3.4375	684000 154000	0.51	1.33	1.97	102000 22900	88700 19900	177000 39800	1.15
206.375 8.1250	336.550 13.2500	180.975 7.1250	184.150 7.2500	2180000 491000	0.33	2.03	3.02	325000 73100	185000 41600	566000 127000	1.76
215.900 8.5000	355.600 14.0000	127.000 5.0000	130.175 5.1250	1220000 275000	0.59	1.14	1.70	182000 41000	184000 41400	317000 71300	0.99
219.075 8.6250	358.775 14.1250	196.850 7.7500	200.025 7.8750	2470000 555000	0.33	2.03	3.02	367000 82600	209000 47000	639000 144000	1.76
228.600 9.0000	355.600 14.0000	120.650 4.7500	120.650 4.7500	1360000 306000	0.33	2.04	3.04	202000 45500	114000 25700	352000 79200	1.77
228.600 9.0000	355.600 14.0000	120.650 4.7500	120.650 4.7500	1360000 306000	0.33	2.04	3.04	202000 45500	114000 25700	352000 79200	1.77
228.600 9.0000	400.050 15.7500	139.700 5.5000	139.700 5.5000	1900000 428000	0.31	2.19	3.25	283000 63700	150000 33700	493000 111000	1.89
234.950 9.2500	384.175 15.1250	209.550 8.2500	209.550 8.2500	2860000 643000	0.33	2.03	3.02	426000 95700	242000 54500	741000 167000	1.76
241.224 9.4970	355.600 14.0000	107.950 4.2500	107.950 4.2500	1130000 253000	0.35	1.91	2.85	168000 37700	101000 22800	292000 65700	1.65
254.000 10.0000	355.600 14.0000	92.710 3.6500	92.862 3.6560	956000 215000	0.36	1.86	2.77	142000 32000	88500 19900	248000 55700	1.61

[1] Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
[2] Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
[3] These maximum fillet radii will be cleared by the bearing corners.
[4] A groove and holes in the outer race spacer allow for lubricant passage from the bearing housing.

Part Number			Dimensions, mm (inches)				Factors			Weight kg (lbs.)
			Shaft		Housing					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.				
Inner	Outer	Spacer [4]	R[3]	d_a	r[3]	D_b	G_1	G_2	Cg	
82680D	82620	Y1S-82620	1.5 0.06	195.0 7.68	3.3 0.13	251.0 9.88	661	119	0.1313	26.31 57.99
94706D	94113	Y7S-94113	1.5 0.06	195.0 7.68	3.3 0.13	259.0 10.20	692	93.8	0.1287	32.48 71.61
HM237546D	HM237510	HM237510EF	1.5 0.06	194.0 7.64	3.3 0.13	266.0 10.47	751	101	0.1168	30.92 68.17
HM237546DD	HM237510		1.5 0.06	194.0 7.64	3.3 0.13	266.0 10.47	751	101	0.1168	36.67 80.84
EE280700D	281200	Y1S-281200	3.3 0.13	200.0 7.87	3.3 0.13	279.0 10.98	591	86	0.1115	31.88 70.29
H239649D	H239610	H239610EA	3.3 0.13	209.0 8.23	4.8 0.19	293.0 11.54	906	90.3	0.1242	52.48 115.70
H239649D	H239612	H239612EE	3.3 0.13	209.0 8.23	4.8 0.19	293.0 11.54	906	90.3	0.1242	53.02 116.90
93751D	93125	Y1S-93126	6.4 0.25	222.0 8.74	3.3 0.13	286.0 11.26	912	126	0.1460	41.77 92.09
93751D	93126		6.4 0.25	222.0 8.74	3.3 0.13	285.0 11.22	912	126	0.1460	43.57 96.06
EE420750D	421437		3.3 0.13	221.0 8.70	3.3 0.13	329.0 12.95	1150	128	0.1450	76.29 168.18
EE420750D	421450	Y4S-421450	3.3 0.13	221.0 8.70	3.3 0.13	331.0 13.03	1150	128	0.1450	76.88 169.49
93788D	93125	Y15S-93125	6.4 0.25	227.0 8.93	3.3 0.13	286.0 11.26	912	126	0.1460	46.94 103.49
93788D	93126		6.4 0.25	227.0 8.93	3.3 0.13	285.0 11.22	912	126	0.1460	40.54 89.37
93800D	93125	Y11S-93125	1.5 0.06	222.0 8.74	3.3 0.13	286.0 11.26	912	126	0.1460	42.43 93.53
93801D	93125	Y1S-93126	6.4 0.25	227.0 8.93	3.3 0.13	286.0 11.26	912	126	0.1460	37.13 81.85
93801D	93126	Y1S-93126	6.4 0.25	227.0 8.93	3.3 0.13	285.0 11.22	912	126	0.1460	38.93 85.83
EE420800D	421437	Y1S-421437	3.3 0.13	230.0 9.06	3.3 0.13	329.0 12.95	1150	128	0.1450	70.53 155.49
EE420800D	421450		3.3 0.13	230.0 9.06	3.3 0.13	331.0 13.03	1150	128	0.1450	71.12 156.80
67985D	67920	Y1S-67920	0.8 0.03	219.0 8.62	3.3 0.13	260.0 10.24	820	172	0.1388	16.46 36.29
H242649D	H242610	H242610EA	1.5 0.06	227.0 8.94	3.3 0.13	306.0 12.05	1400	135	0.1465	64.57 142.36
96851D	96140	Y4S-96140	6.4 0.25	249.0 9.80	3.3 0.13	318.0 12.52	1140	160	0.1626	50.93 112.27
H244849D	H244810	H244810EA	1.5 0.06	242.0 9.53	6.4 0.25	323.0 12.72	1630	150	0.1540	83.42 183.91
EE130900D	131400	Y5S-131400	1.5 0.06	247.0 9.72	1.5 0.06	329.0 12.95	1160	168	0.1358	43.36 95.59
EE130901D	131400		5.5 0.22	255.0 10.04	1.5 0.06	329.0 12.95	1160	168	0.1358	46.82 103.22
EE529091D	529157		3.3 0.13	256.0 10.08	3.3 0.13	367.0 14.45	1400	153	0.1415	73.75 162.60
H247549D	H247510	H247510EA	1.5 0.06	259.0 10.20	6.4 0.25	346.0 13.62	1960	148	0.1638	97.43 214.79
EE127094D	127140		1.5 0.06	257.0 10.12	3.3 0.13	327.0 12.87	1180	164	0.1392	36.32 80.08
EE171000D	171400	Y1S-171400	1.5 0.06	269.0 10.59	3.3 0.13	334.0 13.15	1070	172	0.1354	27.99 61.70

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.
[7] Compound radius on inner race. Details on drawing for bearing.

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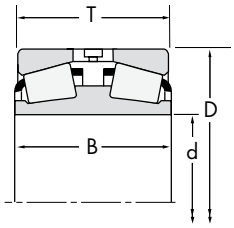
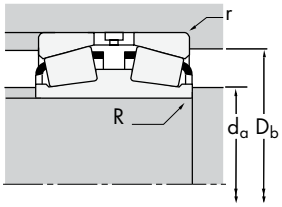
TDI

DOUBLE INNER RACE





Dimensions, mm (inches)				Load Ratings, N (lbf.)							
				Dynamic (1)		Factors (5)		Dynamic (2)		Dynamic (2)	Factors (5)
d	D	T	B	C_1	e	Y_1	Y_2	C_{90}	Ca_{90}	$C_{90(2)}$	K
254.000 10.0000	358.775 14.1250	130.175 5.1250	130.175 5.1250	1560000 351000	0.33	2.03	3.02	232000 52200	132000 29700	405000 91000	1.76
254.000 10.0000	365.049 14.3720	92.710 3.6500	92.862 3.6560	956000 215000	0.36	1.86	2.77	142000 32000	88500 19900	248000 55700	1.61
254.000 10.0000	368.300 14.5000	92.710 3.6500	92.862 3.6560	956000 215000	0.36	1.86	2.77	142000 32000	88500 19900	248000 55700	1.61
260.350 10.2500	365.125 14.3750	107.950 4.2500	107.950 4.2500	1160000 261000	0.37	1.80	2.69	173000 38800	111000 24900	301000 67600	1.56
260.350 10.2500	400.050 15.7500	119.060 4.6874	114.300 4.5000	1410000 318000	0.39	1.71	2.55	210000 47300	142000 31900	366000 82300	1.48
269.875 10.6250	381.000 15.0000	136.525 5.3750	136.525 5.3750	1710000 384000	0.33	2.03	3.02	255000 57200	145000 32600	443000 99600	1.76
276.225 10.8750	393.700 15.5000	130.175 5.1250	130.175 5.1250	1510000 339000	0.40	1.68	2.50	224000 50400	154000 34700	391000 87800	1.45
276.225 10.8750	406.400 16.0000	122.240 4.8126	130.175 5.1250	1510000 339000	0.40	1.68	2.50	224000 50400	154000 34700	391000 87800	1.45
288.925 11.3750	406.400 16.0000	144.462 5.6875	144.462 5.6875	2030000 457000	0.34	2.00	2.97	302000 68000	175000 39300	526000 118000	1.73
300.038 11.8125	422.275 16.6250	150.812 5.9375	150.812 5.9375	2210000 498000	0.34	2.00	2.99	330000 74100	190000 42700	574000 129000	1.73
304.648 11.9940	438.048 17.2460	131.762 5.1875	131.762 5.1875	1880000 423000	0.33	2.04	3.03	280000 63000	159000 35800	488000 110000	1.76
304.648 11.9940	438.048 17.2460	131.762 5.1875	131.762 5.1875	1840000 414000	0.33	2.04	3.03	274000 61700	156000 35000	478000 107000	1.76
304.648 11.9940	438.048 17.2460	138.112 5.4375	128.588 5.0625	1880000 422000	0.47	1.43	2.12	279000 62800	226000 50800	486000 109000	1.24
304.800 12.0000	495.300 19.5000	137.952 5.4312	134.938 5.3125	2310000 519000	0.40	1.68	2.50	343000 77200	236000 53100	598000 134000	1.45
304.800 12.0000	495.300 19.5000	171.450 6.7500	165.100 6.5000	2510000 564000	0.40	1.68	2.50	374000 84000	257000 57800	651000 146000	1.45
317.500 12.5000	447.675 17.6250	158.750 6.2500	158.750 6.2500	2500000 561000	0.33	2.02	3.00	372000 83600	213000 47900	647000 145000	1.74
330.302 13.0040	438.023 17.2450	120.650 4.7500	114.300 4.5000	1250000 282000	0.46	1.47	2.19	187000 41900	146000 32900	325000 73000	1.27
346.075 13.6250	488.950 19.2500	174.625 6.8750	174.625 6.8750	2950000 663000	0.33	2.02	3.00	439000 98700	252000 56600	765000 172000	1.74
355.600 14.0000	457.200 18.0000	120.650 4.7500	120.650 4.7500	1610000 361000	0.32	2.12	3.15	239000 53800	131000 29400	417000 93600	1.83
393.700 15.5000	546.100 21.5000	141.288 5.5625	120.650 4.7500	1620000 363000	0.48	1.42	2.11	241000 54100	196000 44100	419000 94200	1.23
393.700 15.5000	558.800 22.0000	119.062 4.6875	120.650 4.7500	1620000 363000	0.48	1.42	2.11	241000 54100	196000 44100	419000 94200	1.23
406.400 16.0000	590.550 23.2500	193.675 7.6250	193.675 7.6250	3940000 886000	0.33	2.08	3.09	587000 132000	327000 73400	1020000 230000	1.80
449.949 17.7145	594.949 23.4232	178.000 7.0079	178.000 7.0079	3400000 765000	0.33	2.03	3.02	507000 114000	289000 64900	882000 198000	1.76
457.200 18.0000	863.498 33.9960	368.300 14.5000	368.300 14.5000	9200000 2070000	0.36	1.87	2.79	1370000 308000	845000 190000	2390000 536000	1.62
585.788 23.0625	771.525 30.3750	230.188 9.0625	230.188 9.0625	5620000 1260000	0.33	2.03	3.02	836000 188000	476000 107000	1460000 327000	1.76
595.312 23.4375	844.550 33.2500	296.862 11.6875	296.862 11.6875	8300000 1870000	0.33	2.03	3.02	1240000 278000	704000 158000	2150000 484000	1.76
660.400 26.0000	812.800 32.0000	176.212 6.9375	176.213 6.9375	4070000 915000	0.33	2.03	3.02	606000 136000	345000 77600	1060000 237000	1.76
682.625 26.8750	965.200 38.0000	338.138 13.3125	338.138 13.3125	10700000 2400000	0.33	2.03	3.02	1590000 357000	903000 203000	2760000 621000	1.76

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) A groove and holes in the outer race spacer allow for lubricant passage from the bearing housing.

Part Number			Dimensions, mm (inches)				Factors			Weight kg (lbs.)
			Shaft		Housing					
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.				
Inner	Outer	Spacer [4]	R[3]	d_a	r[3]	D_b	G_1	G_2	Cg	
M249748D	M249710	M249710EA	3.3 0.13	272.5 10.73	3.3 0.13	335.0 13.19	1630	168	0.1526	42.26 93.16
EE171000D	171436	Y2S-171436	1.5 0.06	269.0 10.59	3.3 0.13	338.0 13.31	1070	172	0.1354	30.85 68.02
EE171000D	171450	Y2S-171450	1.5 0.06	269.0 10.59	3.3 0.13	340.0 13.39	1070	172	0.1354	32.05 70.66
EE134102D	134143	Y1S-134143	3.3 0.13	280.0 11.02	6.4 0.25	339.0 13.35	1330	187	0.1474	33.77 74.46
EE221025D	221575		6.4 0.25	290.0 11.42	6.4 0.25	366.0 14.41	1320	207	0.1497	51.08 112.61
M252349D	M252310	M252310EB	3.3 0.13	290.0 11.42	3.3 0.13	356.0 14.02	1840	226	0.1588	49.31 108.70
EE275109D	275155	Y1S-275155	1.5 0.06	293.5 11.56	6.4 0.25	366.0 14.41	1450	201	0.1555	49.64 109.44
EE275109D	275160		1.5 0.06	293.5 11.56	6.4 0.25	373.0 14.69	1450	201	0.1555	65.71 144.87
M255449D	M255410	M255410EA	3.3 0.13	310.0 12.20	3.3 0.13	379.0 14.92	2300	287	0.1722	58.31 128.54
HM256849D	HM256810	HM256810EA	3.3 0.13	322.0 12.68	3.3 0.13	394.0 15.51	2550	282	0.1779	66.34 146.25
EE329117D	329172	Y1S-329172	3.3 0.13	327.0 12.87	3.3 0.13	410.0 16.14	2100	262	0.1651	61.46 135.49
EE329119D	329172		3.3 0.13	327.0 12.87	3.3 0.13	410.0 16.14	2050	257	0.1638	62.83 138.51
M757447D	M757410	M757410EA	3.3 0.13	328.0 12.91	4.8 0.19	407.0 16.02	1840	253	0.1775	64.12 141.35
EE941206D	941950		1.5 0.06	329.0 12.95	3.3 0.13	459.0 18.07	1770	187	0.1657	97.13 214.13
EE724121D	724195	Y1S-724195	3.3 0.13	334.0 13.15	6.4 0.25	450.0 17.72	2180	166	0.1783	124.80 275.14
HM259049D	HM259010	HM259010EA	3.3 0.13	340.0 13.39	3.3 0.13	418.0 16.46	2940	304	0.1863	78.83 173.78
EE138131D	138172	Y1S-138172	1.5 0.06	347.0 13.66	3.3 0.13	412.0 16.22	1970	290	0.1786	46.18 101.82
HM262749D	HM262710	HM262710EB	3.3 0.13	371.0 14.61	3.3 0.13	456.0 17.95	3650	342	0.1999	105.90 233.47
LM263149D	LM263110	LM263110EA	1.5 0.06	372.0 14.65	3.3 0.13	434.0 17.09	3090	470	0.1845	50.39 111.09
EE234157D	234215		3.3 0.13	420.0 16.54	6.4 0.25	504.0 19.84	2780	448	0.2018	93.77 206.72
EE234157D	234220	Y1S-234220	3.3 0.13	420.0 16.54	6.4 0.25	516.0 20.31	2780	448	0.2018	95.13 209.73
EE833161XD	833232	Y1S-833232	3.3 0.13	435.0 17.13	6.4 0.25	549.0 21.61	4960	446	0.2186	175.96 387.92
M270449DA	M270410	M270410EA	3.0 0.12	474.0 18.66	6.0 0.24	561.0 22.09	6020	562	0.2343	130.94 288.68
EE480181D	480340	Y2S-480340	6.4 0.25	516.0 20.31	6.4 0.25	780.0 30.71	7380	343	0.2575	935.42 2062.22
LM278848D	LM278810	LM278810EA	6.4 0.25	616.0 24.25	6.4 0.25	726.0 28.58	11600	784	0.2906	285.67 629.78
M280049D	M280010		3.3 0.13	633.0 24.92	6.4 0.25	786.0 30.94	13600	704	0.3081	536.88 1183.60
L281149D	L281110	L281110EA	3.3 0.13	683.0 26.88	6.4 0.25	777.0 30.59	12600	984	0.2968	195.70 431.45
M282249D	M282210	M282210EA	3.3 0.13	723.0 28.46	6.4 0.25	900.0 35.43	18800	843	0.3426	808.16 1781.66

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

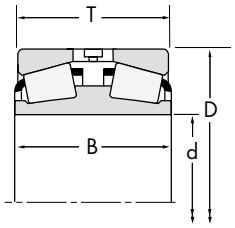
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

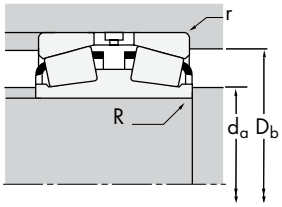
[7] Compound radius on inner race. Details on drawing for bearing.

Continued on next page.

TDI

TWO-ROW





Dimensions, mm (inches)				Load Ratings, N (lbf.) Dynamic (1)		Factors		Dynamic (2)			Factors (5)
d	D	T	B	C(1)	e	Y(1)	Y(2)	C_{90}	Ca_{90}	$C_{90(2)}$	K
708.025 27.8750	**930.275** 36.6250	**273.050** 10.7500	**273.050** 10.7500	**7910000** 1780000	**0.33**	**2.03**	**3.02**	**1180000** 265000	**670000** 151000	**2050000** 461000	**1.76**
749.300 29.5000	**1066.800** 42.0000	**361.950** 14.2500	**349.250** 13.7500	**12200000** 2730000	**0.33**	**2.05**	**3.05**	**1810000** 407000	**1020000** 230000	**3150000** 709000	**1.77**
762.000 30.0000	**1295.400** 51.0000	**311.153** 12.2501	**311.150** 12.2500	**12700000** 2860000	**0.38**	**1.76**	**2.62**	**1890000** 425000	**1240000** 279000	**3290000** 741000	**1.52**
938.212 36.9375	**1270.000** 50.0000	**400.050** 15.7500	**400.050** 15.7500	**15600000** 3500000	**0.33**	**2.03**	**3.02**	**2320000** 521000	**1320000** 297000	**4040000** 907000	**1.76**

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and Ca_{90} are radial and thrust values for a single-row, $C_{90(2)}$ is the two-row radial value.
(3) These maximum fillet radii will be cleared by the bearing corners.
(4) A groove and holes in the outer race spacer allow for lubricant passage from the bearing housing.

Part Number			Dimensions, mm (inches)				Factors			Weight kg (lbs.)
			Shaft			Housing				
			max shaft fillet radius	backing shoulder dia.	max housing fillet radius	backing shoulder dia.				
Inner	Outer	Spacer [4]	R[3]	d_b	r[3]	D_a	G_1	G_2	Cg	
LM282549D	LM282510	LM282510EA	3.3 0.13	741.0 29.17	6.4 0.25	879.0 34.61	18200	1090	0.3379	498.22 1098.37
EE325296D	325420	Y1S-325420	9.2 0.36	806.5 31.75	12.7 0.50	996.0 39.21	21200	980	0.3551	1005.09 2215.80
EE433301D	433512		6.4 0.25	852.0 33.54	6.4 0.25	1210.0 47.64	22200	957	0.3760	1703.94 3756.49
LM287649D	LM287610	LM287610EA	4.8 0.19	990.0 38.98	12.7 0.50	1190.0 46.85	37200	1610	0.4283	1474.36 3250.36

[5] These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.
[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.
[7] Compound radius on inner race. Details on drawing for bearing.

NOTES

IsoClass™

TAPERED ROLLER BEARINGS - IsoClass™ METRIC 30000 SERIES BEARINGS

- Timken offers more than 170 part numbers in the 30000 Series, representing 95 percent of the market value for metric bearings.
- Part numbers give specifiers the widest possible choice from the comprehensive range of metric (ISO and 'J' prefix) and inch-sizes available.
- Consult your Timken representative before making a final bearing selection to ensure suitability, availability and the most cost-effective application.
- To place an order or obtain a quotation, specify the inner and outer part numbers.

  Example: inner race outer race

  XAA32004X - YA32004X
- In most ISO bearings, only one bearing number is specified for both races:

  Example: **30203**

  Conforms to the ISO 355 standard.

BEARING DATA TABLES

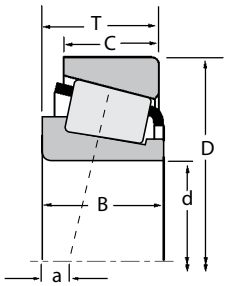
In the following bearing data tables, part numbers are listed in ascending order of bore, outside diameter and width.

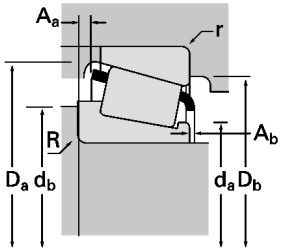
Bearing ratings shown in tables are based on environmental reference conditions. Effects of known operating conditions on bearing performance in an application should be investigated before final bearing selection is made.

Approximate mass is listed for every part number. For weight-critical applications or exact freight cost evaluation purposes, a more accurate value should be obtained from your Timken representative.

IsoClass™

METRIC 30000





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
17.000 0.6693	40.000 1.5748	13.250 0.5217	19800 4440	0.35	1.74	5120 1150	3030 680	1.69	19900 4460	30203	30203
20.000 0.7874	42.000 1.6535	15.000 0.5906	25700 5770	0.37	1.60	6660 1500	4260 959	1.56	29400 6600	32004X	32004X
20.000 0.7874	42.000 1.6535	15.000 0.5906	25700 5770	0.37	1.60	6660 1500	4260 959	1.56	29400 6600	XAA32004X	YAA32004X
20.000 0.7874	52.000 2.0472	16.250 0.6398	35700 8020	0.30	2.00	9250 2080	4750 1070	1.95	34500 7760	30304	30304
20.000 0.7874	52.000 2.0472	22.250 0.8760	46400 10400	0.30	2.00	12000 2710	6180 1390	1.95	48300 10900	32304	32304
25.000 0.9843	47.000 1.8504	15.000 0.5906	28500 6410	0.43	1.39	7390 1660	5440 1220	1.36	35400 7950	XAA32005X	YAA32005X
25.000 0.9843	52.000 2.0472	16.250 0.6398	31600 7100	0.38	1.60	8190 1840	5260 1180	1.56	34400 7730	30205	30205
25.000 0.9843	52.000 2.0472	22.000 0.8661	51100 11500	0.35	1.71	13200 2980	7950 1790	1.66	63600 14300	33205	33205
25.000 0.9843	62.000 2.4409	25.250 0.9941	67100 15100	0.30	2.00	17400 3910	8930 2010	1.95	72400 16300	32305	32305
30.000 1.1811	55.000 2.1654	17.000 0.6693	36300 8160	0.43	1.39	9410 2120	6930 1560	1.36	45300 10200	32006X	32006X
30.000 1.1811	62.000 2.4409	17.250 0.6791	45700 10300	0.38	1.60	11800 2660	7580 1710	1.56	51800 11600	30206	30206
30.000 1.1811	62.000 2.4409	21.250 0.8366	59400 13400	0.38	1.60	15400 3460	9890 2220	1.56	71900 16200	32206	32206
30.000 1.1811	62.000 2.4409	21.250 0.8366	51700 11600	0.56	1.07	13400 3010	12900 2900	1.04	62300 14000	32206-B	32206-B
30.000 1.1811	72.000 2.8346	20.750 0.8169	60600 13600	0.32	1.90	15700 3530	8470 1900	1.85	61900 13900	30306	30306
30.000 1.1811	72.000 2.8346	28.750 1.1319	81200 18200	0.32	1.90	21000 4730	11300 2550	1.85	89800 20200	32306	32306
35.000 1.3780	62.000 2.4409	18.000 0.7087	44100 9920	0.45	1.32	11400 2570	8890 2000	1.29	57600 12900	32007X	32007X
35.000 1.3780	72.000 2.8346	24.250 0.9547	69400 15600	0.38	1.60	18000 4040	11500 2600	1.56	82300 18500	32207	32207
35.000 1.3780	80.000 3.1496	22.750 0.8957	80500 18100	0.32	1.90	20900 4690	11300 2530	1.85	86100 19400	30307	30307
40.000 1.5748	68.000 2.6772	19.000 0.7480	51400 11600	0.38	1.58	13300 3000	8640 1940	1.54	71600 16100	32008X	32008X
40.000 1.5748	68.000 2.6772	19.000 0.7480	51400 11600	0.38	1.58	13300 3000	8640 1940	1.54	71600 16100	XAA32008X	Y32008X
40.000 1.5748	75.000 2.9528	26.000 1.0236	81500 18300	0.36	1.69	21100 4750	12900 2890	1.64	105000 23600	XAA33108	Y33108
40.000 1.5748	80.000 3.1496	24.750 0.9744	74900 16800	0.38	1.60	19400 4370	12500 2800	1.56	86500 19400	32208	32208
40.000 1.5748	80.000 3.1496	32.000 1.2598	112000 25200	0.36	1.68	29000 6520	17800 4000	1.63	144000 32400	33208	33208
40.000 1.5748	90.000 3.5433	25.250 0.9941	91500 20600	0.35	1.74	23700 5330	14000 3150	1.69	102000 23000	30308	30308
40.000 1.5748	90.000 3.5433	25.250 0.9941	79000 17800	0.83	0.73	20500 4610	28900 6510	0.71	88100 19800	31308	31308
40.000 1.5748	90.000 3.5433	35.250 1.3878	123000 27500	0.55	1.10	31800 7140	29700 6670	1.07	160000 36100	XBA32308-B	Y32308-B
45.000 1.7717	75.000 2.9528	20.000 0.7874	61500 13800	0.39	1.53	15900 3580	10700 2410	1.49	84300 19000	32009X	32009X
45.000 1.7717	75.000 2.9528	20.000 0.7874	61500 13800	0.39	1.53	15900 3580	10700 2410	1.49	84300 19000	XAA32009X	Y32009X

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

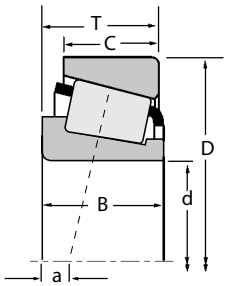
Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
12.000 0.4724	11.000 0.4331	-3.6 -0.14	1.0 0.04	21.0 0.83	22.0 0.87	1.0 0.04	37.0 1.46	35.0 1.38	0.10 0.00	1.60 0.06	4.2	5.96	0.0398	0.08 0.18
15.000 0.5906	12.000 0.4724	-4.6 -0.18	0.6 0.02	25.5 1.00	26.5 1.04	0.6 0.02	39.5 1.56	37.0 1.46	0.40 0.02	1.40 0.06	6.2	6.1	0.0469	0.10 0.21
15.000 0.5906	12.000 0.4724	-4.6 -0.18	2.0 0.08	25.5 1.00	29.0 1.14	1.0 0.04	39.5 1.56	36.5 1.44	0.40 0.02	1.40 0.06	6.2	6.1	0.0469	0.10 0.21
15.000 0.5906	13.000 0.5118	-4.8 -0.19	1.5 0.06	24.5 0.96	27.0 1.06	1.5 0.06	47.5 1.87	45.5 1.79	-0.60 -0.02	2.60 0.10	7.5	5.5	0.0458	0.17 0.38
21.000 0.8268	18.000 0.7087	-8.4 -0.33	1.5 0.06	26.0 1.02	28.0 1.10	1.5 0.06	47.5 1.87	44.5 1.75	0.90 0.04	2.20 0.09	9.3	5.73	0.0495	0.24 0.52
15.000 0.5906	11.500 0.4528	-3.3 -0.13	3.3 0.13	30.0 1.18	37.0 1.46	1.0 0.04	44.5 1.75	41.0 1.61	0.60 0.02	1.20 0.05	8.6	8.7	0.0546	0.11 0.25
15.000 0.5906	13.000 0.5118	-3.6 -0.14	1.0 0.04	30.5 1.20	32.0 1.26	1.0 0.04	48.5 1.91	46.0 1.81	0.4 0.02	1.60 0.06	8.4	6.21	0.0514	0.15 0.34
22.000 0.8661	18.000 0.7087	-7.6 -0.30	1.0 0.04	30.5 1.20	34.0 1.34	1.0 0.04	49.0 1.93	44.5 1.75	0.70 0.03	1.90 0.08	13.4	8.6	0.0594	0.22 0.50
24.000 0.9449	20.000 0.7874	-9.7 -0.38	1.5 0.06	31.5 1.24	35.0 1.38	1.5 0.06	57.0 2.24	54.0 2.13	2.20 0.09	2.30 0.09	15.1	5.58	0.0580	0.37 0.81
17.000 0.6693	13.000 0.5118	-3.3 -0.13	1.0 0.04	36.0 1.42	37.5 1.48	1.0 0.04	52.5 2.07	49.0 1.93	1.00 0.04	1.30 0.05	12.1	10.5	0.0611	0.17 0.38
16.000 0.6299	14.000 0.5512	-3.6 -0.14	1.0 0.04	36.5 1.44	38.0 1.50	1.0 0.04	58.0 2.28	55.0 2.17	0.20 0.01	2.30 0.09	13.4	10.7	0.0601	0.24 0.52
20.000 0.7874	17.000 0.6693	-5.6 -0.22	1.0 0.04	37.0 1.46	43.0 1.69	1.0 0.04	59.0 2.32	54.0 2.13	2.00 0.08	2.90 0.11	16.8	10.9	0.0652	0.29 0.63
20.000 0.7874	17.000 0.6693	-3.3 -0.13	1.0 0.04	36.5 1.44	39.5 1.56	1.0 0.04	59.0 2.32	53.0 2.09	1.60 0.06	2.80 0.11	14.1	8.92	0.0700	0.30 0.65
19.000 0.7480	16.000 0.6299	-5.8 -0.23	1.5 0.06	35.5 1.40	38.0 1.50	1.5 0.06	66.0 2.60	64.0 2.52	0.90 0.04	3.10 0.12	16.2	8.17	0.0600	0.39 0.87
27.000 1.0630	23.000 0.9055	-10.7 -0.42	1.5 0.06	37.0 1.46	40.5 1.59	1.5 0.06	66.0 2.60	62.0 2.44	2.90 0.11	2.70 0.11	20.6	8.55	0.0654	0.56 1.23
18.000 0.7087	14.000 0.5512	-2.5 -0.10	1.0 0.04	41.5 1.63	43.0 1.69	1.0 0.04	59.5 2.34	55.0 2.17	0.80 0.03	1.40 0.06	16.7	15.7	0.0691	0.23 0.50
23.000 0.9055	19.000 0.7480	-6.4 -0.25	1.5 0.06	41.5 1.63	43.5 1.71	1.5 0.06	67.0 2.64	63.0 2.48	1.90 0.08	1.80 0.07	21.5	11.4	0.0705	0.44 0.96
21.000 0.8268	18.000 0.7087	-5.8 -0.23	2.0 0.08	43.5 1.71	46.5 1.83	1.5 0.06	75.0 2.95	72.0 2.83	0.50 0.02	3.90 0.15	22.9	12.6	0.0675	0.52 1.16
19.000 0.7480	14.500 0.5709	-3.8 -0.15	1.0 0.04	45.5 1.79	47.0 1.85	1.0 0.04	65.0 2.56	61.0 2.40	0.90 0.04	1.70 0.07	23.8	16.1	0.0732	0.27 0.61
19.000 0.7480	14.500 0.5709	-3.8 -0.15	3.5 0.14	45.5 1.79	52.0 2.05	1.0 0.04	65.0 2.56	61.0 2.40	0.90 0.04	1.70 0.07	23.8	16.1	0.0732	0.27 0.61
26.000 1.0236	20.500 0.8071	-7.6 -0.30	3.5 0.14	47.0 1.85	55.0 2.17	1.5 0.06	71.0 2.80	67.0 2.64	1.80 0.07	1.70 0.07	29.4	14.9	0.0771	0.50 1.09
23.000 0.9055	19.000 0.7480	-5.6 -0.22	1.5 0.06	46.0 1.81	48.5 1.91	1.5 0.06	75.0 2.95	71.0 2.80	1.60 0.06	2.40 0.10	25	11.4	0.0738	0.53 1.17
32.000 1.2598	25.000 0.9843	-10.9 -0.43	1.5 0.06	47.0 1.85	51.0 2.01	1.5 0.06	76.0 2.99	70.0 2.76	2.80 0.11	2.40 0.10	35.9	11.2	0.0827	0.73 1.61
23.000 0.9055	20.000 0.7874	-5.8 -0.23	2.0 0.08	46.5 1.83	50.0 1.97	1.5 0.06	84.0 3.31	80.0 3.15	1.80 0.07	2.80 0.11	30.1	11.6	0.0762	0.73 1.61
23.000 0.9055	17.000 0.6693	4.1 0.16	2.0 0.08	52.0 2.05	61.0 2.40	1.5 0.06	86.0 3.39	76.0 2.99	4.10 0.16	3.10 0.12	22.9	9.14	0.0910	0.72 1.58
33.500 1.3189	27.000 1.0630	-7.4 -0.29	2.0 0.08	49.0 1.93	58.0 2.28	1.5 0.06	84.0 3.31	76.0 2.99	3.50 0.14	2.90 0.11	38.1	14	0.0966	1.10 2.43
20.000 0.7874	15.500 0.6102	-3.3 -0.13	1.0 0.04	51.0 2.01	53.0 2.09	1.0 0.04	72.0 2.83	68.0 2.68	0.60 0.02	2.10 0.08	28.7	16.2	0.0788	0.34 0.76
20.000 0.7874	15.500 0.6102	-3.3 -0.13	3.0 0.12	51.0 2.01	57.0 2.24	1.0 0.04	72.0 2.83	68.0 2.68	0.60 0.02	2.10 0.08	28.7	16.2	0.0788	0.34 0.76

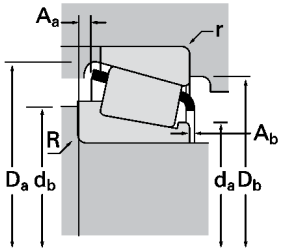
(7) Compound radius on inner race. Details on drawing for bearing.
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

IsoClass™

METRIC 30000





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
45.000 1.7717	75.000 2.9528	20.000 0.7874	61500 13800	0.39	1.53	15900 3580	10700 2410	1.49	84300 19000	XAB-32009X	Y32009X
45.000 1.7717	80.000 3.1496	26.000 1.0236	88000 19800	0.38	1.57	22800 5130	15000 3370	1.52	119000 26800	33109	33109
45.000 1.7717	85.000 3.3465	20.750 0.8169	74100 16700	0.40	1.48	19200 4320	13300 3000	1.44	89000 20000	30209	30209
45.000 1.7717	85.000 3.3465	24.750 0.9744	81100 18200	0.40	1.48	21000 4730	14600 3280	1.44	98700 22200	32209	32209
45.000 1.7717	85.000 3.3465	32.000 1.2598	116000 26100	0.39	1.56	30100 6770	19900 4470	1.51	155000 34800	33209	33209
45.000 1.7717	100.000 3.9370	27.250 1.0728	97900 22000	0.83	0.73	25400 5700	35900 8050	0.71	113000 25400	31309	31309
45.000 1.7717	100.000 3.9370	38.250 1.5059	147000 33100	0.55	1.10	38100 8580	35600 8020	1.07	187000 42000	32309-B	32309-B
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	32010X	32010X
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAA32010X	Y32010X
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAB-32010X	Y32010X
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAD32010X	Y32010X
50.000 1.9685	80.000 3.1496	20.000 0.7874	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAE32010X	Y32010X
50.000 1.9685	82.000 3.2283	21.500 0.8465	64700 14500	0.42	1.42	16800 3770	12200 2730	1.38	92700 20800	XAB-32010X	YKB-32010X
50.000 1.9685	85.000 3.3465	26.000 1.0236	89500 20100	0.41	1.46	23200 5220	16300 3670	1.42	125000 28100	33110	33110
50.000 1.9685	90.000 3.5433	21.750 0.8563	73600 16500	0.42	1.43	19100 4290	13700 3080	1.39	87400 19700	30210	30210
50.000 1.9685	100.000 3.9370	33.500 1.3189	150000 33700	0.40	1.50	38900 8750	26600 5980	1.46	202000 45300	XLA33211	Y33211
50.000 1.9685	110.000 4.3307	29.250 1.1516	131000 29600	0.35	1.74	34100 7660	20100 4530	1.69	150000 33800	30310	30310
50.000 1.9685	110.000 4.3307	29.250 1.1516	115000 25900	0.83	0.73	29900 6720	42200 9490	0.71	132000 29700	31310	31310
50.000 1.9685	110.000 4.3307	42.250 1.6634	173000 38900	0.35	1.74	44900 10100	26500 5960	1.69	211000 47500	32310	32310
50.000 1.9685	110.000 4.3307	42.250 1.6634	179000 40200	0.55	1.10	46300 10400	43300 9740	1.07	241000 54300	32310-B	32310-B
50.815 2.0006	100.000 3.9370	35.000 1.3780	150000 33700	0.40	1.50	38900 8750	26600 5980	1.46	202000 45300	XGA33211	Y33211
52.000 2.0472	90.000 3.5433	21.750 0.8563	73600 16500	0.42	1.43	19100 4290	13700 3080	1.39	87400 19700	XGA30210	Y30210
55.000 2.1654	90.000 3.5433	23.000 0.9055	87900 19800	0.41	1.48	22800 5120	15900 3560	1.44	126000 28300	32011X	32011X
55.000 2.1654	90.000 3.5433	27.000 1.0630	92100 20700	0.31	1.92	23900 5370	12800 2870	1.87	141000 31700	33011	33011
55.000 2.1654	100.000 3.9370	22.750 0.8957	99100 22300	0.40	1.48	25700 5780	17800 4010	1.44	122000 27400	30211	30211
55.000 2.1654	100.000 3.9370	35.000 1.3780	150000 33700	0.40	1.50	38900 8750	26600 5980	1.46	202000 45300	33211	33211
55.000 2.1654	120.000 4.7244	31.500 1.2402	134000 30200	0.83	0.73	34800 7830	49200 11100	0.71	157000 35300	31311	31311
55.000 2.1654	120.000 4.7244	45.500 1.7913	206000 46400	0.55	1.10	53500 12000	50000 11200	1.07	286000 64300	32311-B	32311-B

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
20.000 0.7874	15.500 0.6102	-3.3 -0.13	2.3 0.09	51.0 2.01	58.0 2.28	1.0 0.04	72.0 2.83	68.0 2.68	0.60 0.02	2.10 0.08	28.7	16.2	0.0788	0.34 0.75
26.000 1.0236	20.500 0.8071	-6.6 -0.26	1.5 0.06	52.0 2.05	55.0 2.17	1.5 0.06	76.0 2.99	71.0 2.80	1.90 0.08	1.70 0.07	35.7	14.5	0.0843	0.53 1.17
19.000 0.7480	16.000 0.6299	-2.5 -0.10	1.5 0.06	53.0 2.09	55.0 2.17	1.5 0.06	80.0 3.15	76.0 2.99	1.10 0.04	3.80 0.15	28.3	16.4	0.0789	0.49 1.08
23.000 0.9055	19.000 0.7480	-4.3 -0.17	1.5 0.06	51.0 2.01	54.0 2.13	1.5 0.06	81.0 3.19	76.0 2.99	1.10 0.04	3.80 0.15	30.5	12.4	0.0809	0.58 1.27
32.000 1.2598	25.000 0.9843	-9.9 -0.39	1.5 0.06	52.0 2.05	57.0 2.24	1.5 0.06	81.0 3.19	74.0 2.91	2.90 0.12	2.40 0.10	41.9	13.2	0.0892	0.79 1.73
25.000 0.9843	18.000 0.7087	4.3 0.17	2.0 0.08	56.0 2.20	67.0 2.64	1.5 0.06	100.0 3.94	86.0 3.39	5.40 0.21	4.40 0.17	30.4	12.7	0.1001	0.94 2.07
36.000 1.4173	30.000 1.1811	-7.9 -0.31	2.0 0.08	55.0 2.17	54.0 2.13	1.5 0.06	95.0 3.74	85.0 3.35	4.50 0.18	2.50 0.10	44.9	18.7	0.1017	1.42 3.14
20.000 0.7874	15.500 0.6102	-2.0 -0.08	1.0 0.04	56.0 2.20	58.0 2.28	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
20.000 0.7874	15.500 0.6102	-2.0 -0.08	2.3 0.09	56.0 2.20	60.0 2.36	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
20.000 0.7874	15.500 0.6102	-2.0 -0.08	3.0 0.12	55.0 2.17	62.0 2.44	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
20.000 0.7874	15.500 0.6102	-2.0 -0.08	1.5 0.06	56.0 2.20	59.0 2.32	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
20.000 0.7874	15.500 0.6102	-2.0 -0.08	0.3 0.01	55.0 2.17	56.0 2.20	1.0 0.04	77.0 3.03	73.0 2.87	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.37 0.82
20.000 0.7874	17.000 0.6693	-2.0 -0.08	3.0 0.12	55.0 2.17	62.0 2.44	0.5 0.02	77.0 3.03	76.0 2.99	0.90 0.04	2.10 0.08	34	20.3	0.0853	0.42 0.93
26.000 1.0236	20.000 0.7874	-5.3 -0.21	1.5 0.06	57.0 2.24	61.0 2.40	1.5 0.06	82.0 3.23	76.0 2.99	2.30 0.09	1.70 0.07	40.6	20.6	0.0899	0.58 1.29
20.000 0.7874	17.000 0.6693	-2.0 -0.08	1.5 0.06	56.0 2.20	59.0 2.32	1.5 0.06	85.0 3.35	81.0 3.19	1.40 0.05	3.10 0.12	30.3	14.9	0.0814	0.54 1.19
33.500 1.3189	27.000 1.0630	-8.1 -0.32	2.0 0.08	62.0 2.44	67.0 2.64	1.5 0.06	96.0 3.78	89.0 3.50	1.40 0.05	2.80 0.11	59.3	15.3	0.1010	1.24 2.73
27.000 1.0630	23.000 0.9055	-6.1 -0.24	2.5 0.10	58.0 2.28	62.0 2.44	2.0 0.08	103.0 4.06	98.0 3.86	2.00 0.08	3.20 0.12	48.7	16.7	0.0892	1.26 2.77
27.000 1.0630	19.000 0.7480	5.6 0.22	2.5 0.10	63.0 2.48	75.0 2.95	2.0 0.08	104.5 4.11	93.0 3.66	5.20 0.20	4.20 0.16	37.1	14.6	0.0690	1.21 2.68
40.000 1.5748	33.000 1.2992	-14.2 -0.56	2.5 0.10	60.0 2.36	65.0 2.56	2.0 0.08	103.0 4.06	95.0 3.74	4.60 0.18	2.90 0.11	60.6	16	0.0965	1.83 4.03
40.000 1.5748	33.000 1.2992	-8.6 -0.34	2.5 0.10	60.0 2.36	71.0 2.80	2.0 0.08	103.0 4.06	93.0 3.66	4.30 0.17	3.30 0.13	62.7	17.9	0.0783	1.94 4.28
35.000 1.3780	27.000 1.0630	-9.7 -0.38	2.0 0.08	62.0 2.44	67.0 2.64	1.5 0.06	96.0 3.78	89.0 3.50	2.90 0.11	2.80 0.11	59.3	15.3	0.1010	1.25 2.76
20.000 0.7874	17.000 0.6693	-2.0 -0.08	4.0 0.16	59.0 2.32	66.0 2.60	1.5 0.06	85.0 3.35	81.0 3.19	1.40 0.05	3.10 0.12	30.3	15.9	0.0814	0.51 1.13
23.000 0.9055	17.500 0.6890	-3.0 -0.12	1.5 0.06	62.0 2.44	65.0 2.56	1.5 0.06	86.5 3.41	82.0 3.23	1.80 0.07	2.00 0.08	46	28	0.0931	0.57 1.25
27.000 1.0630	21.000 0.8268	-7.9 -0.31	1.5 0.06	61.0 2.40	63.0 2.48	1.5 0.06	87.0 3.43	82.0 3.23	2.40 0.09	1.90 0.07	56.5	27.9	0.0915	0.66 1.46
21.000 0.8268	18.000 0.7087	-1.8 -0.07	2.0 0.08	64.0 2.52	67.0 2.64	1.5 0.06	95.0 3.74	91.0 3.58	1.50 0.06	4.40 0.17	41.9	22.8	0.0897	0.72 1.58
35.000 1.3780	27.000 1.0630	-9.7 -0.38	2.0 0.08	62.0 2.44	68.0 2.68	1.5 0.06	96.0 3.78	89.0 3.50	2.90 0.11	2.80 0.11	59.3	15.3	0.1010	1.16 2.55
29.000 1.1417	21.000 0.8268	6.9 0.27	2.5 0.10	68.0 2.68	82.0 3.23	2.0 0.08	115.0 4.53	103.0 4.06	4.80 0.19	4.30 0.17	45.5	15.9	0.0739	1.57 3.45
43.000 1.6929	35.000 1.3780	-8.6 -0.34	2.5 0.10	66.0 2.60	82.0 3.23	2.0 0.08	114.0 4.49	101.0 3.98	4.50 0.18	3.50 0.14	78.8	24.6	0.0794	2.45 5.40

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

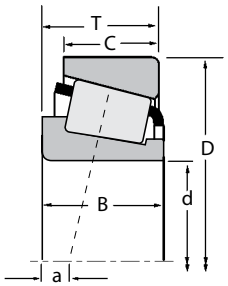
[7] Compound radius on inner race. Details on drawing for bearing.

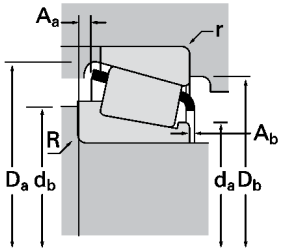
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

IsoClass™

METRIC 30000





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
60.000 2.3622	95.000 3.7402	23.000 0.9055	89600 20100	0.43	1.39	23200 5220	17100 3840	1.36	132000 29600	32012X	32012X
60.000 2.3622	95.000 3.7402	27.000 1.0630	95100 21400	0.33	1.83	24600 5540	13800 3110	1.78	150000 33600	33012	33012
60.000 2.3622	100.000 3.9370	30.000 1.1811	127000 28500	0.40	1.51	32800 7380	22300 5020	1.47	180000 40500	33112	33112
60.000 2.3622	110.000 4.3307	23.750 0.9350	99100 22300	0.40	1.48	25700 5770	17800 4000	1.44	117000 26200	30212	30212
60.000 2.3622	110.000 4.3307	38.000 1.4961	183000 41200	0.40	1.48	47500 10700	32800 7380	1.44	253000 56800	33212	33212
60.000 2.3622	110.000 4.3307	38.000 1.4961	183000 41200	0.40	1.48	47500 10700	32800 7380	1.44	253000 56800	XAA33212	Y33212
60.000 2.3622	110.000 4.3307	38.000 1.4961	183000 41200	0.40	1.48	47500 10700	32800 7380	1.44	253000 56800	XAB-33212	Y33212
60.000 2.3622	130.000 5.1181	33.500 1.3189	186000 41900	0.35	1.74	48300 10900	28500 6420	1.69	221000 49800	30312	30312
60.000 2.3622	130.000 5.1181	33.500 1.3189	159000 35700	0.83	0.73	41200 9250	58200 13100	0.71	188000 42200	31312	31312
60.000 2.3622	130.000 5.1181	48.500 1.9094	245000 55000	0.35	1.74	63400 14300	37500 8420	1.69	310000 69800	32312	32312
65.000 2.5591	100.000 3.9370	23.000 0.9055	90800 20400	0.46	1.31	23500 5290	18500 4160	1.27	137000 30900	32013X	32013X
65.000 2.5591	100.000 3.9370	27.000 1.0630	99100 22300	0.35	1.72	25700 5780	15300 3450	1.68	162000 36400	33013	33013
65.000 2.5591	110.000 4.3307	34.000 1.3386	155000 34700	0.39	1.55	40100 9010	26600 5980	1.51	225000 50600	33113	33113
65.000 2.5591	120.000 4.7244	24.750 0.9744	128000 28800	0.40	1.48	33300 7480	23100 5190	1.44	158000 35500	30213	30213
65.000 2.5591	120.000 4.7244	32.750 1.2894	161000 36200	0.40	1.48	41700 9380	28900 6500	1.44	209000 46900	32213	32213
65.000 2.5591	120.000 4.7244	41.000 1.6142	182000 40900	0.39	1.54	47200 10600	31500 7080	1.50	280000 63000	33213	33213
65.000 2.5591	140.000 5.5118	36.000 1.4173	206000 46300	0.35	1.74	53400 12000	31500 7090	1.69	242000 54400	30313	30313
65.000 2.5591	140.000 5.5118	36.000 1.4173	182000 40800	0.83	0.73	47100 10600	66500 15000	0.71	217000 48700	31313	31313
70.000 2.7559	110.000 4.3307	25.000 0.9843	104000 23400	0.43	1.38	27000 6060	20100 4510	1.34	163000 36700	32014X	32014X
70.000 2.7559	110.000 4.3307	31.000 1.2205	142000 31900	0.28	2.11	36800 8280	17900 4040	2.05	236000 53000	33014	33014
70.000 2.7559	120.000 4.7244	37.000 1.4567	183000 41200	0.38	1.58	47500 10700	30800 6930	1.54	270000 60800	33114	33114
70.000 2.7559	125.000 4.9213	26.250 1.0335	128000 28800	0.42	1.43	33200 7450	23800 5360	1.39	157000 35300	30214	30214
70.000 2.7559	125.000 4.9213	33.250 1.3091	169000 38000	0.42	1.43	43800 9840	31500 7080	1.39	224000 50400	32214	32214
70.000 2.7559	150.000 5.9055	38.000 1.4961	197000 44400	0.83	0.73	51200 11500	72300 16200	0.71	235000 52900	31314	31314
70.000 2.7559	150.000 5.9055	54.000 2.1260	339000 76200	0.35	1.74	87900 19800	51900 11700	1.69	448000 101000	32314	32314
75.000 2.9528	115.000 4.5276	25.000 0.9842	106000 23700	0.46	1.31	27400 6150	21500 4830	1.27	170000 38200	32015X	32015X
75.000 2.9528	115.000 4.5276	31.000 1.2205	146000 32800	0.30	2.01	37800 8510	19300 4340	1.96	239000 53700	33015	33015
75.000 2.9528	125.000 4.9213	37.000 1.4567	189000 42600	0.40	1.51	49100 11000	33400 7510	1.47	287000 64500	33115	33115

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a(3)	R(4)	d_a	d_b	r(4)	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
23.000 0.9055	17.500 0.6890	-1.8 -0.07	1.5 0.06	66.0 2.60	68.0 2.68	1.5 0.06	91.0 3.58	86.0 3.39	1.80 0.07	2.00 0.08	51.2	31.4	0.0982	0.60 1.32
27.000 1.0630	21.000 0.8268	-7.1 -0.28	1.5 0.06	65.0 2.56	69.0 2.72	1.5 0.06	91.0 3.58	86.0 3.39	2.50 0.10	1.90 0.07	63	31.1	0.0964	0.69 1.53
30.000 1.1811	23.000 0.9055	-6.4 -0.25	1.5 0.06	67.0 2.64	72.0 2.83	1.5 0.06	96.0 3.78	90.0 3.54	2.40 0.10	2.50 0.10	61.7	24	0.1021	0.91 2.00
22.000 0.8661	19.000 0.7480	-1.8 -0.07	2.0 0.08	66.0 2.60	70.0 2.76	1.5 0.06	103.0 4.06	99.0 3.90	1.50 0.06	3.50 0.14	44.1	27	0.0909	0.89 1.96
38.000 1.4961	29.000 1.1417	-9.9 -0.39	2.0 0.08	68.0 2.68	74.0 2.91	1.5 0.06	105.0 4.13	98.0 3.86	4.00 0.16	2.50 0.10	76.2	18.1	0.0758	1.53 3.37
38.000 1.4961	29.000 1.1417	-9.9 -0.39	6.0 0.24	68.0 2.68	85.0 3.35	1.5 0.06	105.0 4.13	98.0 3.86	4.00 0.16	2.50 0.10	76.2	18.1	0.0758	1.53 3.37
38.000 1.4961	29.000 1.1417	-9.9 -0.39	5.0 0.20	68.0 2.68	83.0 3.27	1.5 0.06	105.0 4.13	98.0 3.86	4.00 0.16	2.50 0.10	76.2	18.1	0.0758	1.53 3.37
31.000 1.2205	26.000 1.0236	-7.1 -0.28	3.0 0.12	69.0 2.72	74.0 2.91	2.5 0.10	121.0 4.76	116.0 4.57	2.50 0.10	3.90 0.16	75.8	16.7	0.0710	1.96 4.32
31.000 1.2205	22.000 0.8661	7.6 0.30	3.0 0.12	74.0 2.91	89.0 3.50	2.5 0.10	123.0 4.84	111.0 4.37	5.80 0.23	4.10 0.16	56.2	25.1	0.0792	1.97 4.33
46.000 1.8110	37.000 1.4567	-16.5 -0.65	3.0 0.12	72.0 2.83	78.0 3.07	2.5 0.10	121.0 4.76	113.0 4.45	7.00 0.28	3.40 0.13	94.1	21.2	0.0768	2.88 6.35
23.000 0.9055	17.500 0.6890	-0.3 -0.01	1.5 0.06	71.0 2.80	73.0 2.87	1.5 0.06	97.0 3.82	91.0 3.58	2.00 0.08	2.00 0.08	57.4	35.6	0.1039	0.64 1.40
27.000 1.0630	21.000 0.8268	-6.1 -0.24	1.5 0.06	70.0 2.76	74.0 2.91	1.5 0.06	96.0 3.78	91.0 3.58	2.50 0.10	1.90 0.08	72.4	36.1	0.1029	0.74 1.64
34.000 1.3386	26.500 1.0433	-7.9 -0.31	1.5 0.06	73.0 2.87	77.0 3.03	1.5 0.06	106.0 4.17	99.0 3.90	2.40 0.10	2.50 0.10	80.1	24.5	0.1105	1.26 2.78
23.000 0.9055	20.000 0.7874	-1.5 -0.06	2.0 0.08	74.0 2.91	77.0 3.03	1.5 0.06	114.0 4.49	110.0 4.33	2.10 0.08	4.30 0.17	60.4	27.4	0.0653	1.15 2.53
31.000 1.2205	27.000 1.0630	-5.6 -0.22	2.0 0.08	73.0 2.87	77.0 3.03	1.5 0.06	114.0 4.49	108.0 4.25	3.70 0.14	3.10 0.12	72.9	20.5	0.0742	1.51 3.34
41.000 1.6142	32.000 1.2598	-11.2 -0.44	2.0 0.08	74.0 2.91	79.0 3.11	1.5 0.06	115.0 4.53	107.0 4.21	3.40 0.14	2.70 0.11	90.3	21.8	0.0745	1.97 4.35
33.000 1.2992	28.000 1.1024	-7.6 -0.30	3.0 0.12	75.0 2.95	80.0 3.15	2.5 0.10	131.0 5.16	125.0 4.92	2.50 0.10	4.70 0.18	87.4	22.9	0.0743	2.46 5.43
33.000 1.2992	23.000 0.9055	8.1 0.32	3.0 0.12	80.0 3.15	96.0 3.78	2.5 0.10	132.5 5.22	120.0 4.72	6.20 0.24	4.70 0.18	67.1	22.2	0.0839	2.40 5.30
25.000 0.9843	19.000 0.7480	-1.0 -0.04	1.5 0.06	76.0 2.99	78.0 3.07	1.5 0.06	105.0 4.13	100.0 3.94	2.40 0.09	1.80 0.07	74.1	44.8	0.1112	0.87 1.91
31.000 1.2205	25.500 1.0039	-8.6 -0.34	1.5 0.06	77.0 3.03	79.0 3.11	1.5 0.06	106.0 4.17	101.0 3.98	0.60 0.02	3.60 0.14	105	50.4	0.0985	1.10 2.43
37.000 1.4567	29.000 1.1417	-8.6 -0.34	2.0 0.08	79.0 3.11	85.0 3.35	1.5 0.06	115.0 4.53	108.0 4.25	2.70 0.11	2.40 0.09	99.5	31.5	0.0809	1.68 3.71
24.000 0.9449	21.000 0.8268	-0.5 -0.02	2.0 0.08	77.0 3.03	80.0 3.15	1.5 0.06	118.0 4.65	115.0 4.53	1.80 0.07	3.80 0.15	63.7	24.7	0.0714	1.25 2.75
31.000 1.2205	27.000 1.0630	-4.6 -0.18	2.0 0.08	79.0 3.11	82.0 3.23	1.5 0.06	119.0 4.69	114.0 4.49	3.40 0.13	3.30 0.13	81.4	25.6	0.0779	1.64 3.61
35.000 1.3780	25.000 0.9843	9.1 0.36	3.0 0.12	85.0 3.35	101.0 3.98	2.5 0.10	141.5 5.57	129.0 5.08	5.70 0.22	5.60 0.22	75.8	29.5	0.0873	2.93 6.47
51.000 2.0079	42.000 1.6535	-16.8 -0.66	3.0 0.12	86.0 3.39	94.0 3.70	2.5 0.10	141.0 5.55	133.0 5.24	4.00 0.16	4.50 0.18	142	33.1	0.0828	4.41 9.72
25.000 0.9843	19.000 0.7480	0.5 0.02	1.5 0.06	82.0 3.23	84.0 3.31	1.5 0.06	110.0 4.33	105.0 4.13	2.50 0.10	1.80 0.07	81.8	49.9	0.1166	0.91 2.01
31.000 1.2205	25.500 1.0039	-7.6 -0.30	1.5 0.06	83.0 3.27	90.0 3.54	1.5 0.06	110.0 4.33	104.0 4.09	1.50 0.06	2.50 0.10	109	47.2	0.1122	1.15 2.54
37.000 1.4567	29.000 1.1417	-7.4 -0.29	2.0 0.08	83.0 3.27	88.0 3.46	1.5 0.06	120.0 4.72	112.0 4.41	2.80 0.11	2.40 0.09	111	26.3	0.0851	1.76 3.88

(6) For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

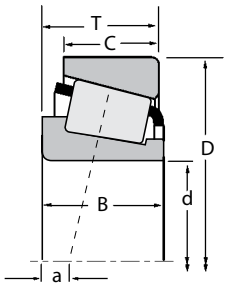
(7) Compound radius on inner race. Details on drawing for bearing.

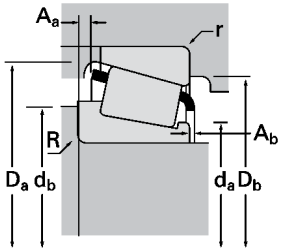
(8) Pin-type cage. Please consult The Timken Company.

Continued on next page.

IsoClass™

METRIC 30000





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
75.000 2.9528	130.000 5.1181	27.250 1.0728	141000 31600	0.44	1.38	36500 8190	27100 6100	1.34	179000 40300	30215	30215
75.000 2.9528	130.000 5.1181	33.250 1.3091	170000 38300	0.44	1.38	44100 9920	32900 7390	1.34	227000 51100	32215	32215
75.000 2.9528	130.000 5.1181	41.000 1.6142	219000 49200	0.43	1.40	56700 12800	41500 9340	1.37	316000 71000	33215	33215
75.000 2.9528	160.000 6.2992	40.000 1.5748	273000 61400	0.35	1.74	70800 15900	41800 9390	1.69	333000 74800	30315	30315
75.000 2.9528	160.000 6.2992	40.000 1.5748	236000 53200	0.83	0.73	61300 13800	86600 19500	0.71	288000 64700	31315	31315
80.000 3.1496	125.000 4.9213	29.000 1.1417	154000 34600	0.42	1.42	39800 8960	28900 6490	1.38	238000 53600	32016X	32016X
80.000 3.1496	130.000 5.1181	37.000 1.4567	193000 43400	0.42	1.44	50100 11300	35700 8020	1.40	300000 67300	33116	33116
80.000 3.1496	130.000 5.1181	37.000 1.4567	172000 38700	0.42	1.44	44700 10000	31800 7120	1.40	300000 67300	XA33116	Y33116
80.000 3.1496	140.000 5.5118	28.250 1.1122	161000 36300	0.42	1.43	41800 9400	30100 6760	1.39	204000 45900	30216	30216
80.000 3.1496	140.000 5.5118	35.250 1.3878	190000 42800	0.42	1.43	49400 11100	35500 7980	1.39	249000 56000	32216	32216
80.000 3.1496	140.000 5.5118	46.000 1.8110	275000 61800	0.43	1.41	71300 16000	51900 11700	1.37	409000 91900	33216	33216
80.000 3.1496	141.000 5.5512	30.250 1.1909	151000 34000	0.42	1.43	39300 8830	28200 6350	1.39	187000 42000	XUB-30216	YFA30216
80.000 3.1496	170.000 6.6929	42.500 1.6732	309000 69400	0.35	1.74	80000 18000	47300 10600	1.69	379000 85200	30316	30316
80.000 3.1496	170.000 6.6929	61.500 2.4213	414000 93000	0.35	1.74	107000 24100	63200 14200	1.69	563000 127000	32316	32316
84.000 3.3071	140.000 5.5118	32.000 1.2598	170000 38200	0.42	1.42	44000 9890	31900 7160	1.38	264000 59400	XUA32018X	Y32018X
85.000 3.3465	130.000 5.1181	29.000 1.1417	151000 33800	0.44	1.36	39000 8770	29500 6640	1.32	235000 52900	32017X	32017X
85.000 3.3465	130.000 5.1181	29.000 1.1417	151000 33800	0.44	1.36	39000 8770	29500 6640	1.32	235000 52900	XAA32017X	Y32017X
85.000 3.3465	130.000 5.1181	36.000 1.4173	204000 45800	0.29	2.06	52900 11900	26400 5930	2.00	343000 77100	33017	33017
85.000 3.3465	140.000 5.5118	41.000 1.6142	235000 52800	0.41	1.48	60900 13700	42400 9540	1.44	386000 86800	33117	33117
85.000 3.3465	150.000 5.9055	30.500 1.2008	185000 41500	0.42	1.43	47900 10800	34400 7740	1.39	236000 53000	30217	30217
85.000 3.3465	150.000 5.9055	38.500 1.5157	227000 51100	0.42	1.43	58900 13200	42300 9520	1.39	305000 68700	32217	32217
85.000 3.3465	150.000 5.9055	49.000 1.9291	325000 73100	0.42	1.43	84300 19000	60400 13600	1.40	483000 109000	33217	33217
85.000 3.3465	180.000 7.0866	44.500 1.7520	290000 65300	0.35	1.74	75300 16900	44400 9990	1.69	346000 77700	30317	30317
90.000 3.5433	140.000 5.5118	32.000 1.2598	170000 38200	0.42	1.42	44000 9890	31900 7160	1.38	264000 59400	32018X	32018X
90.000 3.5433	140.000 5.5118	32.000 1.2598	170000 38200	0.42	1.42	44000 9890	31900 7160	1.38	264000 59400	XAA32018X	Y32018X
90.000 3.5433	140.000 5.5118	39.000 1.5354	229000 51500	0.27	2.23	59400 13300	27300 6140	2.17	377000 84700	33018	33018
90.000 3.5433	150.000 5.9055	45.000 1.7717	284000 63800	0.40	1.51	73500 16500	50000 11200	1.47	447000 100000	33118	33118
90.000 3.5433	160.000 6.2992	32.500 1.2795	197000 44300	0.42	1.43	51100 11500	36700 8260	1.39	249000 56000	30218	30218

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
25.000 0.9843	22.000 0.8661	0.0 0.00	2.0 0.08	85.0 3.35	88.0 3.46	1.5 0.06	124.0 4.88	120.0 4.72	2.00 0.08	3.80 0.15	74.1	35.2	0.0760	1.35 2.97
31.000 1.2205	27.000 1.0630	-3.6 -0.14	2.0 0.08	84.0 3.31	88.0 3.46	1.5 0.06	125.0 4.92	117.0 4.61	3.50 0.14	3.40 0.13	87.5	37.8	0.0806	1.69 3.72
41.000 1.6142	31.000 1.2205	-8.6 -0.34	2.0 0.08	83.0 3.27	89.0 3.50	1.5 0.06	125.0 4.92	117.0 4.61	4.20 0.17	2.70 0.11	111	27	0.0874	2.16 4.77
37.000 1.4567	31.000 1.2205	-7.9 -0.31	3.0 0.12	90.0 3.54	94.0 3.70	2.5 0.10	149.0 5.87	145.0 5.71	2.40 0.10	5.40 0.21	125	36.2	0.0788	3.60 7.93
37.000 1.4567	26.000 1.0236	10.2 0.40	3.0 0.12	90.0 3.54	109.0 4.29	2.5 0.10	151.5 5.96	138.0 5.43	6.30 0.25	5.50 0.22	93.8	19	0.0938	3.43 7.56
29.000 1.1417	22.000 0.8661	-1.8 -0.07	1.5 0.06	87.0 3.43	91.0 3.58	1.5 0.06	120.0 4.72	114.0 4.49	2.80 0.11	2.40 0.09	104	32.7	0.1234	1.27 2.80
37.000 1.4567	29.000 1.1417	-6.1 -0.24	2.0 0.08	89.0 3.50	94.0 3.70	1.5 0.06	125.0 4.92	119.0 4.69	3.40 0.13	2.40 0.10	122	37.8	0.0891	1.86 4.11
37.000 1.4567	29.000 1.1417	-6.1 -0.24	2.0 0.08	89.0 3.50	94.0 3.70	1.5 0.06	125.0 4.92	119.0 4.69	3.40 0.13	2.40 0.10	122	37.8	0.0838	1.86 4.10
26.000 1.0236	22.000 0.8661	-0.5 -0.02	2.5 0.10	90.0 3.54	94.0 3.70	2.0 0.08	133.0 5.24	128.0 5.04	2.00 0.08	6.00 0.23	85.8	37.4	0.0742	1.66 3.66
33.000 1.2992	28.000 1.1024	-4.6 -0.18	2.5 0.10	89.0 3.50	94.0 3.70	2.0 0.08	133.0 5.24	126.0 4.96	3.90 0.15	4.00 0.16	98.4	28.7	0.0828	2.05 4.51
46.000 1.8110	35.000 1.3780	-10.7 -0.42	2.5 0.10	89.0 3.50	97.0 3.82	2.0 0.08	135.0 5.31	125.0 4.92	5.40 0.21	2.80 0.11	143	38	0.0948	2.94 6.49
28.000 1.1024	22.000 0.8661	-2.0 -0.08	0.5 0.02	90.0 3.54	90.0 3.54	2.0 0.08	133.0 5.24	128.0 5.04	3.80 0.15	3.50 0.14	80.7	25.6	0.0771	1.80 3.98
39.000 1.5354	33.000 1.2992	-7.9 -0.31	3.0 0.12	96.0 3.78	100.0 3.94	2.5 0.10	159.0 6.26	154.0 6.06	1.90 0.08	5.90 0.23	147	37.5	0.0830	4.33 9.54
58.000 2.2835	48.000 1.8898	-19.0 -0.75	3.0 0.12	100.0 3.94	105.0 4.13	2.5 0.10	159.0 6.26	151.0 5.94	6.00 0.24	4.50 0.18	196	38.8	0.0922	6.35 13.99
32.000 1.2598	24.000 0.9449	-2.0 -0.08	0.5 0.02	94.0 3.70	94.0 3.70	1.5 0.06	134.0 5.28	128.0 5.04	3.20 0.13	2.20 0.09	128	42.8	0.1317	1.96 4.32
29.000 1.1417	22.000 0.8661	-0.5 -0.02	1.5 0.06	92.0 3.62	95.0 3.74	1.5 0.06	125.0 4.92	119.0 4.69	2.10 0.08	2.70 0.11	109	36.3	0.1270	1.33 2.93
29.000 1.1417	22.000 0.8661	-0.5 -0.02	6.5 0.26	92.0 3.62	106.0 4.17	1.5 0.06	125.0 4.92	119.0 4.69	2.10 0.08	2.70 0.11	109	36.3	0.1270	1.31 2.89
36.000 1.4173	29.500 1.1614	-9.4 -0.37	1.5 0.06	93.0 3.66	96.0 3.78	1.5 0.06	125.0 4.92	120.0 4.72	1.50 0.06	2.80 0.11	158	55.4	0.0865	1.74 3.83
41.000 1.6142	32.000 1.2598	-8.1 -0.32	2.5 0.10	96.0 3.78	100.0 3.94	2.0 0.08	135.0 5.31	126.0 4.96	4.50 0.18	2.80 0.11	161	39.6	0.0972	2.46 5.42
28.000 1.1024	24.000 0.9449	-0.3 -0.01	2.5 0.10	93.0 3.66	97.0 3.82	2.0 0.08	142.0 5.59	137.0 5.39	2.00 0.08	4.10 0.16	101	40.6	0.0833	2.07 4.57
36.000 1.4173	30.000 1.1811	-4.6 -0.18	2.5 0.10	94.0 3.70	100.0 3.94	2.0 0.08	142.0 5.59	134.0 5.28	4.10 0.16	3.20 0.12	121	25.7	0.0888	2.62 5.78
49.000 1.9291	37.000 1.4567	-11.7 -0.46	2.5 0.10	94.0 3.70	103.0 4.06	2.0 0.08	144.0 5.67	134.0 5.28	5.60 0.22	3.20 0.13	168	34.4	0.0995	3.59 7.92
41.000 1.6142	34.000 1.3386	-9.7 -0.38	4.0 0.16	100.0 3.94	106.0 4.17	3.0 0.12	166.5 6.56	162.0 6.38	6.00 0.24	3.50 0.14	144	41.6	0.0823	4.78 10.54
32.000 1.2598	24.000 0.9449	-2.0 -0.08	2.0 0.08	98.0 3.86	102.0 4.02	1.5 0.06	134.0 5.28	128.0 5.04	3.20 0.13	2.20 0.09	128	41.1	0.1317	1.70 3.75
32.000 1.2598	24.000 0.9449	-2.0 -0.08	6.0 0.24	98.0 3.86	111.0 4.37	1.5 0.06	134.0 5.28	128.0 5.04	3.20 0.13	2.20 0.09	128	41.1	0.1317	1.70 3.75
39.000 1.5354	32.500 1.2795	-10.9 -0.43	2.0 0.08	98.0 3.86	101.0 3.98	1.5 0.06	135.0 5.31	131.0 5.16	1.80 0.07	2.30 0.09	183	55.8	0.0884	2.20 4.85
45.000 1.7717	35.000 1.3780	-9.4 -0.37	2.5 0.10	100.0 3.94	108.0 4.25	2.0 0.08	145.0 5.71	135.0 5.31	3.80 0.15	2.90 0.12	180	43.2	0.0942	3.15 6.94
30.000 1.1811	26.000 1.0236	-0.8 -0.03	2.5 0.10	98.0 3.86	103.0 4.06	2.0 0.08	151.0 5.94	146.0 5.75	2.40 0.09	4.80 0.19	112	47.7	0.0859	2.52 5.57

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

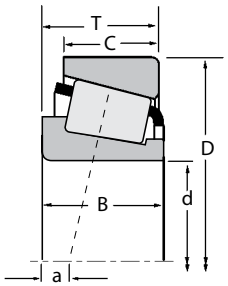
[7] Compound radius on inner race. Details on drawing for bearing.

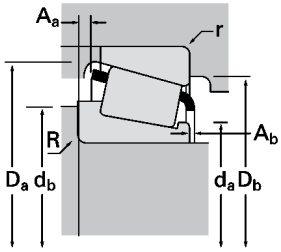
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

IsoClass™

METRIC 30000





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)			Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
95.000 3.7402	145.000 5.7087	39.000 1.5354	228000 51300	0.28	2.16	59100 13300	28100 6320	2.10	378000 85100	XAA33019	Y33019
95.000 3.7402	170.000 6.6929	34.500 1.3583	245000 55000	0.42	1.43	63400 14300	45600 10300	1.39	325000 73000	30219	30219
95.000 3.7402	170.000 6.6929	45.500 1.7913	293000 65800	0.42	1.43	75900 17100	54600 12300	1.39	401000 90100	32219	32219
100.000 3.9370	150.000 5.9055	39.000 1.5354	232000 52200	0.29	2.09	60200 13500	29600 6650	2.03	393000 88300	33020	33020
100.000 3.9370	180.000 7.0866	37.000 1.4567	279000 62800	0.42	1.43	72400 16300	52100 11700	1.39	376000 84500	30220	30220
100.000 3.9370	180.000 7.0866	49.000 1.9291	364000 81900	0.42	1.43	94400 21200	67900 15200	1.39	521000 117000	32220	32220
105.000 4.1339	160.000 6.2992	35.000 1.3780	210000 47300	0.44	1.35	54500 12300	41500 9320	1.31	339000 76200	32021X	32021X
105.000 4.1339	160.000 6.2992	43.000 1.6929	269000 60600	0.28	2.12	69800 15700	33800 7590	2.07	449000 101000	33021	33021
105.000 4.1339	190.000 7.4803	53.000 2.0866	369000 82900	0.42	1.43	95600 21500	68800 15500	1.39	516000 116000	32221	32221
106.000 4.1732	160.000 6.2992	35.000 1.3780	210000 47300	0.44	1.35	54500 12300	41500 9320	1.31	339000 76200	XGA32021X	Y32021X
110.000 4.3307	170.000 6.6929	38.000 1.4961	261000 58600	0.43	1.39	67600 15200	49800 11200	1.36	433000 97300	32022X	32022X
110.000 4.3307	200.000 7.8740	41.000 1.6142	345000 77500	0.42	1.43	89300 20100	64200 14500	1.39	472000 106000	30222	30222
110.000 4.3307	200.000 7.8740	56.000 2.2047	426000 95800	0.42	1.43	111000 24800	79500 17900	1.39	612000 137000	32222	32222
110.000 4.3307	215.000 8.4646	61.500 2.4213	502000 113000	0.44	1.38	130000 29300	97000 21800	1.34	753000 169000	XFA32224	Y32224
120.000 4.7244	165.000 6.4961	29.000 1.1417	164000 36800	0.35	1.72	42500 9550	25400 5700	1.68	303000 68100	32924	32924
120.000 4.7244	180.000 7.0866	38.000 1.4961	269000 60400	0.46	1.31	69700 15700	54700 12300	1.27	464000 104000	32024X	32024X
120.000 4.7244	180.000 7.0866	38.000 1.4961	271000 60900	0.46	1.31	70200 15800	55100 12400	1.27	466000 105000	XAA32024X	Y32024X
120.000 4.7244	215.000 8.4646	43.500 1.7126	367000 82500	0.44	1.38	95100 21400	70800 15900	1.34	508000 114000	30224	30224
120.000 4.7244	215.000 8.4646	61.500 2.4213	543000 122000	0.44	1.38	141000 31600	105000 23500	1.34	832000 187000	32224	32224
130.000 5.1181	200.000 7.8740	45.000 1.7717	359000 80700	0.43	1.38	93100 20900	69300 15600	1.34	620000 139000	32026X	32026X
130.000 5.1181	230.000 9.0551	43.750 1.7224	399000 89700	0.44	1.38	103000 23300	76700 17400	1.34	550000 124000	30226	30226
140.000 5.5118	190.000 7.4803	32.000 1.2598	207000 46600	0.36	1.67	53800 12100	33200 7460	1.62	398000 89500	32928	32928
140.000 5.5118	210.000 8.2677	45.000 1.7717	365000 82100	0.46	1.31	94700 21300	74400 16700	1.27	646000 145000	XAA32028X	Y32028X
140.000 5.5118	250.000 9.8425	45.750 1.8012	465000 104000	0.44	1.38	120000 27100	89400 20200	1.34	649000 146000	30228	30228
150.000 5.9055	210.000 8.2677	38.000 1.4961	300000 67500	0.33	1.83	77800 17500	43700 9830	1.78	573000 129000	32930	32930
150.000 5.9055	225.000 8.8583	48.000 1.8898	410000 92200	0.46	1.31	106000 23900	83200 18800	1.27	730000 164000	32030X	32030X
150.000 5.9055	270.000 10.6299	49.000 1.9291	523000 118000	0.44	1.38	136000 30500	101000 22700	1.34	735000 165000	30230	30230
160.000 6.2992	240.000 9.4488	51.000 2.0079	471000 106000	0.46	1.31	122000 27500	95800 21600	1.27	853000 192000	32032X	32032X

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	a[3]	R[4]	d_a	d_b	r[4]	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
39.000 1.5354	32.500 1.2795	-10.2 -0.40	6.0 0.24	102.0 4.02	114.0 4.49	1.5 0.06	139.0 5.47	133.0 5.24	1.90 0.07	2.30 0.09	192	48.4	0.0907	2.23 4.93
32.000 1.2598	27.000 1.0630	-1.0 -0.04	3.0 0.12	108.0 4.25	113.0 4.45	2.5 0.10	161.0 6.34	154.0 6.06	2.60 0.10	6.20 0.24	143	49.8	0.0880	3.14 6.92
43.000 1.6929	37.000 1.4567	-6.4 -0.25	3.0 0.12	106.0 4.17	111.0 4.37	2.5 0.10	161.0 6.34	152.0 5.98	4.80 0.19	3.00 0.12	166	35.3	0.0984	4.06 8.94
39.000 1.5354	32.500 1.2795	-9.4 -0.37	2.0 0.08	107.0 4.21	111.0 4.37	1.5 0.06	144.0 5.67	139.0 5.47	1.90 0.08	2.30 0.09	206	65.1	0.0938	2.37 5.22
34.000 1.3386	29.000 1.1417	-0.8 -0.03	3.0 0.12	115.0 4.53	119.0 4.69	2.5 0.10	169.0 6.65	163.0 6.42	2.10 0.08	6.10 0.24	168	51.9	0.0928	3.77 8.3
46.000 1.8110	39.000 1.5354	-7.4 -0.29	3.0 0.12	113.0 4.45	122.0 4.80	2.5 0.10	171.0 6.73	162.0 6.38	5.30 0.21	5.40 0.21	211	49.9	0.1006	5.00 11.02
35.000 1.3780	26.000 1.0236	-0.3 -0.01	2.5 0.10	113.0 4.45	119.0 4.69	2.0 0.08	154.0 6.06	147.0 5.79	3.20 0.13	2.60 0.10	176	50.7	0.1024	2.40 5.29
43.000 1.6929	34.000 1.3386	-12.2 -0.48	2.5 0.10	113.0 4.45	118.0 4.65	2.0 0.08	153.0 6.02	147.0 5.79	3.10 0.12	3.10 0.12	236	54.8	0.0975	2.95 6.50
50.000 1.9685	43.000 1.6929	-7.9 -0.31	3.0 0.12	118.0 4.65	123.0 4.84	2.5 0.10	180.0 7.09	171.0 6.73	5.20 0.20	2.70 0.11	220	43.5	0.1082	5.98 13.18
35.000 1.3780	26.000 1.0236	-0.3 -0.01	6.0 0.24	115.0 4.53	128.0 5.04	2.0 0.08	154.0 6.06	147.0 5.79	3.20 0.13	2.60 0.10	176	50.7	0.1024	2.36 5.19
38.000 1.4961	29.000 1.1417	-1.0 -0.04	2.5 0.10	119.0 4.69	124.0 4.88	2.0 0.08	164.0 6.46	156.0 6.14	3.30 0.13	3.00 0.12	222	46.3	0.1095	3.06 6.74
38.000 1.4961	32.000 1.2598	-1.5 -0.06	3.0 0.12	126.0 4.96	130.0 5.12	2.5 0.10	187.0 7.36	181.0 7.13	3.20 0.12	7.20 0.28	219	59.9	0.1012	5.24 11.55
53.000 2.0866	46.000 1.8110	-8.6 -0.34	3.0 0.12	124.0 4.88	129.0 5.08	2.5 0.10	190.0 7.48	179.0 7.05	6.40 0.25	3.00 0.12	261	55.9	0.1146	7.18 15.82
58.000 2.2835	50.000 1.9685	-9.4 -0.37	3.0 0.12	133.0 5.24	137.0 5.39	2.5 0.10	204.0 8.03	192.0 7.56	7.80 0.31	3.00 0.12	329	52.3	0.1253	9.85 21.72
29.000 1.1417	23.000 0.9055	0.3 0.01	1.5 0.06	127.0 5.00	129.0 5.08	1.5 0.06	160.0 6.30	155.0 6.10	1.10 0.04	3.10 0.12	222	114	0.1332	1.79 3.95
38.000 1.4961	29.000 1.1417	1.8 0.07	2.5 0.10	130.0 5.12	136.0 5.35	2.0 0.08	174.0 6.85	165.0 6.50	1.90 0.07	4.10 0.16	255	66.2	0.1100	3.27 7.22
38.000 1.4961	29.000 1.1417	1.5 0.06	5.0 0.20	130.0 5.12	141.0 5.55	2.0 0.08	174.0 6.85	165.0 6.50	3.50 0.14	3.00 0.12	255	58.3	0.1169	3.26 7.19
40.000 1.5748	34.000 1.3386	0.3 0.01	3.0 0.12	136.0 5.35	140.0 5.51	2.5 0.10	201.0 7.91	195.0 7.68	3.70 0.15	6.20 0.25	252	64.7	0.1072	6.24 13.75
58.000 2.2835	50.000 1.9685	-10.2 -0.40	3.0 0.12	135.0 5.31	147.0 5.79	2.5 0.10	204.0 8.03	191.0 7.52	5.50 0.22	6.50 0.26	352	68.2	0.1208	9.26 20.42
45.000 1.7717	34.000 1.3386	-1.0 -0.04	2.5 0.10	142.0 5.59	148.0 5.83	2.0 0.08	192.0 7.56	184.0 7.24	3.50 0.14	3.60 0.14	340	97.2	0.1190	4.95 10.92
40.000 1.5748	34.000 1.3386	2.0 0.08	4.0 0.16	146.0 5.75	152.0 5.98	3.0 0.12	217.0 8.54	210.0 8.27	2.80 0.11	7.10 0.28	287	76.9	0.1118	7.06 15.56
32.000 1.2598	25.000 0.9843	2.3 0.09	2.0 0.08	148.0 5.83	151.0 5.94	1.5 0.06	184.0 7.24	179.0 7.05	1.60 0.06	2.70 0.11	314	144	0.1509	2.51 5.53
45.000 1.7717	34.000 1.3386	1.5 0.06	6.5 0.26	151.0 5.94	166.0 6.54	2.0 0.08	203.0 7.99	193.0 7.60	3.10 0.12	3.60 0.14	375	108	0.1250	5.24 11.55
42.000 1.6535	36.000 1.4173	2.8 0.11	4.0 0.16	157.0 6.18	164.0 6.46	3.0 0.12	233.0 9.17	227.0 8.94	3.30 0.13	8.30 0.33	348	75.7	0.1191	8.23 18.14
38.000 1.4961	30.000 1.1811	-1.5 -0.06	2.5 0.10	160.0 6.30	163.0 6.42	2.0 0.08	203.0 7.99	197.0 7.76	1.60 0.06	3.90 0.15	429	157	0.1167	4.00 8.82
48.001 1.8898	36.000 1.4173	1.0 0.04	3.0 0.12	163.0 6.42	169.0 6.65	2.5 0.10	217.0 8.54	206.0 8.11	4.80 0.19	4.30 0.17	437	115	0.1314	6.38 14.06
45.000 1.7717	38.000 1.4961	3.6 0.14	4.0 0.16	168.0 6.61	174.0 6.85	3.0 0.12	250.0 9.84	245.0 9.65	3.00 0.12	7.50 0.29	407	78.1	0.1254	11.08 24.43
51.000 2.0079	38.000 1.4961	1.8 0.07	3.0 0.12	174.0 6.85	181.0 7.13	2.5 0.10	234.0 9.21	221.0 8.70	3.50 0.14	4.00 0.16	522	134	0.1166	7.90 17.42

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.

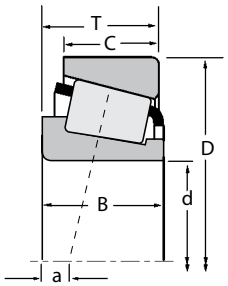
[7] Compound radius on inner race. Details on drawing for bearing.

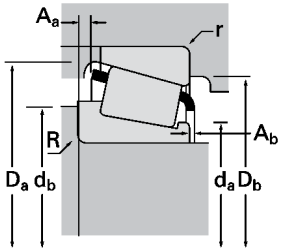
[8] Pin-type cage. Please consult The Timken Company.

Continued on next page.

IsoClass™

METRIC 30000





Dimensions, mm (inches)			Load Ratings, N (lbf.) Dynamic (1)		Factors (5)	Dynamic (2)		Factors (5)	Static	Part Number	
d	D	T	C_1	e	Y	C_{90}	C_{a90}	K	C_0	Inner	Outer
170.000 6.6929	230.000 9.0551	38.000 1.4961	333000 74800	0.38	1.57	86200 19400	56600 12700	1.52	652000 146000	32934	32934
180.000 7.0866	250.000 9.8425	45.000 1.7717	376000 84600	0.48	1.25	97500 21900	80200 18000	1.22	739000 166000	32936	32936
180.000 7.0866	280.000 11.0236	64.000 2.5197	722000 162000	0.42	1.42	187000 42100	135000 30500	1.38	1280000 287000	32036X	32036X
190.000 7.4803	290.000 11.4173	64.000 2.5197	734000 165000	0.44	1.36	190000 42800	144000 32400	1.32	1330000 298000	32038X	32038X
200.000 7.8740	280.000 11.0236	51.000 2.0079	522000 117000	0.39	1.52	135000 30400	91300 20600	1.48	1050000 237000	32940	32940
220.000 8.6614	300.000 11.8110	51.000 2.0079	550000 124000	0.43	1.41	143000 32100	104000 23400	1.37	1090000 245000	32944	32944
220.000 8.6614	340.000 13.3858	76.000 2.9921	975000 219000	0.43	1.39	253000 56800	186000 41800	1.36	1800000 405000	32044X	32044X
280.000 11.0236	380.000 14.9606	63.500 2.5000	833000 187000	0.43	1.39	216000 48600	160000 36000	1.35	1780000 401000	32956	32956
320.000 12.5984	480.000 18.8976	100.000 3.9370	1770000 398000	0.46	1.31	459000 103000	360000 80900	1.27	3420000 768000	32064X	32064X
360.000 14.1732	480.000 18.8976	76.000 2.9921	1220000 275000	0.46	1.31	317000 71400	249000 56100	1.27	2780000 624000	32972	32972

(1) Based on 1 x 10^6 revolutions L_{10} life, for the ISO life calculation method.
(2) Based on 90 x 10^6 revolutions L_{10} life, for The Timken Company life calculation method. C_{90} and C_{a90} are radial and thrust values.
(3) Negative value indicates effective center inside cone backface.
(4) These maximum fillet radii will be cleared by the bearing corners.
(5) These factors apply for both inch and metric calculations. Consult your Timken representative for instruction on use.

Dimensions, mm (inches)											Factors			Weight kg (lbs.)
Bearing			Shaft			Housing			Cage					
			max shaft fillet radius	backing shoulder dia.	backing shoulder dia.		backing shoulder dia.							
B	C	$a^{(3)}$	$R^{(4)}$	d_a	d_b	$r^{(4)}$	D_a	D_b	A_a	A_b	G_1	G_2	C_g	
38.000 1.4961	**30.000** 1.1811	**3.8** 0.15	**2.5** 0.10	**179.0** 7.05	**183.0** 7.20	**2.0** 0.08	**223.0** 8.78	**215.0** 8.46	**2.10** 0.08	**4.60** 0.18	**519**	**180**	**0.1305**	**4.40** 9.71
45.000 1.7717	**34.000** 1.3386	**8.9** 0.35	**2.5** 0.10	**191.0** 7.52	**196.0** 7.72	**2.0** 0.08	**241.0** 9.49	**232.0** 9.13	**3.60** 0.14	**3.40** 0.13	**569**	**184**	**0.1211**	**6.51** 14.34
64.000 2.5197	**48.000** 1.8898	**-3.6** -0.14	**3.0** 0.12	**197.0** 7.76	**203.0** 7.99	**2.5** 0.10	**270.0** 10.63	**256.0** 10.08	**6.20** 0.25	**3.70** 0.15	**773**	**147**	**0.1298**	**11.39** 25.10
64.000 2.5197	**48.000** 1.8898	**-0.5** -0.02	**3.0** 0.12	**207.0** 8.15	**214.0** 8.43	**2.5** 0.10	**282.0** 11.10	**267.0** 10.51	**6.40** 0.25	**3.90** 0.15	**842**	**161**	**0.1353**	**14.81** 32.65
51.000 2.0079	**39.000** 1.5354	**3.3** 0.13	**3.0** 0.12	**213.0** 8.39	**217.0** 8.54	**2.5** 0.10	**272.0** 10.71	**262.0** 10.31	**3.30** 0.13	**3.50** 0.14	**848**	**220**	**0.1300**	**9.45** 20.83
51.000 2.0079	**39.000** 1.5354	**8.1** 0.32	**3.0** 0.12	**232.0** 9.13	**237.0** 9.33	**2.5** 0.10	**290.0** 11.42	**281.0** 11.06	**4.80** 0.19	**3.10** 0.12	**909**	**152**	**0.1361**	**9.90** 21.83
76.000 2.9921	**57.000** 2.2441	**-3.3** -0.13	**4.0** 0.16	**241.0** 9.49	**248.0** 9.76	**3.0** 0.12	**325.0** 12.80	**312.0** 12.28	**10.20** 0.40	**4.30** 0.17	**1210**	**128**	**0.1509**	**24.04** 53.01
63.500 2.5000	**48.000** 1.8898	**11.4** 0.45	**3.0** 0.12	**296.0** 11.65	**300.0** 11.81	**2.5** 0.10	**368.0** 14.49	**356.0** 14.02	**7.40** 0.29	**3.40** 0.13	**1700**	**236**	**0.1680**	**19.87** 43.81
100.000 3.9370	**74.000** 2.9134	**4.3** 0.17	**5.0** 0.20	**343.0** 13.50	**357.0** 14.06	**4.0** 0.16	**461.0** 18.15	**442.0** 17.40	**13.50** 0.53	**5.20** 0.21	**2670**	**201**	**0.1998**	**59.73** 131.68
76.000 2.9921	**57.000** 2.2441	**20.6** 0.81	**4.0** 0.16	**378.0** 14.88	**385.0** 15.16	**3.0** 0.12	**466.0** 18.35	**451.0** 17.76	**10.80** 0.43	**4.10** 0.16	**2980**	**344**	**0.2061**	**36.43** 80.31

[6] For standard class (4 or 2) only, the maximum metric value is a whole millimeter dimension.
[7] Compound radius on inner race. Details on drawing for bearing.
[8] Pin-type cage. Please consult The Timken Company.

NOTES

RADIAL CYLINDRICAL ROLLER BEARINGS

Overview: A radial cylindrical roller bearing consists of an inner and/or outer ring, a roller retaining cage and a complement of controlled contour cylindrical rollers. Depending on the style of bearing, either the inner or the outer ring will have two roller guiding ribs. The other ring, separable from the assembly, has one rib or none. The ring with two ribs axially locates the position of the roller assembly. The diameters of these ribs may be used to support the roller cage. One of the ribs may carry light thrust loads when an opposing rib is provided in the mating ring.

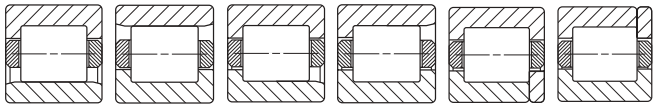
- **Sizes:** 15 mm - 65 mm (0.5906 in. to 2.5591 in.) and 100 mm - 600 mm (4 in. - 27.20 in.).
- **Markets:** Power generation, oil field, mining and aggregate processing, gear drives and rolling mills.
- **Features:** Extensive product range for integration into heavy-duty industrial applications.
- **Benefits:** Accommodate heavy radial loads through expertly designed critical dimensions, such as roller and raceway diameter and contact geometry.

Radial Cylindrical Roller Bearings

Bore

inch:		metric:	
200	20.0 in.	**200**	200 mm
42	4.25 in.	**210**	210 mm
43	4.375 in.	**220**	220 mm
standard sizes are 4 - 27.20 inch		standard sizes are 100 - 600 mm	

Standard Styles inch/metric



RIU,RU,NU **RIN,RN,N** **RIJ,RJ,NJ** **RIF,RF,NF** **RIT,RT,NUP** **RIP,RP,NP**

METRIC **200** **RU** **02** **OA107** **R3**

Series:
two digits indicates metric envelope dimensions
three digits indicates inch envelope dimensions

Modifications:
(First two letters are assigned by Timken engineers)
letter other than "O" in first position indicates modification to inner ring.
Letter other than "O" in second position indicates modification to outer ring.

Common Modifications:

101 outer ring with special lubrication hole size
107 outer ring with standard lubrication holes and machined lubrication groove in center of O.D.
127 steel cage
132 wide inner ring
229 rings and rollers made of carburized grade steel
305 inner ring with oversize bore outer ring with standard lubrication holes and machined lubrication groove in center of O.D.
334 centrifically cast brass cage
771 mark bearings serially

Radial Internal Clearance:

R1 < R2	**C2 < C0**
R2 < R3	**C0 < C3**
R3 = Standard	**C3 < C4**
R4 > R3	**C4 < C5**
R5 > R4	**C5**

Cylindrical Roller Radial Bearings - Metric Nominal Dimensions

Prefix

NJ = cylindrical roller radial bearing (two ribs on outer ring, one rib on inner ring)
NU = cylindrical roller radial bearing (two ribs on outer ring, cylindrical inner ring)
NUP = cylindrical roller radial bearing (two ribs on outer ring, one fixed rib and one loose rib/flat washer on inner ring)
RNU = cylindrical roller radial bearing (two ribs on outer ring, without an inner ring)

Inner Ring Bore Diameter
02 = 15 mm
03 = 17 mm
(for inner ring bore > 20 mm):
bore code x 5 = bore diameter
04 = 4 x 5 = 20 mm

NJ **2** **04** **E.TVP**

Series

10 = width series 1; diameter series 0 (dimension series 10)
2 = width series 0; diameter series 2 (dimension series 02)
22 = width series 2; diameter series 2 (dimension series 22)
3 = width series 0; diameter series 3 (dimension series 03)
23 = width series 2; diameter series 3 (dimension series 23)

Suffix

E.TVP = "E" design bearing, molded reinforced polymer window-type cage
M = machined brass cage

Radial Cylindrical Roller Bearings

SINGLE-ROW RADIAL BEARINGS – METRIC SERIES

The Timken radial cylindrical roller bearing has integral end ribs on the outer ring for end guiding the cylindrical rollers. The inner ring is separable for simplified mounting and removal.

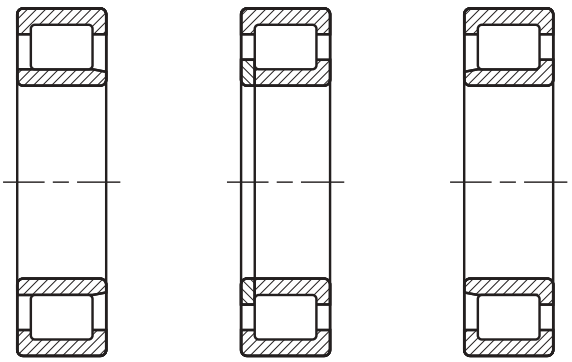
All NU design bearings are available on request without inner rings. For this requirement add letter R in the prefix.

The modified line contact between the cylindrical rollers and raceways reduces edge stressing.

REFERENCE STANDARDS ARE:

- DIN 5412 single-row cylindrical roller bearings.
- ISO 246 & DIN 5412 angle rings (thrust collar).

TYPES OF METRIC SERIES CYLINDRICAL ROLLER RADIAL BEARINGS



NU NUP NJ

SUFFIXES

E.TVP	E-design bearing, molded window type cage of engineered polymer.
M	Machined brass cages.

CONSTRUCTION

Cylindrical roller radial bearings can be recognized by the arrangement of their end ribs. Bearings of NU design have two ribs on the outer ring, the inner ring being cylindrical, making them well-suited for use as floating bearings. They are separable, which simplifies mounting and removal. Radial cylindrical roller bearings of NJ design have two ribs on the outer ring and one rib on the inner ring. They can accept axial loading in one direction.

Bearings of NUP design have two ribs on the outer ring, and one fixed and one loose rib (a flat washer) on the inner ring. These radial cylindrical roller bearings are used for locating purposes and can accept reversing axial loading. A radial cylindrical roller bearing of NJ design with an HJ Type thrust collar forms a locating bearing similar to the NUP design.

Cylindrical roller bearings of RNU Type, available on request, are supplied without an inner ring so that the cylindrical rollers run directly on a hardened and ground shaft. For most general applications, the shaft may be machined to g6 and the housing bore to K6 tolerances.

CAGE DESIGNS

The majority of cylindrical roller bearings of series 2..E, 22..E, 3..E and 23..E use cages of glass-fiber reinforced nylon. This cage construction allows bearings to be designed with maximum load carrying capability. These cages can also be used at operating temperatures of up to 120° C over extended periods. When bearings are lubricated with an oil, presence of additives may reduce operating life if the temperature exceeds 100° C over extended periods. Furthermore, stagnant oil may affect the performance of the cage at these temperatures, requiring oil change intervals to be strictly observed.

Suffix M indicates that the bearings use machined brass cages.

DIMENSIONAL ACCURACY

TOLERANCES AND BEARING CLEARANCE

Metric series radial cylindrical roller bearings are available in various tolerance classes and clearance groups. Single-row cylindrical roller bearings are made to normal clearance group C0, although bearings with radial clearance groups C2, C3 and C4 may be obtained on request.

For tolerances of radial cylindrical roller bearings see the engineering section. For radial internal clearances of radial cylindrical roller bearings see the engineering section.

ALIGNMENT

The modified line contact between the cylindrical rollers and raceways of cylindrical roller bearings reduces stress concentration at ends of the rollers and provides some aligning capability. The angular alignment of single-row cylindrical roller bearings must not exceed a maximum of four angular minutes at a .001% load of C/P∂5= equivalent dynamic load, kN. At higher applied loads, or with presence of greater misalignment, consultation with Timken engineering is strongly encouraged.

MOUNTING DIMENSIONS

The bearing inner and outer rings should be mounted against the stepped portion on the shaft and the shoulder of the housing. Under no circumstances should they interfere with the shaft or housing fillets. For this reason, the maximum fillet radius $r_{as\ max}$ of the mating component must be no greater than the minimum chamfer dimension of the corresponding cylindrical roller bearing ring corner $r_{s\ min}$.

The shoulder of the mating components must be such that, even with the maximum permissible single chamfer dimension of the corresponding bearing ring, there is an adequate contact surface area. Table 1 lists the maximum fillet radius $r_{as\ max}$ and the minimum shoulder height. At high axial loads the ribs must be supported over half their height.

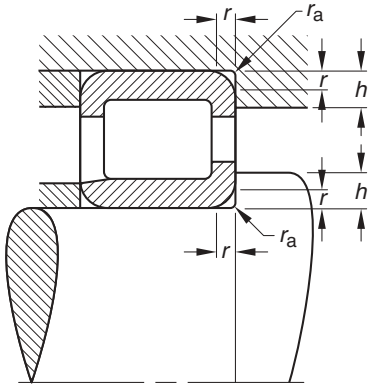
$$\left(\frac{H+E}{2} \text{ and } \frac{F+J}{2}\right)$$

where from bearing tables:

F raceway diameter of the inner ring
E raceway diameter of the outer ring
J rib diameter of the inner ring
H rib diameter of the outer ring

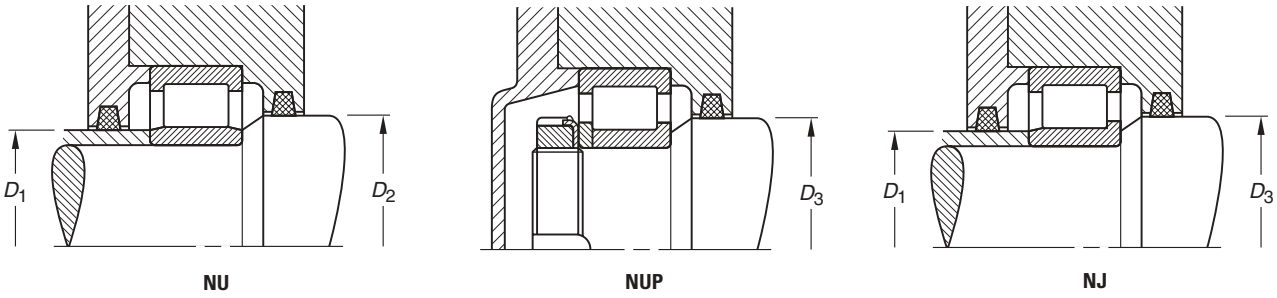
The shaft can be mounted and removed if the mounting dimensions shown in Table 2 on page B330 are observed.

TABLE 1 –
ABUTMENT DIMENSIONS AS SPECIFIED IN DIN 5418 FOR METRIC SERIES BEARINGS



$r_{s\ min}$ mm	$r_{as\ max}$	h_{min} BEARING SERIES	
		10	2..E 3..E 22..E 23..E
0.3	0.3	1	1.2
0.6	0.6	1.6	2.1
1	1	2.3	2.8
1.1	1	3	3.5
1.5	1.5	3.5	4.5
2	2	4.4	5.5
2.1	2.1	5.1	6
3	2.5	6.2	7
4	3	7.3	8.5
5	4	9	10
6	5	11.5	13

See the Needle section for cylindrical roller bearings with inner rings.



NU NUP NJ

TABLE 2 – MOUNTING DIMENSIONS FOR METRIC SERIES SINGLE-ROW CYLINDRICAL ROLLER BEARINGS

Bore Reference Number	Shaft Dia.	BEARING SERIES							
		10	22..E		2..E	23..E	3..E		
	mm	D_1 max.	D_2 min.	D_1 max.	D_2 min.	D_3 min.	D_1 max.	D_2 min.	D_3 min.
02	15			20	23	26			
03	17			21	25	27	24	27	30
04	20	25	27	26	29	32	27	30	33
05	25	30	32	31	34	37	33	37	40
06	30	35	38	37	40	44	40	44	48
07	35	41	44	43	46	50	45	48	53
08	40	46	49	49	52	56	51	55	60
09	45	52	54	54	57	61	57	60	66
10	50	57	59	58	62	67	63	67	73
11	55	63	66	65	68	73	69	72	80
12	60	68	71	71	75	80	75	79	86
13	65	73	76	77	81	87	81	85	93
14	70	78	82	82	86	92	87	92	100
15	75	83	87	87	90	96	93	97	106
16	80	90	94	94	97	104	99	105	114

LOAD RATINGS

CYLINDRICAL ROLLER BEARING MAXIMUM ALLOWABLE AXIAL LOAD

Metric series cylindrical roller bearings of NUP, NJ, as well as NU or NJ designs with a thrust collar can transmit axial loads if they are radially loaded at the same time. The allowable axial load ratio F_a/C of 0.1 maximum depends to a great extent on the magnitude of radial load, the operating speed, type of lubricant used, the operating temperature, and heat transfer conditions at the bearing location. The heat balance achieved at the bearing location is used as a basis for determination of the allowable axial load.

The nomogram on page B332 should be used to determine the allowable axial load F_{az} based on the following operating conditions:

- The axial load is of constant direction and magnitude.
- Radial load ratio $F_r/C \leq 0.2$.
- Ratio of axial load to radial load $F_a/F_r<0.4$.
- The temperature of the bearing is 80° C at an ambient temperature of 20° C.
- Lubricating oil is ISO VG 100 using oil bath lubrication or circulating oil.
- As an alternative, the bearing may be lubricated with a grease using the above specified base oil and viscosity. Use of EP additives will be necessary, although considerably shorter relubrication intervals may be expected than with purely radially loaded radial cylindrical roller bearings.

EXAMPLE OF USING THE NOMOGRAM

From the lower part of the nomogram, determine the intersection point of the inner ring bore diameter and the dimension series of the bearing. From the upper part, the allowable axial load ratio F_{az}/C can be found as a function of the operating speed, n.

For a cylindrical roller radial bearing **NU2207E.TVP**
C = 63 kN; d = 35 mm
n = 2000 RPM
F_r = 10 kN

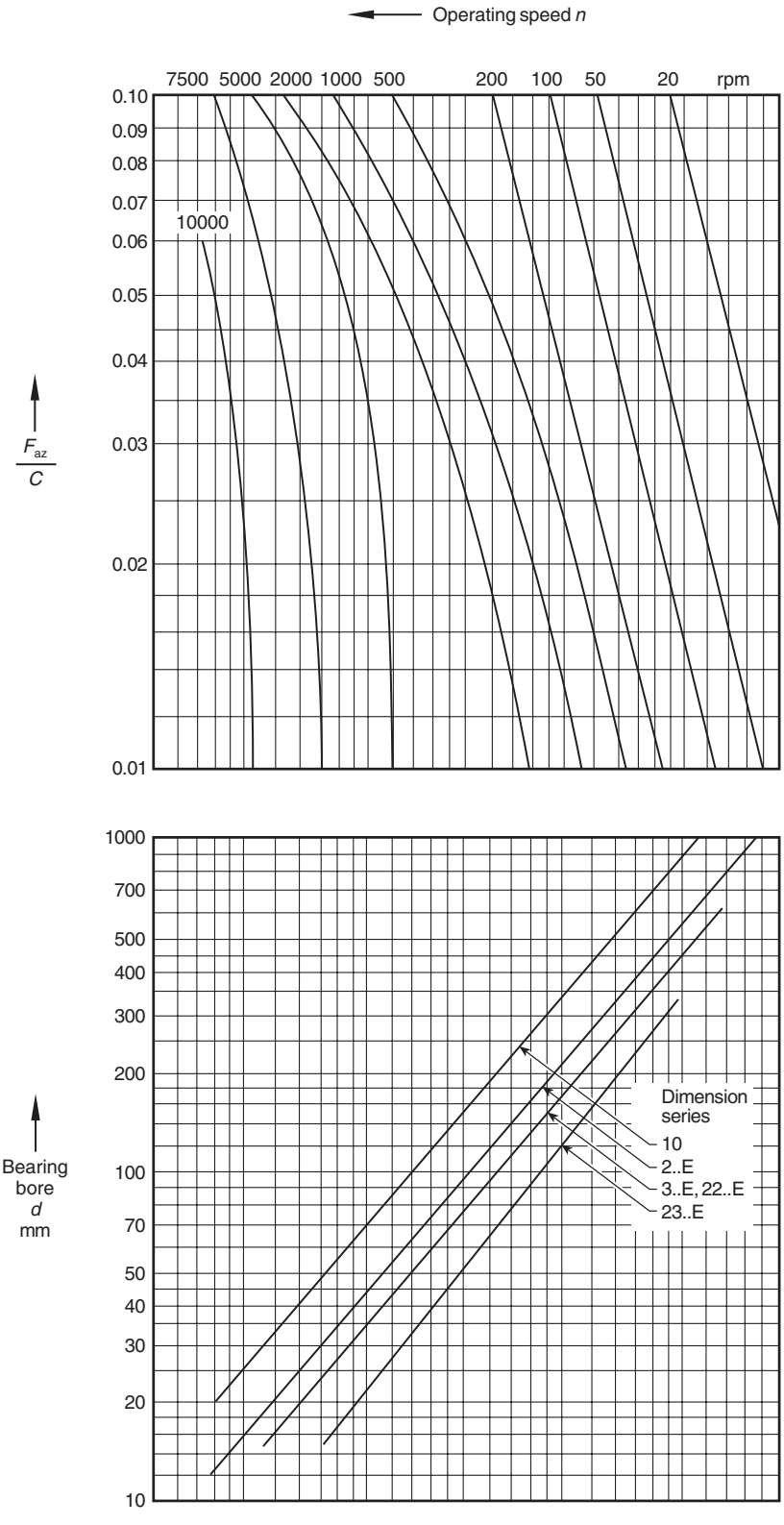
From the nomogram:
$F_{az}/C = 0.06$
Then $F_{az} = 0.06 \bullet 63$
The calculated allowable axial load F_{az} is 3.78 kN

It should be noted that an axial load as high as that determined by means of the nomogram should not be applied if an oil of rated kinematic viscosity lower than ISO VG 100 is used. Suitable EP additives, which are known for fatigue life improving qualities, may allow for an increase in applied axial load subject to thorough testing.

HIGHER APPLIED AXIAL LOADS

Axial loads greater than those determined by means of the nomogram may be considered, providing they are to be applied intermittently. Also, the bearing should be cooled using circulating oil lubrication. If the operating temperature, due to the internal friction and the higher axial load, exceeds 80° C, a more viscous oil must be used.

NOMOGRAM FOR DETERMINING THE ALLOWABLE AXIAL LOAD F_{az}



INTRODUCTION

Timken heavy-duty radial cylindrical roller bearings are designed to provide the highest possible radial capacity for a given cross section, and to perform under heavy radial loads.

These bearings incorporate improved internal proportions developed through computer-assisted optimization studies to make maximum use of the total available cross-sectional area. Controlled contour rollers redistribute end-stress concentration and provide more uniform distribution of the applied load.

Cylindrical roller bearings with bore sizes from 100 mm (3.937 in.) up to 700 mm (27.5 in.) are shown in this catalog, and even larger sizes can be provided on special order. Consult your Timken representative for complete information on your bearing size requirements.

The standard cylindrical roller bearing furnished consists of an outer ring, a complement of controlled contour rollers, a cage and an inner ring. The 5200 Series bearings include styles without an inner ring for applications where the shaft functions as the inner ring. Bearing rings and rollers are manufactured from bearing-quality steel.

BEARING TYPES

STANDARD SIZES

Six standard styles of cylindrical roller bearings are listed in this section of the catalog. All six styles have the same roller complement for a given cross section or envelope and, therefore, the same radial load capacity.

In all six styles, one ring (either the inner or the outer) has two integral roller-guiding ribs. The other ring is separable from the assembly and has either one integral rib or none. The two-rib ring locates the roller complement axially, and the ground diameter of the ribs may be used to support the cage.

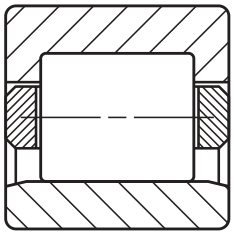
Moderate thrust loads from one direction only are acceptable for those styles with three integral ribs (RJ, RF, RT and RP). The decision as to which ring should be double-ribbed is determined by conditions of assembly and mounting procedures in a specific application. Standard cage material is fully machined brass with stamped steel also available.

For convenience, all six styles of bearings are listed in the dimension tables in order of ascending bore size, with both inch and metric sizes indicated for each bearing. ABMA designations are used for these bearings. Inch-sized bearings are identified by the letter "I" with the part number in bold type. RIU, for example, indicates an inch bearing, while RU indicates the equivalent style in metric dimensions.

All types can be mounted with interference fits on either inner or outer ring (or both). In the latter case, a bearing with increased internal clearance must be specified to provide proper running clearance.

RIU, RU

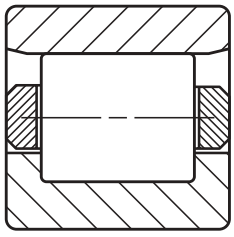
These bearings carry radial load only and can accommodate expansion or contraction. The relative axial displacement of one ring to the other occurs with minimum friction while the bearing is rotating. These bearings may be used in one or two positions for shaft support if other means of axial location are provided. The outer ring has two integral ribs while the inner ring has a cylindrical O.D. without ribs.



RIU, RU, NU

RIN, RN

This series has the same characteristics as RIU and RU, bearings except that two ribs are incorporated in the inner ring, and the outer ring has a cylindrical bore without ribs.

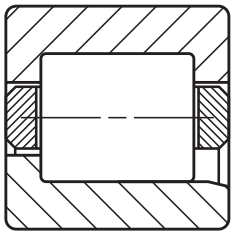


RIN, RN, N

RIJ, RJ

Types RIJ and RJ have double-ribbed outer and single-ribbed inner rings and can support heavy radial loads, as well as light unidirectional thrust loads up to 10 percent of the radial load. The thrust load is transmitted between the diagonally opposed rib faces in a sliding rather than a rolling action. Thus, when limiting thrust conditions are approached, lubrication can become critical.

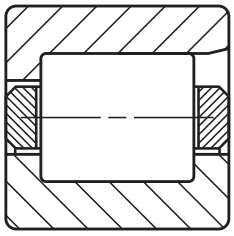
Your Timken representative should be consulted for such applications. When thrust loads are very light, these bearings may be used in an opposed mounting to locate the shaft. In these cases, shaft endplay should be adjusted at time of assembly.



RIJ, RJ, NJ

RIF, RF

This type has the same characteristics as RIJ and RJ, except it incorporates a double-ribbed inner ring and a single-ribbed outer ring.

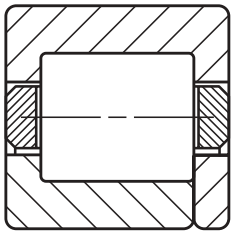


RIF, RF, NF

RIT, RT

These types have a double-ribbed outer ring and a single-ribbed inner ring with an abutting loose rib, which allows the bearing to provide axial location and to carry light thrust loads in both directions. Factors governing radial and thrust capacities are the same as for RIJ and RJ.

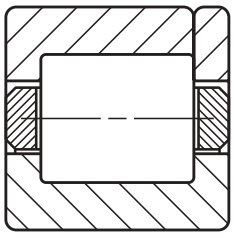
A type RIT or RT bearing may be used in conjunction with a type RN or RU bearing for applications where axial shaft expansion is anticipated. In these cases, the fixed bearing is usually placed nearest the drive end of the shaft to minimize alignment variations in the drive. Shaft endplay (or float) is determined by the axial clearance in the bearing.



RIT, RT, NUP

RIP, RP

These types have the same characteristics as RIT and RT, except the inner ring is double-ribbed with a loose abutting rib.



RIP, RP, NP

5200 METRIC SERIES

The Timken 5200 metric cylindrical roller bearing offers an enhanced radial capacity in most applications due to its internal design proportions. The outer ring of a 5200 Series bearing is double-ribbed to create a recessed raceway for the complement of rollers. Style A-5200, which fits the widest variety of applications in industry, includes a full-width plain inner ring.

Because of the manufacturing tolerances established by Timken for the 5200 Series, components for any one cross section are interchangeable. This enables Timken to supply finished 5200 Series bearings to customers quickly from our complete inventory. 5200 Series bearings are available with bore sizes from 100 mm to 240 mm (3.9370 in. to 9.4488 in.).

The designer also is offered the option of specifying these bearings without the inner ring, for installations with limited radial cross sections. In these installations, the shaft serves as the inner ring and must therefore be hardened to Rc58 (minimum) and ground to a 14Ra or better surface finish.

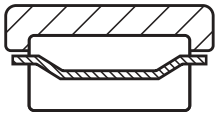
The 5200 Series bearings are supplied with a stamped steel cage that is land-riding on the outer ring ribs (indicated by the suffix "S" on the catalog number). The cage is designed to provide free-rolling separation and also to retain the rollers. If the bearing is to be used under special conditions, such as reversing or high-speed applications, a machined brass cage is available (suffix "M" on catalog number). Your Timken representative should be consulted for specific suggestions.

The outer rings and rollers of 5200 Series bearings are made from bearing-quality alloy steel. The inner rings are deep-case hardened to accommodate the hoop stresses resulting from heavy press fits.

When supplied with an inner ring, all 5200 Series bearings have an R6 radial internal clearance as standard (see page B348). Other radial internal clearances can be provided as required by using a different inner ring. Proper roller guidance is assured by integral ribs and roller end-clearance control.

5200

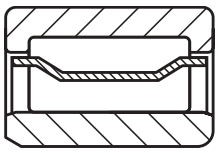
This type carries radial load only and has a double-ribbed outer ring. It has enhanced radial capacity due to internal design proportions. The bearings are useful for installations in which limited radial cross section is available where the shaft serves as the inner ring.



5200

A-5200-WS

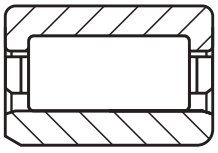
This type has the same characteristics as the 5200, except, includes a full-width cylindrical O.D. inner ring.



A-5200-WS

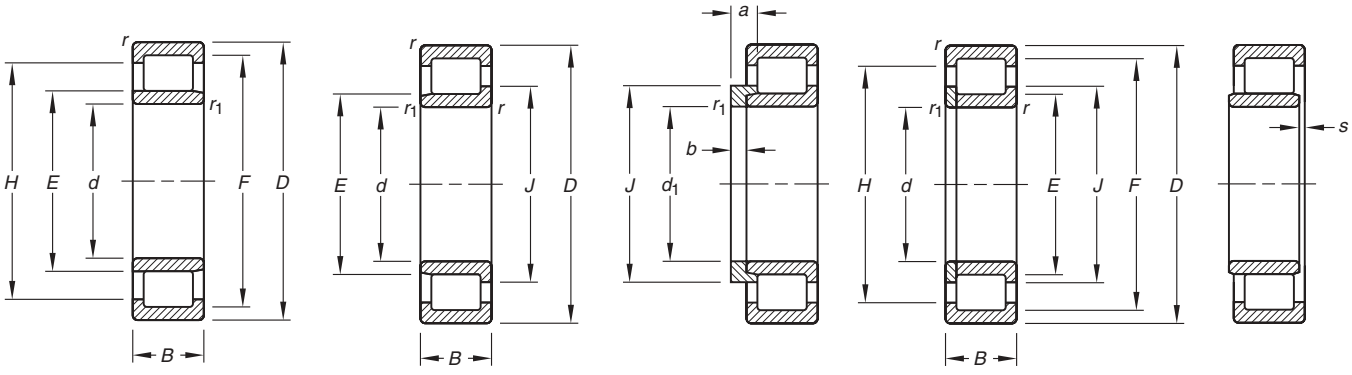
A-5200-WM

This type has the same characteristics as the WS except, with a machined brass cage.



A-52XX-WM

CYLINDRICAL ROLLER RADIAL BEARINGS SINGLE-ROW METRIC SERIES

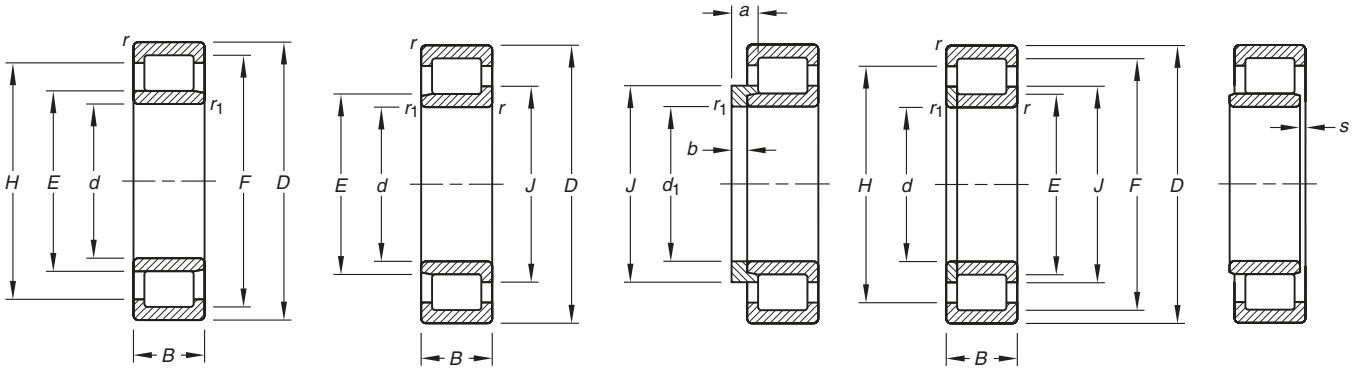


Bearing Number	Bore d or d_1	O.D. D	Width B	Min Outer r	Fillet Radius Inner r_1	Backing Dia. Shaft E	Backing Dia. Housing F	Rib Dia. Inner J	Rib Dia. Outer H	a	b	s	Load Ratings Static C_0	Load Ratings Dynamic C	Lubrication Factor C_g	Reference Speed Grease	Thermal Ratings Oil	Wt. Brg.	Wt. Thrust Collar
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.	kg lbs.
NJ202E.TVP	**15** 0.5906	**35** 1.3780	**11** 0.4331	**0.3** 0.01	**0.6** 0.02	**19.3** 0.76	**30.3** 1.19	**21.8** 0.86	**27.8** 1.09	**5.0** 0.20	**2.5** 0.10		**11.6** 2610	**13.9** 3120	**0.0327**	**14000**	**17000**	**0.047** 0.104	**0.015** 0.007
NU202E.TVP	**15** 0.5906	**35** 1.3780	**11** 0.4331	**0.3** 0.01	**0.6** 0.02	**19.3** 0.76	**30.3** 1.19		**27.8** 1.09			**1.0** 0.04	**11.6** 2610	**13.9** 3120	**0.0327**	**14000**	**17000**	**0.047** 0.104	
NJ203E.TVP	**17** 0.6693	**40** 1.5748	**12** 0.4724	**0.3** 0.01	**0.6** 0.02	**22.1** 0.87	**35.1** 1.38	**24.7** 0.97	**32.0** 1.26	**5.5** 0.22	**3.0** 0.12		**16.0** 3600	**18.9** 4250	**0.0366**	**12000**	**15000**	**0.068** 0.150	**0.020** 0.009
NU203E.TVP	**17** 0.6693	**40** 1.5748	**12** 0.4724	**0.3** 0.01	**0.6** 0.02	**22.1** 0.87	**35.1** 1.38		**32.0** 1.26			**1.2** 0.05	**16.0** 3600	**18.9** 4250	**0.0366**	**12000**	**15000**	**0.068** 0.150	
NUP203E.TVP	**17** 0.6693	**40** 1.5748	**12** 0.4724	**0.3** 0.01	**0.6** 0.02	**22.1** 0.87	**35.1** 1.38	**24.7** 0.97	**32.0** 1.26				**16.0** 3600	**18.9** 4250	**0.0366**	**12000**	**15000**	**0.068** 0.150	
NJ2203E.TVP	**17** 0.6693	**40** 1.5748	**16** 0.6299	**0.3** 0.01	**0.6** 0.02	**22.1** 0.87	**35.1** 1.38	**24.7** 0.97	**32.0** 1.26	**6.0** 0.24	**3.0** 0.12		**23.3** 5240	**25.3** 5690	**0.0402**	**11000**	**13000**	**0.091** 0.201	**0.022** 0.010
NU2203E.TVP	**17** 0.6693	**40** 1.5748	**16** 0.6299	**0.3** 0.01	**0.6** 0.02	**22.1** 0.87	**35.1** 1.38		**32.0** 1.26			**1.0** 0.04	**23.3** 5240	**25.3** 5690	**0.0402**	**11000**	**13000**	**0.091** 0.201	
NUP2203E.TVP	**17** 0.6693	**40** 1.5748	**16** 0.6299	**0.3** 0.01	**0.6** 0.02	**22.1** 0.87	**35.1** 1.38	**24.7** 0.97	**32.0** 1.26				**23.3** 5240	**25.3** 5690	**0.0402**	**11000**	**13000**	**0.091** 0.201	
NJ303E.TVP	**17** 0.6693	**47** 1.8504	**14** 0.5512	**0.6** 0.02	**1.1** 0.04	**24.2** 0.95	**40.2** 1.58	**27.6** 1.09	**36.8** 1.45	**6.5** 0.26	**4.0** 0.16		**22.8** 5130	**26.7** 6000	**0.0392**	**11000**	**13000**	**0.121** 0.267	**0.012** 0.026
NU303E.TVP	**17** 0.6693	**47** 1.8504	**14** 0.5512	**0.6** 0.02	**1.1** 0.04	**24.2** 0.95	**40.2** 1.58		**36.8** 1.45			**1.2** 0.05	**22.8** 5130	**26.7** 6000	**0.0392**	**11000**	**13000**	**0.121** 0.267	
NJ204E.TVP	**20** 0.7874	**47** 1.8504	**14** 0.5512	**0.6** 0.02	**1.0** 0.04	**26.5** 1.04	**41.5** 1.63	**29.9** 1.18	**38.4** 1.51	**5.5** 0.22	**3.0** 0.12		**26.5** 5960	**29.0** 6520	**0.0436**	**11000**	**13000**	**0.133** 0.293	**0.024** 0.011
NU204E.TVP	**20** 0.7874	**47** 1.8504	**14** 0.5512	**0.6** 0.02	**1.0** 0.04	**26.5** 1.04	**41.5** 1.63		**38.4** 1.51			**1.0** 0.04	**26.5** 5960	**29.0** 6520	**0.0436**	**11000**	**13000**	**0.133** 0.293	
NUP204E.TVP	**20** 0.7874	**47** 1.8504	**14** 0.5512	**0.6** 0.02	**1.0** 0.04	**26.5** 1.04	**41.5** 1.63	**29.9** 1.18	**38.4** 1.51				**26.5** 5960	**29.0** 6520	**0.0433**	**11000**	**13000**	**0.133** 0.293	
NJ2204E.TVP	**20** 0.7874	**47** 1.8504	**18** 0.7087	**0.6** 0.02	**1.0** 0.04	**26.5** 1.04	**41.5** 1.63	**29.9** 1.18	**38.4** 1.51	**6.5** 0.26	**3.0** 0.12		**32.7** 7350	**34.1** 7670	**0.0459**	**9400**	**11000**	**0.142** 0.313	**0.012** 0.026
NU2204E.TVP	**20** 0.7874	**47** 1.8504	**18** 0.7087	**0.6** 0.02	**1.0** 0.04	**26.5** 1.04	**41.5** 1.63		**38.4** 1.51			**1.8** 0.07	**32.7** 7350	**34.1** 7670	**0.0459**	**9400**	**11000**	**0.142** 0.313	
NUP2204E.TVP	**20** 0.7874	**47** 1.8504	**18** 0.7087	**0.6** 0.02	**1.0** 0.04	**26.5** 1.04	**41.5** 1.63	**29.9** 1.18	**38.4** 1.51				**32.7** 7350	**34.1** 7670	**0.0459**	**9400**	**11000**	**0.142** 0.313	
NJ304E.TVP	**20** 0.7874	**52** 2.0472	**15** 0.5906	**0.6** 0.02	**1.1** 0.04	**27.5** 1.08	**45.5** 1.79	**31.4** 1.24	**41.8** 1.65	**6.5** 0.26	**4.0** 0.16		**28.0** 6290	**32.6** 7330	**0.0435**	**10000**	**12000**	**0.152** 0.335	**0.017** 0.037
NU304E.TVP	**20** 0.7874	**52** 2.0472	**15** 0.5906	**0.6** 0.02	**1.1** 0.04	**27.5** 1.08	**45.5** 1.79		**41.8** 1.65			**1.1** 0.04	**28.0** 6290	**32.6** 7330	**0.0435**	**10000**	**12000**	**0.152** 0.335	
NUP304E.TVP	**20** 0.7874	**52** 2.0472	**15** 0.5906	**0.6** 0.02	**1.1** 0.04	**27.5** 1.08	**45.5** 1.79	**31.4** 1.24	**41.8** 1.65				**28.0** 6290	**32.6** 7330	**0.0435**	**10000**	**12000**	**0.152** 0.335	
NJ2304E.TVP	**20** 0.7874	**52** 2.0472	**21** 0.8268	**0.6** 0.02	**1.1** 0.04	**27.5** 1.08	**45.5** 1.79	**31.4** 1.24	**41.8** 1.65	**7.5** 0.30	**4.0** 0.16		**40.0** 8990	**42.9** 9640	**0.0475**	**8200**	**9800**	**0.207** 0.456	**0.020** 0.044

Bearing Number	Bore d or d_1	O.D. D	Width B	Min Outer r	Fillet Radius Inner r_1	Backing Dia. Shaft E	Backing Dia. Housing F	Rib Dia. Inner J	Rib Dia. Outer H	a	b	s	Load Ratings Static C_0	Load Ratings Dynamic C	Lubrication Factor C_g	Reference Speed Grease	Thermal Ratings Oil	Wt. Brg.	Wt. Thrust Collar
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.	kg lbs.
NJ205E.TVP	**25** 0.9843	**52** 2.0472	**15** 0.5906	**0.6** 0.02	**1.0** 0.04	**31.5** 1.24	**46.5** 1.83	**34.9** 1.37	**43.3** 1.70	**6.0** 0.24	**3.0** 0.12		**29.8** 6700	**31.0** 6970	**0.0489**	**9600**	**12000**	**0.140** 0.309	**0.031** 0.014
NU205E.TVP	**25** 0.9843	**52** 2.0472	**15** 0.5906	**0.6** 0.02	**1.0** 0.04	**31.5** 1.24	**46.5** 1.83		**43.3** 1.70			**1.3** 0.05	**29.8** 6700	**31.0** 6970	**0.0489**	**9600**	**12000**	**0.140** 0.309	
NUP205E.TVP	**25** 0.9843	**52** 2.0472	**15** 0.5906	**0.6** 0.02	**1.0** 0.04	**31.5** 1.24	**46.5** 1.83	**34.9** 1.37	**43.3** 1.70				**29.8** 6700	**31.0** 6970	**0.0486**	**9600**	**12000**	**0.140** 0.309	
NJ2205E.TVP	**25** 0.9843	**52** 2.0472	**18** 0.7087	**0.6** 0.02	**1.0** 0.04	**31.5** 1.24	**46.5** 1.83	**34.9** 1.37	**43.3** 1.70	**6.5** 0.26	**3.0** 0.12		**36.7** 8250	**36.5** 8210	**0.0515**	**8100**	**9700**	**0.160** 0.353	**0.014** 0.031
NU2205E.TVP	**25** 0.9843	**52** 2.0472	**18** 0.7087	**0.6** 0.02	**1.0** 0.04	**31.5** 1.24	**46.5** 1.83		**43.3** 1.70			**1.7** 0.07	**36.7** 8250	**36.5** 8210	**0.0515**	**8100**	**9700**	**0.160** 0.353	
NUP2205E.TVP	**25** 0.9843	**52** 2.0472	**18** 0.7087	**0.6** 0.02	**1.0** 0.04	**31.5** 1.24	**46.5** 1.83	**34.9** 1.37	**43.3** 1.70				**36.7** 8250	**36.5** 8210	**0.0515**	**8100**	**9700**	**0.160** 0.353	
NJ305E.TVP	**25** 0.9843	**62** 2.4409	**17** 0.6693	**1.1** 0.04	**1.1** 0.04	**34.0** 1.34	**54.0** 2.13	**38.3** 1.51	**50.1** 1.97	**7.0** 0.28	**4.0** 0.16		**38.9** 8750	**42.8** 9620	**0.0508**	**8500**	**10000**	**0.243** 0.536	**0.025** 0.055
NU305E.TVP	**25** 0.9843	**62** 2.4409	**17** 0.6693	**1.1** 0.04	**1.1** 0.04	**34.0** 1.34	**54.0** 2.13		**50.1** 1.97			**1.5** 0.06	**38.9** 8750	**42.8** 9620	**0.0508**	**8500**	**10000**	**0.243** 0.536	
NUP305E.TVP	**25** 0.9843	**62** 2.4409	**17** 0.6693	**1.1** 0.04	**1.1** 0.04	**34.0** 1.34	**54.0** 2.13	**38.3** 1.51	**50.1** 1.97				**38.9** 8750	**42.8** 9620	**0.0508**	**8500**	**10000**	**0.243** 0.536	
NJ2305E.TVP	**25** 0.9843	**62** 2.4409	**24** 0.9449	**1.1** 0.04	**1.1** 0.04	**34.0** 1.34	**54.0** 2.13	**38.3** 1.51	**50.1** 1.97	**8.0** 0.31	**4.0** 0.16		**57.6** 12900	**58.1** 13100	**0.0561**	**6900**	**8300**	**0.348** 0.767	**0.026** 0.057
NU2305E.TVP	**25** 0.9843	**62** 2.4409	**24** 0.9449	**1.1** 0.04	**1.1** 0.04	**34.0** 1.34	**54.0** 2.13		**50.1** 1.97			**1.9** 0.07	**57.6** 12900	**58.1** 13100	**0.0561**	**6900**	**8300**	**0.348** 0.767	
NJ206E.TVP	**30** 1.1811	**62** 2.4409	**16** 0.6299	**0.6** 0.02	**1.0** 0.04	**37.5** 1.48	**55.5** 2.19	**41.4** 1.63	**52.0** 2.05	**7.0** 0.28	**4.0** 0.16		**39.0** 8770	**40.4** 9080	**0.0552**	**8000**	**9700**	**0.206** 0.454	**0.055** 0.025
NU206E.TVP	**30** 1.1811	**62** 2.4409	**16** 0.6299	**0.6** 0.02	**1.0** 0.04	**37.5** 1.48	**55.5** 2.19		**52.0** 2.05			**1.4** 0.06	**39.0** 8770	**40.4** 9080	**0.0280**	**8000**	**9700**	**0.206** 0.454	
NUP206E.TVP	**30** 1.1811	**62** 2.4409	**16** 0.6299	**0.6** 0.02	**1.0** 0.04	**37.5** 1.48	**55.5** 2.19	**41.4** 1.63	**52.0** 2.05				**39.0** 8770	**40.4** 9080	**0.0552**	**8000**	**9700**	**0.206** 0.454	
NJ2206E.TVP	**30** 1.1811	**62** 2.4409	**20** 0.7874	**0.6** 0.02	**1.0** 0.04	**37.5** 1.48	**55.5** 2.19	**41.4** 1.63	**52.0** 2.05	**7.5** 0.30	**4.0** 0.16		**51.5** 11600	**50.1** 11300	**0.0591**	**6800**	**8100**	**0.255** 0.562	**0.025** 0.055
NU2206E.TVP	**30** 1.1811	**62** 2.4409	**20** 0.7874	**0.6** 0.02	**1.0** 0.04	**37.5** 1.48	**55.5** 2.19		**52.0** 2.05			**1.6** 0.06	**51.5** 11600	**50.1** 11300	**0.0591**	**6800**	**8100**	**0.255** 0.562	
NUP2206E.TVP	**30** 1.1811	**62** 2.4409	**20** 0.7874	**0.6** 0.02	**1.0** 0.04	**37.5** 1.48	**55.5** 2.19	**41.4** 1.63	**52.0** 2.05				**51.5** 11600	**50.1** 11300	**0.0591**	**6800**	**8100**	**0.255** 0.562	
NJ306E.TVP	**30** 1.1811	**72** 2.8346	**19** 0.7480	**1.1** 0.04	**1.1** 0.04	**40.5** 1.59	**62.5** 2.46	**45.1** 1.78	**58.3** 2.30	**8.5** 0.33	**5.0** 0.20		**52.1** 11700	**54.6** 12300	**0.0581**	**7400**	**8800**	**0.370** 0.816	**0.042** 0.093
NU306E.TVP	**30** 1.1811	**72** 2.8346	**19** 0.7480	**1.1** 0.04	**1.1** 0.04	**40.5** 1.59	**62.5** 2.46		**58.3** 2.30			**1.9** 0.07	**52.1** 11700	**54.6** 12300	**0.0581**	**7400**	**8800**	**0.370** 0.816	
NUP306E.TVP	**30** 1.1811	**72** 2.8346	**19** 0.7480	**1.1** 0.04	**1.1** 0.04	**40.5** 1.59	**62.5** 2.46	**45.1** 1.78	**58.3** 2.30				**52.1** 11700	**54.6** 12300	**0.0581**	**7400**	**8800**	**0.370** 0.816	
NJ2306E.TVP	**30** 1.1811	**72** 2.8346	**27** 1.0630	**1.1** 0.04	**1.1** 0.04	**40.5** 1.59	**62.5** 2.46	**45.1** 1.78	**58.3** 2.30	**9.5** 0.37	**5.0** 0.20		**79.5** 17900	**75.9** 17100	**0.0645**	**6000**	**7200**	**0.530** 1.169	**0.095** 0.043
NUP2306E.TVP	**30** 1.1811	**72** 2.8346	**27** 1.0630	**1.1** 0.04	**1.1** 0.04	**40.5** 1.59	**62.5** 2.46	**45.1** 1.78	**58.3** 2.30				**79.5** 17900	**75.9** 17100	**0.0642**	**6000**	**7200**	**0.530** 1.169	
NJ207E.TVP	**35** 1.3780	**72** 2.8346	**17** 0.6693	**0.6** 0.02	**1.1** 0.04	**44.0** 1.73	**64.0** 2.52	**48.0** 1.89	**60.1** 2.37	**7.0** 0.28	**4.0** 0.16		**52.2** 11700	**51.8** 11600	**0.0624**	**6800**	**8200**	**0.303** 0.668	**0.073** 0.033
NU2207E.TVP	**35** 1.3780	**72** 2.8346	**23** 0.9055	**0.6** 0.02	**1.1** 0.04	**44.0** 1.73	**64.0** 2.52		**60.1** 2.37			**2.9** 0.11	**67.3** 15100	**63.0** 14200	**0.0664**	**6100**	**7300**	**0.395** 0.871	
NUP2207E.TVP	**35** 1.3780	**72** 2.8346	**23** 0.9055	**0.6** 0.02	**1.1** 0.04	**44.0** 1.73	**64.0** 2.52	**48.0** 1.89	**60.1** 2.37				**67.3** 15100	**63.0** 14200	**0.0664**	**6100**	**7300**	**0.395** 0.871	
NJ307E.TVP	**35** 1.3780	**80** 3.1496	**21** 0.8268	**1.1** 0.04	**1.5** 0.06	**46.2** 1.82	**70.2** 2.76	**51.2** 2.02	**65.7** 2.59	**9.5** 0.37	**6.0** 0.24		**66.4** 14900	**67.3** 15100	**0.0653**	**6700**	**7900**	**0.485** 1.069	**0.132** 0.060
NUP307E.TVP	**35** 1.3780	**80** 3.1496	**21** 0.8268	**1.1** 0.04	**1.5** 0.06	**46.2** 1.82	**70.2** 2.76	**51.2** 2.02	**65.7** 2.59				**66.4** 14900	**67.3** 15100	**0.0653**	**6700**	**7900**	**0.485** 1.069	
NU2307E.TVP	**35** 1.3780	**80** 3.1496	**31** 1.2205	**1.1** 0.04	**1.5** 0.06	**46.2** 1.82	**70.2** 2.76		**65.7** 2.59			**3.0** 0.12	**102.0** 22900	**93.7** 21100	**0.0724**	**5600**	**6600**	**0.720** 1.588	
NUP208E.TVP	**40** 1.5748	**80** 3.1496	**18** 0.7087	**1.1** 0.04	**1.1** 0.04	**49.5** 1.95	**71.5** 2.81	**54.1** 2.13	**67.3** 2.65				**57.7** 13000	**57.3** 12900	**0.0668**	**6200**	**7500**	**0.380** 0.838	

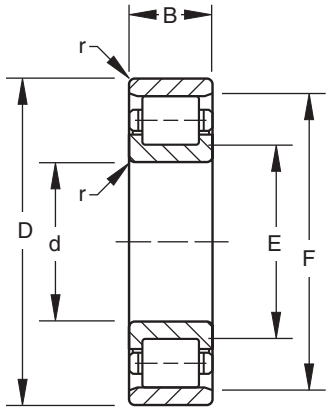
Continued on next page.

CYLINDRICAL ROLLER RADIAL BEARINGS SINGLE-ROW METRIC SERIES - *continued*



Bearing Number	Bore d or d_1	O.D. D	Width B	Min Outer r	Fillet Radius Inner r_1	Backing Dia. Shaft E	Backing Dia. Housing F	Rib Dia. Inner J	Rib Dia. Outer H	a	b	s	Load Ratings Static C_0	Load Ratings Dynamic C	Lubrication Factor C_g	Reference Speed Grease	Thermal Ratings Oil	Wt. Brg.	Wt. Thrust Collar
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.	kg lbs.
NU2208E.TVP	**40** 1.5748	**80** 3.1496	**23** 0.9055	**1.1** 0.04	**1.1** 0.04	**49.5** 1.95	**71.5** 2.81		**67.3** 2.65			**2.3** 0.09	**79.8** 17900	**73.8** 16600	**0.0724**	**5300**	**6300**	**0.490** 1.080	
NUP308E.TVP	**40** 1.5748	**90** 3.5433	**23** 0.9055	**1.5** 0.06	**1.5** 0.06	**52.0** 2.05	**80.0** 3.15	**57.7** 2.27	**74.9** 2.95				**82.7** 18600	**84.0** 18900	**0.0714**	**6000**	**7100**	**0.660** 1.455	
NJ2308E.TVP	**40** 1.5748	**90** 3.5433	**33** 1.2992	**1.5** 0.06	**1.5** 0.06	**52.0** 2.05	**80.0** 3.15	**57.7** 2.27	**74.9** 2.95	**12.5** 0.49	**7.0** 0.28		**123.0** 27700	**115.0** 25900	**0.0788**	**5000**	**5900**	**0.950** 2.095	**0.091** 0.201
NU2209E.TVP	**45** 1.7717	**85** 3.3465	**23** 0.9055	**1.1** 0.04	**1.1** 0.04	**54.5** 2.15	**76.5** 3.01		**72.4** 2.85			**2.3** 0.09	**87.0** 19600	**77.7** 17500	**0.0775**	**4800**	**5700**	**0.530** 1.169	
NUP2209E.TVP	**45** 1.7717	**85** 3.3465	**23** 0.9055	**1.1** 0.04	**1.1** 0.04	**54.5** 2.15	**76.5** 3.01	**59.1** 2.33	**72.4** 2.85				**87.0** 19600	**77.7** 17500	**0.0775**	**4800**	**5700**	**0.530** 1.169	
NJ309E.TVP	**45** 1.7717	**100** 3.9370	**25** 0.9843	**1.5** 0.06	**1.5** 0.06	**58.5** 2.30	**88.5** 3.48	**64.6** 2.54	**83.1** 3.27	**11.5** 0.45	**7.0** 0.28		**104.0** 23400	**101.0** 22700	**0.0785**	**5500**	**6400**	**0.895** 1.973	**0.110** 0.243
NUP210E.TVP	**50** 1.9685	**90** 3.5433	**20** 0.7874	**1.1** 0.04	**1.1** 0.04	**59.5** 2.34	**81.5** 3.21	**64.1** 2.52	**77.4** 3.05				**74.5** 16700	**67.7** 15200	**0.0778**	**5500**	**6600**	**0.490** 1.080	
NU2210E.TVP	**50** 1.9685	**90** 3.5433	**23** 0.9055	**1.1** 0.04	**1.1** 0.04	**59.5** 2.34	**81.5** 3.21		**77.4** 3.05			**2.2** 0.09	**94.1** 21200	**81.2** 18300	**0.0824**	**4400**	**5200**	**0.575** 1.268	
NUP211E.TVP	**55** 2.1654	**100** 3.9370	**21** 0.8268	**1.1** 0.04	**1.5** 0.06	**66.0** 2.60	**90.0** 3.54	**71.0** 2.80	**85.6** 3.37				**100.0** 22500	**87.2** 19600	**0.0862**	**4800**	**5700**	**0.665** 1.466	
NU311E.TVP	**55** 2.1654	**120** 4.7244	**29** 1.1417	**2.0** 0.08	**2.0** 0.08	**70.5** 2.78	**106.5** 4.19		**100.3** 3.95			**3.0** 0.12	**149.0** 33500	**142.0** 31900	**0.0628**	**4700**	**5500**	**1.470** 3.241	
NUP212E.TVP	**60** 2.3622	**110** 4.3307	**22** 0.8661	**1.5** 0.06	**1.5** 0.06	**72.0** 2.83	**100.0** 3.94	**77.7** 3.06	**95.1** 3.74				**109.0** 24500	**98.6** 22200	**0.0896**	**4500**	**5300**	**0.825** 1.819	
NUP2212E.TVP	**60** 2.3622	**110** 4.3307	**28** 1.1024	**1.5** 0.06	**1.5** 0.06	**72.0** 2.83	**100.0** 3.94	**77.7** 3.06	**95.1** 3.74				**158.0** 35500	**132.0** 29700	**0.0984**	**3700**	**4300**	**1.080** 2.381	
NUP2213E.TVP	**65** 2.5591	**120** 4.7244	**31** 1.2205	**1.5** 0.06	**1.5** 0.06	**78.5** 3.09	**108.5** 4.27	**84.6** 3.33	**103.2** 4.06				**188.0** 42300	**153.0** 34400	**0.0723**	**3500**	**4100**	**1.420** 3.131	

STANDARD STYLES



Bearing Number and Style					d Bore	D O.D.	B Width	r (1) Fillet Radius (max.)	Backing Dia.		Load Ratings		Lubrication Factor C_g	Reference Speed	Thermal Ratings	Wt.
									Shaft E	Housing F	Static Load Rating C_0	Dynamic Load Ratings C		Grease	Oil	
RU RIU	RN RIN	RJ RIJ	RF RIF	RT RIT	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
100RU02	100RN02	100RJ02	100RF02	100RT02	100.000 3.9370	180.000 7.0866	34.000 1.3386	2.0 0.08	114 4.5	165 6.5	245 55000	216 49000	0.088	2200	2600	3.8 8.5
100RU33	100RN33	100RJ33	100RF33	100RT33	100.000 3.9370	215.000 8.4646	82.600 3.2500	2.5 0.10	122 4.8	193 7.6	865 196000	670 150000	0.119	2200	2500	15.5 34.2
40RIU130	40RIN130	40RIJ130	40RIF130	40RIT130	101.600 4.0000	142.880 5.6250	22.230 0.8750	2.5 0.10	110 4.3	135 5.3	134 30000	98 22000	0.081	2100	2500	1.1 2.4
40RIU133	40RIN133	40RIJ133	40RIF133	40RIT133	101.600 4.0000	215.900 8.5000	44.450 1.7500	4.0 0.16	121 4.8	197 7.8	325 73500	320 72000	0.095	2200	2600	8.3 18.3
105RU02	105RN02	105RJ02	105RF02	105RT02	105.000 4.1339	190.000 7.4803	36.000 1.4173	2.0 0.08	121 4.8	175 6.9	250 57000	224 50000	0.090	2100	2600	4.6 10.2
105RU32	105RN32	105RJ32	105RF32	105RT32	105.000 4.1339	190.000 7.4803	65.100 2.5625	2.0 0.08	121 4.8	175 6.9	655 146000	480 108000	0.113	2300	2700	8.3 18.3
105RU03	105RN03	105RJ03	105RF03	105RT03	105.000 4.1339	225.000 8.8583	49.000 1.9291	2.5 0.10	127 5.0	203 8.0	450 100000	400 90000	0.104	2100	2400	10.1 22.2
42RIU194	42RIN194	42RIJ194	42RIF194	42RIT194	107.950 4.2500	222.250 8.7500	69.850 2.7500	4.0 0.16	127 5.0	203 8.0	720 160000	570 129000	0.115	2100	2400	13.6 30.0
110RU02	110RN02	110RJ02	110RF02	110RT02	110.000 4.3307	200.000 7.8740	38.000 1.4961	2.0 0.08	125 4.9	185 7.3	315 71000	275 62000	0.098	2000	2400	5.4 11.8
110RU03	110RN03	110RJ03	110RF03	110RT03	110.000 4.3307	240.000 9.4488	50.000 1.9685	2.5 0.10	135 5.3	215 8.5	750 170000	550 122000	0.106	1600	1900	11.7 25.8
45RIU196	45RIN196	45RIJ196	45RIF196	45RIT196	114.300 4.5000	203.200 8.0000	33.340 1.3125	3.0 0.12	130 5.1	187 7.4	245 55000	224 50000	0.090	1900	2300	4.8 10.5
120RU30	120RN30	120RJ30	120RF30	120RT30	120.000 4.7244	180.000 7.0866	46.000 1.8110	2.0 0.08	130 5.1	170 6.7	390 88000	255 57000	0.108	2200	2600	4.2 9.3
120RU02	120RN02	120RJ02	120RF02	120RT02	120.000 4.7244	215.000 8.4646	40.000 1.5748	2.0 0.08	137 5.4	198 7.8	320 72000	285 64000	0.098	1900	2300	6.5 14.4
120RU92	120RN92	120RJ92	120RF92	120RT92	120.000 4.7244	215.000 8.4646	76.200 3.0000	2.0 0.08	137 5.4	198 7.8	865 196000	620 140000	0.125	2000	2300	12.4 27.3
120RU03	120RN03	120RJ03	120RF03	120RT03	120.000 4.7244	260.000 10.2362	55.000 2.1654	2.5 0.10	145 5.7	235 9.2	540 120000	490 112000	0.114	1800	2100	15.2 33.4
130RU30	130RN30	130RJ30	130RF30	130RT30	130.000 5.1181	200.000 7.8740	52.000 2.0472	2.0 0.08	143 5.6	187 7.4	540 122000	355 80000	0.119	2000	2300	6.1 13.5
130RU02	130RN02	130RJ02	130RF02	130RT02	130.000 5.1181	230.000 9.0551	40.000 1.5748	2.5 0.10	148 5.8	212 8.3	355 80000	305 69500	0.105	1800	2100	7.4 16.3
130RU92	130RN92	130RJ92	130RF92	130RT92	130.000 5.1181	230.000 9.0551	79.400 3.1250	2.5 0.10	148 5.8	213 8.4	980 224000	680 153000	0.133	1800	2000	14.7 32.4
130RU03	130RN03	130RJ03	130RF03	130RT03	130.000 5.1181	280.000 11.0236	58.000 2.2835	3.0 0.12	158 6.2	252 9.9	600 134000	550 125000	0.100	1600	1900	18.5 40.8

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

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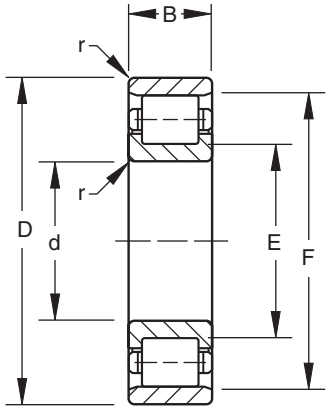
STANDARD STYLES - *continued*



Bearing Number and Style					d Bore	D O.D.	B Width	r (1) Fillet Radius (max.)	Backing Dia.		Load Ratings		Lubrication Factor	Reference Speed	Thermal Ratings	Wt.
									Shaft E	Housing F	Static Load Rating C_0	Dynamic Load Ratings C	C_g	Grease	Oil	
RU RIU	RN RIN	RJ RIJ	RF RIF	RT RIT	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
140RU30	140RN30	140RJ30	140RF30	140RT30	140.000 5.5118	210.000 8.2677	53.000 2.0866	2.0 0.08	152 6.0	198 7.8	540 122000	355 80000	0.120	1900	2200	6.6 14.6
140RU51	140RN51	140RJ51	140RF51	140RT51	140.000 5.5118	220.000 8.6614	36.000 1.4173	2.0 0.08	155 6.1	206 8.1	300 68000	240 54000	0.104	1700	2000	5.3 11.6
140RU91	140RN91	140RJ91	140RF91	140RT91	140.000 5.5118	220.000 8.6614	63.500 2.5000	2.0 0.08	154 6.1	206 8.1	800 180000	520 116000	0.132	1800	2000	9.3 20.5
140RU02	140RN02	140RJ02	140RF02	140RT02	140.000 5.5118	250.000 9.8425	42.000 1.6535	2.5 0.10	159 6.2	231 9.1	465 104000	400 88000	0.114	1600	1900	9.2 20.2
140RU92	140RN92	140RJ92	140RF92	140RT92	140.000 5.5118	250.000 9.8425	82.600 3.2500	2.5 0.10	159 6.2	231 9.1	1200 270000	830 186000	0.143	1600	1800	18.2 40.0
140RU03	140RN03	140RJ03	140RF03	140RT03	140.000 5.5118	300.000 11.8110	62.000 2.4409	3.0 0.12	168 6.6	271 10.7	670 150000	610 137000	0.106	1500	1800	22.8 50.2
140RU93	140RN93	140RJ93	140RF93	140RT93	140.000 5.5118	300.000 11.8110	114.300 4.5000	3.0 0.12	168 6.6	271 10.7	1760 400000	1290 290000	0.109	1400	1500	42.0 92.5
150RU51	150RN51	150RJ51	150RF51	150RT51	150.000 5.9055	235.000 9.2520	38.000 1.4961	2.0 0.08	165 6.5	220 8.7	400 90000	310 69500	0.114	1500	1900	6.3 13.9
150RU91	150RN91	150RJ91	150RF91	150RT91	150.000 5.9055	235.000 9.2520	66.700 2.6250	2.0 0.08	165 6.5	220 8.7	900 204000	585 132000	0.139	1600	1800	11.1 24.5
150RU02	150RN02	150RJ02	150RF02	150RT02	150.000 5.9055	270.000 10.6299	45.000 1.7717	2.5 0.10	171 6.8	248 9.8	520 118000	440 100000	0.099	1400	1700	11.7 25.7
150RU92	150RN92	150RJ92	150RF92	150RT92	150.000 5.9055	270.000 10.6299	88.900 3.5000	2.5 0.10	170 6.7	250 9.8	1400 315000	950 216000	0.126	1400	1600	23.1 50.9
150RU03	150RN03	150RJ03	150RF03	150RT03	150.000 5.9055	320.000 12.5984	65.000 2.5591	3.0 0.12	182 7.2	288 11.3	815 183000	720 163000	0.111	1300	1600	27.3 60.1
150RU93	150RN93	150RJ93	150RF93	150RT93	150.000 5.9055	320.000 12.5984	123.900 4.8750	3.0 0.12	182 7.2	288 11.3	2040 455000	1460 325000	0.137	1300	1400	51.8 114.1
60RIU247	60RIN247	60RIJ247	60RIF247	60RIT247	152.400 6.0000	203.200 8.0000	25.400 1.0000	2.5 0.10	161 6.3	194 7.7	270 61000	173 39000	0.110	1400	1700	2.2 4.9
60RIU248	60RIN248	60RIJ248	60RIF248	60RIT248	152.400 6.0000	266.700 10.5000	39.690 1.5625	4.0 0.16	173 6.8	246 9.7	450 100000	380 86500	0.097	1400	1700	9.7 21.4
60RIU249	60RIN249	60RIJ249	60RIF249	60RIT249	152.400 6.0000	266.700 10.5000	61.910 2.4375	4.0 0.16	174 6.8	245 9.7	865 196000	640 146000	0.114	1400	1700	15.2 33.5
60RIU250	60RIN250	60RIJ250	60RIF250	60RIT250	152.400 6.0000	304.800 12.0000	57.150 2.2500	5.0 0.20	182 7.2	275 10.8	735 166000	640 143000	0.109	1300	1600	20.7 45.6
60RIU251	60RIN251	60RIJ251	60RIF251	60RIT251	152.400 6.0000	304.800 12.0000	88.900 3.5000	5.0 0.20	181 7.1	276 10.9	1340 305000	1020 228000	0.125	1300	1500	32.3 71.3
160RU30	160RN30	160RJ30	160RF30	160RT30	160.000 6.2992	240.000 9.4488	60.000 2.3622	2.0 0.08	175 6.9	225 8.9	765 170000	475 108000	0.138	1600	1800	9.8 21.7
160RU51	160RN51	160RJ51	160RF51	160RT51	160.000 6.2992	250.000 9.8425	40.000 1.5748	2.0 0.08	173 6.8	237 9.3	455 102000	345 78000	0.100	1500	1700	7.5 16.5

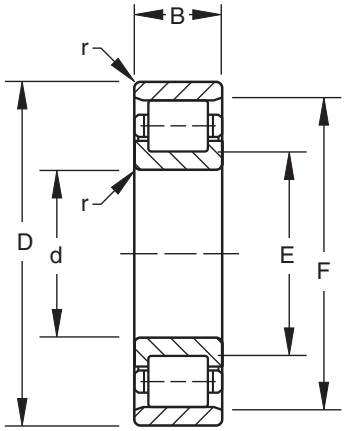
(1) Maximum shaft or housing fillet radius that bearing corners will clear.

Bearing Number and Style					d	D	B	r (1)	Backing Dia.		Load Ratings		Lubri-cation	Reference	Thermal	Wt.
					Bore	O.D.	Width	Fillet Radius (max.)	Shaft E	Housing F	Static Load Rating C_0	Dynamic Load Ratings C	Factor C_g	Speed Grease	Ratings Oil	
RU RIU	RN RIN	RJ RIJ	RF RIF	RT RIT	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
160RU91	160RN91	160RJ91	160RF91	160RT91	160.000 6.2992	250.000 9.8425	73.000 2.8750	2.0 0.08	173 6.8	237 9.3	1060 240000	670 150000	0.124	1500	1700	13.7 30.3
160RU02	160RN02	160RJ02	160RF02	160RT02	160.000 6.2992	290.000 11.4173	48.000 1.8898	2.5 0.10	183 7.2	267 10.5	670 150000	550 122000	0.106	1300	1500	14.4 31.8
160RU92	160RN92	160RJ92	160RF92	160RT92	160.000 6.2992	290.000 11.4173	98.000 3.8750	2.5 0.10	183 7.2	267 10.5	1560 345000	1060 236000	0.134	1300	1500	29.8 65.6
160RU03	160RN03	160RJ03	160RF03	160RT03	160.000 6.2992	340.000 13.3858	68.000 2.6772	3.0 0.12	194 7.6	306 12.1	900 204000	780 176000	0.115	1200	1400	32.2 71.0
160RU93	160RN93	160RJ93	160RF93	160RT93	160.000 6.2992	340.000 13.3858	133.000 5.2500	3.0 0.12	194 7.6	306 12.1	2320 520000	1660 375000	0.147	1200	1300	62.8 138.6
170RU30	170RN30	170RJ30	170RF30	170RT30	170.000 6.6929	260.000 10.2362	67.000 2.6378	2.0 0.08	186 7.3	243 9.6	1020 228000	640 143000	0.125	1400	1600	13.2 29.1
170RU51	170RN51	170RJ51	170RF51	170RT51	170.000 6.6929	265.000 10.4331	42.000 1.6535	2.5 0.10	187 7.4	248 9.8	510 114000	380 86500	0.104	1400	1600	8.8 19.4
170RU91	170RN91	170RJ91	170RF91	170RT91	170.000 6.6929	265.000 10.4331	76.200 3.0000	2.5 0.10	187 7.4	248 9.8	1160 260000	735 166000	0.130	1400	1600	16.1 35.5
170RU02	170RN02	170RJ02	170RF02	170RT02	170.000 6.6929	310.000 12.2047	52.000 2.0472	3.0 0.12	195 7.7	285 11.2	695 156000	585 132000	0.112	1200	1500	18.2 40.0
170RU92	170RN92	170RJ92	170RF92	170RT92	170.000 6.6929	310.000 12.2047	104.800 4.1250	3.0 0.12	196 7.7	284 11.2	1930 430000	1270 290000	0.141	1200	1300	36.5 80.6
170RU03	170RN03	170RJ03	170RF03	170RT03	170.000 6.6929	360.000 14.1732	72.000 2.8346	3.0 0.12	205 8.1	325 12.8	1020 228000	880 200000	0.123	1200	1300	38.2 84.1
170RU93	170RN93	170RJ93	170RF93	170RT93	170.000 6.6929	360.000 14.1732	139.700 5.5000	3.0 0.12	205 8.1	325 12.8	2600 585000	1830 415000	0.153	1100	1200	73.6 162.4
180RU51	180RN51	180RJ51	180RF51	180RT51	180.000 7.0866	280.000 11.0236	44.000 1.7323	2.5 0.10	196 7.7	263 10.3	600 134000	440 100000	0.111	1200	1500	10.3 22.7
180RU30	180RN30	180RJ30	180RF30	180RT30	180.000 7.0866	280.000 11.0236	74.000 2.9134	2.0 0.08	197 7.8	264 10.4	1250 280000	780 176000	0.132	1200	1400	17.4 38.4
180RU91	180RN91	180RJ91	180RF91	180RT91	180.000 7.0866	280.000 11.0236	82.600 3.2500	2.5 0.10	197 7.8	262 10.3	1430 325000	880 196000	0.138	1200	1400	19.4 42.9
180RU02	180RN02	180RJ02	180RF02	180RT02	180.000 7.0866	320.000 12.5984	52.000 2.0472	3.0 0.12	205 8.1	295 11.6	710 160000	585 129000	0.114	1200	1400	18.9 41.6
180RU92	180RN92	180RJ92	180RF92	180RT92	180.000 7.0866	320.000 12.5984	108.000 4.2500	3.0 0.12	206 8.1	294 11.6	1930 440000	1270 285000	0.144	1100	1300	39.3 86.6
180RU03	180RN03	180RJ03	180RF03	180RT03	180.000 7.0866	380.000 14.9606	75.000 2.9528	3.0 0.12	216 8.5	344 13.6	1200 270000	1020 232000	0.127	1000	1200	44.0 97.0
190RU30	190RN30	190RJ30	190RF30	190RT30	190.000 7.4803	290.000 11.4173	75.000 2.9528	2.0 0.08	207 8.2	272 10.7	1270 285000	780 176000	0.138	1200	1400	18.4 40.6
190RU51	190RN51	190RJ51	190RF51	190RT51	190.000 7.4803	300.000 11.8110	46.000 1.8110	2.5 0.10	210 8.2	280 11.0	695 156000	510 114000	0.117	1100	1300	12.7 28.0
190RU91	190RN91	190RJ91	190RF91	190RT91	190.000 7.4803	300.000 11.8110	85.700 3.3750	2.5 0.10	210 8.2	281 11.1	1630 365000	980 220000	0.144	1100	1300	23.8 52.5
190RU02	190RN02	190RJ02	190RF02	190RT02	190.000 7.4803	340.000 13.3858	55.000 2.1654	3.0 0.12	216 8.5	314 12.4	930 208000	735 166000	0.124	1000	1200	22.7 50.0
190RU92	190RN92	190RJ92	190RF92	190RT92	190.000 7.4803	340.000 13.3858	114.300 4.5000	3.0 0.12	217 8.6	312 12.3	2240 500000	1460 325000	0.154	1000	1100	47.3 104.2
190RU03	190RN03	190RJ03	190RF03	190RT03	190.000 7.4803	400.000 15.7480	78.000 3.0709	4.0 0.16	233 9.2	357 14.1	1320 290000	1060 240000	0.136	980	1100	51.5 113.5
200RU30	200RN30	200RJ30	200RF30	200RT30	200.000 7.8740	310.000 12.2047	82.000 3.2283	2.0 0.08	220 8.7	290 11.4	1560 355000	930 212000	0.146	1100	1200	23.8 52.5
200RU51	200RN51	200RJ51	200RF51	200RT51	200.000 7.8740	320.000 12.5984	48.000 1.8898	2.5 0.10	221 8.7	299 11.8	735 166000	550 122000	0.120	1100	1300	15.5 34.1
200RU91	200RN91	200RJ91	200RF91	200RT91	200.000 7.8740	320.000 12.5984	88.900 3.5000	3.0 0.12	221 8.7	299 11.8	1630 365000	1020 228000	0.150	1100	1200	28.8 63.4
200RU02	200RN02	200RJ02	200RF02	200RT02	200.000 7.8740	360.000 14.1732	58.000 2.2835	3.0 0.12	230 9.1	330 13.0	930 208000	735 163000	0.127	1000	1200	27.3 60.2

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

Continued on next page.

STANDARD STYLES - *continued*



Bearing Number and Style					d Bore	D O.D.	B Width	r (1) Fillet Radius (max.)	Backing Dia.		Load Ratings		Lubrication Factor	Reference Speed	Thermal Ratings	Wt.
									Shaft E	Housing F	Static Load Rating C_0	Dynamic Load Ratings C	C_g	Grease	Oil	
RU RIU	RN RIN	RJ RIJ	RF RIF	RT RIT	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
200RU92	200RN92	200RJ92	200RF92	200RT92	200.000 7.8740	360.000 14.1732	120.700 4.7500	3.0 0.12	230 9.1	330 13.0	2600 585000	1630 365000	0.164	940	1000	56.8 125.2
200RU03	200RN03	200RJ03	200RF03	200RT03	200.000 7.8740	420.000 16.5354	80.000 3.1496	4.0 0.16	241 9.5	379 14.9	1290 290000	1120 250000	0.135	950	1100	57.6 127.0
210RU51	210RN51	210RJ51	210RF51	210RT51	210.000 8.2677	340.000 13.3858	50.000 1.9685	2.5 0.10	234 9.2	316 12.4	780 176000	600 134000	0.124	1000	1200	18.3 40.3
210RU91	210RN91	210RJ91	210RF91	210RT91	210.000 8.2677	340.000 13.3858	95.300 3.7500	2.5 0.10	233 9.2	318 12.5	1960 440000	1220 275000	0.156	980	1100	35.3 77.7
210RU02	210RN02	210RJ02	210RF02	210RT02	210.000 8.2677	380.000 14.9606	62.000 2.4409	3.0 0.12	242 9.5	348 13.7	1060 236000	850 190000	0.132	940	1100	32.4 71.5
210RU92	210RN92	210RJ92	210RF92	210RT92	210.000 8.2677	380.000 14.9606	127.000 5.0000	3.0 0.12	240 9.4	350 13.8	2700 600000	1760 400000	0.165	900	1000	66.1 145.8
210RU03	210RN03	210RJ03	210RF03	210RT03	210.000 8.2677	440.000 17.3228	84.000 3.3071	4.0 0.16	252 9.9	398 15.7	1430 325000	1220 275000	0.142	890	1000	66.3 146.2
220RU30	220RN30	220RJ30	220RF30	220RT30	220.000 8.6614	340.000 13.3858	90.000 3.5433	2.5 0.10	241 9.5	318 12.5	1960 440000	1160 260000	0.159	930	1000	31.2 68.9
220RU51	220RN51	220RJ51	220RF51	220RT51	220.000 8.6614	350.000 13.7796	51.000 2.0079	2.5 0.10	244 9.6	326 12.8	865 193000	630 143000	0.128	950	1100	19.6 43.2
220RU91	220RN91	220RJ91	220RF91	220RT91	220.000 8.6614	350.000 13.7796	98.400 3.8750	2.5 0.10	241 9.5	329 12.9	2080 475000	1290 290000	0.160	930	1000	37.6 82.9
220RU02	220RN02	220RJ02	220RF02	220RT02	220.000 8.6614	400.000 15.7480	65.000 2.5591	3.0 0.12	256 10.1	365 14.4	1180 260000	915 208000	0.138	880	1000	38.3 84.4
220RU92	220RN92	220RJ92	220RF92	220RT92	220.000 8.6614	400.000 15.7480	133.400 5.2500	3.0 0.12	252 9.9	368 14.5	3250 735000	2000 455000	0.178	800	880	78.4 172.9
220RU03	220RN03	220RJ03	220RF03	220RT03	220.000 8.6614	460.000 18.1102	88.000 3.4646	4.0 0.16	261 10.3	419 16.5	1600 360000	1340 305000	0.149	840	970	75.9 167.2
90RIU395	90RIN395	90RIJ395	90RIF395	90RIT395	228.600 9.0000	304.800 12.0000	38.100 1.5000	4.0 0.16	241 9.5	292 11.5	585 132000	355 80000	0.124	990	1200	7.8 17.3
90RIU396	90RIN396	90RIJ396	90RIF396	90RIT396	228.600 9.0000	368.300 14.5000	50.800 2.0000	5.0 0.20	255 10.0	342 13.5	930 208000	680 153000	0.133	880	1000	21.9 48.4
90RIU399	90RIN399	90RIJ399	90RIF399	90RIT399	228.600 9.0000	431.800 17.0000	117.480 4.6250	5.0 0.20	265 10.4	395 15.6	2600 600000	1860 415000	0.168	810	900	82.7 182.4
230RU51	230RN51	230RJ51	230RF51	230RT51	230.000 9.0551	370.000 14.5669	53.000 2.0866	3.0 0.12	256 10.1	344 13.6	1000 224000	720 163000	0.134	880	1000	23.1 50.8
230RU91	230RN91	230RJ91	230RF91	230RT91	230.000 9.0551	370.000 14.5669	101.600 4.0000	3.0 0.12	256 10.1	344 13.6	2450 550000	1460 325000	0.167	830	920	44.3 97.7
230RU02	230RN02	230RJ02	230RF02	230RT02	230.000 9.0551	420.000 16.5354	69.000 2.7165	3.0 0.12	263 10.4	387 15.2	1370 305000	1080 240000	0.144	820	950	44.5 98.1
230RU92	230RN92	230RJ92	230RF92	230RT92	230.000 9.0551	420.000 16.5354	139.000 5.5000	3.0 0.12	263 10.4	387 15.2	3400 765000	2200 490000	0.178	770	840	90.4 199.2

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

Bearing Number and Style					d	D	B	r (1)	Backing Dia.		Load Ratings		Lubri-cation	Reference Speed	Thermal Ratings	Wt.
					Bore	O.D.	Width	Fillet Radius (max.)	Shaft E	Housing F	Static Load Rating C_0	Dynamic Load Ratings C	Factor C_g	Grease	Oil	
RU RIU	RN RIN	RJ RIJ	RF RIF	RT RIT	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
230RU03	230RN03	230RJ03	230RF03	230RT03	230.000 9.0551	480.000 18.8976	91.000 3.5827	4.0 0.16	279 11.0	431 17.0	1700 380000	1400 315000	0.151	800	920	85.6 188.8
240RU30	240RN30	240RJ30	240RF30	240RT30	240.000 9.4488	360.000 14.1732	92.000 3.6220	2.5 0.10	262 10.3	338 13.3	2200 490000	1220 275000	0.169	840	930	34.4 75.8
240RU51	240RN51	240RJ51	240RF51	240RT51	240.000 9.4488	390.000 15.3543	55.000 2.1654	3.0 0.12	265 10.4	365 14.4	1060 236000	765 173000	0.140	830	970	27.2 59.8
240RU91	240RN91	240RJ91	240RF91	240RT91	240.000 9.4488	390.000 15.3543	108.000 4.2500	3.0 0.12	265 10.4	365 14.4	2700 600000	1600 355000	0.176	790	870	53.4 117.7
240RU02	240RN02	240RJ02	240RF02	240RT02	240.000 9.4488	440.000 17.3228	72.000 2.8346	3.0 0.12	277 10.9	402 15.8	1400 315000	1100 250000	0.146	800	920	51.6 113.7
240RU92	240RN92	240RJ92	240RF92	240RT92	240.000 9.4488	440.000 17.3228	146.000 5.7500	3.0 0.12	277 10.9	402 15.8	3750 850000	2400 540000	0.185	720	790	104.3 230.0
240RU03	240RN03	240RJ03	240RF03	240RT03	240.000 9.4488	500.000 19.6850	95.000 3.7402	4.0 0.16	289 11.4	451 17.8	2000 450000	1600 360000	0.159	730	840	97.5 215.0
95RIU430	95RIN430	95RIJ430	95RIF430	95RIT430	241.300 9.5000	323.850 12.7500	41.270 1.6250	4.0 0.16	255 10.0	310 12.2	695 156000	425 95000	0.133	920	1100	9.8 21.5
250RU51	250RN51	250RJ51	250RF51	250RT51	250.000 9.8425	410.000 16.1417	57.000 2.2441	3.0 0.12	278 10.9	383 15.1	1140 255000	850 190000	0.144	790	920	31.3 69.0
250RU91	250RN91	250RJ91	250RF91	250RT91	250.000 9.8425	410.000 16.1417	111.100 4.3750	3.0 0.12	278 10.9	383 15.1	2750 610000	1700 380000	0.177	760	840	60.9 134.3
250RU02	250RN02	250RJ02	250RF02	250RT02	250.000 9.8425	460.000 18.1102	76.000 2.9921	4.0 0.16	291 11.5	418 16.5	1600 360000	1220 275000	0.154	750	860	59.8 131.8
250RU92	250RN92	250RJ92	250RF92	250RT92	250.000 9.8425	460.000 18.1102	152.400 6.0000	4.0 0.16	291 11.5	418 16.5	4050 915000	2550 570000	0.192	680	740	119.7 263.9
250RU03	250RN03	250RJ03	250RF03	250RT03	250.000 9.8425	520.000 20.4724	98.000 3.8583	5.0 0.20	300 11.8	470 18.5	2120 475000	1660 375000	0.165	700	800	109.0 240.3
100RIU433	100RIN433	100RIJ433	100RIF433	100RIT433	254.000 10.0000	336.550 13.2500	41.270 1.6250	4.0 0.16	269 10.6	322 12.7	735 163000	430 96500	0.136	870	1000	10.2 22.4
260RU30	260RN30	260RJ30	260RF30	260RT30	260.000 10.2362	400.000 15.7480	104.000 4.0945	3.0 0.12	285 11.2	375 14.8	2600 600000	1530 345000	0.180	760	840	49.8 109.8
260RU51	260RN51	260RJ51	260RF51	260RT51	260.000 10.2362	430.000 16.9291	59.000 2.3228	3.0 0.12	291 11.4	399 15.7	1200 270000	900 204000	0.147	750	880	36.1 79.6
260RU91	260RN91	260RJ91	260RF91	260RT91	260.000 10.2362	430.000 16.9291	114.300 4.5000	3.0 0.12	291 11.4	399 15.7	3100 695000	1900 425000	0.182	700	770	70.0 154.3
260RU02	260RN02	260RJ02	260RF02	260RT02	260.000 10.2362	480.000 18.8976	80.000 3.1496	4.0 0.16	300 11.8	440 17.3	1760 400000	1370 305000	0.160	710	820	68.2 150.4
260RU92	260RN92	260RJ92	260RF92	260RT92	260.000 10.2362	480.000 18.8976	158.800 6.2500	4.0 0.16	300 11.8	440 17.3	4400 1000000	2800 630000	0.200	640	700	136.3 300.4
260RU03	260RN03	260RJ03	260RF03	260RT03	260.000 10.2362	540.000 21.2598	102.000 4.0157	5.0 0.20	314 12.4	486 19.1	2320 520000	1860 415000	0.171	660	760	122.0 268.9
110RIU473	110RIN473	110RIJ473	110RIF473	110RIT473	279.400 11.0000	368.300 14.5000	44.450 1.7500	4.0 0.16	295 11.6	352 13.9	930 208000	530 118000	0.150	760	890	13.0 28.7
280RU30	280RN30	280RJ30	280RF30	280RT30	280.000 11.0236	420.000 16.5354	106.000 4.1732	3.0 0.12	303 11.9	397 15.6	3050 680000	1700 380000	0.192	670	740	53.9 118.8
280RU51	280RN51	280RJ51	280RF51	280RT51	280.000 11.0236	460.000 18.1102	63.000 2.4803	3.0 0.12	311 12.2	429 16.9	1430 325000	1000 228000	0.156	680	790	44.5 98.1
280RU91	280RN91	280RJ91	280RF91	280RT91	280.000 11.0236	460.000 18.1102	123.800 4.8750	3.0 0.12	311 12.2	429 16.9	3750 830000	2120 475000	0.201	620	680	87.4 192.8
280RU02	280RN02	280RJ02	280RF02	280RT02	280.000 11.0236	500.000 19.6850	80.000 3.1496	4.0 0.16	319 12.6	461 18.2	2000 450000	1500 335000	0.169	640	730	72.1 159.0
280RU92	280RN92	280RJ92	280RF92	280RT92	280.000 11.0236	500.000 19.6850	165.100 6.5000	4.0 0.16	319 12.6	461 18.2	5200 1180000	3150 710000	0.213	570	610	148.7 327.9
280RU03	280RN03	280RJ03	280RF03	280RT03	280.000 11.0236	580.000 22.8346	108.000 4.2520	5.0 0.20	341 13.4	519 20.4	2750 620000	2160 480000	0.182	590	670	148.6 327.6
300RU30	300RN30	300RJ30	300RF30	300RT30	300.000 11.8110	460.000 18.1102	118.000 4.6457	3.0 0.12	330 13.0	429 16.9	3750 830000	2040 455000	0.205	590	640	75.3 166.0

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

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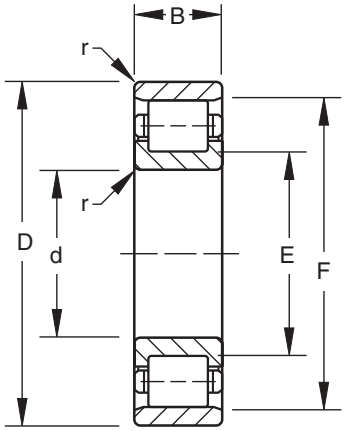
STANDARD STYLES - *continued*



Bearing Number and Style					d Bore	D O.D.	B Width	r (1) Fillet Radius (max.)	Backing Dia.		Load Ratings		Lubrication Factor	Reference Speed	Thermal Ratings	Wt.
									Shaft E	Housing F	Static Load Rating C_0	Dynamic Load Ratings C	C_g	Grease	Oil	
RU RIU	RN RIN	RJ RIJ	RF RIF	RT RIT	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
300RU51	300RN51	300RJ51	300RF51	300RT51	300.000 11.8110	480.000 18.8976	67.000 2.6378	3.0 0.12	329 12.9	452 17.8	1660 375000	1160 260000	0.166	630	730	49.1 108.2
300RU91	300RN91	300RJ91	300RF91	300RT91	300.000 11.8110	480.000 18.8976	127.000 5.0000	3.0 0.12	329 12.9	452 17.8	4000 900000	2320 520000	0.204	580	630	93.0 205.1
300RU02	300RN02	300RJ02	300RF02	300RT02	300.000 11.8110	540.000 21.2598	85.000 3.3465	4.0 0.16	343 13.5	497 19.6	2280 510000	1660 375000	0.178	580	660	90.5 199.6
300RU92	300RN92	300RJ92	300RF92	300RT92	300.000 11.8110	540.000 21.2598	177.800 7.0000	4.0 0.16	343 13.5	497 19.6	6200 1400000	3750 830000	0.226	500	540	188.5 415.6
125RIU550	125RIN550	125RIJ550	125RIF550	125RIT550	317.500 12.5000	419.100 16.5000	50.800 2.0000	5.0 0.20	337 13.2	400 15.8	1290 290000	710 160000	0.167	640	740	19.4 42.8
125RIU551	125RIN551	125RIJ551	125RIF551	125RIT551	317.500 12.5000	482.600 19.0000	66.670 2.6250	5.0 0.20	337 13.8	451 17.8	1800 405000	1180 260000	0.174	590	680	46.0 101.3
320RU30	320RN30	320RJ30	320RF30	320RT30	320.000 12.5984	480.000 18.8976	121.000 4.7638	3.0 0.12	347 13.7	453 17.8	4050 900000	2120 480000	0.215	550	600	81.3 179.1
320RU51	320RN51	320RJ51	320RF51	320RT51	320.000 12.5984	500.000 19.6850	71.000 2.7953	3.0 0.12	352 13.9	468 18.4	1900 425000	1270 285000	0.176	590	670	54.7 120.7
320RU91	320RN91	320RJ91	320RF91	320RT91	320.000 12.5984	500.000 19.6850	130.200 5.1250	3.0 0.12	352 13.9	468 18.4	4300 980000	2450 550000	0.214	540	590	100.3 221.2
320RU02	320RN02	320RJ02	320RF02	320RT02	320.000 12.5984	580.000 22.8346	92.000 3.6220	4.0 0.16	368 14.5	532 20.9	2450 550000	1800 405000	0.186	550	630	114.9 253.4
320RU92	320RN92	320RJ92	320RF92	320RT92	320.000 12.5984	580.000 22.8346	190.500 7.5000	4.0 0.16	370 14.6	530 20.9	6700 1530000	4000 900000	0.238	470	510	236.4 521.1
340RU30	340RN30	340RJ30	340RF30	340RT30	340.000 13.3858	520.000 20.4724	133.000 5.2362	4.0 0.16	372 14.7	488 19.2	4650 1040000	2550 570000	0.224	500	550	107.6 237.2
135RIU580	135RIN580	135RIJ580	135RIF580	135RIT580	342.900 13.5000	457.200 18.0000	57.150 2.2500	5.0 0.20	365 14.4	435 17.1	1530 345000	815 183000	0.181	580	680	27.2 60.0
135RIU582	135RIN582	135RIJ582	135RIF582	135RIT582	342.900 13.5000	527.100 20.7500	104.770 4.1250	5.0 0.20	376 14.8	494 19.4	3450 765000	2040 455000	0.208	520	580	88.0 193.9
360RU30	360RN30	360RJ30	360RF30	360RT30	360.000 14.1732	540.000 21.2598	134.000 5.2765	4.0 0.16	392 15.4	508 20.0	4900 1100000	2600 585000	0.232	470	520	113.6 250.4
145RIU610	145RIN610	145RIJ610	145RIF610	145RIT610	368.300 14.5000	495.300 19.5000	63.500 2.5000	5.0 0.20	391 15.4	473 18.6	2040 455000	1100 245000	0.194	510	590	35.8 79.0
380RU30	380RN30	380RJ30	380RF30	380RT30	380.000 14.9606	560.000 22.0472	135.000 5.3150	4.0 0.16	412 16.2	528 20.8	5200 1180000	2750 610000	0.241	440	480	119.5 263.4
150RIU613	150RIN613	150RIJ613	150RIF613	150RIT613	381.000 15.0000	508.000 20.0000	63.500 2.5000	5.0 0.20	404 15.9	485 19.1	2040 455000	1100 245000	0.196	500	570	36.9 81.3
155RIU640	155RIN640	155RIJ640	155RIF640	155RIT640	393.700 15.5000	520.700 20.5000	63.500 2.5000	5.0 0.20	416 16.4	498 19.6	2040 455000	1080 245000	0.200	480	560	38.0 83.8
400RU30	400RN30	400RJ30	400RF30	400RT30	400.000 15.7480	600.000 23.6220	148.000 5.8268	4.0 0.16	438 17.2	562 22.1	6000 1340000	3100 695000	0.252	410	440	155.7 343.2

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

Bearing Number and Style					d	D	B	r (1)	Backing Dia.		Load Ratings		Lubri-cation	Reference Speed	Thermal Ratings	Wt.
					Bore	O.D.	Width	Fillet Radius (max.)	Shaft E	Housing F	Static Load Rating C_0	Dynamic Load Ratings C	Factor C_g	Grease	Oil	
RU RIU	RN RIN	RJ RIJ	RF RIF	RT RIT	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
160RIU643	160RIN643	160RIJ643	160RIF643	160RIT643	406.400 16.0000	546.100 21.5000	69.850 2.7500	5.0 0.20	432 17.0	521 20.5	2500 560000	1320 300000	0.212	450	510	48.2 106.2
160RIU644	160RIN644	160RIJ644	160RIF644	160RIT644	406.400 16.0000	603.250 23.7500	82.550 3.2500	5.0 0.20	444 17.5	565 22.2	2800 630000	1700 380000	0.211	440	500	86.4 190.4
160RIU645	160RIN645	160RIJ645	160RIF645	160RIT645	406.400 16.0000	603.250 23.7500	123.820 4.8750	5.0 0.20	442 17.4	568 22.3	5000 1120000	2600 600000	0.243	410	450	129.4 285.4
165RIU662	165RIN662	165RIJ662	165RIF662	165RIT662	419.100 16.5000	622.300 24.5000	127.000 5.0000	5.0 0.20	456 18.0	585 23.0	5400 1200000	2900 655000	0.247	390	420	141.0 310.9
170RIU663	170RIN663	170RIJ663	170RIF663	170RIT663	431.800 17.0000	584.200 23.0000	76.200 3.0000	6.0 0.24	460 18.1	556 21.9	3000 670000	1560 355000	0.223	410	460	61.4 135.4
170RIU664	170RIN664	170RIJ664	170RIF664	170RIT664	431.800 17.0000	635.000 25.0000	88.900 3.5000	6.0 0.24	470 18.5	597 23.5	3450 780000	2040 455000	0.226	400	450	101.2 223.2
440RU30	440RN30	440RJ30	440RF30	440RT30	440.000 17.3228	650.000 25.5906	157.000 6.1811	5.0 0.20	476 18.8	613 24.1	7350 1660000	3650 830000	0.274	350	370	189.4 417.5
180RIU683	180RIN683	180RIJ683	180RIF683	180RIT683	457.200 18.0000	685.800 27.0000	88.900 3.5000	6.0 0.24	500 19.7	643 25.3	3450 780000	2160 480000	0.229	370	420	122.5 270.1
180RIU684	180RIN684	180RIJ684	180RIF684	180RIT684	457.200 18.0000	685.800 27.0000	139.700 5.5000	6.0 0.24	500 19.7	643 25.3	6300 1430000	3400 765000	0.265	350	380	192.2 423.8
460RU30	460RN30	460RJ30	460RF30	460RT30	460.000 18.1102	680.000 26.7717	163.000 6.4173	5.0 0.20	498 19.6	641 25.2	8000 1800000	4000 900000	0.283	330	350	215.6 475.2
185RIU696	185RIN696	185RIJ696	185RIF696	185RIT696	469.900 18.5000	698.500 27.5000	88.900 5.5000	6.0 0.24	513 20.2	656 25.8	6550 1500000	3550 800000	0.266	260	280	125.5 434.6
480RU30	480RN30	480RJ30	480RF30	480RT30	480.000 18.8976	700.000 27.5591	165.000 6.4961	5.0 0.20	518 20.4	660 26.0	8150 1830000	4000 900000	0.294	320	340	225.6 497.4
500RU30	500RN30	500RJ30	500RF30	500RT30	500.000 19.6850	720.000 28.3465	167.000 6.5748	5.0 0.20	540 21.2	680 26.8	8300 1900000	4150 930000	0.296	310	330	235.3 518.7
530RU30	530RN30	530RJ30	530RF30	530RT30	530.000 20.8661	780.000 30.7087	185.000 7.2835	5.0 0.20	578 22.8	730 28.8	10600 2360000	5100 1140000	0.320	260	280	321.7 709.2
210RIU728	210RIN728	210RIJ728	210RIF728	210RIT728	533.400 21.0000	787.400 31.0000	161.920 6.3750	6.0 0.24	579 22.8	742 29.2	8500 1900000	4300 965000	0.302	280	300	288.5 636.0
220RIU744	220RIN744	220RIJ744	220RIF744	220RIT744	558.800 22.0000	711.200 28.0000	111.120 4.3750	5.0 0.20	587 23.1	683 26.9	5700 1290000	2450 550000	0.292	300	330	112.2 247.3
560RU30	560RN30	560RJ30	560RF30	560RT30	560.000 22.0472	820.000 32.2835	195.000 7.6772	5.0 0.20	607 23.9	773 30.4	11400 2550000	5500 1250000	0.324	250	270	369.7 815.0
600RU30	600RN30	600RJ30	600RF30	600RT30	600.000 23.6220	870.000 34.2520	200.000 7.8740	5.0 0.20	650 25.6	820 32.3	12500 2800000	6000 1340000	0.341	230	240	420.3 926.7
260RIU802	260RIN802	260RIJ802	260RIF802	260RIT802	660.400 26.0000	958.850 37.7500	127.000 5.0000	6.0 0.24	716 28.2	903 35.6	7200 1630000	4000 900000		230	260	326.6 720.1
275RIU808	275RIN808	275RIJ808	275RIF808	275RIT808	698.500 27.5000	1016.000 40.0000	133.350 5.2500	6.0 0.24	757 29.8	957 37.7	8300 1860000	4550 1040000	0.325	210	230	385.7 850.3

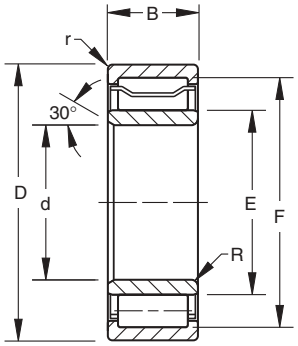
(1) Maximum shaft or housing fillet radius that bearing corners will clear.

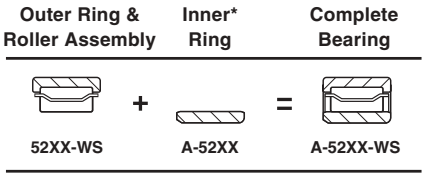
5200, A5200 METRIC SERIES

- Ring tolerances are found on page B348.
- Life and load calculations are found in the engineering section of this catalog.
- Shaft and housing fits, tolerances and shaft diameters are found on pages B347 and B348.

IN THE BEARING NUMBER

W = double ribbed outer ring.
S = stamped steel land-riding cage.
M = machined brass land-riding cage.





*** Inner ring can be ordered separately**

Bearing Number	d Bore	D O.D.	B Width	Max. Fillet Radius R Shaft	Max. Fillet Radius r Housing	Backing Diameter Shaft E	Backing Diameter Housing F	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Ratings C	Lubrication Factor Cg	Reference Speed Grease	Thermal Rating Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
A-5220-WS	**100** 3.9370	**180** 7.0866	**60.325** 2.3750	**4.0** 0.16	**2.0** 0.08	**118** 4.6	**167** 6.6	**489** 110000	**387** 87000	**0.112**	**2600**	**3100**	**7.2** 15.9
A-5222-WS	**110** 4.3307	**200** 7.8740	**69.850** 2.7500	**4.0** 0.16	**2.0** 0.08	**130** 5.1	**186** 7.3	**645** 145000	**498** 112000	**0.124**	**2300**	**2700**	**10.4** 22.9
A-5224-WS	**120** 4.7244	**215** 8.4646	**76.200** 3.0000	**4.8** 0.19	**2.0** 0.08	**144** 5.7	**197** 7.8	**774** 174000	**574** 129000	**0.134**	**2100**	**2400**	**13.0** 28.6
A-5226-WS	**130** 5.1181	**230** 9.0551	**79.375** 3.1250	**4.8** 0.19	**2.5** 0.10	**148** 5.8	**213** 8.4	**867** 195000	**645** 145000	**0.140**	**1900**	**2200**	**15.2** 33.6
A-5228-WS	**140** 5.5118	**250** 9.8425	**82.550** 3.2500	**4.8** 0.19	**2.5** 0.10	**165** 6.5	**232** 9.1	**992** 223000	**730** 164000	**0.148**	**1700**	**1900**	**18.9** 41.7
A-5230-WS	**150** 5.9055	**270** 10.6299	**88.900** 3.5000	**6.4** 0.25	**2.5** 0.10	**179** 7.0	**252** 9.9	**1190** 268000	**872** 196000	**0.132**	**1500**	**1700**	**23.9** 52.8
A-5232-WS	**160** 6.2992	**290** 11.4173	**98.425** 3.8750	**6.4** 0.25	**2.5** 0.10	**190** 7.5	**268** 10.6	**1410** 318000	**1020** 229000	**0.141**	**1400**	**1600**	**30.8** 67.8
A-5234-WS	**170** 6.6929	**310** 12.2047	**104.775** 4.1250	**6.4** 0.25	**3.0** 0.12	**202** 7.9	**286** 11.2	**1610** 361000	**1130** 255000	**0.148**	**1300**	**1400**	**37.6** 82.9
A-5236-WS	**180** 7.0866	**320** 12.5984	**107.950** 4.2500	**6.4** 0.25	**3.0** 0.12	**211** 8.3	**298** 11.7	**1740** 392000	**1220** 274000	**0.153**	**1200**	**1300**	**40.4** 89.0
A-5238-WS	**190** 7.4803	**340** 13.3858	**114.300** 4.5000	**7.9** 0.31	**3.0** 0.12	**224** 8.8	**313** 12.3	**1940** 437000	**1350** 304000	**0.160**	**1100**	**1200**	**48.5** 107.0
A-5240-WS	**200** 7.8740	**360** 14.1732	**120.650** 4.7500	**7.9** 0.31	**3.0** 0.12	**235** 9.2	**325** 12.8	**1810** 406000	**1230** 277000	**0.165**	**1100**	**1300**	**57.6** 127.0
A-5244-WM	**220** 8.6614	**400** 15.7480	**133.350** 5.2500	**9.5** 0.38	**3.0** 0.12	**260** 10.2	**367** 14.4	**2740** 615000	**1850** 416000	**0.182**	**880**	**980**	**76.4** 175.0
A-5248-WM	**240** 9.4488	**440** 17.3228	**146.050** 5.7500	**9.5** 0.38	**3.0** 0.12	**285** 11.2	**402** 15.8	**3270** 736000	**2210** 497000	**0.195**	**780**	**860**	**106.1** 234.0

5200, A5200 METRIC SERIES SHAFT AND HOUSING FITS AND TOLERANCES

SHAFT FITS[1]

All tolerances shown in ten thousandth (.0001") and micrometers (µm).

Bearing O.D.		Bore Tolerance	Press fit Rotating Inner Ring				Slip Fit Stationary Inner Ring			
			Shaft Diameter		Fit		Shaft Diameter		Fit	
Over	Incl.	+0	min.	max.			min.	max.		
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
80 3.1496	120 4.7236	-20 -8	+25 +10	+48 +19	25T 10T	69T 27T	-23 -9	0 0	23L 9L	20T 8T
120 4.7236	140 5.5108	-25 -10	+30 +12	+56 +22	30T 12T	81T 32T	-25 -10	0 0	25L 10L	25T 10T
140 5.5108	180 7.0856	-25 -10	+46 +18	+71 +28	46T 18T	97T 38T	-25 -10	10 0	25L 10L	25T 10T
180 7.0856	240 9.4476	-30 -12	+51 +20	+81 +32	51T 20T	112T 44T	-30 -12	0 0	30L 12L	30T 12T

[1] When shaft is used as race surface, hardness to be Rc58 minimum and surface finish to be 15 RMS.

HOUSING FITS

All tolerances shown in ten thousandth (.0001") and micrometers (µm).

Bearing O.D.		O.D. Tolerance Inner Ring	Press fit Rotating Inner Ring				Slip Fit Stationary Inner Ring			
			Housing Diameter		Fit		Housing Diameter		Fit	
Over	Incl.	+0	min.	max.			min.	max.		
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
– –	180 7.0866	-25 -10	-15 -6	+22 +8	15T 6T	46L 18L	-56 -22	-25 -10	56T 22T	0L 0L
180 7.0866	200 7.8740	-30 -12	-18 -7	+18 +7	18T 7T	48L 19L	-66 -26	-30 -12	66T 26T	0L 0L
200 7.874	230 9.0551	-30 -12	-18 -7	+23 +9	18T 7T	53L 21L	-66 -26	-30 -12	66T 26T	0L 0L
230 9.0551	250 9.8425	-30 -12	-18 -7	+28 +11	18T 7T	58L 23L	-66 -12	-30 -12	66T 26T	0L 0L
250 9.8425	270 10.6299	-36 -14	-18 -7	+28 +11	18T 7T	64L 25L	-71 -28	-30 -12	71T 28T	5L 2L
270 10.6299	310 12.2047	-36 -14	-18 -7	+33 +13	18T 7T	69L 27L	-71 -28	-36 -14	71T 28T	5L 2L
310 12.2047	400 15.7480	-41 -16	-18 -7	+38 +15	18T 7T	79L 31L	-76 -30	-36 -14	79T 30T	5L 2L
400 15.748	440 17.3228	-46 -18	-23 -9	+41 +16	23T 9T	86L 34L	-86 -14	-36 -34	86T 34T	10L 4L

5200, A5200 METRIC SERIES SHAFT AND HOUSING FITS AND TOLERANCES - *continued*

RADIAL INTERNAL CLEARANCE (R6)

Bearing Bore		Radial Internal Clearance	
Over	Incl.	min.	max.
mm in.	mm in.	mm in.	mm in.
– –	100 3.937	0.127 0.005	0.183 0.0072
100 3.937	120 4.7244	0.127 0.005	0.188 0.0074
120 4.7244	140 5.5118	0.142 0.0056	0.208 0.0082
140 5.5118	170 6.6929	0.152 0.006	0.224 0.0088
170 6.6929	180 7.0866	0.152 0.006	0.229 0.009
180 7.0866	220 8.6614	0.173 0.0068	0.254 0.01
220 8.6614	240 9.4488	0.183 0.0072	0.269 0.0106

INNER RING TOLERANCES

All tolerances shown in ten thousandth (.0001") and micrometers (µm).

Bearing Bore		Bore & Inner O.D.	Width
Over	Incl.	+0	+0
mm in.	mm in.	mm in.	mm in.
80 3.1496	120 4.7244	-20 -8	-203 -80
120 4.7244	180 7.0866	-25 -10	-254 -100
180 7.0866	250 9.8425	-30 -12	-305 -120

OUTER RING TOLERANCES

All tolerances shown in ten thousandth (.0001") and micrometers (µm).

Bearing O.D.		O.D.	Diameter Under Rollers
Over	Incl.	+0	-0
mm in.	mm in.	mm in.	mm in.
150 5.9055	180 7.0866	-25 -10	+36 +14
180 7.0866	250 9.8425	-30 -12	+41 +16
250 9.8425	315 12.4016	-36 -14	+46 +18
315 12.4016	400 15.748	-41 -16	+51 +20
400 15.748	500 19.685	-46 -18	+56 +22

SHAFT DIMENSIONS - 5200 BEARINGS WITHOUT INNER RING

Bearing Number	Slip Fit Housing*		Press Fit Housing*	
	max.	min.	max.	min.
	mm in.	mm in.	mm in.	mm in.
5220 WS	121.064 4.7663	121.044 4.7655	121.036 4.7652	121.016 4.7644
5222 WS	133.007 5.2365	132.987 5.2357	132.969 5.235	132.949 5.2343
5224 WS	145.194 5.7163	145.174 5.7155	145.156 5.7148	145.136 5.714
5226 WS	155.042 6.104	155.016 6.103	155.004 6.1025	154.978 6.1015
5228 WS	168.529 6.635	168.504 6.634	168.491 6.6335	168.466 6.6325
5230 WS	181.623 7.1505	181.597 7.1495	181.587 7.149	181.559 7.148
5232 WS	193.713 7.6265	193.688 7.6255	193.675 7.625	193.65 7.624
5234 WS	205.562 8.093	205.537 8.092	205.524 8.0915	205.499 8.0905
5236 WS	216.37 8.5185	216.344 8.5175	216.319 8.5165	216.294 8.5155
5238 WS	229.032 9.017	229.001 9.0158	228.994 9.0155	228.963 9.0143
5240 WS	242.296 9.5392	242.265 9.538	242.245 9.5372	242.214 9.536
5244 WM	266.02 10.4725	265.971 10.4713	265.951 10.4705	265.92 10.4693
5248WM	291.292 11.4682	291.262 11.467	291.241 11.4662	291.211 11.465

*All shaft diameters are based on a housing bore to housing O.D. ratio of 0.7.

NCF/NU

- Single-row, full-complement cylindrical roller bearings.
- Features include integral flanges on the inner and outer rings.
- Can manage axial loads in one direction and permit small axial displacements.

Bearing Number	d Bore	D O.D.	B Width	r Fillet Rad. (max.)	Backing Diameter		Load Ratings		Lubrication Factor	Reference Speed	Thermal Ratings	Weight
					Shaft E	Housing F	Static Load Rating C_0	Dynamic Load Ratings C	Cg	Grease	Oil	
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		RPM	RPM	kg lbs.
NCF												
NCF1840V	**200** 7.8740	**250** 9.8425	**24** 0.9449	**1.5** 0.06	**207** 8.1	**243** 9.6	**343** 77200	**193** 43300	**0.112**	**610**	**740**	**2.5** 5.5
NCF1844V	**220** 8.6614	**270** 10.6299	**24** 0.9449	**1.5** 0.06	**227** 8.9	**263** 10.4	**377** 84800	**202** 45400	**0.119**	**550**	**670**	**2.9** 6.4
NCF2944V	**220** 8.6614	**300** 11.8110	**48** 1.8898	**2.1** 0.08	**230** 9.1	**290** 11.4	**1010** 226000	**575** 129000	**0.144**	**560**	**660**	**10.9** 24.0
NCF1852V	**260** 10.2362	**320** 12.5984	**28** 1.1024	**2.0** 0.08	**269** 10.6	**311** 12.3	**561** 126000	**297** 66700	**0.138**	**480**	**580**	**4.8** 10.6
NCF1864V	**320** 12.5984	**400** 15.7480	**38** 1.4961	**2.1** 0.08	**330** 13.0	**390** 15.3	**912** 205000	**479** 108000	**0.164**	**380**	**460**	**10.6** 23.4
NCF2964V	**320** 12.5984	**440** 17.3228	**72** 2.8346	**2.5** 0.10	**332** 13.1	**428** 16.8	**2380** 536000	**1300** 293000	**0.197**	**340**	**400**	**32.9** 72.5
NCF1876V	**380** 14.9606	**480** 18.8976	**46** 1.8110	**2.1** 0.08	**390** 15.4	**470** 18.5	**1360** 307000	**708** 159000	**0.190**	**310**	**370**	**19.1** 42.1
NCF2976V	**380** 14.9606	**520** 20.4724	**82** 3.2283	**3.0** 0.12	**395** 15.5	**505** 19.9	**3380** 759000	**1800** 405000	**0.226**	**270**	**310**	**52.9** 116.6
NCF1880V	**400** 15.7480	**500** 19.6850	**46** 1.8110	**2.1** 0.08	**410** 16.1	**490** 19.3	**1420** 319000	**722** 162000	**0.195**	**290**	**350**	**20.6** 45.4
NCF1888V	**440** 17.3228	**540** 21.2598	**46** 1.8110	**2.1** 0.08	**450** 17.7	**530** 20.9	**1560** 351000	**756** 170000	**0.208**	**260**	**310**	**22.3** 49.2
NCF1892V	**460** 18.1102	**580** 22.8346	**56** 2.2047	**2.5** 0.10	**472** 18.6	**568** 22.3	**2020** 455000	**1030** 232000	**0.220**	**250**	**290**	**34.2** 75.4
NCF18/530V	**530** 20.8661	**650** 25.5906	**56** 2.2047	**2.5** 0.10	**542** 21.4	**638** 25.1	**2320** 521000	**1100** 248000	**0.242**	**210**	**240**	**37.8** 83.3
NCF18/600V	**600** 23.6220	**730** 28.7402	**60** 2.3622	**2.5** 0.10	**612** 24.1	**718** 28.3	**2610** 587000	**1170** 263000	**0.264**	**180**	**210**	**50.2** 110.7
NCF18/630V	**630** 24.8031	**780** 30.7087	**69** 2.7165	**3.0** 0.12	**645** 25.4	**765** 30.1	**3080** 692000	**1410** 316000	**0.276**	**170**	**200**	**72.2** 159.2
NCF18/710V	**710** 27.9528	**870** 34.2520	**74** 2.9134	**3.0** 0.12	**725** 28.5	**855** 33.7	**3900** 876000	**1740** 390000	**0.304**	**150**	**170**	**91.6** 201.9
NU												
NU1036MA	**180** 7.0866	**280** 11.0236	**46** 1.8110	**2.1** 0.08	**190** 7.5	**270** 10.6	**505** 113000	**391** 88000	**0.111**	**2100**	**2600**	**10.7** 23.6
NU1040MA	**200** 7.8740	**310** 12.2047	**51** 2.0079	**2.1** 0.08	**210** 8.3	**300** 11.8	**602** 135000	**445** 100000	**0.120**	**1900**	**2300**	**14.6** 32.2
NU1052MA	**260** 10.2362	**400** 15.7480	**65** 2.5591	**3.0** 0.12	**275** 10.8	**385** 15.2	**1030** 232000	**737** 166000	**0.148**	**1400**	**1700**	**30.0** 66.1
NU1056MA	**280** 11.0236	**420** 16.5354	**65** 2.5591	**3.0** 0.12	**295** 11.6	**405** 16.0	**1080** 243000	**754** 169000	**0.154**	**1300**	**1600**	**31.9** 70.3
NU1060MA	**300** 11.8110	**460** 18.1102	**74** 2.9134	**3.0** 0.12	**315** 12.4	**445** 17.5	**1420** 319000	**1000** 225000	**0.167**	**1200**	**1400**	**45.7** 100.8
NU1064MA	**320** 12.5984	**480** 18.8976	**74** 2.9134	**3.0** 0.12	**335** 13.2	**465** 18.3	**1490** 335000	**1020** 230000	**0.173**	**1100**	**1300**	**48.1** 106.0
NU1068MA	**340** 13.3858	**520** 20.4724	**82** 3.2283	**4.0** 0.16	**358** 14.1	**502** 19.8	**1800** 404000	**1240** 279000	**0.184**	**1000**	**1200**	**64.2** 141.5
NU1080MA	**400** 15.7480	**600** 23.6220	**90** 3.5433	**4.0** 0.16	**418** 16.5	**582** 22.9	**2340** 525000	**1560** 350000	**0.206**	**830**	**970**	**91.9** 202.6
NU10/600	**600** 23.6220	**870** 34.2520	**118** 4.6457	**5.0** 0.20	**651** 25.6	**807** 31.8	**5030** 1130000	**3080** 692000	**0.283**	**490**	**560**	**239.6** 528.2

NOTES

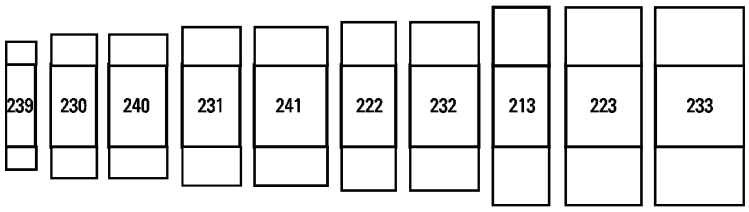
SPHERICAL ROLLER BEARINGS

Overview: Timken spherical roller bearings feature all of the characteristics that have made Timken renowned – superior design, reliable performance and comprehensive technical support. Spherical roller bearings are designed to manage high radial loads and perform consistently, even when misalignment, marginal lubrication, contamination, extreme speeds and critical application stresses are present.

- **Sizes:** Bore sizes of 25 mm and larger.
- **Markets:** Pulp and paper, power generation, oil field, mining and aggregate processing, wind turbines, gear drives and rolling mills.
- **Features:** Large bores for integration into heavy-duty industrial applications.
- **Benefits:** High load capacity under misalignment conditions from shaft deflections or housing misalignment.

Spherical Roller Bearings

Series:



Bore:
(5 x _ _ = bore in millimeters when 2 digits)
5 x 07 = 35 mm
5 x 76 = 380 mm
(/ # # # = bore in millimeters when >2 digits)
/530 = 530 mm
/1060 = 1060 mm

222	**17**	**K CJ W33**	**C3**
223	**26**	**YM W33 W800**	**C4**

Modification and style codes:
K = tapered bore
CJ = 2 piece steel cage - window type
VJ = 2 piece steel cage - finger type
YM = 1 piece brass cage - finger type
YMB = 1 piece brass, finger type, land piloted
YMD = 2 piece brass, finger type, land piloted
W33 = 3 holes and groove in O.D.
W800 = shaker screen modification:
- tighter bore diameter and O.D. tolerances
- brass cage
- RIC in upper 2/3 of clearance specified

W47 = inner ring with oversize bore

Internal Clearance:
C2 less than C0
C0 normal
C3 greater than C0
C4 greater than C3
C5 greater than C4
C6 special clearance

Current Industry Standard:

22326

	2	**23**	**26**
	double-row series SRB		
Old ABMA Part Number:	**SD**	**23**	
130			

130SD23

Bore
130 = Bore in millimeters
130 mm

Bore
5 x 26 = Bore in millimeters
130 mm

B

Spherical Roller Bearings

INTRODUCTION

The Timken self-aligning spherical roller bearing is a combination radial and thrust bearing, designed to operate even if shaft and housing are, or become, misaligned under load. This high-capacity bearing is the favored choice when conditions include heavy loads, plus difficulties in establishing or maintaining housing alignment, or when shaft deflection can be expected.

Shaft deflections and housing distortions caused by shock or heavy loads, which lead to misalignment, are compensated for by the internal self-alignment of the bearing elements during operation. Edge loading of rollers, a condition that limits service life on other types of bearings, does not develop in spherical roller bearings. Optimum bearing capacity can often be realized with up to ±1 ½ degrees of misalignment, depending on the size and series of bearing selected.

The inherent compensation for misalignment provided by the spherical roller bearing offers the designer the opportunity to use weldments for housing frames instead of complex castings, eliminating high-cost machining operations. Even when castings may be preferred, bore alignment is less critical if spherical roller bearings are specified. Unit design and construction also make the spherical roller bearing convenient to handle during installation or maintenance.

Several types of radial spherical roller bearings include CJ, YM, YMB, YMD, and VCSJ types.

Bearings are made to RBEC-1 tolerances. Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.

BEARING TYPES

CJ

YM

Tapered Bore with Adapter Sleeve

YM

- Higher load ratings for longer life.
- Incorporates advanced features and precision-machined roller-riding one piece brass cage.
- Suited for severe conditions of use.

YMB

- Higher load ratings for longer life.
- Incorporates advanced features and precision-machined, land-riding one piece brass cage.
- Suited for use in severe conditions.

YMD

- Incorporates advanced features and offers higher load ratings for longer life.
- Precision-machined, land-riding and two-pieced brass cages.
- Suited for use in severe conditions.

CJ

- High load ratings for longer life.
- Incorporates stamped steel window type cage for a broad range of applications.
- Utilize advanced features.

VCSJ

- Compact design for general use.
- Stamped steel finger type cage.

TAPERED BORE BEARINGS WITH ADAPTER SLEEVES

- SNW adapter assemblies consist of a sleeve and locknut. Lockwashers are available for shaft mounting of tapered bore "K" bearings.
- Description of shaft mounting techniques for tapered bore bearings with adapter sleeves are found on page B380.

SHAKER SCREEN EQUIPMENT

- Vibrating equipment commonly found in the aggregate industry is one of the most demanding applications for spherical roller bearings.
- Timken manufactures spherical roller bearings suited for high rotational speeds, high radial and impact loads, fluctuating and unbalanced loads, misalignment and extreme centrifugal forces in tough environmental conditions.
- The design allows for static and dynamic misalignment in the application while maintaining the bearing's full dynamic capacity. This achieves maximum expected service life.
- Standards and special modification codes are available for shaft (s4 or m6) and housing (P6 or H7) fits as in the engineering section.

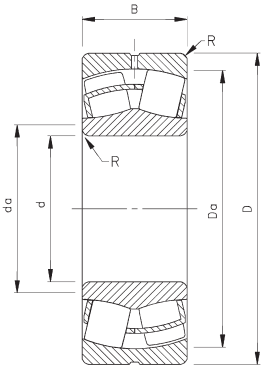
TIMKEN SPHERICAL ROLLER BEARING MODIFICATIONS

TKN	SKF	FAG	TIMKEN GENERAL DEFINITION
Other modifications available, contact your local Timken representative for more information.			
CJ	CJ, CC	J	Spherical with stamped steel cage
YM	M2	M	One-piece roller riding machined brass cage
YMB	MC	MB	One-piece inner ring piloted machined brass cage
CO2	CO2	T52BE	Inner ring with P5 running accuracy, W4 (SKF does not include W4)
CO2 C3	CO23	C3, T52BE	Inner ring with P5 running accuracy, C3 RIC
CO2 C4	CO24	C4, T52BE	Inner ring with P5 running accuracy, C4 RIC
CO4	CO4	T52BN	Outer ring with P5 running accuracy, W4 (SKF does not include W4)
CO4 C3	CO43	C3, T52BN	Outer ring with P5 running accuracy, C3 RIC
CO4 C4	CO44	C4, T52BN	Outer ring with P5 running accuracy, C4 RIC
CO8	C08	T52BW C02	P5 running accuracy (CO2 and CO4)
CO8 C3	CO83	C3, T52BW	P5 running accuracy (CO2 and CO4), C3 RIC
CO8 C4	CO84	C4, T52BW	PS running accuracy (CO2 and CO4), C4 RIC
C6	C6	—	Special RIC non-specific
K	K	K	Tapered bore (1: 12 on diameter 22, 23, 30, 31, 32, 33, 39 series)
K	K30	K30	Tapered bore (1: 30 on diameter 40,41,42 series)
W4	W4	J26A	Mark high and low points of eccentricity on face of rings
W6R	—	—	Engineered coating on rollers to combat low lube or abrasive contamination
W8	—	—	Rings and rollers TDC® coated
W20	W20	SY	Outer ring with standard lubrication holes
W22	W22	700855	Special reduced O.D. tolerance on outer rings
W25	W73	—	Outer ring with counter drilled lubrication hole
W31	W31	—	Bearing inspected to certain quality control requirements
W33	W33	S	Standard lubrication holes and groove in outer ring (FAG drops S from number for sizes larger than 315 mm O.D.)
W33 W4	W503	S + J26A	Timken and FAG drop W33 W4 in conjunction with CO8, W507
W33 W22 W31	W512 (W22 + W31 + W33)	S + 700855	Timken and FAG drop W31 in conjunction with CO2, CO4, and CO8
W33 W94	W513 (W26 + W33)	S + H40A	See other component description
W37			Special finish
W40I	ECB (Prefix)	W209B	Inner ring only made of carburizing grade steel
W40R	—	—	Rollers only made of carburizing grade steel
W45A	W61	—	Tapped lifting holes in face of outer ring to facilitate lifting and handling
W84	W77	H44S (H40)*	Outer ring with standard lubrication holes plugged
W88	—	—	Special reduced bore tolerance on inner ring
W93	—	—	Inner ring with keyway in bore
W94	W26	H40A	Inner ring lubrication holes and retainer face grooves SKF and FAG - no retainer face grooves
W502	W502 (W22 + W33)	S + 700855	W22, W33 and W45A (where feasible)
W507	W507 (W4 + W31 + W33)	S +	W31, W33 and W45A (where feasible)
W509	W509 (W26 + W31 + W33)	S.H40A + …	W31, W33, W94 and W45A (where feasible)
W525	W525 (W31 + W77)	S.H44S (H40)*	W31, W33, W84 and W45A (where feasible)
W534	W534 (CO8 + W507)	—	W507 and CO8
W800	VA405	T41A	W22 + W88 + radial internal clearance in upper two-thirds of range specified range (shaker screen modification)
W906A	—	—	CO2 + CO4 + W31 + W33 + W401 + W40R (offered on tapered bore product, supercedes W507A, W534A)

Data in this chart has been compiled to make the information as complete as possible, Timken cannot assume any responsibility for errors, omissions or accuracy of the published data.

SPHERICAL ROLLER BEARINGS

- Timken inventory systems are designed to provide fast delivery for frequently-ordered sizes and styles.
- Consult your Timken representative for up-to-date information about the availability of the bearings you have selected.
- Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.
- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



CJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
22205CJ	25 0.9843	52 2.0472	18.0 0.7087	1.0 0.04	30 1.2	47 1.9	43.0 9700	44.0 9800	0.34	2.00	2.98	1.96	0.0384	7700	9600	0.2 0.4
21305VCSJ	25 0.9843	62 2.4409	17.0 0.6693	1.0 0.04	33 1.3	54 2.1	38.0 8400	41.0 9200	0.29	2.33	3.47	2.28	0.0403	7000	8700	0.30 0.6
22206CJ	30 1.1811	62 2.4409	20.0 0.7874	1.0 0.04	38 1.5	56 2.2	61.0 13700	58.0 13100	0.31	2.15	3.20	2.10	0.0435	6600	8100	0.3 0.6
21306VCSJ	30 1.1811	72 2.8346	19.0 0.7480	1.0 0.04	39 1.5	63 2.5	51.0 11300	53.0 12000	0.28	2.45	3.64	2.39	0.0444	6200	7600	0.40 0.8
22207CJ	35 1.3780	72 2.8346	23.0 0.9055	1.0 0.04	45 1.8	65 2.6	88.0 19700	78.0 17500	0.31	2.21	3.29	2.16	0.0484	5900	7200	0.5 1.0
21307VCSJ	35 1.3779	80 3.1496	21.0 0.8268	1.5 0.06	44 1.7	71 2.8	66.0 14800	67.0 15000	0.27	2.48	3.69	2.42	0.0484	5600	6900	0.50 1.1
22208CJ	40 1.5748	80 3.1496	23.0 0.9055	1.0 0.04	50 2.0	72 2.9	100 22400	90.0 20100	0.27	2.47	3.67	2.41	0.0494	5100	6300	0.6 1.2
22208YM	40 1.5748	80 3.1496	23.0 0.9055	1.0 0.04	50 2.0	72 2.9	93.5 21000	85.5 19200	0.27	2.47	3.67	2.41	0.0514	5200	6400	0.6 1.2
21308VCSJ	40 1.5748	90 3.5433	23.0 0.9055	1.5 0.06	51 2.0	81 3.2	85.0 19100	81.0 18200	0.26	2.55	3.80	2.50	0.0529	5100	6200	0.70 1.5
22308CJ	40 1.5748	90 3.5433	33.0 1.2992	1.5 0.06	53 2.1	81 3.2	148 33100	133 29800	0.36	1.87	2.79	1.83	0.0541	4900	5800	1.1 2.3
22308YM	40 1.5748	90 3.5433	33.0 1.2992	1.5 0.06	53 2.1	81 3.2	148 33100	133 29800	0.36	1.87	2.79	1.83	0.0541	4900	5800	1.1 2.3
22209CJ	45 1.7717	85 3.3465	23.0 0.9055	1.0 0.04	55 2.2	77 3.0	108 24200	94.0 21100	0.26	2.64	3.93	2.58	0.0547	4700	5700	0.6 1.3
22209YM	45 1.7717	85 3.3465	23.0 0.9055	1.0 0.04	55 2.2	77 3.0	101 22800	90.0 20100	0.26	2.64	3.93	2.58	0.0547	4700	5800	0.6 1.3
21309VCSJ	45 1.7717	100 3.9370	25.0 0.9843	1.5 0.06	57 2.2	91 3.6	106 23900	100 22500	0.26	2.64	3.93	2.58	0.0567	4600	5700	0.90 2
22309CJ	45 1.7717	100 3.9370	36.0 1.4173	1.5 0.06	58 2.3	90 3.5	182 40800	162 36400	0.36	1.90	2.83	1.86	0.0565	4500	5300	1.4 3.1
22309YM	45 1.7717	100 3.9370	36.0 1.4173	1.5 0.06	58 2.3	90 3.5	182 40800	162 36400	0.36	1.90	2.83	1.86	0.0579	4500	5300	1.4 3.1
22210CJ	50 1.9685	90 3.5433	23.0 0.9055	1.0 0.04	59 2.3	82 3.2	118 26000	101 22600	0.24	2.84	4.23	2.78	0.0575	4300	5200	0.6 1.4
22210YM	50 1.9685	90 3.5433	23.0 0.9055	1.0 0.04	59 2.3	82 3.2	112 25100	96.5 21700	0.24	2.84	4.23	2.78	0.0575	4300	5300	0.6 1.4
22310CJ	50 1.9685	110 4.3307	40.0 1.5748	2.0 0.08	64 2.5	98 3.9	226 51000	197 44200	0.36	1.87	2.79	1.83	0.0422	4200	4900	1.9 4.2
22310YM	50 1.9685	110 4.3307	40.0 1.5748	2.0 0.08	64 2.5	98 3.9	226 51000	197 44200	0.36	1.87	2.79	1.83	0.0422	4200	4900	1.9 4.2
22211CJ	55 2.1654	100 3.9370	25.0 0.9843	1.5 0.06	66 2.6	91 3.6	142 32000	120 27000	0.23	2.95	4.40	2.89	0.0604	4000	4800	0.9 1.9

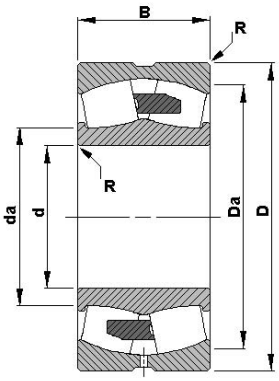
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

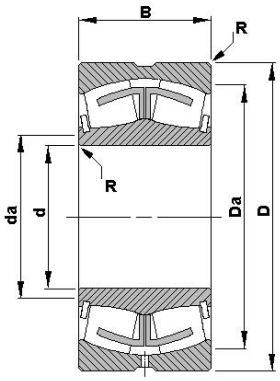
* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



YM



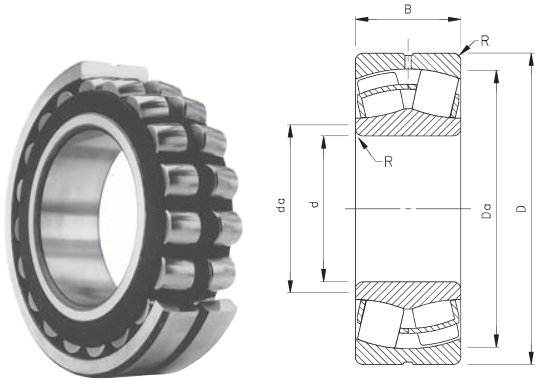
VCSJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors(1)				Lubrication Life Adjustment Factor(4)	Reference Speed	Thermal Ratings(3)	Weight
					d_a Shaft	D_a Housing	Static Load Rating C_0	Dynamic Load Rating C		Dynamic		Static	C_g			
									e	$\frac{T}{R} \le e$ X = 1	$\frac{T}{R} > e$ X = .67	In All Cases X_0 = 1		Grease	Oil	
										Y	Y	Y_0				
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
22311CJ	55 2.1654	120 4.7244	43.0 1.6929	2.0 0.08	69 2.7	107 4.2	248 55800	221 49600	0.36	1.87	2.79	1.83	0.0446	3900	4700	2.4 5.3
22311YM	55 2.1654	120 4.7244	43.0 1.6929	2.0 0.08	69 2.7	107 4.2	248 55800	221 49600	0.36	1.87	2.79	1.83	0.0446	3900	4700	2.4 5.3
21311VCSJ	55 2.1654	120 4.7244	29.0 1.1417	2.0 0.08	70 2.8	109 4.3	158 35500	141 31700	0.24	2.82	4.20	2.76	0.0446	4000	4800	1.50 3.3
22212CJ	60 2.3622	110 4.3307	28.0 1.1024	1.5 0.06	72 2.8	100 4.0	174 39100	146 32800	0.24	2.84	4.23	2.78	0.0652	3800	4600	1.2 2.6
22212YM	60 2.3622	110 4.3307	28.0 1.1024	1.5 0.06	72 2.8	100 4.0	164 36900	140 31400	0.24	2.84	4.23	2.78	0.0645	3800	4700	1.2 2.6
22312CJ	60 2.3622	130 5.1181	46.0 1.8110	2.0 0.08	75 3.0	117 4.6	312 70100	269 60400	0.35	1.95	2.90	1.91	0.0463	3600	4300	3.0 6.6
22312YM	60 2.3622	130 5.1181	46.0 1.8110	2.0 0.08	75 3.0	117 4.6	312 70100	269 60400	0.35	1.95	2.90	1.91	0.0471	3600	4300	3.0 6.6
21312VCSJ	60 2.3622	130 5.1181	31.0 1.2205	2.0 0.08	76 3.0	118 4.7	179 40200	158 35500	0.24	2.81	4.19	2.75	0.0467	3700	4600	1.90 4.2
22213CJ	65 2.5591	120 4.7244	31.0 1.2205	1.5 0.06	78 3.1	109 4.3	217 49000	177 39800	0.24	2.79	4.15	2.73	0.0473	3600	4400	1.6 3.4
22213YM	65 2.5591	120 4.7244	31.0 1.2205	1.5 0.06	78 3.1	109 4.3	204 46000	170 38200	0.24	2.79	4.15	2.73	0.0468	3600	4400	1.6 3.4
21313VCSJ	65 2.5591	140 5.5118	33.0 1.2992	2.0 0.08	82 3.2	128 5.0	215 48300	189 42500	0.23	2.91	4.33	2.84	0.0463	3500	4300	2.40 5.3
22313CJ	65 2.5591	140 5.5118	48.0 1.8898	2.0 0.08	82 3.2	126 5.0	333 74900	290 65200	0.33	2.06	3.06	2.01	0.0455	3400	4100	3.6 8.0
22313YM	65 2.5591	140 5.5118	48.0 1.8898	2.0 0.08	82 3.2	126 5.0	333 74900	290 65200	0.33	2.06	3.06	2.01	0.0464	3400	4100	3.6 8.0
22214CJ	70 2.7559	125 4.9213	31.0 1.2205	1.5 0.06	84 3.3	115 4.5	231 52000	184 41400	0.22	3.01	4.48	2.94	0.0464	3400	4100	1.6 3.6
22314CJ	70 2.7559	150 5.9055	51.0 2.0079	2.0 0.08	87 3.4	131 5.2	385 86500	331 74300	0.34	2.00	2.98	1.96	0.0482	3200	3800	4.4 9.7
21314VCSJ	70 2.7559	150 5.9055	35.0 1.3780	2.0 0.08	88 3.5	138 5.4	240 54000	208 46700	0.23	2.90	4.31	2.83	0.0480	3300	4100	2.90 6.4
22314YM	70 2.7559	150 5.9055	51.0 2.0079	2.0 0.08	87 3.4	131 5.2	385 86500	331 74300	0.34	2.00	2.98	1.96	0.0482	3200	3800	4.4 9.7
22215CJ	75 2.9528	130 5.1181	31.0 1.2205	1.5 0.06	88 3.5	120 4.7	241 54100	191 42900	0.22	3.14	4.67	3.07	0.0477	3200	3900	1.7 3.8
22315CJ	75 2.9528	160 6.2992	55.0 2.1654	2.0 0.08	93 3.7	140 5.5	456 102000	387 87100	0.34	2.00	2.98	1.96	0.0505	3100	3600	5.4 11.9
21315VCSJ	75 2.9528	160 6.2992	37.0 1.4567	2.0 0.08	94 3.7	148 5.8	274 61600	237 53200	0.23	2.94	4.37	2.87	0.0502	3200	3800	3.50 7.7
22315YM	75 2.9528	160 6.2992	55.0 2.1654	2.0 0.08	93 3.7	140 5.5	456 102000	387 87100	0.34	2.00	2.98	1.96	0.0505	3100	3600	5.4 11.9

Continued on next page.

SPHERICAL ROLLER BEARINGS - *continued*

- Timken inventory systems are designed to provide fast delivery for frequently-ordered sizes and styles.
- Consult your Timken representative for up-to-date information about the availability of the bearings you have selected.
- Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.
- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



CJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
22216CJ	80 3.1496	140 5.5118	33.0 1.2992	2.0 0.08	95 3.7	129 5.1	278 62500	218 49100	0.22	3.14	4.67	3.07	0.0499	3000	3700	2.2 4.7
22216YM	80 3.1496	140 5.5118	33.0 1.2992	2.0 0.08	95 3.7	129 5.1	263 59200	210 47100	0.22	3.14	4.67	3.07	0.0495	3000	3700	2.2 4.7
21316VCSJ	80 3.1496	170 6.6929	39.0 1.5354	2.0 0.08	100 3.9	158 6.2	305 68500	260 58400	0.23	2.95	4.40	2.89	0.0522	3000	3700	4.10 9
22316CJ	80 3.1496	170 6.6929	58.0 2.2835	2.0 0.08	97 3.8	148 5.8	510 115000	427 96100	0.34	2.00	2.98	1.96	0.0526	2900	3500	6.4 14.2
22316YM	80 3.1496	170 6.6929	58.0 2.2835	2.0 0.08	97 3.8	148 5.8	510 115000	427 96100	0.34	2.00	2.98	1.96	0.0526	2900	3500	6.4 14.2
22217CJ	85 3.3465	150 5.9055	36.0 1.4173	2.0 0.08	101 4.0	139 5.5	320 72000	255 57200	0.22	3.07	4.57	3.00	0.0518	2900	3500	2.7 6.0
22217YM	85 3.3465	150 5.9055	36.0 1.4173	2.0 0.08	101 4.0	139 5.5	302 67900	244 54800	0.22	3.07	4.57	3.00	0.0513	2900	3600	2.7 6.0
21317VCSM	85 3.3465	180 7.0866	41.0 1.6142	3.0 0.12	107 4.2	166 6.5	365 82000	301 67800	0.23	2.99	4.46	2.93	0.0547	2900	3500	5.20 11.5
22317CJ	85 3.3465	180 7.0866	60.0 2.3622	2.5 0.10	106 4.2	158 6.2	591 133000	474 107000	0.32	2.09	3.11	2.04	0.0554	2700	3200	7.5 16.4
22317YM	85 3.3465	180 7.0866	60.0 2.3622	2.5 0.10	106 4.2	158 6.2	591 133000	474 107000	0.32	2.09	3.11	2.04	0.0554	2700	3200	7.5 16.4
22218CJ	90 3.5433	160 6.2992	40.0 1.5748	2.0 0.08	105 4.2	146 5.8	388 87200	303 68100	0.23	2.90	4.31	2.83	0.0536	2800	3400	3.5 7.6
22218YM	90 3.5433	160 6.2992	40.0 1.5748	2.0 0.08	105 4.2	146 5.8	388 87200	303 68100	0.23	2.90	4.31	2.83	0.0536	2800	3400	3.5 7.6
23218CJ	90 3.5433	160 6.2992	52.0 2.0630	2.0 0.08	104 4.1	146 5.8	504 113000	369 83000	0.30	2.25	3.34	2.20	0.0536	2300	2700	4.5 10.0
23218YM	90 3.5433	160 6.2992	52.0 2.0630	2.0 0.08	104 4.1	146 5.8	504 113000	369 83000	0.30	2.25	3.34	2.20	0.0536	2300	2700	4.5 10.0
22318CJ	90 3.5433	190 7.4803	64.0 2.5197	2.5 0.10	110 4.3	167 6.6	642 144000	529 119000	0.35	1.92	2.86	1.88	0.0565	2600	3000	8.8 19.4
22318YM	90 3.5433	190 7.4803	64.0 2.5197	2.5 0.10	110 4.3	167 6.6	642 144000	529 119000	0.33	2.06	3.06	2.01	0.0565	2600	3000	8.8 19.4
21318VCSM	90 3.5433	190 7.4803	43.0 1.6929	3.0 0.12	113 4.5	176 6.9	398 89500	327 73400	0.23	3.00	4.47	2.93	0.0567	2800	3300	6.00 13.5
22319CJ	90 3.5433	190 7.4803	64.0 2.5197	2.5 0.10	110 4.3	167 6.6	642 144000	529 119000	0.33	2.06	3.06	2.01	0.0593	2600	3000	8.8 19.4
23318YM	90 3.5433	190 7.4803	73.0 2.8740	2.5 0.10	110 4.3	167 6.6	664 149000	516 116000	0.40	1.70	2.52	1.66	0.0555	1900	2200	10.1 22.2
22219CJ	95 3.7402	170 6.6929	43.0 1.6929	2.0 0.08	112 4.4	152 6.0	383 86200	289 65000	0.25	2.68	3.99	2.62	0.0556	2800	3400	4.2 9.3
22219YM	95 3.7402	170 6.6929	43.0 1.6929	2.0 0.08	112 4.4	152 6.0	383 86200	289 65000	0.25	2.68	3.99	2.62	0.0558	2800	3400	4.2 9.3

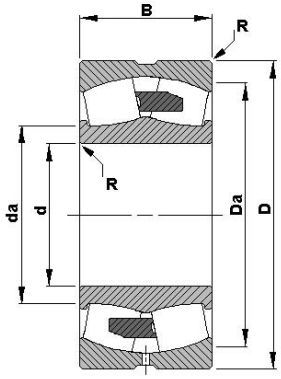
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



YM

Bearing Number	d Bore	D O.D.	B Width	R Fillet[2] (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors[1]				Lubrication Life Adjustment Factor[4]	Reference Speed	Thermal Ratings[3]	Weight
					d_a Shaft	D_a Housing	Static Load Rating C_0	Dynamic Load Rating C	Dynamic			Static	C_g	Grease	Oil	
									e	$\frac{T}{R} \le e$ $X = 1$ Y	$\frac{T}{R} > e$ $X = .67$ Y	In All Cases $X_0 = 1$ Y_0				
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
22319YM	95 3.7402	200 7.8740	67.0 2.6378	2.5 0.10	119 4.7	175 6.9	735 165000	580 130000	0.32	2.09	3.11	2.04	0.0593	2400	2800	10.2 22.5
23120YM	100 3.9370	165 6.4961	52.0 2.0472	2.0 0.08	112 4.5	151 6.0	575 129000	379 85200	0.28	2.39	3.56	2.34	0.0567	2400	2800	4.4 9.7
22220CJ	100 3.9370	180 7.0866	46.0 1.8110	2.0 0.08	119 4.7	160 6.3	484 109000	373 83800	0.24	2.84	4.23	2.78	0.0577	2700	3200	5.1 11.2
22220YM	100 3.9370	180 7.0866	46.0 1.8110	2.0 0.08	119 4.7	160 6.3	484 109000	373 83800	0.24	2.84	4.23	2.78	0.0577	2700	3200	5.1 11.2
23220CJ	100 3.9370	180 7.0866	60.3 2.3740	2.0 0.08	118 4.7	165 6.5	646 145000	463 104000	0.31	2.18	3.24	2.13	0.0579	2100	2500	6.6 15.0
23220YM	100 3.9370	180 7.0866	60.3 2.3740	2.0 0.08	118 4.7	165 6.5	646 145000	463 104000	0.31	2.18	3.24	2.13	0.0579	2100	2500	6.6 15.0
22320CJ	100 3.9370	215 8.4646	73.0 2.8740	2.5 0.10	125 4.9	187 7.4	756 170000	586 132000	0.36	1.90	2.82	1.85	0.0618	2300	2700	13.0 28.7
22320YM	100 3.9370	215 8.4646	73.0 2.8740	2.5 0.10	125 4.9	187 7.4	756 170000	586 132000	0.36	1.90	2.82	1.85	0.0618	2300	2700	13.0 28.7
23122CJ	110 4.3307	180 7.0866	56.0 2.2047	2.0 0.08	127 5.0	169 6.7	615 138000	377 84800	0.28	2.37	3.53	2.32	0.0596	2200	2600	5.6 12.3
23122YM	110 4.3307	180 7.0866	56.0 2.2047	2.0 0.08	127 5.0	169 6.7	615 138000	377 84800	0.28	2.37	3.53	2.32	0.0596	2200	2600	5.6 12.3
24122CJ	110 4.3307	180 7.0866	69.0 2.7165	2.0 0.08	124 4.9	164 6.5	676 152000	448 101000	0.36	1.85	2.76	1.81	0.0588	1800	2100	6.9 15.2
22222CJ	110 4.3307	200 7.8740	53.0 2.0866	2.0 0.08	132 5.2	179 7.0	627 141000	475 107000	0.25	2.69	4.00	2.63	0.0616	2500	3000	7.3 16.1
22222YM	110 4.3307	200 7.8740	53.0 2.0866	2.0 0.08	132 5.2	179 7.0	627 141000	475 107000	0.25	2.69	4.00	2.63	0.0616	2500	3000	7.3 16.1
23222CJ	110 4.3307	200 7.8740	69.8 2.7480	2.0 0.08	130 5.1	183 7.2	853 192000	596 134000	0.32	2.12	3.15	2.07	0.0618	1900	2200	9.6 21.1
23222YM	110 4.3307	200 7.8740	69.8 2.7480	2.0 0.08	130 5.1	183 7.2	853 192000	596 134000	0.32	2.12	3.15	2.07	0.0618	1900	2200	9.6 21.1
22322CJ	110 4.3307	240 9.4488	80.0 3.1496	2.5 0.10	139 5.5	208 8.2	962 216000	733 165000	0.35	1.92	2.86	1.88	0.0654	2000	2300	18.0 39.5
22322YM	110 4.3307	240 9.4488	80.0 3.1496	2.5 0.10	139 5.5	208 8.2	962 216000	733 165000	0.35	1.92	2.86	1.88	0.0654	2000	2300	18.0 39.5
23322YM	110 4.3307	240 9.4488	92.1 3.6260	2.5 0.10	137 5.4	210 8.3	1070 240000	808 182000	0.40	1.67	2.49	1.63	0.0641	1500	1700	20.7 45.5
23024CJ	120 4.7244	180 7.0866	46.0 1.8110	2.0 0.08	134 5.3	169 6.6	564 127000	352 79200	0.22	3.14	4.67	3.07	0.0616	2300	2900	4.1 9.0
24024CJ	120 4.7244	180 7.0866	60.0 2.3622	2.0 0.08	131 5.2	164 6.5	642 144000	393 88400	0.30	2.25	3.34	2.20	0.0610	2000	2400	5.3 11.7
23124CJ	120 4.7244	200 7.8740	62.0 2.4409	2.0 0.08	142 5.6	189 7.4	803 180000	524 118000	0.30	2.28	3.39	2.23	0.0636	2000	2300	7.8 17.2

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SPHERICAL ROLLER BEARINGS - *continued*

- Timken inventory systems are designed to provide fast delivery for frequently-ordered sizes and styles.
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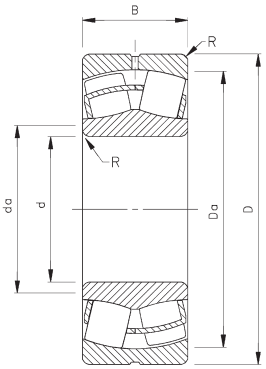


CJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) Dynamic e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
23124YM	**120** 4.7244	**200** 7.8740	**62.0** 2.4409	**2.0** 0.08	**142** 5.6	**189** 7.4	**803** 180000	**524** 118000	**0.30**	**2.28**	**3.39**	**2.23**	**0.0636**	**2000**	**2300**	**7.8** 17.2
24124CJ	**120** 4.7244	**200** 7.8740	**80.0** 3.1496	**2.0** 0.08	**136** 5.4	**181** 7.1	**923** 207000	**590** 133000	**0.39**	**1.74**	**2.59**	**1.70**	**0.0625**	**1600**	**1800**	**10.1** 22.2
22224CJ	**120** 4.7244	**215** 8.4646	**58.0** 2.2835	**2.0** 0.08	**142** 5.6	**192** 7.6	**667** 150000	**475** 107000	**0.27**	**2.51**	**3.74**	**2.46**	**0.0648**	**2400**	**2900**	**9.1** 20.0
22224YM	**120** 4.7244	**215** 8.4646	**58.0** 2.2835	**2.0** 0.08	**142** 5.6	**192** 7.6	**667** 150000	**475** 107000	**0.27**	**2.51**	**3.74**	**2.46**	**0.0648**	**2400**	**2900**	**9.1** 20.0
23224YM	**120** 4.7244	**215** 8.4646	**76.0** 2.9921	**2.0** 0.08	**140** 5.5	**197** 7.8	**977** 220000	**678** 152000	**0.32**	**2.09**	**3.11**	**2.04**	**0.0647**	**1700**	**2000**	**12.0** 26.0
22324CJ	**120** 4.7244	**260** 10.2362	**86.0** 3.3858	**2.5** 0.10	**151** 5.9	**225** 8.9	**1090** 245000	**825** 185000	**0.35**	**1.92**	**2.85**	**1.87**	**0.0680**	**1800**	**2100**	**22.6** 49.6
22324YM	**120** 4.7244	**260** 10.2362	**86.0** 3.3858	**2.5** 0.10	**151** 5.9	**225** 8.9	**1090** 245000	**825** 185000	**0.35**	**1.92**	**2.85**	**1.87**	**0.0704**	**1800**	**2100**	**22.6** 49.6
23324YM	**120** 4.7244	**260** 10.2362	**106.0** 4.1732	**2.5** 0.10	**147** 5.8	**226** 8.9	**1420** 320000	**1030** 232000	**0.43**	**1.57**	**2.34**	**1.54**	**0.0681**	**1300**	**1400**	**27.8** 61.2
23926YM	**130** 5.1181	**180** 7.0866	**37.0** 1.4567	**1.5** 0.06	**142** 5.6	**169** 6.7	**427** 95900	**245** 55000	**0.18**	**3.76**	**5.60**	**3.68**	**0.0880**	**2000**	**2500**	**2.8** 6.2
23026CJ	**130** 5.1181	**200** 7.8740	**52.0** 2.0472	**2.0** 0.08	**146** 5.8	**187** 7.4	**703** 158000	**446** 100000	**0.22**	**3.01**	**4.48**	**2.94**	**0.0654**	**2200**	**2700**	**5.9** 13.0
24026CJ	**130** 5.1181	**200** 7.8740	**69.0** 2.7165	**2.0** 0.08	**144** 5.7	**182** 7.2	**795** 179000	**501** 113000	**0.32**	**2.09**	**3.11**	**2.04**	**0.0642**	**1900**	**2200**	**7.9** 17.3
23126CJ	**130** 5.1181	**210** 8.2677	**64.0** 2.5197	**2.0** 0.08	**149** 5.9	**195** 7.7	**888** 200000	**562** 126000	**0.29**	**2.34**	**3.49**	**2.29**	**0.0663**	**1800**	**2100**	**8.6** 19.0
23126YM	**130** 5.1181	**210** 8.2677	**64.0** 2.5197	**2.0** 0.08	**149** 5.9	**195** 7.7	**888** 200000	**562** 126000	**0.29**	**2.34**	**3.49**	**2.29**	**0.0663**	**1800**	**2100**	**8.6** 19.0
24126CJ	**130** 5.1181	**210** 8.2677	**80.0** 3.1496	**2.0** 0.08	**147** 5.8	**190** 7.5	**967** 217000	**608** 137000	**0.36**	**1.85**	**2.76**	**1.81**	**0.0655**	**1500**	**1700**	**10.7** 23.6
22226CJ	**130** 5.1181	**230** 9.0551	**64.0** 2.5197	**2.5** 0.10	**152** 6.0	**206** 8.1	**805** 181000	**562** 126000	**0.27**	**2.47**	**3.68**	**2.42**	**0.0676**	**2200**	**2600**	**11.4** 25.0
22226YM	**130** 5.1181	**230** 9.0551	**64.0** 2.5197	**2.5** 0.10	**152** 6.0	**206** 8.1	**805** 181000	**562** 126000	**0.27**	**2.47**	**3.68**	**2.42**	**0.0676**	**2200**	**2600**	**11.4** 25.0
23226YM	**130** 5.1181	**230** 9.0551	**80.0** 3.1496	**2.5** 0.10	**151** 5.9	**211** 8.3	**1110** 249000	**759** 171000	**0.32**	**2.12**	**3.15**	**2.07**	**0.0676**	**1600**	**1800**	**14.0** 31.0
22326CJ	**130** 5.1181	**280** 11.0236	**93.0** 3.6614	**3.0** 0.12	**161** 6.4	**242** 9.5	**1270** 286000	**952** 214000	**0.35**	**1.92**	**2.85**	**1.87**	**0.0610**	**1700**	**1900**	**28.2** 62.1
22326YM	**130** 5.1181	**280** 11.0236	**93.0** 3.6614	**3.0** 0.12	**161** 6.4	**242** 9.5	**1270** 286000	**952** 214000	**0.35**	**1.92**	**2.85**	**1.87**	**0.0610**	**1700**	**1900**	**28.2** 62.1
23326YM	**130** 5.1181	**280** 11.0236	**112.0** 4.4094	**3.0** 0.12	**164** 6.5	**244** 9.6	**1550** 348000	**1090** 245000	**0.42**	**1.62**	**2.42**	**1.59**	**0.0600**	**1200**	**1300**	**34.0** 74.7
23928YM	**140** 5.5118	**190** 7.4803	**37.0** 1.4567	**1.5** 0.06	**152** 6.0	**179** 7.1	**456** 102000	**253** 56900	**0.17**	**4.01**	**5.97**	**3.92**	**0.0920**	**1900**	**2300**	**3.0** 6.6

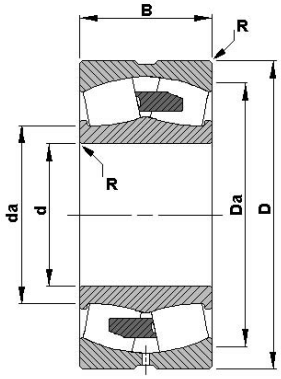
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



YM

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors(1)				Lubrication Life Adjustment Factor(4)	Reference Speed	Thermal Ratings(3)	Weight
					d_a Shaft	D_a Housing	Static Load Rating C_0	Dynamic Load Rating C	Dynamic			Static	C_g	Grease	Oil	
									e	$\frac{T}{R} \le e$ X = 1 Y	$\frac{T}{R} > e$ X = .67 Y	In All Cases X_0 = 1 Y_0				
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
23028CJ	140 5.5118	210 8.2677	53.0 2.0866	2.0 0.08	156 6.1	197 7.8	764 173000	471 106000	0.22	3.14	4.67	3.07	0.0680	2000	2500	6.4 14.0
24028CJ	140 5.5118	210 8.2677	69.0 2.7165	2.0 0.08	154 6.1	192 7.6	899 202000	527 118000	0.31	2.21	3.29	2.16	0.0676	1700	2000	8.3 18.3
23128YM	140 5.5118	225 8.8583	68.0 2.6772	2.0 0.08	159 6.3	209 8.2	1010 228000	636 143000	0.29	2.37	3.52	2.31	0.0670	1700	2000	10.0 23.0
24128CJ	140 5.5118	225 8.8583	85.0 3.3465	2.0 0.08	156 6.2	203 8.0	1120 252000	701 158000	0.36	1.90	2.83	1.86	0.0684	1300	1500	13.0 28.6
26228YM	140 5.5118	240 9.4488	80.0 3.1496	2.5 0.10	161 6.3	217 8.6	1120 251000	726 163000	0.32	2.08	3.10	2.04	0.0693	1200	1400	14.7 32.4
22228CJ	140 5.5118	250 9.8425	68.0 2.6772	2.5 0.10	166 6.5	225 8.9	930 209000	646 145000	0.27	2.51	3.73	2.45	0.0713	2000	2400	14.4 31.7
22228YM	140 5.5118	250 9.8425	68.0 2.6772	2.5 0.10	166 6.5	225 8.9	930 209000	646 145000	0.27	2.51	3.73	2.45	0.0713	2000	2400	14.4 31.7
22328CJ	140 5.5118	300 11.8110	102.0 4.0157	3.0 0.12	174 6.9	262 10.3	1520 341000	1120 252000	0.36	1.88	2.81	1.84	0.0648	1500	1700	35.4 77.9
22328YM	140 5.5118	300 11.8110	102.0 4.0157	3.0 0.12	174 6.9	262 10.3	1520 341000	1120 252000	0.36	1.88	2.81	1.84	0.0648	1500	1700	35.4 77.9
23328YM	140 5.5118	300 11.8110	118.0 4.6457	3.0 0.12	175 6.9	261 10.3	1920 432000	1310 295000	0.41	1.64	2.45	1.61	0.0632	1000	1100	41.0 90.1
23030YM	150 5.9055	225 8.8583	56.0 2.2047	2.0 0.08	169 6.6	211 8.3	872 196000	521 117000	0.21	3.20	4.77	3.13	0.0714	1900	2300	7.8 17.0
24030CJ	150 5.9055	225 8.8583	75.0 2.9528	2.0 0.08	166 6.5	206 8.1	1000 226000	603 136000	0.31	2.18	3.24	2.13	0.0699	1600	1900	10.4 22.9
23130YM	150 5.9055	250 9.8425	80.0 3.1496	2.0 0.08	172 6.8	230 9.1	1320 298000	837 188000	0.31	2.20	3.27	2.15	0.0614	1500	1700	16.0 35.0
24130CJ	150 5.9055	250 9.8425	100.0 3.9370	2.0 0.08	169 6.7	225 8.9	1400 315000	901 203000	0.38	1.78	2.65	1.74	0.0603	1200	1300	19.7 43.4
22230CJ	150 5.9055	270 10.6299	73.0 2.8740	2.5 0.10	179 7.0	242 9.5	1100 247000	752 169000	0.27	2.52	3.75	2.46	0.0626	1800	2200	18.2 39.9
22230YM	150 5.9055	270 10.6299	73.0 2.8740	3.0 0.10	177 7.0	248 9.8	1200 269000	853 192000	0.25	2.74	4.08	2.68	0.0626	1800	2100	18.0 40.0
23230YM	150 5.9055	270 10.6299	96.0 3.7795	2.5 0.10	175 6.9	247 9.7	1590 357000	1060 239000	0.33	2.03	3.02	1.98	0.0625	1300	1500	24.0 53.0
22330CJ	150 5.9055	320 12.5984	108.0 4.2520	3.0 0.12	186 7.3	280 11.0	1720 386000	1260 283000	0.35	1.91	2.84	1.87	0.0667	1400	1600	42.6 93.6
22330YM	150 5.9055	320 12.5984	108.0 4.2520	3.0 0.12	186 7.3	280 11.0	1720 386000	1260 283000	0.35	1.91	2.84	1.87	0.0667	1400	1600	42.6 93.6
23330YM	150 5.9055	320 12.5984	128.0 5.0394	3.0 0.12	185 7.3	280 11.0	2130 478000	1480 332000	0.41	1.64	2.44	1.60	0.0654	960	1100	50.4 111
23932YM	160 6.2992	220 8.6614	45.0 1.7717	2.0 0.08	175 6.9	206 8.1	655 147000	348 78200	0.19	3.60	5.35	3.52	0.0724	1800	2100	5.1 11.1

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SPHERICAL ROLLER BEARINGS - *continued*

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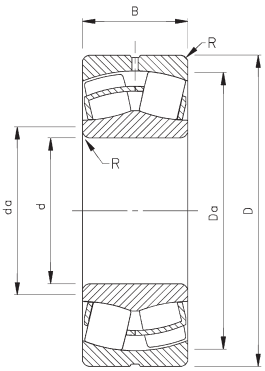


CJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) e	Equivalent Radial load Factors(1) Dynamic $\frac{T}{R} \le e$ X = 1 Y	Equivalent Radial load Factors(1) Dynamic $\frac{T}{R} > e$ X = .67 Y	Equivalent Radial load Factors(1) Static In All Cases $X_0 = 1$ Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
23032YM	**160** 6.2992	**240** 9.4488	**60.0** 2.3622	**2.0** 0.08	**179** 7.0	**225** 8.9	**979** 220000	**591** 133000	**0.21**	**3.20**	**4.77**	**3.13**	**0.0620**	**1700**	**2100**	**9.4** 21.0
24032CJ	**160** 6.2992	**240** 9.4488	**80.0** 3.1496	**2.0** 0.08	**173** 6.8	**224** 8.8	**1100** 246000	**665** 150000	**0.30**	**2.28**	**3.39**	**2.23**	**0.0611**	**1500**	**1800**	**12.6** 27.8
23132YM	**160** 6.2992	**270** 10.6299	**86.0** 3.3858	**2.0** 0.08	**189** 7.4	**244** 9.6	**1560** 350000	**968** 218000	**0.30**	**2.23**	**3.32**	**2.18**	**0.0633**	**1400**	**1600**	**20.1** 44.1
22232CJ	**160** 6.2992	**290** 11.4173	**80.0** 3.1496	**2.5** 0.10	**192** 7.6	**260** 10.2	**1280** 288000	**864** 194000	**0.27**	**2.47**	**3.67**	**2.41**	**0.0655**	**1700**	**2000**	**23.1** 50.8
23232YM	**160** 6.2992	**290** 11.4173	**104.0** 4.0945	**2.5** 0.10	**187** 7.4	**260** 10.2	**1680** 377000	**1090** 246000	**0.34**	**1.96**	**2.91**	**1.91**	**0.0645**	**1200**	**1400**	**30.0** 66.0
22332CJ	**160** 6.2992	**340** 13.3858	**114.0** 4.4882	**3.0** 0.12	**198** 7.8	**298** 11.7	**1920** 432000	**1400** 314000	**0.35**	**1.92**	**2.86**	**1.88**	**0.0702**	**1300**	**1500**	**50.6** 111
22332YMB	**160** 6.2992	**340** 13.3858	**114.0** 4.4882	**3.0** 0.12	**198** 7.8	**298** 11.7	**1920** 432000	**1400** 314000	**0.35**	**1.92**	**2.86**	**1.88**	**0.0702**	**1300**	**1500**	**50.6** 111
23332YM	**160** 6.2992	**340** 13.3858	**136.0** 5.3543	**3.0** 0.12	**202** 8.0	**297** 11.7	**2540** 572000	**1670** 375000	**0.42**	**1.62**	**2.41**	**1.58**	**0.0686**	**850**	**940**	**60.4** 133
23934YM	**170** 6.6929	**230** 9.0551	**45.0** 1.7717	**2.0** 0.08	**184** 7.3	**217** 8.6	**692** 156000	**371** 83400	**0.18**	**3.79**	**5.65**	**3.71**	**0.0627**	**1600**	**2000**	**5.3** 11.7
23034YM	**170** 6.6929	**260** 10.2362	**67.0** 2.6378	**2.0** 0.08	**192** 7.6	**243** 9.6	**1220** 274000	**724** 163000	**0.22**	**3.07**	**4.57**	**3.00**	**0.0649**	**1600**	**1900**	**12.8** 28.1
24034CJ	**170** 6.6929	**260** 10.2362	**90.0** 3.5433	**2.0** 0.08	**185** 7.3	**242** 9.5	**1430** 322000	**851** 191000	**0.32**	**2.12**	**3.15**	**2.07**	**0.0641**	**1300**	**1600**	**17.2** 38.0
23134YM	**170** 6.6929	**280** 11.0236	**88.0** 3.4646	**2.0** 0.08	**194** 7.7	**255** 10.2	**1670** 375000	**1010** 226000	**0.30**	**2.28**	**3.40**	**2.23**	**0.0654**	**1300**	**1500**	**21.5** 47.3
24134CJ	**170** 6.6929	**280** 11.0236	**109.0** 4.2913	**2.0** 0.08	**191** 7.5	**252** 10.1	**1840** 413000	**1110** 248000	**0.37**	**1.83**	**2.72**	**1.79**	**0.0657**	**980**	**1100**	**26.6** 58.5
22234CJ	**170** 6.6929	**310** 12.2047	**86.0** 3.3858	**3.0** 0.12	**201** 7.9	**278** 10.9	**1450** 326000	**999** 225000	**0.28**	**2.44**	**3.63**	**2.38**	**0.0672**	**1600**	**1900**	**28.5** 62.7
23234YM	**170** 6.6929	**310** 12.2047	**110.0** 4.3307	**3.0** 0.12	**200** 7.9	**276** 10.9	**1960** 441000	**1240** 279000	**0.34**	**1.97**	**2.94**	**1.93**	**0.0676**	**1100**	**1200**	**36.5** 80.2
23036YM	**180** 7.0866	**280** 11.0236	**74.0** 2.9134	**2.0** 0.08	**204** 8.0	**261** 10.3	**1420** 321000	**851** 192000	**0.23**	**2.95**	**4.40**	**2.89**	**0.0677**	**1500**	**1800**	**17.0** 37.0
24036CJ	**180** 7.0866	**280** 11.0236	**100.0** 3.9370	**2.0** 0.08	**198** 7.8	**260** 10.2	**1700** 385000	**992** 223000	**0.33**	**2.03**	**3.02**	**1.98**	**0.0671**	**1200**	**1500**	**23.0** 50.0
23136YM	**180** 7.0866	**300** 11.8110	**96.0** 3.7795	**2.5** 0.10	**205** 8.1	**273** 10.8	**1810** 406000	**1100** 247000	**0.31**	**2.20**	**3.28**	**2.15**	**0.0677**	**1200**	**1400**	**27.0** 60.0
24136CJ	**180** 7.0866	**300** 11.8110	**118.0** 4.6457	**2.5** 0.10	**201** 7.9	**275** 10.8	**2050** 464000	**1250** 280000	**0.38**	**1.78**	**2.65**	**1.74**	**0.0680**	**920**	**1000**	**33.0** 74.0
22236CJ	**180** 7.0866	**320** 12.5984	**86.0** 3.3858	**3.0** 0.12	**213** 8.4	**288** 11.3	**1540** 346000	**1030** 231000	**0.27**	**2.54**	**3.78**	**2.48**	**0.0698**	**1500**	**1700**	**30.0** 65.0
23236YM	**180** 7.0866	**320** 12.5984	**112.0** 4.4094	**3.0** 0.12	**209** 8.2	**288** 11.3	**2110** 473000	**1330** 298000	**0.34**	**2.00**	**2.97**	**1.95**	**0.0694**	**1000**	**1200**	**39.0** 85.0

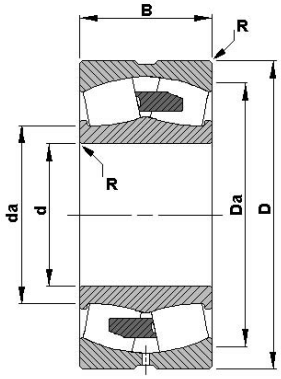
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



YM

Bearing Number	d Bore	D O.D.	B Width	R Fillet[2] (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors[1] Dynamic e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor[4] C_g	Reference Speed Grease	Thermal Ratings[3] Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
22336YMB	180 7.0866	380 14.9606	126.0 4.9606	3.0 0.12	222 8.8	334 13.1	2460 554000	1760 395000	0.34	1.98	2.94	1.93	0.0730	1100	1200	69.0 153
23938YM	190 7.4803	260 10.2362	52.0 2.0472	2.0 0.08	207 8.2	245 9.6	910 205000	480 108000	0.18	3.84	5.72	3.75	0.0677	1400	1700	8.1 18.0
23038YM	190 7.4803	290 11.4173	75.0 2.9528	2.0 0.08	213 8.4	271 10.7	1540 349000	901 203000	0.22	3.01	4.48	2.94	0.0698	1400	1700	18.0 39.0
24038CJ	190 7.4803	290 11.4173	100.0 3.9370	2.0 0.08	211 8.3	264 10.4	1810 407000	957 215000	0.31	2.16	3.22	2.12	0.0682	1200	1400	24.0 52.0
23138YM	190 7.4803	320 12.5984	104.0 4.0945	2.5 0.10	218 8.6	290 11.4	2090 470000	1250 282000	0.31	2.15	3.21	2.11	0.0716	1100	1300	34.0 75.0
24138CJ	190 7.4803	320 12.5984	128.0 5.0394	2.5 0.10	211 8.3	286 11.3	2310 520000	1350 305000	0.40	1.68	2.50	1.64	0.0710	860	950	42.0 92.0
22238YM	190 7.4803	340 13.3858	92.0 3.6220	3.0 0.12	224 8.8	306 12.0	1810 407000	1200 270000	0.27	2.53	3.77	2.48	0.0725	1400	1600	36.0 79.0
23238YM	190 7.4803	340 13.3858	120.0 4.7244	3.0 0.12	221 8.7	306 12.0	2390 536000	1490 335000	0.34	1.99	2.96	1.95	0.0714	960	1100	47.0 104
22338YMB	190 7.4803	400 15.7480	132.0 5.1969	4.0 0.16	236 9.3	350 13.8	2730 614000	1900 428000	0.34	1.97	2.94	1.93	0.0761	1000	1200	80.0 177
23940YM	200 7.8740	280 11.0236	60.0 2.3622	2.0 0.08	219 8.6	263 10.3	1140 256000	608 137000	0.19	3.65	5.43	3.57	0.0704	1400	1600	11.0 25.0
23040YM	200 7.8740	310 12.2047	82.0 3.2283	2.0 0.08	225 8.9	289 11.4	1760 398000	1040 234000	0.23	2.95	4.40	2.89	0.0723	1300	1600	23.0 50.0
24040CJ	200 7.8740	310 12.2047	109.0 4.2913	2.0 0.08	223 8.8	284 11.2	2080 468000	1120 251000	0.32	2.09	3.11	2.04	0.0710	1100	1300	30.0 66.0
23140YM	200 7.8740	340 13.3858	112.0 4.4094	2.5 0.10	230 9.0	308 12.1	2300 518000	1390 313000	0.31	2.15	3.20	2.10	0.0730	1100	1200	42.0 92.0
23140YMB	200 7.8740	340 13.3858	112.0 4.4094	2.5 0.10	230 9.0	308 12.1	2300 518000	1390 313000	0.31	2.15	3.20	2.10	0.0730	1100	1200	42.0 92.0
24140YMB	200 7.8740	340 13.3858	140.0 5.5118	2.5 0.10	226 8.9	308 12.1	2950 663000	1690 380000	0.39	1.74	2.59	1.70	0.0730	750	830	52.0 115
22240YMB	200 7.8740	360 14.1732	98.0 3.8583	3.0 0.12	236 9.3	323 12.7	2030 456000	1330 300000	0.27	2.50	3.72	2.44	0.0751	1300	1500	43.0 95.0
23240YM	200 7.8740	360 14.1732	128.0 5.0394	3.0 0.12	233 9.2	323 12.7	2720 611000	1670 376000	0.35	1.95	2.90	1.91	0.0746	890	1000	56.0 124
26340YM	200 7.8740	380 14.9606	126.0 4.9606	4.0 0.16	240 9.4	337 13.3	2710 610000	1740 391000	0.33	2.02	3.01	1.98	0.0759	700	780	65.8 145
22340YMB	200 7.8740	420 16.5354	138.0 5.4331	4.0 0.16	247 9.7	369 14.5	2950 663000	2070 465000	0.33	2.02	3.01	1.98	0.0778	970	1100	93.0 204
23340YM	200 7.8740	420 16.5354	165.0 6.4961	4.0 0.16	246 9.7	366 14.4	3750 844000	2450 550000	0.41	1.66	2.47	1.62	0.0784	640	700	111 244
23944YM	220 8.6614	300 11.8110	60.0 2.3622	2.0 0.08	239 9.4	283 11.2	1220 275000	632 142000	0.17	3.94	5.87	3.85	0.0743	1200	1500	12.0 27.0

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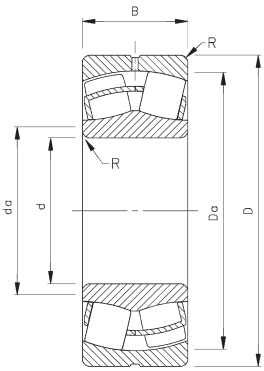


CJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) Dynamic e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
23044YM	**220** 8.6614	**340** 13.3858	**90.0** 3.5433	**2.5** 0.10	**247** 9.7	**313** 12.3	**1990** 447000	**1130** 254000	**0.24**	**2.77**	**4.13**	**2.71**	**0.0767**	**1200**	**1400**	**30.0** 66.0
24044YM	**220** 8.6614	**340** 13.3858	**118.0** 4.6457	**2.5** 0.10	**245** 9.6	**313** 12.3	**2740** 616000	**1450** 326000	**0.32**	**2.14**	**3.18**	**2.09**	**0.0762**	**930**	**1100**	**39.0** 86.0
23144YM	**220** 8.6614	**370** 14.5669	**120.0** 4.7244	**3.0** 0.12	**252** 9.9	**336** 13.2	**2760** 621000	**1630** 366000	**0.31**	**2.17**	**3.24**	**2.12**	**0.0777**	**940**	**1100**	**52.0** 115
23144YMB	**220** 8.6614	**370** 14.5669	**120.0** 4.7244	**3.0** 0.12	**252** 9.9	**336** 13.2	**2760** 621000	**1630** 366000	**0.31**	**2.17**	**3.24**	**2.12**	**0.0777**	**940**	**1100**	**52.0** 115
24144YMB	**220** 8.6614	**370** 14.5669	**150.0** 5.9055	**3.0** 0.12	**248** 9.8	**337** 13.3	**3250** 730000	**1870** 421000	**0.36**	**1.86**	**2.77**	**1.82**	**0.0773**	**690**	**760**	**65.0** 144
22244YMB	**220** 8.6614	**400** 15.7480	**108.0** 4.2520	**3.0** 0.12	**261** 10.3	**359** 14.1	**2330** 524000	**1550** 349000	**0.27**	**2.51**	**3.73**	**2.45**	**0.0810**	**1200**	**1400**	**59.0** 131
23244YM	**220** 8.6614	**400** 15.7480	**144.0** 5.6693	**3.0** 0.12	**257** 10.1	**359** 14.1	**3380** 760000	**2080** 467000	**0.35**	**1.95**	**2.90**	**1.90**	**0.0790**	**780**	**870**	**79.0** 174
26344YM	**220** 8.6614	**420** 16.5354	**138.0** 5.4331	**4.0** 0.16	**265** 10.4	**372** 14.6	**3280** 738000	**2080** 468000	**0.33**	**2.04**	**3.03**	**1.99**	**0.0808**	**610**	**680**	**88.2** 194
22344YMB	**220** 8.6614	**460** 18.1102	**145.0** 5.7087	**4.0** 0.16	**273** 10.7	**404** 15.9	**3490** 784000	**2400** 540000	**0.32**	**2.08**	**3.10**	**2.04**	**0.0834**	**840**	**950**	**116** 257
23344YM	**220** 8.6614	**460** 18.1102	**180.0** 7.0866	**4.0** 0.16	**269** 10.6	**402** 15.8	**4500** 1010000	**2900** 652000	**0.40**	**1.67**	**2.48**	**1.63**	**0.0832**	**560**	**610**	**145** 319
23948YM	**240** 9.4488	**320** 12.5984	**60.0** 2.3622	**2.0** 0.08	**260** 10.2	**303** 11.9	**1360** 306000	**666** 150000	**0.16**	**4.19**	**6.24**	**4.09**	**0.0782**	**1100**	**1300**	**13.0** 29.0
23048YM	**240** 9.4488	**360** 14.1732	**92.0** 3.6220	**2.5** 0.10	**267** 10.5	**334** 13.1	**2150** 484000	**1180** 266000	**0.23**	**2.91**	**4.34**	**2.85**	**0.0797**	**1100**	**1300**	**33.0** 72.0
24048YM	**240** 9.4488	**360** 14.1732	**118.0** 4.6457	**2.5** 0.10	**265** 10.4	**334** 13.1	**2920** 657000	**1500** 338000	**0.29**	**2.31**	**3.44**	**2.26**	**0.0797**	**850**	**980**	**42.0** 92.0
23148YMB	**240** 9.4488	**400** 15.7480	**128.0** 5.0394	**3.0** 0.12	**276** 10.9	**364** 14.3	**3200** 719000	**1850** 415000	**0.30**	**2.28**	**3.40**	**2.23**	**0.0817**	**850**	**970**	**65.0** 142
24148YMB	**240** 9.4488	**400** 15.7480	**160.0** 6.2992	**3.0** 0.12	**271** 10.7	**364** 14.3	**4090** 919000	**2250** 505000	**0.37**	**1.80**	**2.68**	**1.76**	**0.0817**	**580**	**640**	**81.0** 178
22248YMB	**240** 9.4488	**440** 17.3228	**120.0** 4.7244	**3.0** 0.12	**284** 11.2	**395** 15.6	**2970** 668000	**1960** 441000	**0.27**	**2.46**	**3.67**	**2.41**	**0.0840**	**1000**	**1200**	**80.0** 177
23248YM	**240** 9.4488	**440** 17.3228	**160.0** 6.2992	**3.0** 0.12	**281** 11.1	**394** 15.5	**4190** 942000	**2540** 571000	**0.35**	**1.92**	**2.86**	**1.88**	**0.0839**	**680**	**760**	**107** 236
26348YM	**240** 9.4488	**460** 18.1102	**147.0** 5.7874	**4.0** 0.16	**286** 11.3	**410** 16.2	**3720** 836000	**2430** 547000	**0.32**	**2.08**	**3.10**	**2.04**	**0.0852**	**550**	**610**	**113** 248
22348YMB	**240** 9.4488	**500** 19.6850	**155.0** 6.1024	**4.0** 0.16	**297** 11.7	**439** 17.3	**3990** 897000	**2740** 616000	**0.32**	**2.10**	**3.13**	**2.05**	**0.0880**	**760**	**850**	**147** 324
23348YM	**240** 9.4488	**500** 19.6850	**195.0** 7.6772	**4.0** 0.16	**293** 11.5	**437** 17.2	**5320** 1200000	**3380** 761000	**0.40**	**1.67**	**2.49**	**1.64**	**0.0878**	**500**	**540**	**185** 407
26250YM	**250** 9.8425	**410** 16.1417	**128.0** 5.0394	**3.0** 0.12	**284** 11.2	**374** 14.7	**3180** 714000	**1830** 412000	**0.30**	**2.28**	**3.39**	**2.23**	**0.0831**	**580**	**650**	**64.0** 141

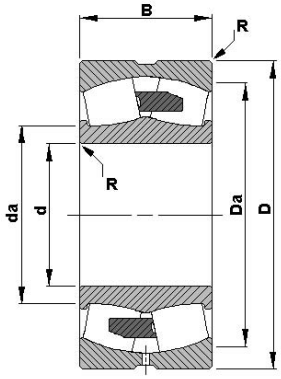
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



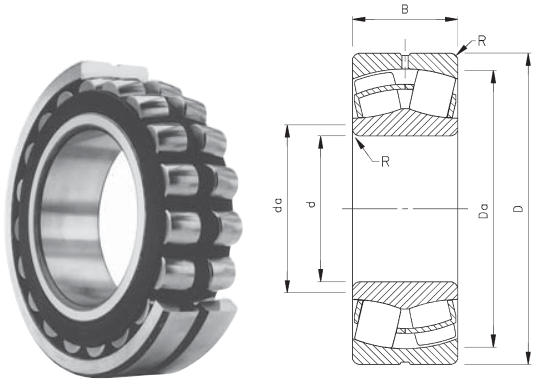
YM

Bearing Number	d Bore	D O.D.	B Width	R Fillet[2] (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors[1] e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor[4] C_g	Reference Speed Grease	Thermal Ratings[3] Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
23952YM	260 10.2362	360 14.1732	75.0 2.9528	2.0 0.08	284 11.2	339 13.3	1880 422000	951 214000	0.18	3.74	5.56	3.65	0.0830	1000	1200	23.0 50.0
23052YM	260 10.2362	400 15.7480	104.0 4.0945	3.0 0.12	291 11.5	369 14.5	2770 622000	1540 345000	0.24	2.85	4.24	2.78	0.0847	990	1200	47.0 104
23052YMB	260 10.2362	400 15.7480	104.0 4.0945	3.0 0.12	291 11.5	369 14.5	2770 622000	1540 345000	0.24	2.85	4.24	2.78	0.0847	990	1200	47.0 104
24052YM	260 10.2362	400 15.7480	140.0 5.5118	3.0 0.12	288 11.3	369 14.5	3870 871000	1990 448000	0.32	2.12	3.15	2.07	0.0846	750	860	64.0 140
23152YMB	260 10.2362	440 17.3228	144.0 5.6693	3.0 0.12	302 11.9	400 15.7	3970 891000	2240 504000	0.30	2.23	3.31	2.18	0.0867	760	860	89.0 197
24152YMB	260 10.2362	440 17.3228	180.0 7.0866	3.0 0.12	296 11.7	398 15.7	4840 1090000	2630 592000	0.37	1.82	2.70	1.78	0.0865	530	570	112 246
22252YMB	260 10.2362	480 18.8976	130.0 5.1181	4.0 0.16	309 12.2	430 16.9	3530 793000	2300 518000	0.27	2.46	3.66	2.41	0.0887	910	1100	104 230
23252YM	260 10.2362	480 18.8976	174.0 6.8504	4.0 0.16	308 12.1	430 16.9	4880 1100000	2930 658000	0.34	1.98	2.95	1.94	0.0893	610	680	139 307
22352YMB	260 10.2362	540 21.2598	165.0 6.4961	5.0 0.20	321 12.6	475 18.7	4590 1030000	3130 703000	0.32	2.13	3.17	2.08	0.0924	680	770	182 401
23352YM	260 10.2362	540 21.2598	206.0 8.1102	5.0 0.20	318 12.5	473 18.6	6040 1360000	3830 861000	0.39	1.71	2.54	1.67	0.0923	450	480	227 501
23956YMB	280 11.0236	380 14.9606	75.0 2.9528	2.0 0.08	304 12.0	360 14.2	2000 450000	1000 225000	0.17	3.95	5.88	3.86	0.0865	920	1100	24.0 54.0
23056YMB	280 11.0236	420 16.5354	106.0 4.1732	3.0 0.12	312 12.3	389 15.3	2830 636000	1540 346000	0.23	2.92	4.35	2.86	0.0879	930	1100	51.0 113
24056YMB	280 11.0236	420 16.5354	140.0 5.5118	3.0 0.12	310 12.2	388 15.3	4130 927000	2030 456000	0.30	2.25	3.35	2.20	0.0883	690	790	68.0 149
23156YMB	280 11.0236	460 18.1102	146.0 5.7480	4.0 0.16	320 12.6	419 16.5	4200 944000	2330 524000	0.30	2.26	3.36	2.21	0.0900	710	800	96.0 211
24156YMB	280 11.0236	460 18.1102	180.0 7.0866	4.0 0.16	319 12.6	419 16.5	5100 1150000	2670 601000	0.36	1.86	2.77	1.82	0.0899	490	530	118 260
22256YMB	280 11.0236	500 19.6850	130.0 5.1181	4.0 0.16	331 13.0	449 17.7	3780 850000	2360 530000	0.26	2.62	3.91	2.57	0.0927	850	990	110 242
23256YMB	280 11.0236	500 19.6850	176.0 6.9291	4.0 0.16	329 13.0	450 17.7	5290 1190000	3070 689000	0.33	2.07	3.08	2.02	0.0921	560	620	149 328
22356YMB	280 11.0236	580 22.8346	175.0 6.8898	5.0 0.20	345 13.6	511 20.1	5320 1200000	3590 806000	0.32	2.13	3.17	2.08	0.0968	620	690	222 490
23356YM	280 11.0236	580 22.8346	224.0 8.8189	5.0 0.20	341 13.4	508 20.0	7100 1600000	4430 997000	0.40	1.69	2.52	1.65	0.0966	400	430	284 627
23960YMB	300 11.8110	420 16.5354	90.0 3.5433	2.5 0.10	328 12.9	394 15.5	2650 596000	1330 300000	0.19	3.59	5.34	3.51	0.0911	840	1000	38.0 84.0
23060YMB	300 11.8110	460 18.1102	118.0 4.6457	3.0 0.12	336 13.2	425 16.8	3600 809000	1970 442000	0.24	2.87	4.27	2.80	0.0926	830	980	71.0 156

Continued on next page.

SPHERICAL ROLLER BEARINGS - *continued*

- Timken inventory systems are designed to provide fast delivery for frequently-ordered sizes and styles.
- Consult your Timken representative for up-to-date information about the availability of the bearings you have selected.
- Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.
- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



CJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
24060YMB	300 11.8110	460 18.1102	160.0 6.2992	3.0 0.12	334 13.1	423 16.7	5230 1180000	2560 576000	0.32	2.11	3.13	2.06	0.0928	620	700	96.0 211
23160YMB	300 11.8110	500 19.6850	160.0 6.2992	4.0 0.16	345 13.6	453 17.8	5160 1160000	2810 632000	0.30	2.25	3.35	2.20	0.0946	630	710	126 278
24160YMB	300 11.8110	500 19.6850	200.0 7.8740	4.0 0.16	338 13.3	455 17.9	6320 1420000	3380 759000	0.37	1.82	2.71	1.78	0.0942	430	460	158 347
22260YMB	300 11.8110	540 21.2598	140.0 5.5118	4.0 0.16	355 14.0	484 19.1	4430 997000	2760 621000	0.26	2.59	3.86	2.53	0.0965	770	890	139 306
23260YMB	300 11.8110	540 21.2598	192.0 7.5591	4.0 0.16	353 13.9	482 19.0	6210 1400000	3510 788000	0.34	2.00	2.98	1.96	0.0967	510	560	191 420
23964YMB	320 12.5984	440 17.3228	90.0 3.5433	2.5 0.10	349 13.8	414 16.3	2800 629000	1360 305000	0.18	3.79	5.65	3.71	0.0946	780	930	40.0 89.0
23064YMB	320 12.5984	480 18.8976	121.0 4.7638	3.0 0.12	357 14.1	444 17.5	3910 880000	2040 458000	0.23	2.93	4.36	2.86	0.0962	780	910	76.0 168
24064YMB	320 12.5984	480 18.8976	160.0 6.2992	3.0 0.12	354 13.9	444 17.5	5420 1220000	2620 588000	0.30	2.24	3.34	2.19	0.0961	580	660	101 222
23164YMB	320 12.5984	540 21.2598	176.0 6.9291	4.0 0.16	367 14.4	490 19.3	6000 1350000	3330 749000	0.31	2.14	3.19	2.10	0.0988	580	650	164 361
24164YMB	320 12.5984	540 21.2598	218.0 8.5827	4.0 0.16	362 14.3	489 19.3	7580 1710000	3980 894000	0.38	1.77	2.63	1.73	0.0986	380	410	203 448
22264YMB	320 12.5984	580 22.8346	150.0 5.9055	4.0 0.16	380 15.0	519 20.4	5040 1130000	3110 700000	0.26	2.58	3.84	2.52	0.1009	710	820	173 381
23264YMB	320 12.5984	580 22.8346	208.0 8.1890	4.0 0.16	379 14.9	516 20.3	7140 1610000	3960 891000	0.34	1.98	2.94	1.93	0.1013	460	510	240 528
23968YMB	340 13.3858	460 18.1102	90.0 3.5433	2.5 0.10	369 14.5	435 17.1	3020 678000	1420 320000	0.17	3.98	5.93	3.89	0.0983	730	860	43.0 94.0
23068YMB	340 13.3858	520 20.4724	133.0 5.2362	4.0 0.16	384 15.1	481 18.9	4670 1050000	2430 546000	0.23	2.96	4.40	2.89	0.1005	710	830	101 223
24068YMB	340 13.3858	520 20.4724	180.0 7.0866	4.0 0.16	377 14.9	479 18.9	6590 1480000	3190 717000	0.32	2.14	3.18	2.09	0.1004	530	600	137 302
23168YMB	340 13.3858	580 22.8346	190.0 7.4803	4.0 0.16	397 15.6	526 20.7	6900 1550000	3750 843000	0.30	2.22	3.30	2.17	0.1033	530	590	206 455
24168YMB	340 13.3858	580 22.8346	243.0 9.5669	4.0 0.16	385 15.2	525 20.7	8970 2020000	4720 1060000	0.39	1.75	2.61	1.71	0.1033	340	370	264 582
23268YMB	340 13.3858	620 24.4094	224.0 8.8189	5.0 0.20	399 15.7	554 21.8	8290 1860000	4700 1060000	0.35	1.91	2.84	1.86	0.1051	420	460	296 653
23972YMB	360 14.1732	480 18.8976	90.0 3.5433	2.5 0.10	389 15.3	455 17.9	3170 712000	1460 328000	0.16	4.12	6.13	4.03	0.1013	680	810	45.0 98.0
23072YMB	360 14.1732	540 21.2598	134.0 5.2756	4.0 0.16	403 15.9	499 19.7	4640 1040000	2390 538000	0.23	2.94	4.38	2.88	0.1035	680	800	107 236
24072YMB	360 14.1732	540 21.2598	180.0 7.0866	4.0 0.16	398 15.7	500 19.7	6900 1550000	3270 736000	0.30	2.24	3.33	2.19	0.1036	500	560	144 316

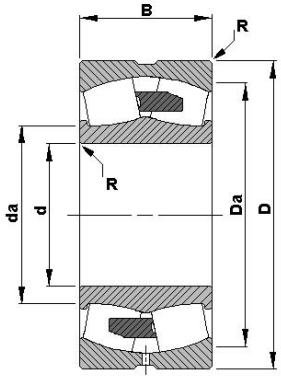
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



YM

Bearing Number	d Bore	D O.D.	B Width	R Fillet[2] (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors[1] e	Equivalent Radial load Factors[1] Dynamic $\frac{T}{R} \le e$ X = 1 Y	Equivalent Radial load Factors[1] Dynamic $\frac{T}{R} > e$ X = .67 Y	Equivalent Radial load Factors[1] Static In All Cases $X_0 = 1$ Y_0	Lubrication Life Adjustment Factor[4] C_g	Reference Speed Grease	Thermal Ratings[3] Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
23172YMB	360 14.1732	600 23.6220	192.0 7.5591	4.0 0.16	419 16.5	546 21.5	7360 1650000	3880 872000	0.29	2.29	3.42	2.24	0.1065	500	560	218 480
24172YMB	360 14.1732	600 23.6220	243.0 9.5669	4.0 0.16	406 16.0	545 21.4	9620 2160000	4890 1100000	0.38	1.79	2.67	1.75	0.1064	320	340	276 608
23272YMB	360 14.1732	650 25.5906	232.0 9.1339	5.0 0.20	420 16.5	583 22.9	8900 2000000	5040 1130000	0.35	1.95	2.91	1.91	0.1086	400	430	334 737
23976YMB	380 14.9606	520 20.4724	106.0 4.1732	3.0 0.12	416 16.4	488 19.2	3970 893000	1810 407000	0.18	3.80	5.66	3.72	0.1057	640	750	66.0 145
23076YMB	380 14.9606	560 22.0472	135.0 5.3150	4.0 0.16	422 16.6	520 20.5	5150 1160000	2590 581000	0.22	3.08	4.58	3.01	0.1068	630	740	112 248
24076YMB	380 14.9606	560 22.0472	180.0 7.0866	4.0 0.16	418 16.4	520 20.5	7150 1610000	3360 755000	0.29	2.32	3.45	2.27	0.1062	470	530	150 330
23176YMB	380 14.9606	620 24.4094	194.0 7.6378	4.0 0.16	431 17.0	566 22.3	7670 1720000	4100 922000	0.30	2.28	3.39	2.23	0.1090	470	530	229 505
24176YMB	380 14.9606	620 24.4094	243.0 9.5669	4.0 0.16	427 16.8	565 22.3	10200 2290000	5080 1140000	0.36	1.87	2.79	1.83	0.1097	300	320	287 633
23276YMB	380 14.9606	680 26.7717	240.0 9.4488	5.0 0.20	442 17.4	611 24.1	9630 2170000	5430 1220000	0.34	1.98	2.95	1.94	0.1119	370	400	376 828
23980YMB	400 15.7480	540 21.2598	106.0 4.1732	3.0 0.12	436 17.2	511 20.1	4050 910000	1850 415000	0.17	3.99	5.94	3.90	0.1086	600	720	69.0 151
23080YMB	400 15.7480	600 23.6220	148.0 5.8268	4.0 0.16	447 17.6	555 21.9	6020 1350000	3050 685000	0.23	2.98	4.44	2.92	0.1109	590	690	146 321
24080YMB	400 15.7480	600 23.6220	200.0 7.8740	4.0 0.16	442 17.4	555 21.9	8550 1920000	3990 898000	0.30	2.24	3.33	2.19	0.1108	430	480	197 434
23180YMB	400 15.7480	650 25.5906	200.0 7.8740	5.0 0.20	454 17.9	594 23.4	8210 1850000	4350 979000	0.29	2.32	3.46	2.27	0.1123	440	500	258 570
24180YMB	400 15.7480	650 25.5906	250.0 9.8425	5.0 0.20	449 17.7	594 23.4	10500 2350000	5280 1190000	0.35	1.91	2.84	1.87	0.1123	290	310	323 712
23280YMB	400 15.7480	720 28.3465	256.0 10.0787	5.0 0.20	466 18.4	646 25.4	11000 2460000	6110 1370000	0.34	1.96	2.93	1.92	0.1159	340	370	452 996
22380YMB	400 15.7480	820 32.2835	243.0 9.5669	6.0 0.24	496 19.5	729 28.7	10200 2290000	6570 1480000	0.30	2.28	3.40	2.23	0.1213	390	430	613 1350
23984YMB	420 16.5354	560 22.0472	106.0 4.1732	3.0 0.12	454 17.9	531 20.9	4270 961000	1930 434000	0.16	4.14	6.17	4.05	0.1117	570	670	72.0 158
23084YMB	420 16.5354	620 24.4094	150.0 5.9055	4.0 0.16	467 18.4	576 22.7	6430 1450000	3170 713000	0.22	3.05	4.54	2.98	0.1139	560	650	154 339
24084YMB	420 16.5354	620 24.4094	200.0 7.8740	4.0 0.16	463 18.2	575 22.7	8710 1960000	4010 901000	0.29	2.37	3.52	2.31	0.1138	410	460	205 451
23184YMB	420 16.5354	700 27.5591	224.0 8.8189	5.0 0.20	480 18.9	637 25.1	9760 2190000	5210 1170000	0.31	2.21	3.28	2.16	0.1166	410	450	346 762
24184YMB	420 16.5354	700 27.5591	280.0 11.0236	5.0 0.20	473 18.6	637 25.1	12500 2810000	6330 1420000	0.37	1.81	2.70	1.77	0.1166	260	280	432 953

Continued on next page.

SPHERICAL ROLLER BEARINGS - *continued*

- Timken inventory systems are designed to provide fast delivery for frequently-ordered sizes and styles.
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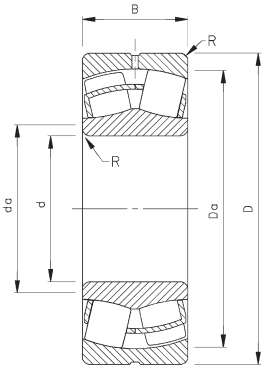
- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



CJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) Dynamic e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
23284YMB	420 16.5354	760 29.9213	272.0 10.7087	6.0 0.24	490 19.3	681 26.8	12000 2690000	6670 1500000	0.35	1.90	2.83	1.86	0.1187	320	350	537 1180
23988YMB	440 17.3228	600 23.6220	118.0 4.6457	3.0 0.12	479 18.9	566 22.3	5080 1140000	2340 525000	0.17	3.93	5.85	3.84	0.1157	530	630	97.0 213
23088YMB	440 17.3228	650 25.5906	157.0 6.1811	5.0 0.20	489 19.3	603 23.8	7050 1590000	3460 777000	0.22	3.04	4.53	2.97	0.1173	520	610	177 390
24088YMB	440 17.3228	650 25.5906	212.0 8.3465	5.0 0.20	485 19.1	603 23.7	9870 2220000	4480 1010000	0.29	2.31	3.44	2.26	0.1173	380	430	239 527
23188YMB	440 17.3228	720 28.3465	226.0 8.8976	5.0 0.20	500 19.7	657 25.9	10400 2340000	5440 1220000	0.30	2.26	3.37	2.21	0.1198	380	430	361 797
24188YMB	440 17.3228	720 28.3465	280.0 11.0236	5.0 0.20	495 19.5	656 25.8	13100 2930000	6450 1450000	0.36	1.88	2.79	1.84	0.1197	250	260	448 987
23288YMB	440 17.3228	790 31.1024	280.0 11.0236	6.0 0.24	512 20.1	710 27.9	13400 3010000	7350 1650000	0.35	1.95	2.91	1.91	0.1231	300	320	593 1310
23992YMB	460 18.1102	620 24.4094	118.0 4.6457	3.0 0.12	504 19.9	582 22.9	4700 1060000	2050 460000	0.16	4.13	6.15	4.04	0.1187	520	620	101 221
23092YMB	460 18.1102	680 26.7717	163.0 6.4173	5.0 0.20	512 20.1	631 24.8	7660 1720000	3740 840000	0.22	3.06	4.56	2.99	0.1207	500	570	202 444
24092YMB	460 18.1102	680 26.7717	218.0 8.5827	5.0 0.20	507 20.0	630 24.8	10400 2350000	4750 1070000	0.28	2.37	3.53	2.32	0.1207	360	410	270 593
23192YMB	460 18.1102	760 29.9213	240.0 9.4488	6.0 0.24	524 20.6	692 27.2	11200 2530000	5920 1330000	0.30	2.24	3.33	2.19	0.1230	370	410	433 953
24192YMB	460 18.1102	760 29.9213	300.0 11.8110	6.0 0.24	517 20.4	692 27.2	15000 3360000	7420 1670000	0.37	1.82	2.71	1.78	0.1239	220	240	542 1190
23292YMB	460 18.1102	830 32.6772	296.0 11.6535	6.0 0.24	535 21.1	746 29.4	14200 3190000	7870 1770000	0.34	1.96	2.93	1.92	0.1259	280	310	697 1530
23996YMB	480 18.8976	650 25.5906	128.0 5.0394	4.0 0.16	522 20.6	614 24.2	5430 1220000	2490 559000	0.17	3.86	5.75	3.78	0.1224	500	590	121 267
23096YMB	480 18.8976	700 27.5591	165.0 6.4961	5.0 0.20	532 21.0	650 25.6	8070 1810000	3840 863000	0.22	3.14	4.67	3.07	0.1236	470	550	211 465
24096YMB	480 18.8976	700 27.5591	218.0 8.5827	5.0 0.20	527 20.7	652 25.7	11000 2470000	4970 1120000	0.28	2.45	3.64	2.39	0.1233	340	380	279 614
23196YMB	480 18.8976	790 31.1024	248.0 9.7638	6.0 0.24	547 21.5	719 28.3	12600 2830000	6480 1460000	0.30	2.26	3.36	2.21	0.1269	340	370	482 1060
24196YMB	480 18.8976	790 31.1024	308.0 12.1260	6.0 0.24	542 21.3	717 28.2	16300 3660000	7840 1760000	0.37	1.85	2.75	1.80	0.1266	210	220	598 1320
23296YMB	480 18.8976	870 34.2520	310.0 12.2047	6.0 0.24	561 22.1	779 30.7	16600 3740000	8940 2010000	0.35	1.92	2.85	1.87	0.1305	250	270	805 1770
239/500YMB	500 19.6850	670 26.3780	128.0 5.0394	4.0 0.16	544 21.4	634 25.0	5730 1290000	2540 571000	0.17	4.02	5.98	3.93	0.1251	470	560	126 276
230/500YMB	500 19.6850	720 28.3465	167.0 6.5748	5.0 0.20	551 21.7	673 26.5	8260 1860000	3950 889000	0.21	3.26	4.85	3.18	0.1263	460	530	221 486

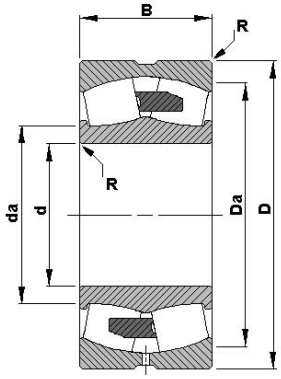
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



YM

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) Dynamic e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
240/500YMB	**500** 19.6850	**720** 28.3465	**218.0** 8.5827	**5.0** 0.20	**547** 21.5	**672** 26.5	**11300** 2540000	**5040** 1130000	**0.27**	**2.51**	**3.74**	**2.45**	**0.1263**	**330**	**370**	**289** 635
231/500YMB	**500** 19.6850	**830** 32.6772	**264.0** 10.3937	**6.0** 0.24	**573** 22.5	**753** 29.6	**14100** 3170000	**7180** 1610000	**0.30**	**2.22**	**3.30**	**2.17**	**0.1307**	**320**	**350**	**572** 1260
241/500YMB	**500** 19.6850	**830** 32.6772	**325.0** 12.7953	**6.0** 0.24	**563** 22.2	**755** 29.7	**17700** 3990000	**8720** 1960000	**0.37**	**1.81**	**2.69**	**1.77**	**0.1300**	**200**	**210**	**704** 1550
232/500YMB	**500** 19.6850	**920** 36.2205	**336.0** 13.2283	**6.0** 0.24	**585** 23.0	**823** 32.4	**18100** 4070000	**9910** 2230000	**0.36**	**1.90**	**2.83**	**1.86**	**0.1340**	**240**	**260**	**988** 2170
239/530YMB	**530** 20.8661	**710** 27.9528	**136.0** 5.3543	**4.0** 0.16	**575** 22.6	**672** 26.4	**6950** 1560000	**3030** 682000	**0.16**	**4.11**	**6.12**	**4.02**	**0.1298**	**430**	**500**	**149** 329
230/530YMB	**530** 20.8661	**780** 30.7087	**185.0** 7.2835	**5.0** 0.20	**588** 23.2	**725** 28.5	**9840** 2210000	**4740** 1070000	**0.21**	**3.14**	**4.68**	**3.07**	**0.1319**	**420**	**480**	**299** 657
240/530YMB	**530** 20.8661	**780** 30.7087	**250.0** 9.8425	**5.0** 0.20	**583** 23.0	**725** 28.5	**13900** 3110000	**6170** 1390000	**0.28**	**2.37**	**3.53**	**2.32**	**0.1318**	**300**	**330**	**403** 888
231/530YMB	**530** 20.8661	**870** 34.2520	**272.0** 10.7087	**6.0** 0.24	**603** 23.7	**793** 31.2	**15300** 3440000	**7770** 1750000	**0.30**	**2.27**	**3.38**	**2.22**	**0.1350**	**300**	**320**	**637** 1400
241/530YMB	**530** 20.8661	**870** 34.2520	**335.0** 13.1890	**6.0** 0.24	**596** 23.5	**792** 31.2	**19800** 4440000	**9430** 2120000	**0.37**	**1.84**	**2.74**	**1.80**	**0.1352**	**180**	**190**	**785** 1730
232/530YMB	**530** 20.8661	**980** 38.5827	**355.0** 13.9764	**7.0** 0.28	**621** 24.4	**878** 34.6	**20500** 4610000	**11200** 2520000	**0.35**	**1.91**	**2.85**	**1.87**	**0.1395**	**220**	**240**	**1190** 2620
239/560YMB	**560** 22.0472	**750** 29.5276	**140.0** 5.5118	**4.0** 0.16	**607** 23.9	**710** 28.0	**7370** 1660000	**3240** 729000	**0.16**	**4.21**	**6.27**	**4.12**	**0.1339**	**400**	**470**	**172** 378
230/560YMB	**560** 22.0472	**820** 32.2835	**195.0** 7.6772	**5.0** 0.20	**620** 24.4	**764** 30.1	**10900** 2460000	**5230** 1180000	**0.22**	**3.14**	**4.67**	**3.07**	**0.1364**	**390**	**450**	**344** 759
240/560YMB	**560** 22.0472	**820** 32.2835	**258.0** 10.1575	**5.0** 0.20	**617** 24.3	**761** 30.0	**15000** 3360000	**6500** 1460000	**0.28**	**2.42**	**3.60**	**2.37**	**0.1365**	**280**	**310**	**456** 1000
231/560YMB	**560** 22.0472	**920** 36.2205	**280.0** 11.0236	**6.0** 0.24	**638** 25.1	**838** 33.0	**16600** 3730000	**8410** 1890000	**0.29**	**2.33**	**3.47**	**2.28**	**0.1399**	**270**	**300**	**734** 1620
241/560YMB	**560** 22.0472	**920** 36.2205	**355.0** 13.9764	**6.0** 0.24	**629** 24.8	**839** 33.0	**22100** 4960000	**10600** 2370000	**0.36**	**1.87**	**2.78**	**1.83**	**0.1400**	**160**	**170**	**931** 2050
232/560YMB	**560** 22.0472	**1030** 40.5512	**365.0** 14.3701	**7.0** 0.28	**661** 26.0	**918** 36.1	**22600** 5090000	**11900** 2690000	**0.34**	**1.96**	**2.91**	**1.91**	**0.1449**	**200**	**220**	**1340** 2960
239/600YMB	**600** 23.6220	**800** 31.4961	**150.0** 5.9055	**4.0** 0.16	**650** 25.6	**757** 29.8	**8690** 1950000	**3680** 827000	**0.16**	**4.20**	**6.25**	**4.11**	**0.1404**	**370**	**430**	**207** 456
230/600YMB	**600** 23.6220	**870** 34.2520	**200.0** 7.8740	**5.0** 0.20	**664** 26.1	**811** 31.9	**11900** 2670000	**5530** 1240000	**0.21**	**3.27**	**4.87**	**3.20**	**0.1413**	**360**	**410**	**391** 861
240/600YMB	**600** 23.6220	**870** 34.2520	**272.0** 10.7087	**5.0** 0.20	**658** 25.9	**811** 31.9	**17000** 3820000	**7320** 1650000	**0.28**	**2.44**	**3.64**	**2.39**	**0.1421**	**260**	**280**	**531** 1170
231/600YMB	**600** 23.6220	**980** 38.5827	**300.0** 11.8110	**6.0** 0.24	**681** 26.8	**895** 35.2	**19100** 4290000	**9560** 2150000	**0.29**	**2.32**	**3.46**	**2.27**	**0.1458**	**250**	**270**	**887** 1950
239/630YMB	**630** 24.8031	**850** 33.4646	**165.0** 6.4961	**5.0** 0.20	**684** 26.9	**804** 31.6	**10200** 2290000	**4390** 986000	**0.17**	**4.02**	**5.99**	**3.93**	**0.1451**	**340**	**400**	**264** 583

Continued on next page.

SPHERICAL ROLLER BEARINGS - *continued*

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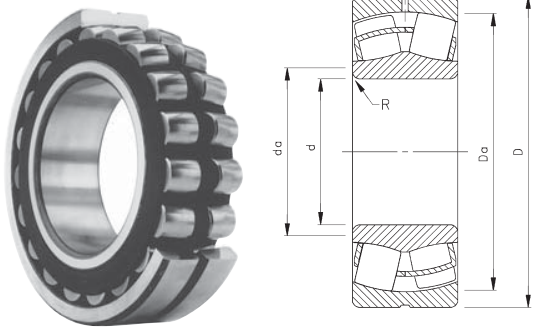


CJ

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors(1)				Lubrication Life Adjustment Factor(4)	Reference Speed	Thermal Ratings(3)	Weight
										Dynamic		Static				
					d_a Shaft	D_a Housing	Static Load Rating C_0	Dynamic Load Rating C	e	$\frac{T}{R} \le e$ X = 1 Y	$\frac{T}{R} > e$ X = .67 Y	In All Cases X_0 = 1 Y_0	C_g	Grease	Oil	
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
230/630YMB	630 24.8031	920 36.2205	212.0 8.3465	6.0 0.24	696 27.4	858 33.8	13600 3050000	6370 1430000	0.21	3.18	4.74	3.11	0.1466	330	380	469 1030
240/630YMB	630 24.8031	920 36.2205	290.0 11.4173	6.0 0.24	691 27.2	856 33.7	18900 4240000	8180 1840000	0.28	2.41	3.59	2.36	0.1465	240	260	642 1410
231/630YMB	630 24.8031	1030 40.5512	315.0 12.4016	6.0 0.24	716 28.2	940 37.0	21500 4820000	10600 2390000	0.29	2.30	3.42	2.25	0.1505	230	250	1030 2270
241/630YMB	630 24.8031	1030 40.5512	400.0 15.7480	6.0 0.24	707 27.8	939 37.0	27900 6270000	13000 2920000	0.37	1.84	2.74	1.80	0.1504	140	140	1310 2880
239/670YMB	670 26.3780	900 35.4331	170.0 6.6929	5.0 0.20	727 28.6	851 33.5	11200 2510000	4720 1060000	0.16	4.15	6.18	4.06	0.1509	320	370	302 666
230/670YMB	670 26.3780	980 38.5827	230.0 9.0551	6.0 0.24	744 29.3	911 35.9	16000 3590000	7230 1630000	0.22	3.12	4.65	3.05	0.1531	310	350	579 1280
240/670YMB	670 26.3780	980 38.5827	308.0 12.1260	6.0 0.24	738 29.0	910 35.8	22100 4960000	9280 2090000	0.28	2.39	3.55	2.33	0.1530	220	240	775 1710
231/670YMB	670 26.3780	1090 42.9134	336.0 13.2283	6.0 0.24	760 29.9	995 39.2	23700 5340000	11600 2610000	0.29	2.31	3.44	2.26	0.1560	210	230	1220 2700
241/670YMD	670 26.3780	1090 42.9134	412.0 16.2205	6.0 0.24	751 29.6	996 39.2	30400 6830000	14100 3180000	0.36	1.90	2.82	1.85	0.1560	130	130	1500 3300
232/670YMD	670 26.3780	1220 48.0315	438.0 17.2441	9.0 0.35	779 30.7	1097 43.2	32100 7220000	16900 3800000	0.35	1.95	2.91	1.91	0.1608	160	170	2240 4940
239/710YMB	710 27.9528	950 37.4016	180.0 7.0866	5.0 0.20	771 30.4	898 35.3	12500 2820000	5150 1160000	0.16	4.13	6.15	4.04	0.1565	300	340	353 778
230/710YMB	710 27.9528	1030 40.5512	236.0 9.2913	6.0 0.24	785 30.9	960 37.8	16900 3800000	7680 1730000	0.21	3.26	4.86	3.19	0.1583	290	330	647 1430
240/710YMD	710 27.9528	1030 40.5512	315.0 12.4016	6.0 0.24	779 30.7	960 37.8	23400 5260000	9880 2220000	0.27	2.49	3.71	2.44	0.1582	200	220	863 1900
231/710YMB	710 27.9528	1150 45.2756	345.0 13.5827	7.0 0.28	809 31.8	1048 41.3	26200 5880000	12500 2800000	0.28	2.38	3.54	2.32	0.1622	200	210	1390 3060
241/710YMD	710 27.9528	1150 45.2756	438.0 17.2441	7.0 0.28	795 31.3	1050 41.4	34300 7720000	15700 3520000	0.36	1.87	2.78	1.83	0.1613	120	120	1760 3890
239/750YMB	750 29.5276	1000 39.3701	185.0 7.2835	5.0 0.20	813 32.0	946 37.3	13500 3040000	5550 1250000	0.16	4.23	6.30	4.14	0.1619	280	320	398 878
230/750YMB	750 29.5276	1090 42.9134	250.0 9.8425	6.0 0.24	830 32.7	1015 40.0	19000 4270000	8550 1920000	0.21	3.26	4.85	3.18	0.1641	270	300	770 1700
240/750YMD	750 29.5276	1090 42.9134	335.0 13.1890	6.0 0.24	824 32.4	1014 39.9	26400 5940000	11000 2480000	0.27	2.48	3.69	2.42	0.1640	190	200	1030 2270
241/750YMD	750 29.5276	1220 48.0315	475.0 18.7008	7.0 0.28	840 33.1	1114 43.9	39200 8800000	17800 4000000	0.36	1.86	2.77	1.82	0.1676	110	110	2170 4770
239/800YMB	800 31.4961	1060 41.7323	195.0 7.6772	5.0 0.20	868 34.2	1007 39.6	13800 3100000	5700 1280000	0.16	4.20	6.25	4.10	0.1685	270	310	465 1020
230/800YMB	800 31.4961	1150 45.2756	258.0 10.1575	6.0 0.24	888 35.0	1074 42.3	20300 4570000	8940 2010000	0.19	3.50	5.22	3.43	0.1696	250	280	868 1910

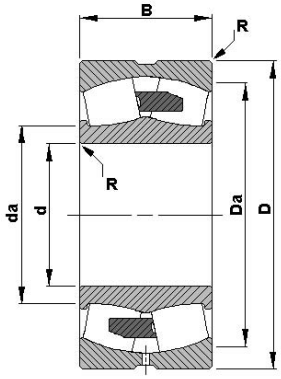
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



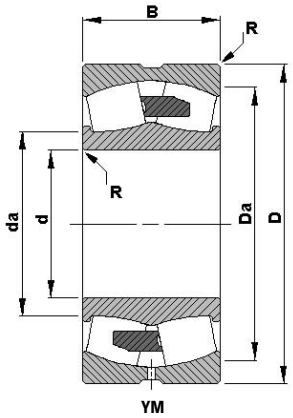
YM

Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) Dynamic e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static In All Cases X_0 = 1 Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
240/800YMD	**800** 31.4961	**1150** 45.2756	**345.0** 13.5827	**6.0** 0.24	**877** 34.5	**1072** 42.2	**28900** 6500000	**11800** 2650000	**0.26**	**2.55**	**3.80**	**2.50**	**0.1790**	**170**	**190**	**1160** 2560
231/800YMB	**800** 31.4961	**1280** 50.3937	**365.0** 14.3701	**7.0** 0.28	**906** 35.7	**1171** 46.1	**31900** 7170000	**15000** 3380000	**0.28**	**2.45**	**3.65**	**2.40**	**0.1741**	**160**	**180**	**1800** 3950
241/800YMD	**800** 31.4961	**1280** 50.3937	**475.0** 18.7008	**7.0** 0.28	**896** 35.3	**1170** 46.1	**41900** 9430000	**18500** 4170000	**0.35**	**1.95**	**2.90**	**1.90**	**0.1740**	**97**	**100**	**2340** 5150
232/800YMD	**800** 31.4961	**1420** 55.9055	**488.0** 19.2126	**11.0** 0.43	**935** 36.8	**1272** 50.1	**44000** 9900000	**21500** 4830000	**0.33**	**2.04**	**3.03**	**1.99**	**0.1798**	**120**	**130**	**3310** 7290
238/850YMB	**850** 33.4646	**1030** 40.5512	**136.0** 5.3543	**4.0** 0.16	**900** 35.4	**993** 39.1	**10500** 2350000	**3650** 822000	**0.11**	**6.23**	**9.27**	**6.09**	**0.1718**	**130**	**150**	**233** 513
239/850YMB	**850** 33.4646	**1120** 44.0945	**200.0** 7.8740	**5.0** 0.20	**919** 36.2	**1050** 41.4	**14700** 3300000	**5720** 1290000	**0.15**	**4.54**	**6.76**	**4.44**	**0.1747**	**250**	**290**	**525** 1150
230/850YMB	**850** 33.4646	**1220** 48.0315	**272.0** 10.7087	**6.0** 0.24	**938** 36.9	**1138** 44.8	**23400** 5250000	**10200** 2290000	**0.20**	**3.37**	**5.02**	**3.30**	**0.1771**	**230**	**260**	**1030** 2260
240/850YMD	**850** 33.4646	**1220** 48.0315	**365.0** 14.3701	**6.0** 0.24	**931** 36.7	**1138** 44.8	**32600** 7320000	**13200** 2960000	**0.26**	**2.56**	**3.81**	**2.50**	**0.1770**	**160**	**170**	**1380** 3030
231/850YMB	**850** 33.4646	**1360** 53.5433	**400.0** 15.7480	**9.0** 0.35	**962** 37.9	**1245** 49.0	**36200** 8140000	**16900** 3800000	**0.28**	**2.44**	**3.63**	**2.39**	**0.1810**	**150**	**160**	**2220** 4890
232/850YMD	**850** 33.4646	**1500** 59.0551	**515.0** 20.2756	**11.0** 0.43	**990** 39.0	**1347** 53.0	**48400** 10900000	**23500** 5280000	**0.33**	**2.06**	**3.06**	**2.01**	**0.1864**	**110**	**120**	**3880** 8540
239/900YMB	**900** 35.4331	**1180** 46.4567	**206.0** 8.1102	**5.0** 0.20	**965** 38.0	**1112** 43.8	**18300** 4110000	**7120** 1600000	**0.14**	**4.69**	**6.98**	**4.58**	**0.1801**	**220**	**250**	**592** 1300
230/900YMB	**900** 35.4331	**1280** 50.3937	**280.0** 11.0236	**6.0** 0.24	**990** 39.0	**1198** 47.2	**25900** 5820000	**11100** 2500000	**0.20**	**3.41**	**5.08**	**3.33**	**0.1828**	**210**	**240**	**1140** 2520
240/900YMD	**900** 35.4331	**1280** 50.3937	**375.0** 14.7638	**6.0** 0.24	**983** 38.7	**1197** 47.1	**35600** 7990000	**14200** 3200000	**0.26**	**2.60**	**3.87**	**2.54**	**0.1827**	**150**	**160**	**1530** 3370
231/900YMB	**900** 35.4331	**1420** 55.9055	**412.0** 16.2205	**9.0** 0.35	**1018** 40.1	**1300** 51.2	**39400** 8860000	**17800** 4010000	**0.27**	**2.49**	**3.71**	**2.43**	**0.1871**	**140**	**150**	**2450** 5390
241/900YMD	**900** 35.4331	**1420** 55.9055	**515.0** 20.2756	**9.0** 0.35	**1008** 39.7	**1298** 51.1	**51000** 11500000	**21700** 4870000	**0.34**	**2.00**	**2.98**	**1.96**	**0.1869**	**82**	**85**	**3060** 6740
232/900YMD	**900** 35.4331	**1580** 62.2047	**515.0** 20.2756	**11.0** 0.43	**1056** 41.6	**1423** 56.0	**51400** 11600000	**24700** 5560000	**0.32**	**2.11**	**3.13**	**2.06**	**0.1926**	**100**	**110**	**4280** 9420
239/950YMB	**950** 37.4016	**1250** 49.2126	**224.0** 8.8189	**6.0** 0.24	**1025** 40.3	**1187** 46.7	**20700** 4660000	**8160** 1830000	**0.15**	**4.39**	**6.54**	**4.29**	**0.1874**	**210**	**240**	**729** 1600
230/950YMB	**950** 37.4016	**1360** 53.5433	**300.0** 11.8110	**6.0** 0.24	**1046** 41.2	**1273** 50.1	**27600** 6190000	**12100** 2720000	**0.19**	**3.49**	**5.19**	**3.41**	**0.1899**	**200**	**230**	**1400** 3080
240/950YMD	**950** 37.4016	**1360** 53.5433	**412.0** 16.2205	**6.0** 0.24	**1039** 40.9	**1269** 50.0	**41300** 9290000	**16400** 3680000	**0.27**	**2.53**	**3.77**	**2.47**	**0.1898**	**130**	**140**	**1920** 4230
231/950YMB	**950** 37.4016	**1500** 59.0551	**438.0** 17.2441	**9.0** 0.35	**1074** 42.3	**1373** 54.1	**44400** 9980000	**19900** 4460000	**0.27**	**2.47**	**3.68**	**2.42**	**0.1937**	**130**	**140**	**2910** 6400
241/950YMD	**950** 37.4016	**1500** 59.0551	**545.0** 21.4567	**9.0** 0.35	**1064** 41.9	**1371** 54.0	**57100** 12800000	**24100** 5410000	**0.34**	**2.00**	**2.97**	**1.95**	**0.1935**	**75**	**77**	**3620** 7970

Continued on next page.

SPHERICAL ROLLER BEARINGS - *continued*

- Timken inventory systems are designed to provide fast delivery for frequently-ordered sizes and styles.
- Consult your Timken representative for up-to-date information about the availability of the bearings you have selected.
- Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.
- Bearings are available with a tapered bore for adapter type mounting.
- To order, add the suffix "K" to bearing number (e.g., 23120K).



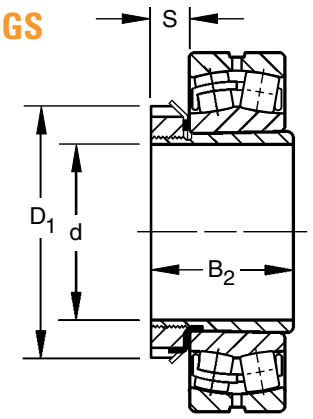
Bearing Number	d Bore	D O.D.	B Width	R Fillet(2) (max.)	Backing Diameter d_a Shaft	Backing Diameter D_a Housing	Load Ratings Static Load Rating C_0	Load Ratings Dynamic Load Rating C	Equivalent Radial load Factors(1) e	Dynamic $\frac{T}{R} \le e$ X = 1 Y	Dynamic $\frac{T}{R} > e$ X = .67 Y	Static Y_0	Lubrication Life Adjustment Factor(4) C_g	Reference Speed Grease	Thermal Ratings(3) Oil	Weight
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.
239/1000YMB	1000 39.3701	1320 51.9685	236.0 9.2913	6.0 0.24	1080 42.5	1252 49.3	23100 5190000	9020 2030000	0.15	4.39	6.54	4.29	0.1939	190	220	864 1900
230/1000YMB	1000 39.3701	1420 55.9055	308.0 12.1260	6.0 0.24	1101 43.4	1327 52.2	32100 7220000	13400 3010000	0.20	3.44	5.12	3.36	0.1960	180	200	1540 3400
240/1000YMD	1000 39.3701	1420 55.9055	412.0 16.2205	6.0 0.24	1094 43.1	1329 52.3	41800 9390000	16600 3730000	0.25	2.69	4.01	2.63	0.1952	130	140	2070 4540
231/1000YMB	1000 39.3701	1580 62.2047	462.0 18.1890	9.0 0.35	1131 44.5	1446 56.9	49500 11100000	22000 4940000	0.27	2.47	3.68	2.42	0.2002	120	130	3410 7500
241/1000YMB	1000 39.3701	1580 62.2047	580.0 22.8346	9.0 0.35	1120 44.1	1444 56.9	64400 14500000	26800 6030000	0.34	1.98	2.95	1.93	0.2000	69	71	4280 9420
239/1060YMB	1060 41.7323	1400 55.1181	250.0 9.8425	6.0 0.24	1145 45.1	1328 52.3	26500 5950000	10200 2300000	0.16	4.25	6.32	4.15	0.2004	180	200	1030 2270
230/1060YMB	1060 41.7323	1500 59.0551	325.0 12.7953	7.0 0.28	1165 45.9	1404 55.3	35800 8050000	14800 3330000	0.20	3.44	5.12	3.36	0.2031	170	190	1810 3970
240/1060YMD	1060 41.7323	1500 59.0551	438.0 17.2441	7.0 0.28	1157 45.6	1403 55.2	49500 11100000	19000 4280000	0.26	2.61	3.88	2.55	0.2030	110	120	2430 5350
231/1060YMB	1060 41.7323	1660 65.3543	475.0 18.7008	11.0 0.43	1194 47.0	1524 60.0	53500 12000000	23700 5330000	0.27	2.53	3.77	2.48	0.2070	110	120	3820 8410
239/1120YMB	1120 44.0945	1460 57.4803	250.0 9.8425	6.0 0.24	1205 47.4	1389 54.7	27100 6090000	10400 2330000	0.15	4.62	6.87	4.51	0.2077	170	190	1080 2380
230/1120YMB	1120 44.0945	1580 62.2047	345.0 13.5827	7.0 0.28	1229 48.4	1480 58.3	40200 9040000	16500 3710000	0.20	3.42	5.09	3.34	0.2101	160	170	2110 4650
240/1120YMD	1120 44.0945	1580 62.2047	462.0 18.1890	7.0 0.28	1220 48.1	1480 58.3	55600 12500000	21200 4760000	0.26	2.62	3.90	2.56	0.2100	110	110	2830 6230
231/1120YMB	1120 44.0945	1750 68.8976	475.0 18.7008	11.0 0.43	1262 49.7	1609 63.3	56100 12600000	25000 5620000	0.25	2.67	3.98	2.62	0.2142	110	110	4240 9320
239/1180YMB	1180 46.4567	1540 60.6299	272.0 10.7087	6.0 0.24	1269 50.0	1465 57.7	31500 7090000	11900 2670000	0.15	4.48	6.67	4.38	0.2148	160	180	1310 2890
230/1180YMB	1180 46.4567	1660 65.3543	355.0 13.9764	7.0 0.28	1293 50.9	1557 61.3	43500 9780000	17800 4000000	0.19	3.50	5.21	3.42	0.2170	150	160	2390 5250
240/1180YMD	1180 46.4567	1660 65.3543	475.0 18.7008	7.0 0.28	1284 50.6	1557 61.3	59800 13400000	22700 5110000	0.25	2.67	3.98	2.61	0.2169	98	110	3190 7030
231/1180YMB	1180 46.4567	1850 72.8346	500.0 19.6850	11.0 0.43	1332 52.5	1698 66.9	62400 14000000	27600 6200000	0.25	2.68	4.00	2.62	0.2217	97	100	5010 11000
239/1250YMB	1250 49.2126	1630 64.1732	280.0 11.0236	6.0 0.24	1345 52.9	1551 61.1	34200 7680000	12800 2890000	0.15	4.60	6.85	4.50	0.2227	140	160	1510 3330
230/1250YMB	1250 49.2126	1750 68.8976	375.0 14.7638	7.0 0.28	1370 54.0	1640 64.6	48800 11000000	19400 4350000	0.19	3.50	5.21	3.42	0.2250	140	150	2770 6100
240/1250YMD	1250 49.2126	1750 68.8976	500.0 19.6850	7.0 0.28	1362 53.6	1639 64.5	66700 15000000	24600 5530000	0.25	2.68	3.99	2.62	0.2249	90	96	3700 8140
231/1250YMB	1250 49.2126	1950 76.7717	530.0 20.8661	11.0 0.43	1407 55.4	1794 70.6	70000 15700000	30700 6900000	0.25	2.67	3.98	2.62	0.2296	89	95	5860 12900

(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.
(2) Maximum shaft or housing fillet radius that bearing corners will clear.
* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).
(3) See thermal speed ratings in the engineering section.
(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."

SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

SNW/SNP – PULL TYPE SLEEVE, LOCKNUT, LOCKWASHER/LOCKPLATE ASSEMBLIES

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.
- SNW assembly consists of a sleeve, locknut and lockwasher.
- SNP assembly consists of a sleeve, locknut and lockplate.



Tapered bore bearing plus SNW

Bearing Number	Accessory Numbers				Shaft Dimensions Inchs		Adapter Dimensions Inches			SNW/SNP Assembly Weight
	Assembly	Sleeve	Locknut	Lockwasher / Lockplate	Diameter d	Tolerance +.000	B_2	S	D_1	
					in.		in.	in.	in.	lbs.
FOR SERIES 222K										
22209K	SNW-09	S-09	N-09	W-09	1 7/16	-.003	1 37/64	1/2	2 17/32	0.6
22210K	SNW-10	S-10	N-10	W-10	1 11/16	-.003	1 49/64	9/16	2 11/16	0.7
22211K	SNW-11	S-11	N-11	W-11	1 15/16	-.003	1 27/32	9/16	2 31/32	0.8
22212K	SNW-12	S-12	N-12	W-12	2 1/16	-.004	1 63/64	19/32	3 5/32	1.1
22213K	SNW-13	S-13	N-13	W-13	2 3/16	-.004	2 3/32	5/8	3 3/8	1.4
22214K	SNW-14	S-14	N-14	W-14	2 5/16	-.004	2 11/64	5/8	3 5/8	1.8
22215K	SNW-15	S-15	AN-15	W-15	2 7/16	-.004	2 19/64	43/64	3 7/8	2
22216K	SNW-16	S-16	AN-16	W-16	2 11/16	-.004	2 3/8	43/64	4 5/32	2.4
22217K	SNW-17	S-17	AN-17	W-17	2 15/16	-.004	2 31/64	45/64	4 13/32	3
22218K	SNW-18	S-18	AN-18	W-18	3 3/16	-.004	2 41/64	25/32	4 21/32	3
22219K	SNW-19	S-19	AN-19	W-19	3 5/16	-.004	2 49/64	13/16	4 15/16	3.3
22220K	SNW-20	S-20	AN-20	W-20	3 7/16	-.004	2 7/8	27/32	5 3/16	4.4
22222K	SNW-22	S-22	AN-22	W-22	3 15/16	-.004	3 13/64	29/32	5 23/32	5
22224K	SNW-24	S-24	AN-24	W-24	4 3/16	-.005	3 15/32	15/16	6 1/8	6.7
22226K	SNW-26	S-26	AN-26	W-26	4 7/16	-.005	3 49/64	1	6 3/4	8.6
22228K	SNW-28	S-28	AN-28	W-28	4 15/16	-.005	3 63/64	1 1/16	7 3/32	10.3
22230K	SNW-30	S-30	AN-30	W-30	5 3/16	-.005	4 15/64	1 1/8	7 11/16	13.5
22232K	SNW-32	S-32	AN-32	W-32	5 7/16	-.005	4 37/64	1 3/16	8 1/16	15.6
22234K	SNW-34	S-34	AN-34	W-34	5 15/16	-.005	4 27/32	1 7/32	8 21/32	19.4
22236K	SNW-36	S-36	AN-36	W-36	6 7/16	-.005	5 1/32	1 1/4	9 1/16	20.5
22238K	SNW-38	S-38	AN-38	W-38	6 15/16	-.005	5 17/64	1 9/32	9 15/32	23.4
22240K	SNW-40	S-40	AN-40	W-40	7 3/16	-.005	5 31/64	1 11/32	9 27/32	30.5
22244K	SNW-44	S-44	AN-44	W-44	7 15/16	-.005	5 29/32	1 3/8	11	33
FOR SERIES 230K										
23024K	SNW-3024	S-3024	N-024	W-024	4 3/16	-.005	2 61/64	13/16	5 11/16	6.1
23026K	SNW-3026	S-3026	N-026	W-026	4 7/16	-.005	3 15/64	7/8	6 1/8	7.5
23028K	SNW-3028	S-3028	N-028	W-028	4 15/16	-.005	3 11/32	15/16	6 1/2	8.4
23030K	SNW-3030	S-3030	N-030	W-030	5 3/16	-.005	3 31/64	31/32	7 1/8	9.8
23032K	SNW-3032	S-3032	N-032	W-032	5 7/16	-.005	3 23/32	1 1/32	7 1/2	11.8
23034K	SNW-3034	S-3034	N-034	W-034	5 15/16	-.005	4 1/64	1 1/16	7 7/8	13.3
23036K	SNW-3036	S-3036	N-036	W-036	6 7/16	-.005	4 11/32	1 3/32	8 1/4	15.2
23038K	SNW-3038	S-3038	N-038	W-038	6 15/16	-.005	4 13/32	1 1/8	8 11/16	16.7
23040K	SNW-3040	S-3040	N-040	W-040	7 3/16	-.005	4 3/4	1 3/16	9 7/16	19.7
23044K	SNW-3044	S-3044	N-044	W-044	7 15/16	-.005	5 1/8	1 1/4	10 1/4	24.4
23048K	SNP-3048	S-3048	N-048	P-048	8 15/16	-.006	5 7/16	1 11/32	11 7/16	32.2
23052K	SNP-3052	S-3052	N-052	P-052	9 7/16	-.006	6 1/64	1 13/32	12 3/16	41.1
23056K	SNP-3056	S-3056	N-056	P-056	10 7/16	-.007	6 3/16	1 1/2	13	45.4
23060K	SNP-3060	S-3060	N-060	P-060	10 15/16	-.007	6 47/64	1 9/16	14 3/16	58.9
23064K	SNP-3064	S-3064	N-064	P-064	11 15/16	-.007	6 61/64	1 21/32	15	65.7
23068K	SNP-3068	S-3068	N-068	P-068	12 7/16	-.008	7 35/64	1 25/32	15 3/4	77.8
23072K	SNP-3072	S-3072	N-072	P-072	13 7/16	-.008	7 37/64	1 25/32	16 1/2	86.2
23076K	SNP-3076	S-3076	N-076	P-076	13 15/16	-.008	7 3/4	1 57/64	17 3/4	94.3
23080K	SNP-3080	S-3080	N-080	P-080	15	-.008	8 13/32	2 1/16	18 1/2	105

SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

SNW/SNP – PULL TYPE SLEEVE, LOCKNUT, LOCKWASHER/LOCKPLATE ASSEMBLIES

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.
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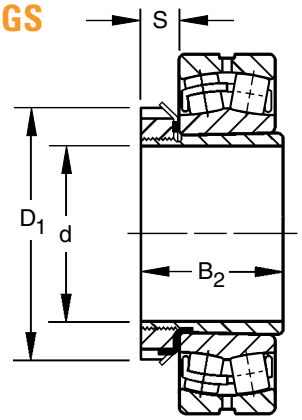
- SNP assembly consists of a sleeve, locknut and lockplate.



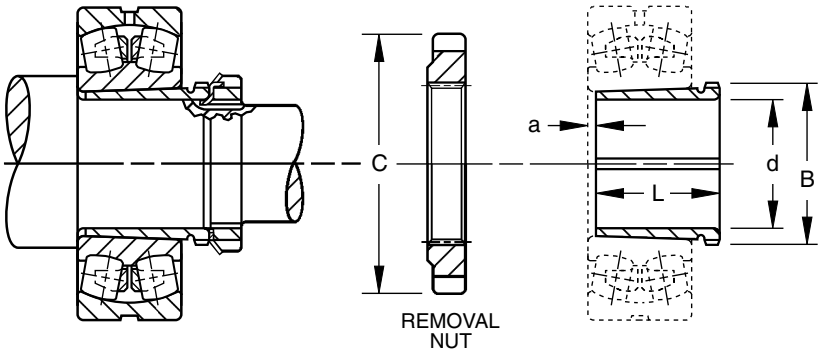
Tapered bore bearing plus SNW

Bearing Number		Accessory Numbers				Shaft Dimensions Inches		Adapter Dimensions Inches			SNW/SNP Assembly Weight
		Assembly	Sleeve	Locknut	Lockwasher / Lockplate	Diameter d	Tolerance +.000	B_2	S	D_1	
						in.		in.	in.	in.	lbs.
FOR SERIES 223K and 232K											
22308K		SNW-108	S-108	N-08	W-08	1 5/16	-.003	2 1/64	1/2	2 1/4	0.8
22309K		SNW-109	S-109	N-09	W-09	1 7/16	-.003	2 9/64	1/2	2 17/32	0.8
22310K		SNW-110	S-110	N-10	W-10	1 11/16	-.003	2 25/64	9/16	2 11/16	0.9
22311K		SNW-111	S-111	N-11	W-11	1 15/16	-.003	2 33/64	9/16	2 31/32	0.9
22312K		SNW-112	S-112	N-12	W-12	2 1/16	-.004	2 21/32	19/32	3 5/32	1.2
22313K		SNW-113	S-113	N-13	W-13	2 3/16	-.004	2 49/64	5/8	3 3/8	1.7
22314K		SNW-114	S-114	N-14	W-14	2 5/16	-.004	2 61/64	5/8	3 5/8	2.3
22315K		SNW-115	S-115	AN-15	W-15	2 7/16	-.004	3 5/64	43/64	3 7/8	3
22316K		SNW-116	S-116	AN-16	W-16	2 11/16	-.004	3 13/64	43/64	4 5/32	3.2
22317K		SNW-117	S-117	AN-17	W-17	2 15/16	-.004	3 5/16	45/64	4 13/32	3.5
22318K		SNW-118	S-118	AN-18	W-18	3 3/16	-.004	3 35/64	25/32	4 21/32	4
22319K		SNW-119	S-119	AN-19	W-19	3 5/16	-.004	3 45/64	13/16	4 15/16	5
22320K	23220K	SNW-120	S-120	AN-20	W-20	3 7/16	-.004	3 31/32	27/32	5 3/16	6.2
22322K	23222K	SNW-122	S-122	AN-22	W-22	3 15/16	-.004	4 11/32	29/32	5 23/32	6.5
22324K	23224K	SNW-124	S-124	AN-24	W-24	4 3/16	-.005	4 41/64	15/16	6 1/8	8
22326K	23226K	SNW-126	S-126	AN-26	W-26	4 7/16	-.005	4 63/64	1	6 3/4	12.4
22328K	23228K	SNW-128	S-128	AN-28	W-28	4 15/16	-.005	5 21/64	1 1/16	7 3/32	13
22330K	23230K	SNW-130	S-130	AN-30	W-30	5 3/16	-.005	5 5/8	1 1/8	7 11/16	17.6
22332K	23232K	SNW-132	S-132	AN-32	W-32	5 7/16	-.005	5 59/64	1 3/16	8 1/16	18.5
22334K	23234K	SNW-134	S-134	AN-34	W-34	5 15/16	-.005	6 3/16	1 7/32	8 21/32	21
22336K	23236K	SNW-136	S-136	AN-36	W-36	6 7/16	-.005	6 29/64	1 1/4	9 1/16	22.5
22338K	23238K	SNW-138	S-138	AN-38	W-38	6 15/16	-.005	6 3/4	1 9/32	9 15/32	28
22340K	23240K	SNW-140	S-140	AN-40	W-40	7 3/16	-.005	7 3/32	1 11/32	9 27/32	36
22344K	23244K	SNW-144	S-144	AN-44	W-44	7 15/16	-.005	7 9/32	1 3/8	11	47
22348K	23248K	SNP-148	S-148	N-048	P-48	8 15/16	-.006	8 7/64	1 11/32	11 7/16	38.3
22352K	23252K	SNP-152	S-152	N-052	P-52	9 7/16	-.006	8 49/64	1 13/32	12 13/16	53.4
22356K	23256K	SNP-3256	S-3256	N-056	P-56	10 7/16	-.007	8 15/16	1 1/2	13	61.3
FOR SERIES 231K											
23122K		SNW-3122	S-22	N-022	W-022	3 15/16	-.004	3 13/64	25/32	5 5/32	4.2
23124K		SNW-3124	S-24	N-024	W-024	4 3/16	-.005	3 15/32	13/16	5 11/16	5.8
23126K		SNW-3126	S-26	N-026	W-026	4 7/16	-.005	3 49/64	7/8	6 1/8	8.3
23128K		SNW-3128	S-28	N-028	W-028	4 15/16	-.005	3 63/64	15/16	6 1/2	8.8
23130K		SNW-3130	S-30	N-030	W-030	5 3/16	-.005	4 15/64	31/32	7 1/8	13.7
23132K		SNW-3132	S-32	N-032	W-032	5 7/16	-.005	4 37/64	1 1/32	7 1/2	13.3
23134K		SNW-3134	S-34	N-034	W-034	5 15/16	-.005	4 27/32	1 1/16	7 7/8	16.1
23136K		SNW-3136	S-36	N-036	W-036	6 7/16	-.005	5 1/32	1 3/32	8 1/4	17.1
23138K		SNW-3138	S-38	N-038	W-038	6 15/16	-.005	5 17/64	1 1/8	8 11/16	19.7
23140K		SNW-3140	S-40	N-040	W-040	7 3/16	-.005	5 31/64	1 3/16	9 7/16	28.4
23144K		SNW-3144	S-44	N-044	W-044	7 15/16	-.005	5 29/32	1 1/4	10 1/4	28.1
23148K		SNP-3148	S-48	N-048	P-48	8 15/16	-.006	6 41/64	1 11/32	11 7/16	36
23152K		SNP-3152	S-52	N-052	P-052	9 7/16	-.006	7 19/32	1 13/32	12 3/16	39
23156K		SNP-3156	S-3156	N-056	P-56	10 7/16	-.007	7 49/64	1 1/2	13	60
23160K		SNP-3160	S-3160	N-060	P-060	10 15/16	-.007	8 3/8	1 9/16	14 3/16	65
23164K		SNP-3164	S-3164	N-064	P-064	11 15/16	-.007	9 7/64	1 21/32	15	70

SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

PUSH TYPE REMOVABLE SLEEVE LOCKNUT AND LOCKWASHER

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.



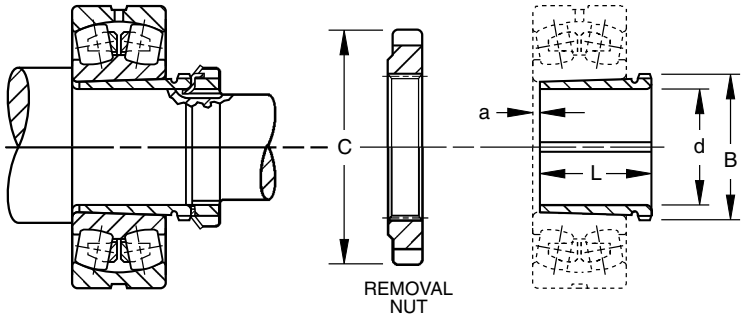
Tapered bore bearing mounted with push type removable sleeve

Bearing Number	Accessory Numbers				Shaft Dimensions		Sleeve Dimensions			C	Sleeve
	Sleeve	Locknut	Lockwasher Lockplate	Removal Nut	Diameter d	Tolerance +.000	B Pitch Dia.	L	a	Removal Nut O.D.	Weight
					mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.
SERIES 222K											
22216K	SK-8022	N-14	W-14	AN-18	70 2.7559	-.10 -.004	88.19 3.472	50 1.969	3.5 0.138	118.39 4.661	0.57 1.25
22217K	SK-8522	AN-15	W-15	AN-19	75 2.9528	-.10 -.004	93.35 3.675	52 2.047	3.5 0.138	125.55 4.943	0.65 1.44
22218K	SK-9022	AN-16	W-16	AN-20	80 3.1496	-.10 -.004	98.12 3.863	53 2.087	3.5 0.138	131.90 5.193	0.69 1.53
22219K	SK-9522	AN-17	W-17	AN-21	85 3.3465	-.10 -.004	103.28 4.066	57 2.244	4.0 0.157	138.25 5.443	0.82 1.81
22220K	SK-10022	AN-18	W-18	AN-22	90 3.5433	-.10 -.004	109.12 4.269	59 2.323	4.0 0.157	145.39 5.724	0.91 2.00
22222K	SK-11022	AN-20	W-20	ARN-22	100 3.9370	-.10 -.004	119.94 4.722	65 2.559	4.0 0.157	158.75 6.250	1.12 2.47
22224K	SK-12022	AN-22	W-22	ARN-24	110 4.3307	-.13 -.005	130.28 5.129	72 2.835	4.0 0.157	174.63 6.875	1.42 3.13
22226K	SK-13022	AN-22	W-22	ARN-26	115 4.5276	-.13 -.005	141.38 5.566	78 3.071	4.0 0.157	184.15 7.250	2.27 5.00
22228K	SK-14022	AN-24	W-24	RN-28	125 4.9213	-.13 -.005	152.73 6.013	82 3.228	5.0 0.197	200.03 7.875	2.67 5.88
22230K	SK-15022	AN-26	W-26	RN-30	135 5.3150	-.13 -.005	163.04 6.419	88 3.465	5.0 0.197	209.55 8.250	3.09 6.81
22232K	SK-16022	AN-28	W-28	RN-32	140 5.5118	-.13 -.005	173.76 6.841	96 3.780	5.0 0.197	225.43 8.875	4.51 9.94
22234K	SK-17022	AN-30	W-30	RN-34	150 5.9055	-.13 -.005	184.07 7.247	104 4.095	5.0 0.197	234.95 9.250	5.22 11.50
22236K	SK-18022	AN-32	W-32	RN-36	160 6.2992	-.13 -.005	194.79 7.669	104 4.095	5.0 0.197	247.65 9.750	5.67 12.50
22238K	SK-19022	AN-34	W-34	RN-38	170 6.6929	-.13 -.005	205.92 8.107	112 4.409	5.0 0.197	269.88 10.625	6.58 14.50
22240K	SK-20022	AN-36	W-36	N-44	180 7.0866	-.13 -.005	217.02 8.544	118 4.646	5.0 0.197	279.53 11.005	7.43 16.37
22244K	SK-22022	AN-40	W-40	N-048	200 7.8740	-.13 -.005	236.98 9.330	130 5.118	6.0 0.236	290.65 11.443	8.89 19.60
22248K	SK-24022	N-44	W-44	N-052	220 8.6614	-.15 -.006	256.03 10.080	144 5.669	6.0 0.236	309.70 12.193	11.02 24.30
22252K	SK-26022	N-048	P-48	N-056	240 9.4488	-.15 -.006	276.66 10.892	155 6.102	6.0 0.236	330.33 13.005	14.02 30.90
22256K	SK-28022	N-052	P-52	RN-56	260 10.2362	-.15 -.006	301.27 11.861	155 6.102	8.0 0.315	425.45 16.75	15.01 33.10
22260K	SK-30022	N-056	P-56	RN-60	280 11.0236	-.15 -.006	325.88 12.830	170 6.693	8.0 0.315	416.10 16.382	17.78 39.20
22264K	SK-32022	N-060	P-60	RN-64	300 11.8110	-.15 -.006	345.72 13.611	180 7.087	10.0 0.394	431.80 17.000	21.00 46.30

SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

PUSH TYPE REMOVABLE SLEEVE, LOCKNUT AND LOCKWASHER

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.



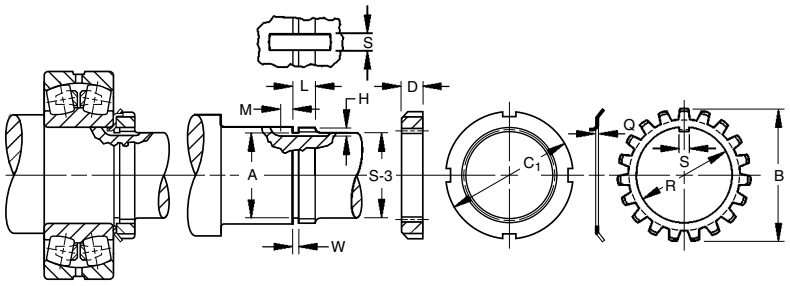
Tapered bore bearing mounted with push type removable sleeve

Bearing Number	Accessory Numbers				Dimensions Shaft		Sleeve Dimensions				Sleeve Weight
	Sleeve	Locknut	Lockwasher Lockplate	Removal Nut	Diameter d	Tolerance +.000	B Pitch Dia.	L	a	C Removal Nut O.D.	
					mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.
SERIES 223K											
22308K	SK-4023	N-07	W-07	N-09	35 1.3780	-.08 -.003	43.94 1.730	40 1.575	3.0 0.118	64.41 2.536	0.11 0.25
22309K	SK-4523	N-08	W-08	N-10	40 1.5748	-.08 -.003	49.02 1.930	44 1.732	3.0 0.118	68.40 2.693	0.14 0.31
22310K	SK-5023	N-09	W-09	RN-10	45 1.7717	-.08 -.003	55.04 2.167	50 1.969	3.0 0.118	76.20 3.000	0.21 0.47
22311K	SK-5523	N-10	W-10	RN-11	50 1.9685	-.08 -.003	60.20 2.370	54 2.126	3.0 0.118	81.76 3.219	0.25 0.56
22312K	SK-6023	N-11	W-11	RN-12	55 2.1654	-.10 -.004	65.76 2.589	57 2.244	3.5 0.138	87.33 3.438	0.31 0.69
22313K	SK-6523	N-12	W-12	AN-15	60 2.3622	-.10 -.004	73.10 2.878	61 2.402	3.5 0.138	98.55 3.880	0.38 0.84
22314K	SK-7023	N-12	W-12	AN-16	60 2.3622	-.10 -.004	78.28 3.082	65 2.559	3.5 0.138	105.69 4.161	0.69 1.53
22315K	SK-7523	N-13	W-13	AN-17	65 2.5591	-.10 -.004	83.44 3.285	69 2.717	3.5 0.138	112.04 4.411	0.81 1.78
22316K	SK-8023	N-14	W-14	AN-18	70 2.7559	-.10 -.004	88.19 3.472	72 2.835	3.5 0.138	118.39 4.661	0.91 2.00
22317K	SK-8523	AN-15	W-15	AN-19	75 2.9528	-.10 -.004	93.35 3.675	75 2.953	3.5 0.138	125.55 4.943	1.02 2.25
22318K	SK-9023	AN-16	W-16	AN-20	80 3.1496	-.10 -.004	98.12 3.863	80 3.150	3.5 0.138	131.90 5.193	1.16 2.56
22319K	SK-9523	AN-17	W-17	AN-21	85 3.3465	-.10 -.004	103.28 4.066	85 3.346	4.0 0.157	138.25 5.443	1.33 2.94
22320K	SK-10023	AN-18	W-18	AN-22	90 3.5433	-.10 -.004	109.12 4.269	90 3.543	4.0 0.157	145.39 5.724	1.53 3.38
22322K	SK-11023	AN-20	W-20	ARN-22	100 3.9370	-.10 -.004	119.94 4.722	98 3.858	4.0 0.157	158.75 6.250	1.93 4.25
22324K	SK-12023	AN-22	W-22	ARN-24	110 4.3307	-.13 -.005	130.28 5.129	105 4.134	4.0 0.157	174.63 6.875	2.27 5.00
22326K	SK-13023	AN-22	W-22	ARN-26	115 4.5276	-.13 -.005	141.38 5.566	115 4.528	4.0 0.157	184.15 7.250	3.63 8.00
22328K	SK-14023	AN-24	W-24	RN-28	125 4.9213	-.13 -.005	152.73 6.013	125 4.921	5.0 0.197	200.03 7.875	4.31 9.50
22330K	SK-15023	AN-26	W-26	RN-30	135 5.3150	-.13 -.005	163.04 6.419	135 5.315	5.0 0.197	209.55 8.250	5.18 11.43
22332K	SK-16023	AN-28	W-28	RN-32	140 5.5118	-.13 -.005	173.76 6.841	140 5.512	6.0 0.236	225.43 8.875	7.03 15.50
22334K	SK-17023	AN-30	W-30	RN-34	150 5.9055	-.13 -.005	184.07 7.247	146 5.748	6.0 0.236	234.95 9.250	7.82 17.25
22336K	SK-18023	AN-32	W-32	RN-36	160 6.2992	-.13 -.005	194.79 7.669	154 6.063	6.0 0.236	247.65 9.750	9.19 20.25
22338K	SK-19023	AN-34	W-34	RN-38	170 6.6929	-.13 -.005	205.92 8.107	160 6.299	7.0 0.276	269.88 10.625	10.03 22.12
22340K	SK-20023	AN-36	W-36	N-44	180 7.0866	-.13 -.005	217.02 8.544	170 6.693	7.0 0.276	279.53 11.005	11.45 25.25
22344K	SK-22023	AN-40	W-40	N-048	200 7.8740	-.13 -.005	236.98 9.330	181 7.126	8.0 0.315	290.65 11.443	13.38 29.50
22348K	SK-24023	N-44	W-44	N-052	220 8.6614	-.15 -.006	256.03 10.080	189 7.441	8.0 0.315	309.70 12.193	15.51 34.20
22352K	SK-26023	N-048	P-48	N-056	240 9.4488	-.15 -.006	276.66 10.892	200 7.874	8.0 0.315	330.33 13.005	18.26 40.25
22356K	SK-28023	N-052	P-52	RN-56	260 10.2362	-.15 -.006	301.27 11.861	210 8.268	10.0 0.394	425.45 16.75	22.00 48.50

SHAFT ADAPTER ACCESSORIES FOR CYLINDRICAL BORE BEARINGS

LOCKNUT AND LOCKWASHER

- The table below shows dimensions for locknuts and lockwashers used in the mounting of cylindrical bore bearings on shafts.
- Other dimensions and tolerances related to shaft configurations also are shown.
- Dimensions are presented according to bearing bore size and are applicable to bearings in the various series (e.g., 222, 223, etc.).



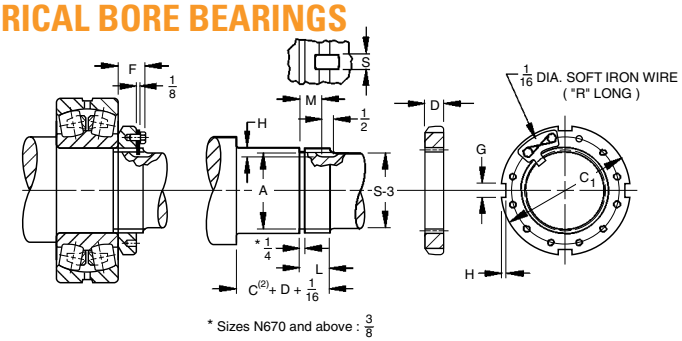
Bearing Bore	Locknut	Lockwasher	Thds. Per Inch	Threads						Shaft						Locknut		Lockwasher			
				Major Dia.		Pitch Dia.		Minor Dia.	Relief Dia.												
				Max.	Min.	Max.	Min.	A		S-3[1]	W +1/64 -0	L +1/64 -0	H +1/64 -0	S +1/64 -0	M +1/64 -0	C_1	D	Q	R	B	S
mm				mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
35	N 07	W 07	18	34.95	34.74	34.03	33.93	33.22	32.82	31.75	2.4	12.7	2.4	4.8	3.2	52.39	11.4	1.3	36.0	57.2	4.5
				1.376	1.3678	1.3399	1.3359	1.3078	1.2922	1 1/4	3/32	1/2	3/32	3/16	1/8	2 1/16	0.448	0.050	1.416	2 1/4	0.176
40	N 08	W 08	18	39.7	39.49	38.78	38.67	37.97	37.57	36.51	3.2	13.5	2.4	7.9	3.2	57.15	11.4	1.5	40.7	62.7	7.4
				1.563	1.5548	1.5269	1.5224	1.4948	1.4792	1 7/16	1/8	17/32	3/32	5/16	1/8	2 1/4	0.448	0.058	1.603	2 15/32	0.290
45	N 09	W 09	18	44.88	44.67	43.96	43.85	43.15	42.75	42.86	3.2	13.5	2.4	7.9	4.0	64.3	11.4	1.5	46.2	69.5	7.4
				1.767	1.7588	1.7309	1.7264	1.6988	1.6832	1 11/16	1/8	17/32	3/32	5/16	5/32	2 17/32	0.448	0.058	1.817	2 47/64	0.290
50	N 10	W 10	18	49.96	49.75	49.05	48.93	48.23	47.83	47.63	3.2	15.1	2.4	7.9	4.0	68.3	13.0	1.5	51.2	74.2	7.4
				1.967	1.9588	1.9309	1.9264	1.8988	1.8832	1 7/8	1/8	19/32	3/32	5/16	5/32	2 11/16	0.510	0.058	2.017	2 59/64	0.290
55	N 11	W 11	18	54.79	54.58	53.87	53.74	53.06	52.66	52.39	3.2	15.1	3.2	7.9	4.0	75.4	13.0	1.6	56.1	79.0	7.4
				2.157	2.1488	2.1209	2.1158	2.0888	2.0732	2 1/16	1/8	19/32	1/8	5/16	5/32	2 31/32	0.510	0.063	2.207	3 7/64	0.290
60	N 12	W 12	18	59.94	59.74	59.03	58.90	58.21	57.82	57.15	3.2	15.9	3.2	7.9	4.0	80.2	13.7	1.6	61.6	85.0	7.4
				2.360	2.3518	2.3239	2.3188	2.2918	2.2762	2 1/4	1/8	5/8	1/8	5/16	5/32	3 5/32	0.541	0.063	2.425	3 11/32	0.290
65	N 13	W 13	18	64.72	64.51	63.80	63.67	62.99	62.59	61.91	3.2	16.7	3.2	7.9	4.0	85.7	14.6	1.6	66.4	90.9	7.4
				2.548	2.5398	2.5119	2.5068	2.4798	2.4642	2 7/16	1/8	21/32	1/8	5/16	5/32	3 3/8	0.573	0.063	2.613	3 37/64	0.290
70	N 14	W 14	18	69.88	69.67	68.96	68.83	68.14	67.75	66.68	3.2	16.7	3.2	7.9	6.4	92.1	14.6	1.6	71.5	97.2	7.4
				2.751	2.7428	2.7149	2.7098	2.6828	2.6672	2 5/8	1/8	21/32	1/8	5/16	1/4	3 5/8	0.573	0.063	2.816	3 53/64	0.290
75	AN 15	W 15	12	74.50	74.21	73.12	72.99	71.90	71.11	71.44	4.0	17.5	3.2	7.9	6.4	98.4	15.3	1.6	76.3	104.4	7.4
				2.933	2.9218	2.8789	2.8735	2.8308	2.7995	2 13/16	5/32	11/16	1/8	5/16	1/4	3 7/8	0.604	0.072	3.003	4 7/64	0.290
80	AN 16	W 16	12	79.68	79.40	78.31	78.16	77.08	76.29	76.20	4.0	17.5	3.2	9.5	6.4	105.6	15.3	1.8	81.5	111.1	9.0
				3.137	3.1258	3.0829	3.0770	3.0348	3.0035	3	5/32	11/16	1/8	3/8	1/4	4 5/32	0.604	0.063	3.207	4 3/8	0.353
85	AN 17	W 17	12	84.84	84.55	83.46	83.31	82.24	81.45	80.96	4.0	16.7	3.2	9.5	6.4	111.9	16.1	1.8	87.0	117.5	9.0
				3.340	3.3288	3.2859	3.2800	3.2378	3.2065	3 3/16	5/32	21/32	1/8	3/8	1/4	4 13/32	0.635	0.072	3.425	4 5/8	0.353
90	AN 18	W 18	12	89.59	89.30	88.21	88.02	86.99	86.20	85.73	4.0	20.6	4.0	9.5	6.4	118.3	17.7	2.4	91.7	125.4	9.0
				3.527	3.5158	3.4729	3.4655	3.4248	3.3935	3 3/8	5/32	13/16	5/32	3/8	1/4	4 21/32	0.698	0.094	3.612	4 15/16	0.353
95	AN 19	W 19	12	94.74	94.46	93.37	93.18	92.15	91.35	90.49	4.0	21.4	4.0	9.5	6.4	125.4	18.5	2.4	97.3	132.6	9.0
				3.730	3.7188	3.6759	3.6685	3.6278	3.5965	3 9/16	5/32	27/32	5/32	3/8	1/4	4 15/16	0.729	0.094	3.830	5 7/32	0.353
100	AN 20	W 20	12	99.52	99.23	98.14	97.96	96.92	96.13	96.84	4.0	22.2	4.0	9.5	7.9	131.8	19.3	2.4	102.1	139.7	9.0
				3.918	3.9068	3.8639	3.8565	3.8158	3.7845	3 13/16	5/32	7/8	5/32	3/8	5/16	5 3/16	0.760	0.094	4.018	5 1/2	0.353
105	AN 21	W 21	12	104.70	104.41	103.32	103.11	102.10	101.31	100.01	4.0	22.2	4.0	9.5	7.9	138.1	19.3	2.4	107.2	144.9	9.0
				4.122	4.1108	4.0679	4.0596	4.0198	3.9885	3 15/16	5/32	7/8	5/32	3/8	5/16	5 7/16	0.760	0.094	4.222	5 45/64	0.353
110	AN 22	W 22	12	109.86	109.57	108.48	108.27	107.26	106.46	106.36	4.0	23.0	4.8	9.5	7.9	145.3	20.1	3.2	112.4	154.0	9.0
				4.325	4.3138	4.2709	4.2626	4.2228	4.1915	4 3/16	5/32	29/32	3/16	3/8	5/16	5 23/32	0.791	0.125	4.425	6 1/16	0.353
120	AN 24	W 24	12	119.79	119.50	118.41	118.20	117.19	116.40	115.89	4.0	23.8	4.8	9.5	7.9	155.6	20.9	3.2	122.7	164.3	9.0
				4.716	4.7048	4.6619	4.6536	4.6138	4.5825	4 9/16	5/32	15/16	3/16	3/8	5/16	6 1/8	0.823	0.125	4.831	6 15/32	0.353
130	AN 26	W 26	12	129.69	129.41	128.32	128.11	127.10	126.30	125.41	4.0	25.4	4.8	12.7	7.9	171.5	22.5	3.2	132.7	178.6	11.1
				5.106	5.0948	5.0519	5.0436	5.0038	4.9725	4 15/16	5/32	1	3/16	1/2	5/16	6 3/4	0.885	0.125	5.226	7 1/32	0.435
140	AN 28	W 28	12	139.62	139.34	138.25	138.04	137.03	136.23	134.94	4.0	27.0	4.8	15.9	7.9	180.2	24.1	3.2	142.7	188.9	15.0
				5.497	5.4858	5.4429	5.4346	5.3948	5.3635	5 5/16	5/32	1 1/16	3/16	5/8	5/16	7 3/32	0.948	0.125	5.617	7 7/16	0.590
150	AN 30	W 30	12	149.56	149.27	148.18	147.97	146.96	146.16	146.05	4.0	28.6	5.6	15.9	9.5	195.3	24.9	4.0	152.9	204.8	15.0
				5.888	5.8768	5.8339	5.8256	5.7858	5.7545	5 3/4	5/32	1 1/8	7/32	5/8	3/8	7 11/16	0.979	0.156	6.018	8 1/16	0.590
160	AN 32	W 32	8	159.61	159.23	157.55	157.32	155.72	154.92	153.99	6.4	30.2	6.0	15.9	9.5	204.8	26.4	4.0	163.2	214.3	15.0
				6.284	6.2688	6.2028	6.1937	6.1306	6.0993	6 1/16	1/4	1 3/16	15/64	5/8	3/8	8 1/16	1.041	0.156	6.424	8 7/16	0.590
170	AN 34	W 34	8	169.14	168.75	167.08	166.85	165.24	164.45	163.51	6.4	31.0	6.0	19.1	9.5	219.9	27.3	4.0	172.7	230.2	18.2
				6.659	6.6438	6.5778	6.5687	6.5056	6.4743	6 7/16	1/4	1 7/32	15/64	3/4	3/8	8 21/32	1.073	0.156	6.799	9 1/16	0.715
180	AN 36	W 36	8	179.48	179.09	177.41	177.18	175.58	174.79	174.63	6.4	31.8	6.0	19.1	9.5	230.2	28.0	4.0	183.0	239.7	18.2
				7.066	7.0508	6.9848	6.9757	6.9126	6.8813	6 7/8	1/4	1 1/4	15/64	3/4	3/8	9 1/16	1.104	0.156	7.206	9 7/16	0.715
190	AN 38	W 38	8	189.79	189.40	187.73	187.50	185.89	185.10	184.15	6.4	32.5	6.0	19.1	9.5	240.5	28.8	4.0	193.3	250.8	18.2
				7.472	7.4568	7.3908	7.3817	7.3186	7.2873	7 1/4	1/4	1 9/32	15/64	3/4	3/8	9 15/32	1.135	0.156	7.612	9 7/8	0.715
200	AN 40	W 40	8	199.31	198.93	197.25	196.96	195.42	194.62	193.68	6.4	34.1	6.0	22.2	9.5	250.0	30.4	4.0	203.6	261.9	21.3
				7.847	7.8318	7.7658	7.7544	7.6936	7.6623	7 5/8	1/4	1 11/32	15/64	7/8	3/8	9 27/32	1.198	0.156	8.017	10 5/16	0.840
220	N 44	W 44	8	219.15	218.77	217.09	216.78	215.25	214.46	211.14	6.4	34.9	9.5	27.0	9.5	279.4	31.8	3.2	221.1	290.5	23.9
				8.628	8.6128	8.5468	8.5347	8.4746	8.4433	8 5/16	1/4	1 3/8	3/8	1 1/16	3/8	11	1.250	0.125	8.703	11 7/16	0.940

[1] See page B383 for suggested S-3 shaft tolerances.

SHAFT ADAPTER ACCESSORIES FOR CYLINDRICAL BORE BEARINGS

LOCKNUT AND LOCKPLATE

- The table below shows dimensions for locknuts and lockwashers used in the mounting of cylindrical bore bearings on shafts.
- Other dimensions and tolerances related to shaft configurations also are shown.
- Dimensions are presented according to bearing bore size and are applicable to bearings in the various series (e.g., 222, 223, etc.).



* Sizes N670 and above : 3/8

Bearing Bore	Lock-nut	Lock-washer	Thds. Per Inch	Threads						Shaft					Locknut/Lockplate					
				Major Dia. Max.	Major Dia. Min.	Pitch Dia. Max.	Pitch Dia. Min.	Minor Dia.	Relief Dia. A	S-3[1]	L +1/64 -0	H +1/64 -0	S +1/64 -0	M +1/64 -0	C_1	D	G	H ±.010"	R	F
mm				mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
240	N 048	P 48	6	239.83 9.442	239.31 9.4218	237.08 9.3337	236.76 9.3213	234.63 9.2374	233.44 9.1905	233.36 9 3/16	42.86 1 11/16	11.1 7/16	28.6 1 1/8	34.9 1 3/8	290.5 11 7/16	34.1 1 11/32	22.48 0.885	9.5 3/8	203.2 8	43.26 1 45/64
260	N 052	P 52	6	258.88 10.192	258.36 10.1718	256.13 10.0837	255.8 10.0707	253.68 9.9874	252.49 9.9405	252.41 9 15/16	45.24 1 25/32	11.1 7/16	30.2 1 3/16	37.3 1 15/32	309.6 12 3/16	35.7 1 13/32	22.48 0.885	9.5 3/8	228.6 9	44.85 1 49/64
280	N 056	P 56	6	279.50 11.004	278.99 10.9838	276.75 10.8957	276.42 10.8827	274.31 10.7994	273.11 10.7525	273.05 10 3/4	47.63 1 7/8	11.1 7/16	31.8 1 1/4	39.7 1 9/16	330.2 13	38.1 1 1/2	25.65 1.010	9.5 3/8	228.6 9	47.23 1 55/64
300	N 060	P 60	6	299.34 11.785	298.83 11.7648	296.59 11.6767	296.26 11.6637	294.14 11.5804	292.95 11.5335	292.1 11 1/2	49.21 1 15/16	11.1 7/16	34.9 1 3/8	41.3 1 5/8	360.4 14 3/16	39.7 1 9/16	25.65 1.010	12.7 1/2	254.0 10	50.01 1 31/32
320	N 064	P 64	6	319.08 12.562	318.56 12.5418	316.32 12.4537	315.98 12.4402	313.88 12.3574	312.69 12.3105	312.74 12 5/16	51.59 2 1/32	11.1 7/16	36.5 1 7/16	43.7 1 23/32	381.0 15	42.1 1 21/32	25.65 1.010	12.7 1/2	254.0 10	52.39 2 1/16
340	N 068	P 68	5	337.90 13.303	337.49 13.287	335.36 13.203	334.95 13.187	332.31 13.083	331.11 13.036	331.79 13 1/16	56.36 2 7/32	11.1 7/16	38.1 1 1/2	48.4 1 29/32	400.1 15 3/4	45.2 1 25/32	25.65 1.010	12.7 1/2	279.4 11	55.56 2 3/16
360	N 072	P 72	5	359.00 14.134	358.60 14.118	356.46 14.034	356.06 14.018	353.42 13.914	352.22 13.867	350.84 13 13/16	56.36 2 7/32	12.7 1/2	38.1 1 1/2	48.4 1 29/32	419.1 16 1/2	45.2 1 25/32	32.00 1.260	12.7 1/2	279.4 11	55.56 2 3/16
380	N 076	P 76	5	378.99 14.921	378.59 14.905	376.45 14.821	376.05 14.805	373.41 14.701	372.21 14.654	371.48 14 5/8	59.53 2 11/32	12.7 1/2	38.1 1 1/2	51.59 2 1/32	450.9 17 3/4	48.4 1 29/32	32.00 1.260	15.1 19/32	304.8 12	61.12 2 13/32
400	N 080	P 80	5	399.01 15.709	398.60 15.693	396.47 15.609	396.06 15.593	393.42 15.489	392.23 15.442	390.53 15 3/8	63.50 2 1/2	12.7 1/2	41.3 1 5/8	55.6 2 3/16	469.9 18 1/2	52.4 2 1/16	32.00 1.260	15.1 19/32	330.2 13	65.09 2 9/16
420	N 084	P 84	5	419.00 16.496	418.59 16.480	416.46 16.396	416.05 16.380	413.41 16.276	412.22 16.229	411.16 16 3/16	63.50 2 1/2	12.7 1/2	41.3 1 5/8	55.6 2 3/16	490.5 19 5/16	52.4 2 1/16	35.18 1.385	15.1 19/32	330.2 13	65.09 2 9/16
440	N 088	P 88	5	438.99 17.283	438.58 17.267	436.45 17.183	436.05 17.167	433.40 17.063	432.21 17.016	431.80 17	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	520.7 20 1/2	60.3 2 3/8	35.18 1.385	15.1 19/32	355.6 14	75.41 2 31/32
460	N 092	P 92	5	459.00 18.071	458.60 18.055	456.46 17.971	456.06 17.955	453.42 17.851	452.22 17.804	450.85 17 3/4	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	539.8 21 1/4	60.3 2 3/8	35.18 1.385	15.1 19/32	406.4 16	75.41 2 31/32
480	N 096	P 96	5	478.99 18.858	478.59 18.842	476.45 18.758	476.05 18.742	473.41 18.638	472.21 18.591	469.9 18 1/2	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	560.4 22 1/16	60.3 2 3/8	38.35 1.510	15.1 19/32	406.4 16	75.41 2 31/32
500	N 500	P 500	5	499.01 19.646	498.60 19.630	496.47 19.546	496.06 19.530	493.42 19.426	492.23 19.379	489.0 19 1/4	79.4 3 1/8	12.7 1/2	46.0 1 13/16	71.4 2 13/16	579.4 22 13/16	68.3 2 11/16	38.35 1.510	15.1 19/32	406.4 16	83.3 3 9/32
530	N 530	P 530	4	529.01 20.827	528.50 20.807	525.83 20.702	525.32 20.682	522.15 20.557	520.55 20.494	517.5 20 3/8	79.4 3 1/8	12.7 1/2	46.0 1 13/16	71.4 2 13/16	630.2 24 13/16	68.3 2 11/16	41.53 1.635	20.6 13/16	425.5 16 3/4	83.3 3 9/32
560	N 560	P 560	4	559.00 22.008	558.50 21.988	555.83 21.883	555.32 21.863	552.15 21.738	550.55 21.675	549.3 21 5/8	85.7 3 3/8	12.7 1/2	46.0 1 13/16	77.8 3 1/16	649.3 25 9/16	71.4 2 15/16	41.53 1.635	20.6 13/16	476.3 18 3/4	89.7 3 17/32
600	N 600	P 600	4	599.01 23.583	598.50 23.563	595.83 23.458	595.33 23.438	592.15 23.313	590.55 23.250	587.4 23 1/8	85.7 3 3/8	12.7 1/2	46.0 1 13/16	77.8 3 1/16	700.1 27 9/16	74.6 2 15/16	41.53 1.635	20.6 13/16	508.0 20	89.7 3 17/32
630	N 630	P 630	4	629.01 24.764	628.50 24.744	625.83 24.639	625.32 24.619	622.15 24.494	520.55 24.431	619.1 24 3/8	85.7 3 3/8	12.7 1/2	50.8 2	77.8 3 1/16	730.3 28 3/4	74.6 2 15/16	47.88 1.885	20.6 13/16	520.7 20 1/2	92.1 3 5/8
670	N 670	P 670	4	669.01 26.339	668.50 26.319	665.84 26.214	665.33 26.194	662.15 26.069	660.55 26.006	657.2 25 7/8	90.5 3 9/16	12.7 1/2	50.8 2	82.6 3 1/4	779.5 30 11/16	79.4 3 1/8	47.88 1.885	20.6 13/16	546.1 21 1/2	96.8 3 13/16
710	N 710	P 710	3	709.02 27.914	708.33 27.887	704.77 27.747	704.09 27.720	700.02 27.56	698.42 27.497	695.3 27 3/8	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	830.3 32 11/16	90.5 3 9/16	51.30 2.020	25.4 1	571.5 22 1/2	108.0 4 1/4
750	N 750	P 750	3	749.02 29.489	748.34 29.462	744.78 29.322	744.09 29.295	740.03 29.135	738.43 29.072	736.6 29	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	870.0 34 1/4	90.5 3 9/16	57.66 2.270	25.4 1	584.2 23	108.0 4 1/4
800	N 800	P 800	3	799.01 31.457	798.32 31.430	794.77 31.290	794.08 31.263	790.02 31.103	788.42 31.040	787.4 31	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	920.8 36 1/4	90.5 3 9/16	57.66 2.270	25.4 1	616.0 24 1/4	108.0 4 1/4
850	N 850	P 850	3	849.02 33.426	848.34 33.399	844.78 33.259	844.09 33.232	840.03 33.072	838.43 33.009	835.0 32 7/8	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	979.5 38 9/16	90.5 3 9/16	64.01 2.520	25.4 1	647.7 25 1/2	108.0 4 1/4
900	N 900	P 900	3	899.01 35.394	898.32 35.367	894.77 35.227	894.08 35.200	890.02 35.040	888.42 34.977	885.8 34 7/8	111.1 4 3/8	15.9 5/8	50.8 2	103.2 4 1/16	1030.3 40 9/16	100.0 3 15/16	64.01 2.520	25.4 1	666.8 26 1/4	117.5 4 5/8
950	N 950	P 950	3	949.02 37.363	948.33 37.336	944.78 37.196	944.09 37.169	940.03 37.009	938.43 36.946	933.5 36 3/4	114.3 4 1/2	19.1 3/4	50.8 2	108 4 1/4	1092.2 43	100.0 3 15/16	64.01 2.520	25.4 1	692.2 27 1/4	117.5 4 5/8

(1) See page B395 for suggested S-3 shaft tolerances.

(2) C is outer ring width which may be obtained from bearing dimension tables.

MOUNTING PROCEDURES

Depending on the size of the bearing and the application, there are different methods for mounting roller bearings. In all methods, certain basic rules must be followed.

CLEANLINESS

- Choose a clean environment, free from dust or moisture.
- The installer should make every effort to ensure cleanliness by use of protective screens and clean cloths.

PLAN THE WORK

- Know in advance your plans and have the necessary tools at hand. This reduces the amount of time for the job and decreases the chance for dirt to get into the bearing.

INSPECTION AND PREPARATION

- All component parts of the machine should be on hand and thoroughly cleaned before proceeding.
- Housings should be cleaned, including blowing out the oil holes.
- Do not use air hose on bearings.
- If blind holes are used, insert a magnetic rod to remove metal chips that might be lodged there during fabrication.
- Shaft shoulders and spacer rings contacting the bearing should be square with the shaft axis.
- The shaft fillet must be small enough to clear the radius of the bearing.
- On original installations, all component parts should be checked against the detail specification prints for dimensional accuracy. Shaft and housing should be carefully checked for size and form (roundness, etc.).

SHAFT AND HOUSING FINISH

- Shaft surfaces on which the bearing will be mounted must be clean and free from nicks and burrs.
- For applications with stationary housing and rotating shaft, it is suggested that the bearing seat on the shaft be ground to 63 RMS (micro-inches) maximum.
- If it is impractical to use a ground finish, a machined finish of 125 RMS is acceptable in many cases, but the amount of interference fit should be slightly increased.
- For a stationary outer ring, which is required to float (e.g., slide axially in the housing), a housing finish of 63 RMS maximum is suggested.
- Where the outer ring is not required to float, a surface finish of 125 RMS maximum is generally satisfactory.

DO NOT REMOVE THE BEARING FROM ITS WRAPPING UNTIL YOU ARE READY TO MOUNT IT.

MOUNTING CYLINDRICAL BORE BEARINGS

HEAT EXPANSION METHOD

- Most applications require a tight interference fit on the shaft.
- Mounting is simplified by heating the bearing to expand it sufficiently to slide easily onto the shaft.
- Two methods of heating are commonly used:
  - Tank of heated oil.
  - Induction heating.
- The first is accomplished by heating the bearing in a tank of oil that has a high flash point.
- The oil temperature should not be allowed to exceed 121° C (250° F). A temperature of 93° C (200° F) is sufficient for most applications.
- The bearing should be heated for 20 or 30 minutes, until it is expanded sufficiently to slide onto the shaft easily.
- Induction heating method is used for mounting small bearings in production line assembly.
- Induction heating is rapid. Care must be taken to prevent bearing temperature from exceeding 93° C (200° F).
- Trial runs with the unit and bearing are usually necessary to obtain proper timing.
- Thermal crayons melted at predetermined temperatures can be used to check the bearing temperature.
- While bearing is hot, it should be positioned squarely against the shoulder.
- Lockwashers and locknuts or clamping plates are then installed to hold the bearing against he shoulder of the shaft.
- As the bearing cools, the locknut or clamping plate should be tightened.
- In cases of outer ring rotation, where the outer ring is a tight fit in the housing, the housing member can be expanded by heating.
- The oil bath is shown in Figure 1. The bearing should not be in direct contact with the heat source.
- The usual arrangement is to have a screen several inches from the bottom of the tank. Small support blocks separate the bearing from the screen.
- It is important to keep the bearing away from any localized high-heat source that may raise its temperature excessively, resulting in race hardness reduction.

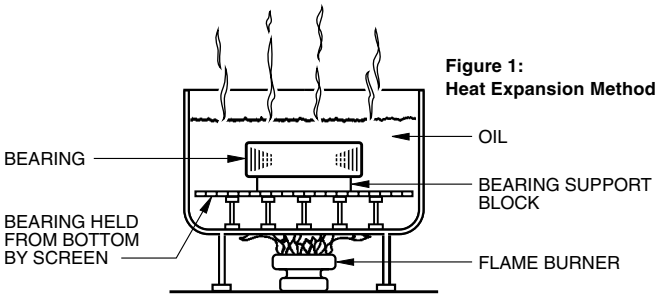


Figure 1: Heat Expansion Method

- Flame-type burners are commonly used. An automatic device for temperature control is desirable.
- If safety regulations prevent the use of an open heated oil bath, a mixture of 15 percent soluble-oil water may be used. This mixture may be heated to a maximum of 93° C (200° F) without being flammable.

ARBOR PRESS METHOD

- The alternate method of mounting, generally used only on smaller sizes, is to press the bearing onto the shaft or into the housing. This can be done by using an arbor press and a mounting tube as shown in Figure 2.
- The tube can be made from soft steel with an inside diameter slightly larger than the shaft.
- The O.D. of the tube should not exceed the maximum shoulder height given in the table of dimensions.
- The tube should be faced square at both ends. It should be thoroughly clean inside and out, and long enough to clear the end of the shaft after the bearing is mounted.

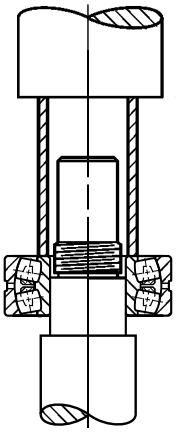
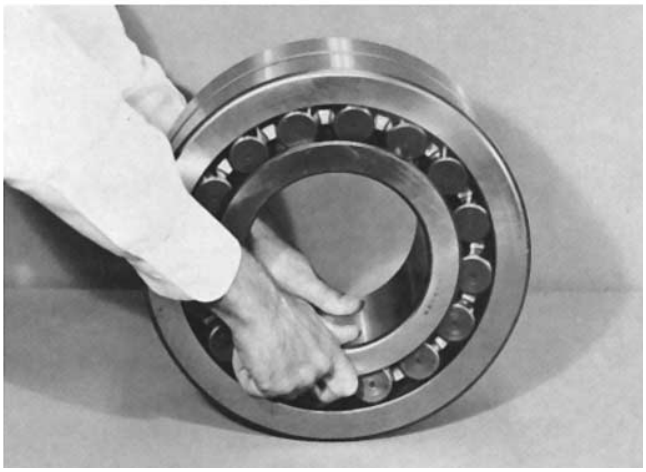


Figure 2:
Arbor Press Method

- If outer ring is being pressed into housing, the O.D. of the mounting tube should be slightly smaller than the housing bore. The I.D. should not be less than the suggested housing basking diameter in the tables of dimensions.
- Coat the shaft with a light machine oil to reduce the force needed for a press fit.
- Carefully place the bearing on the shaft, making sure it is square with the shaft axis.
- Apply steady pressure from the arbor ram to drive the bearing firmly against the shoulder.
- Never attempt a press fit on a shaft by applying pressure to the outer ring, or a press fit in a housing by applying pressure to the inner ring.

SHAFT MOUNTING TAPERED BORE SPHERICAL ROLLER BEARINGS

- Use a feeler gage with the thinnest blade of .0015 in.
- Place the bearing in an upright position with the inner and outer ring faces parallel.
- Place the thumbs on the inner ring bore and oscillate the inner ring two or three elements.
- Position the individual roller assemblies so that a roller is at the top of the inner ring on both sides of the bearing.
- With the roller in the correct position, insert a thin blade of the feeler gage between the roller and the outer ring.
- Move it carefully along the top roller, between the roller and outer ring raceway. Repeat this procedure, using thicker feeler gage blades, until one is found that will not go through.
- The blade thickness that preceded the “no-go” blade is a measure of RIC before installation.



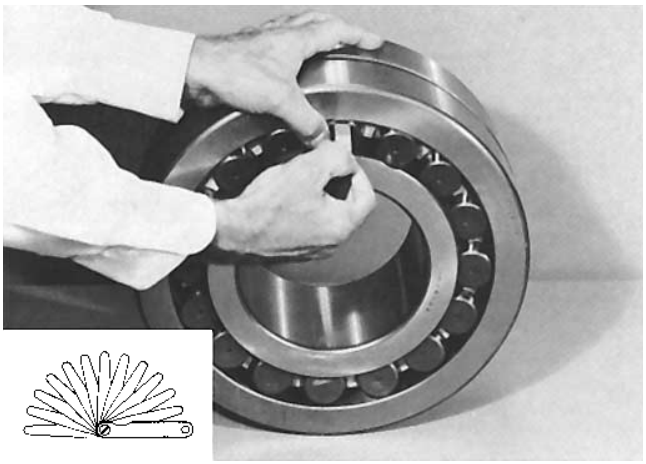
- Start the mounting procedure by lubricating the tapered shaft with a light coat of machine oil.
- Slide bearing onto the shaft as far as it will go.
- As the locknut is tightened, the interference fit builds up resulting in expansion of the inner ring.
- Periodically measure to keep track of the reduction in RIC.
- Continue the procedure until the proper amount of reduction is obtained. Do not exceed suggested amount of reduction.
- As a final check, make sure that the remaining RIC equals or exceeds the minimum mounted clearance shown in the table to the right.

MOUNTING TIMKEN® TAPERED BORE SPHERICAL ROLLER BEARINGS

Nominal bearing bore (mm)		Radial Internal Clearance prior to mounting (mm)						Suggested reduction of RIC (mm)		Axial displacement tapered shaft installation (mm)				Minimum permissible RIC after installation		
		Normal		C3		C4				1:12 Taper**		1:30 Taper**		Normal	C3	C4
over	incl.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.			
30	40	0.035	0.050	0.050	0.065	0.065	0.085	0.020	0.025	0.300	0.380	-	-	0.015	0.025	0.040
40	50	0.045	0.060	0.060	0.080	0.080	0.100	0.025	0.030	0.380	0.460	-	-	0.020	0.030	0.050
50	65	0.055	0.075	0.075	0.095	0.095	0.120	0.030	0.040	0.460	0.560	-	-	0.025	0.040	0.060
65	80	0.070	0.095	0.095	0.120	0.120	0.150	0.040	0.050	0.560	0.760	-	-	0.025	0.045	0.075
80	100	0.080	0.110	0.100	0.140	0.140	0.180	0.045	0.065	0.680	0.970	-	-	0.035	0.050	0.075
100	120	0.100	0.135	0.135	0.170	0.170	0.220	0.050	0.070	0.760	1.070	1.900	2.540	0.050	0.060	0.100
120	140	0.120	0.160	0.160	0.200	0.200	0.260	0.065	0.090	0.890	1.270	2.290	3.050	0.055	0.075	0.115
140	160	0.130	0.180	0.180	0.230	0.230	0.300	0.075	0.100	1.140	1.520	2.670	3.430	0.055	0.075	0.125
160	180	0.140	0.200	0.200	0.260	0.260	0.340	0.075	0.115	1.140	1.650	2.670	4.060	0.060	0.090	0.150
180	200	0.160	0.220	0.220	0.290	0.290	0.370	0.090	0.125	1.400	1.900	3.050	4.450	0.070	0.100	0.165
200	225	0.180	0.250	0.250	0.320	0.320	0.410	0.100	0.140	1.520	2.030	3.560	4.830	0.075	0.115	0.180
225	250	0.200	0.270	0.270	0.350	0.350	0.450	0.115	0.150	1.780	2.290	4.060	5.330	0.090	0.115	0.200
250	280	0.220	0.300	0.300	0.390	0.390	0.490	0.115	0.165	1.780	2.540	4.060	5.840	0.100	0.140	0.230
280	315	0.240	0.330	0.330	0.430	0.430	0.540	0.125	0.180	1.900	2.670	4.450	6.220	0.100	0.150	0.250
315	355	0.270	0.360	0.360	0.470	0.470	0.590	0.140	0.190	2.030	2.790	4.830	6.600	0.115	0.165	0.280
355	400	0.300	0.400	0.400	0.520	0.520	0.650	0.150	0.200	2.290	3.050	5.330	7.110	0.130	0.190	0.330
400	450	0.330	0.440	0.440	0.570	0.570	0.720	0.165	0.215	2.540	3.300	5.840	7.620	0.150	0.230	0.360
450	500	0.370	0.490	0.490	0.630	0.630	0.790	0.180	0.230	2.670	3.430	6.220	8.000	0.165	0.270	0.410
500	560	0.410	0.540	0.540	0.680	0.680	0.870	0.200	0.250	3.050	3.810	7.110	8.890	0.180	0.290	0.440
560	630	0.460	0.600	0.600	0.760	0.760	0.980	0.230	0.280	3.430	4.190	8.000	9.780	0.200	0.320	0.510
630	710	0.510	0.670	0.670	0.850	0.850	1.090	0.250	0.300	3.810	4.570	8.890	10.670	0.200	0.370	0.550
710	800	0.570	0.750	0.750	0.960	0.960	1.220	0.280	0.350	4.190	5.330	9.780	12.450	0.230	0.390	0.610
800	900	0.640	0.840	0.840	1.070	1.070	1.370	0.300	0.380	4.570	5.720	10.670	13.330	0.250	0.460	0.690
900	1000	0.710	0.930	0.930	1.190	1.190	1.520	.0350	0.430	5.334	6.480	12.450	15.110	0.280	0.490	0.750
1000	1120	0.770	1.030	1.030	1.300	1.300	1.670	0.400	0.480	6.100	7.240	14.220	16.890	0.280	0.550	0.810
1120	1250	0.830	1.120	1.120	1.420	1.420	1.830	0.430	0.500	6.480	7.620	15.110	17.780	0.330	0.610	0.910

* Axial displacement values apply to solid steel shafts or to hollow steel shafts with bore diameter less than half the shaft diameter. For shaft materials other than steel or for thin-wall shafts, please consult your Timken representative.

** 1:12 Taper used for 222, 223, 230, 231, 232, 233, 239 series. 1: 30 Taper used for 240, 241, 242 series. For sleeve mounting, multiply axial displacement values by 1.1 for 1:12 taper or by 1.05 for 1:30 taper. Questions on tapered shaft data, consult your Timken representative.



- During mounting, the RIC should be checked at the unloaded roller. If this is at the bottom, make sure that the roller is raised to seat firmly at the inboard position of the inner race.
- When the suggested amount of reduction of RIC has been accomplished, the bearing is properly fitted.
- Complete the procedure by peening the lockwasher tang into the locknut slot or securing the lockplate.

Example: Bearing 22328K C3 (140 mm bore with a C3 clearance pattern) is being mounted on a tapered shaft.

a. By measuring with feeler gage, initial RIC is established to be .007 in.

b. Reference to chart above indicates proper fit is obtained when RIC is reduced by.0025 in. to .0035 in., or approximately .003in.

Initial clearance	.007"
Reduction of RIC	**-.003"**
	.004"

c. Locknut is tightened until RIC reaches .004 in.. Final check against minimum RIC after mounting shows this value to be safe.

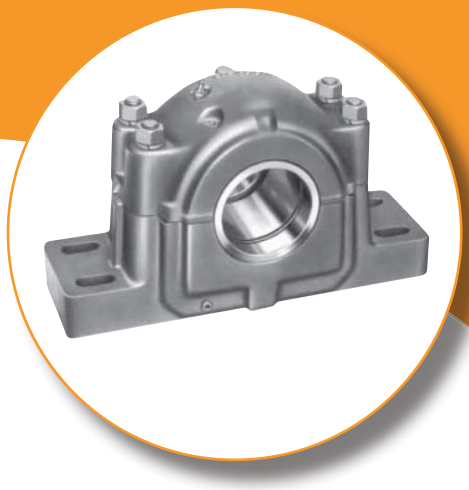
Note: Tapered bore bearings must have the proper amount of radial internal clearance before installation to provide for the required reduction of RIC during mounting and to compensate for any further internal reduction from abnormal temperature conditions. For special applications, send complete operating data to your Timken representative for suggestions on radial internal clearance.

NOTES

SPHERICAL ROLLER BEARING PILLOW BLOCKS

Overview: Spherical roller bearing pillow blocks combine rugged cast iron or steel housings with high-capacity bearings to meet the toughest demands of industry. Each pillow block contains an advanced-design spherical roller bearing with improved geometry and raceway finish for maximum load capacity and service life. Integrated housing and bearing features enhance unit lubrication characteristics. Multiple sealing options protect against contamination.

- **Sizes:** 35 mm - 300 mm shafts (1.37795 in. - 11.811 in.). Special shaft sizes up to 1000 mm (39.37 in.) and beyond.
- **Markets:** Conveyors, mining, rolling mills and pulp and paper mills.
- **Features:** Split construction for convenient assembly and disassembly. These units include pry tool slots and the exclusive Pry-Lug fulcrum, which simplify bearing inspection, service and replacement.
- **Benefits:** Caps can be removed easily and quickly without damage to the bearing or housing.



Pillow Blocks

SAF two- or four-bolt pillow block, cast iron
SDAF four-bolt heavy duty type pillow block, cast iron
SAFS two- or four-bolt pillow block, cast steel
FSAF four-bolt pillow block, cast iron (only when an option)
FSAFS four-bolt pillow block, cast steel (only when an option)
SDAFS four-bolt heavy-duty pillow block, cast steel

To indicate shaft size and used only for pillow block units of $8\,^{7}/_{16}$ in. shaft size or larger.

SDAF **23152** **K** – **9½** **FXOP**

Number indicates basic spherical bearing series. See product data charts for spherical bearing number.

K indicated on adapter type mounting arrangement (for 230, 231, 232 Series, SDAF231K and SDAF232K Series)
DV DUSTAC seals - both sides
DC DUSTAC seals - one side

Indicate construction:
FXOP fixed open
FXCL fixed closed
FLOP float open
FLCL float closed

Spherical Roller Bearing Pillow Blocks

INTRODUCTION

Timken capabilities in the engineering and manufacture of heavy-duty pillow blocks provide important benefits to users.

Another very important benefit is Timken's worldwide sales organization, staffed with experienced bearing engineers who are available for consultation on any pillow block or bearing application. Expert engineering assistance is available for applications involving shaft sizes 40 inches and larger such as BOF trunnions, bridge blocks and ball mills. If your design calls for shaft sizes or loads not listed in this catalog, contact your Timken representative for information about availability of special units.

DESIGN AND CONSTRUCTION

Timken supplies pillow blocks equipped with either tapered bore bearings plus adapters for mounting on straight shafts or cylindrical bore bearings for assembly on shouldered shafts.

Timken spherical roller bearing pillow blocks are made of split construction for convenient assembly and disassembly. These units include pry tool slots and the exclusive Pry-Lug fulcrum that simplify bearing inspection, service, and replacement. Caps can be removed easily and quickly without damage to the bearing or housing.

Precision fit is assured by the Timken system of doweling caps and bases together at an early stage of manufacturing so that they remain a single unit during machining. They are not interchangeable as separate parts and become precisely mated components.

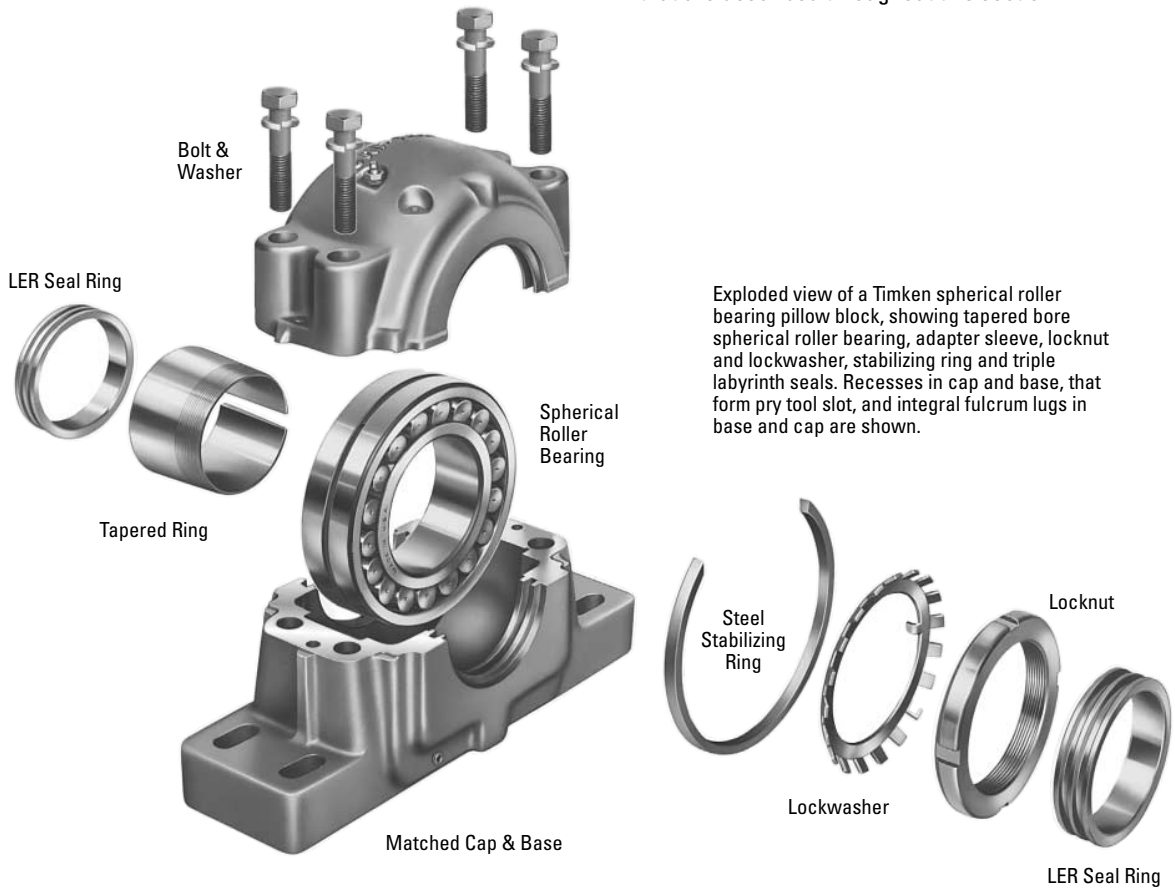
Timken manufactures pillow blocks in two styles: SAF and SDAF. The larger SDAF block is suggested for extreme duty applications.

Caps and bases are made from high-grade stress-relieved cast iron as standard. They also are available in cast steel.

All Timken pillow blocks are designed for four-bolt mounting. Certain smaller sizes are normally furnished for two-bolt mounting. These assemblies are indicated in the tables and can be ordered with optional four-bolt base.

Four cap bolts are used in most Timken pillow blocks in order to equalize the pressure between cap and base, preventing loss of lubricant.

The illustration below shows all parts of a pillow block assembly that are described throughout this section.



Exploded view of a Timken spherical roller bearing pillow block, showing tapered bore spherical roller bearing, adapter sleeve, locknut and lockwasher, stabilizing ring and triple labyrinth seals. Recesses in cap and base, that form pry tool slot, and integral fulcrum lugs in base and cap are shown.

MOUNTING

ADAPTER VS. STRAIGHT BORE

Usually a spherical roller bearing pillow block assembly is mounted on a straight shaft using a tapered bore bearing and adapter assembly. Standard commercial shafting can be used without additional machining. (Suggested shaft diameters are shown on page B395). Adapter mount also permits maximum flexibility in the axial positioning of the bearing on the shaft and will accommodate light locational thrust loads. Timken pillow blocks for tapered bore and adapter mounted bearings are available in Series 225, 226, 230, 231K and 232K.

Adapter mounted spherical roller bearings require the correct removal of diametral clearance from the bearing to prevent relative rotation between inner race and sleeve or shaft. Failure to employ proper mounting procedures can cause heating and reduced bearing performance. For proper shaft mounting of adapter type spherical roller bearings, see B380 of the spherical roller bearing section.

When application conditions produce heavy thrust loads, or a need exists for exact axial location or a positive shaft interference fit, a direct straight bore mounting may be the best option. This requires a shouldered shaft, machined for proper fit, and a straight bore bearing. Timken pillow block assemblies for straight bore applications are available in Series 222, 223, 231 and 232.

Suggested fits for shafts in cylindrical bore spherical roller bearings are shown in the engineering section. For applications involving heavy shock, vibration, unbalanced rotating loads or other abnormal conditions, consult your Timken representative.

FIXED AND FLOAT PILLOW BLOCKS

Any style of Timken pillow blocks can be easily installed either at the float or fixed position on the shaft. For the fixed position, a stabilizing ring is added between the bearing outer face ring and the housing shoulder to positively locate the shaft and prevent axial movement.

Some applications require centering of the bearing in its housing. To accomplish this, two special width stabilizing rings can be ordered.

In the float position, the ring is not used, allowing the bearing to move axially (a maximum of $^{3}/_{8}$ in.) to compensate for thermal expansion or contraction of the shaft.

Pillow blocks ordered by the numbers in the dimension tables are fixed units. To order float units, specify by adding suffix “Float” or “FL” to the pillow block number.

CLOSED END INSTALLATIONS

In some applications, the shaft end is designed to terminate inside the pillow block. For this design, positive fitting end-closure inserts are available to seal out contaminants and retain lubricant. Timken heavy-duty end plugs include O-rings for positive sealing.

Designers and installers need to make sure the shaft end does not contact the closure. A minimum of $^{1}/_{8}$ in. clearance at maximum thermal expansion is suggested between the end of the shaft and the closure. Dimension “Y” in the tables defines the maximum permissible length of shaft from centerline of the pillow block housing. If end closure is desired, specify by adding “CL” (one end closed) to the pillow block assembly number.

LUBRICATION

Timken pillow block housings have been designed for grease and oil bath lubrication. They also can be modified easily to accommodate circulating oil or oil/air mist systems. Grease fittings or sight gages are available upon request.

A lubrication groove and oil holes are provided in the bearing outer ring. This feature, designated by adding suffix “W33” to the bearing number, should be specified whenever re-ordering bearings for pillow blocks. In most cases, the fresh lubricant is fed directly to the center of the bearing between the rows of rollers and distributed to the rest of the bearing. This assures the used lubricant is purged from the bearing.

SEALS

Precision triple ring labyrinth seals are supplied with all Timken pillow blocks to exclude foreign matter and retain lubricants. The pillow block base includes extra large oil return holes at the bottom of the seal grooves to prevent leakage past the seals.

For extremely contaminated or abrasive environments, Timken has developed the exclusive DUSTAC™ seal. This patented seal offers protection against concentrations of dust or abrasive material that a labyrinth seal cannot keep out. See page B398 for further information on DUSTAC.

LOAD RATINGS AND LIFE

Load ratings for the spherical roller bearings that are used in pillow blocks are found in the dimension tables on pages B356 through B372.

Life calculation formulas are found in the engineering section.

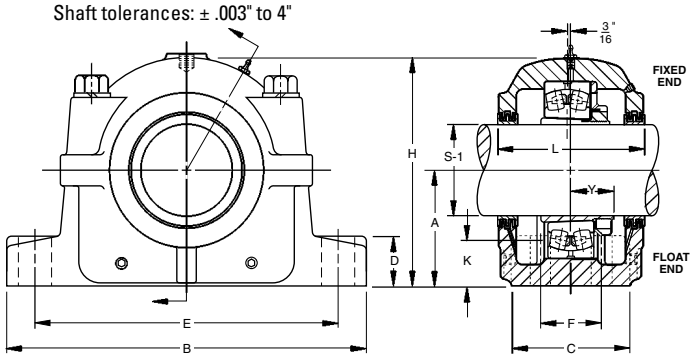
In addition to individual bearing selection, the ability of the pillow block to carry the operating load should be considered.

It should be noted that the load rating figures supplied in this catalog are applicable only when the load direction is generally toward the base of the pillow block. If the pillow block must be mounted so that the load could be applied in any other direction, consult your Timken representative.

TAPERED BORE MOUNTING
SAF225 AND SAF226 SERIES

- The basic number for ordering complete pillow block assemblies is listed in the table below.
- Each assembly includes the housing cap and base, cap bolts, bearing, bearing adapter, locknut and washer, stabilizing ring, and triple ring seals.
- If only the pillow block housing is desired, use the numbers listed in column headed "Housing Only". These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks as described on this page constitute a fixed unit. To order float units, specify part number plus suffix "Float" or "FL".

Shaft tolerances: ± .003" to 4"



- Assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SAFS 22515).
- Four-bolt bases are standard on all assemblies except as noted.

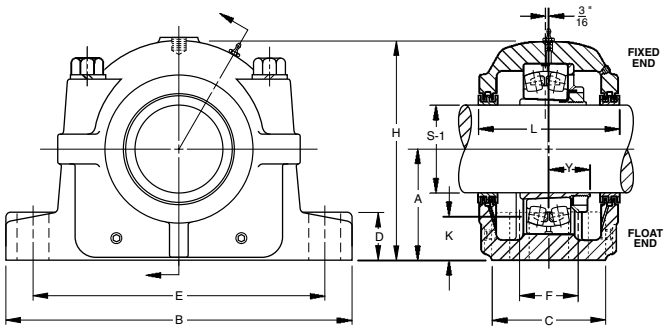
Pillow Block Assembly	Standard Shaft[1] Diam S-1	A	B	C	D	E (Max.)	E (Min.)	F	H	K Oil Level	L	Y	Base Bolts Required No.	Base Bolts Required Size	Bearing Number	Adapter[4] Assembly Number	Housing[2] Only	Stabilizing[3] Ring 1 Req'd	Triple Seal 2 Req'd	Ass'y Wt.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.		in.						lbs.
SERIES SAF225																				
SAF22509	1 7/16	2 1/4	8 1/4	2 3/8	13/16	7	6 1/4	—	4 3/8	31/32	3 5/8	1 3/32	2	1/2	22209K	SNW-9	SAF509	SR-9-9	LER 17	12
SAF22510	1 11/16	2 1/2	8 1/4	2 3/8	15/16	7	6 1/2	—	4 3/4	1 3/32	3 5/8	1 5/32	2	1/2	22210K	SNW-10	SAF510	SR-10-0	LER 20	13
SAF22511	1 15/16	2 3/4	9 5/8	2 3/4	15/16	7 7/8	7 3/8	—	5 11/32	1 3/16	3 3/4	1 3/16	2	1/2	22211K	SNW-11	SAF 511	SR-11-0	LER-24	16
SAF22513	2 3/16	3	11	3 1/8	1	9 1/2	8 1/8	—	5 25/32	1 1/8	4 5/16	1 7/32	2	1/2	22213K	SNW-13	SAF 513	SR-13-0	LER-29	19.5
SAF22515	2 7/16	3 1/4	11 1/4	3 1/8	1 1/8	9 5/8	8 5/8	—	6 3/8	1 1/4	4 3/4	1 9/32	2	5/8	22215K	SNW-15	SAF515	SR-15-0	LER37	30
FSAF22515	2 7/16	3 1/4	11 1/4	3 1/8	1 1/8	9 5/8	8 5/8	1 7/8	6 3/8	1 1/4	4 3/4	1 9/32	4	1/2	22215K	SNW-15	FSAF515	SR-15-0	LER37	30
SAF22516	2 11/16	3 1/2	13	3 1/2	1 3/16	11	9 5/8	—	6 7/8	1 11/32	4 7/8	1 21/64	2	3/4	22216K	SNW-16	SAF516	SR-16-13	LER44	37
FSAF22516	2 11/16	3 1/2	13	3 1/2	1 3/16	11	9 5/8	2 1/8	6 7/8	1 11/32	4 7/8	1 21/64	4	5/8	22216K	SNW-16	FSAF516	SR-16-13	LER44	37
SAF22517	2 15/16	3 3/4	13	3 1/2	1 1/4	11	9 7/8	—	7 1/4	1 7/16	4 15/16	1 27/64	2	3/4	22217K	SNW-17	SAF517	SR-17-14	LER53	40
FSAF22517	2 15/16	3 3/4	13	3 1/2	1 1/4	11	9 7/8	2 1/8	7 1/4	1 7/16	4 15/16	1 27/64	4	5/8	22217K	SNW-17	FSAF517	SR-17-14	LER53	40
SAF22518	3 3/16	4	13 3/4	3 7/8	1 1/2	11 5/8	10 3/8	—	7 3/4	1 17/32	6 1/4	1 37/64	2	3/4	22218K	SNW-18	SAF518	SR-18-15	LER69	49
FSAF22518	3 3/16	4	13 3/4	3 7/8	1 1/2	11 5/8	10 3/8	2 1/8	7 3/4	1 17/32	6 1/4	1 37/64	4	5/8	22218K	SNW-18	FSAF518	SR-18-15	LER69	49
SAF22520	3 7/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	—	8 11/16	1 3/4	6	1 49/64	2	7/8	22220K	SNW-20	SAF520	SR-20-17	LER102	65
FSAF22520	3 7/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 3/4	6	1 49/64	4	3/4	22220K	SNW-20	FSAF520	SR-20-17	LER102	65
SAF22522	3 15/16	4 15/16	16 1/2	4 3/4	2	14 1/2	12 5/8	2 3/4	9 9/16	1 7/8	6 3/8	1 61/64	4	3/4	22222K	SNW-22	SAF522	SR-22-19	LER109	81
SAF22524	4 3/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	1 15/16	7 3/8	2 3/32	4	3/4	22224K	SNW-24	SAF524	SR-24-20	LER113	94
SAF22526	4 7/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 7/16	8	2 17/64	4	7/8	22226K	SNW-26	SAF526	SR-26-0	LER117	137
SAF22528	4 15/16	6	20 1/8	5 7/8	2 3/8	17 1/8	16	3 3/8	11 3/4	2 1/8	7 3/4	2 13/32	4	1	22228K	SNW-28	SAF528	SR-28-0	LER122	159
SAF22530	5 3/16	6 5/16	21 1/4	6 1/4	2 1/2	18 1/4	17	3 3/4	12 1/2	2 3/16	8 3/8	2 37/64	4	1	22230K	SNW-30	SAF530	SR-30-0	LER125	189
SAF22532	5 7/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	2 3/16	8 3/4	2 49/64	4	1	22232K	SNW-32	SAF532	SR-32-0	LER130	225
SAF22534	5 15/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 5/16	9 3/8	2 59/64	4	1	22234K	SNW-34	SAF534	SR-34-0	LER140	300
SAF22536	6 7/16	7 1/2	26 3/4	7 1/8	3	23 5/8	20 7/8	4 5/8	15 1/2	2 9/16	9 11/16	2 61/64	4	1	22236K	SNW-36	SAF536	SR-36-30	LER148	330
SAF22538	6 15/16	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 5/8	10 3/4	3 7/64	4	1 1/4	22238K	SNW-38	SAF538	SR-38-32	LER155	375
SAF22540	7 3/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 11/16	10 13/16	3 9/32	4	1 1/4	22240K	SNW-40	SAF540	SR-40-34	LER159	445
SAF22544	7 15/16	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 5/8	3 3/8	11 1/2	3 17/32	4	1 1/2	22244K	SNW-44	SAF544	SR-44-38	LER167	615
SERIES SAF226																				
SAF22615	2 7/16	4	13 3/4	3 7/8	1 5/8	11 5/8	10 3/8	2 1/8	7 9/16	1 19/32	5 7/8	1 7/8	2,4	3/4, 5/8	22315K	SNW-115	SAF 615	SR-18-15	LOR 37	52
SAF22616	2 11/16	4 1/4	14 1/4	3 7/8	1 3/4	12 5/8	10 5/8	2 1/8	8 1/4	1 11/16	6 1/2	1 15/16	2,4	3/4, 5/8	22316K	SNW-116	SAF 616	SR-19-16	LOR 44	71
SAF22617	2 15/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	—	8 11/16	1 13/16	6 5/8	1 57/64	2	7/8	22317K	SNW-117	SAF617	SR-20-17	LER184	81
FSAF22617	2 15/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 13/16	6 5/8	1 57/64	4	3/4	22317K	SNW-117	FSAF617	SR-20-17	LER184	81
SAF22618	3 3/16	4 3/4	15 1/2	4 3/8	2	13 1/2	12	2 1/4	9 3/16	2	7	2 3/64	4	3/4	22318K	SNW-118	SAF618	SR-21-18	LER188	90
SAF22620	3 7/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	2 1/8	7 3/8	2 19/64	4	3/4	22320K	SNW-120	SAF620	SR-24-20	LER102	113
SAF22622	3 15/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 1/2	8	2 31/64	4	7/8	22322K	SNW-122	SAF622	SR-0-22	LER109	151
SAF22624	4 3/16	6 5/16	21 1/4	6 1/4	2 1/2	18 1/4	17	3 3/4	12 1/2	2 9/16	8 3/8	2 41/64	4	1	22324K	SNW-124	SAF624	SR-0-24	LER113	201
SAF22626	4 7/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	2 5/8	8 3/4	2 27/32	4	1	22326K	SNW-126	SAF626	SR-0-26	LER117	245
SAF22628	4 15/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 11/16	9 3/8	3 5/64	4	1	22328K	SNW-128	SAF628	SR-0-28	LER122	310
SAF22630	5 3/16	7 1/2	26 3/4	7 1/8	3	23 5/8	20 7/8	4 5/8	15 1/2	2 7/8	9 11/16	3 17/64	4	1	22330K	SNW-130	SAF630	SR-36-30	LER125	350
SAF22632	5 7/16	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 15/16	10 3/4	3 7/16	4	1 1/4	22332K	SNW-132	SAF632	SR-38-32	LER130	420
SAF22634	5 15/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	3 1/16	10 13/16	3 19/32	4	1 1/4	22334K	SNW-134	SAF634	SR-40-34	LER140	485
SAF22636	6 7/16	8 7/8	31 1/4	8 1/4	3 1/2	26 5/8	24	5 1/4	18 1/2	3 3/8	11 1/4	3 47/64	4	1 1/4	22336K	SNW-136	SAF636	SR-0-36	LER148	545
SAF22638	6 15/16	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 5/8	3 11/16	11 1/2	3 57/64	4	1 1/2	22338K	SNW-138	SAF638	SR-44-38	LER155	655
SAF22640	7 3/16	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	3 3/4	12 1/4	4 5/64	4	1 1/2	22340K	SNW-140	SAF640	SR-0-40	LER159	725

[1] See page B395 for suggested shaft diameter S-1 tolerances.
[2] "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.
[3] Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.
[4] Includes sleeve, locknut and lockwasher. Add shaft size to order.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

TAPERED BORE MOUNTING
SDAF225 AND SDAF226 SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, bearing adapter, locknut and washer, stabilizing ring and triple ring seals.
- To order pillow block housing only, use the number listed in the "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks as described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- Assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SAFS 22515).



Pillow Block Assembly	Standard Shaft(1) Diam. S-1	A	B	C	D	E (Max.)	E (Min.)	F	H	K Oil Level	L	Y	Base Bolts Required No.	Base Bolts Required Size	Bearing Number	Adapter(4) Assembly Number	Housing(2) Only	Stabilizing(3) Ring 1 Req'd	Triple Seal 2 Req'd	Ass'y Wt.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.		in.						lbs.
SERIES SDAF225																				
SDAF22520	3 7/16	4 1/2	15 1/4	6	1 7/8	13 1/8	11 5/8	3 3/8	8 15/16	1 3/4	6 3/4	1 49/64	4	3/4	22220K	SNW-20	SDAF520	SR-20-17	LER75	81
SDAF22522	3 15/16	4 15/16	16 1/2	6 3/4	2 1/8	14 1/2	12 5/8	4	9 7/8	1 7/8	7 1/4	1 61/64	4	7/8	22222K	SNW-22	SDAF522	SR-22-19	LER93	94
SDAF22524	4 3/16	5 1/4	16 1/2	6 7/8	2 1/4	14 1/2	13 1/4	4 1/8	10 1/2	1 15/16	7 3/8	2 3/32	4	7/8	22224K	SNW-24	SDAF524	SR-24-20	LER113	137
SDAF22526	4 7/16	6	18 3/8	7 1/2	2 3/8	16	14 5/8	4 1/2	11 7/8	2 7/16	8	2 17/64	4	1	22226K	SNW-26	SDAF526	SR-26-0	LER117	159
SDAF22528	4 15/16	6	20 1/8	7 1/2	2 3/8	17 1/8	16	4 1/2	12 1/16	2 1/8	7 13/16	2 13/32	4	1 1/8	22228K	SNW-28	SDAF528	SR-28-0	LER122	189
SDAF22530	5 3/16	6 5/16	21 1/4	7 7/8	2 1/2	18 1/4	17	4 3/4	12 13/16	2 3/16	8 3/8	2 37/64	4	1 1/8	22230K	SNW-30	SDAF530	SR-30-0	LER125	225
SDAF22532	5 7/16	6 11/16	22	8 1/4	2 1/2	19 1/4	17 3/8	5	13 11/16	2 3/16	8 3/4	2 49/64	4	1 1/8	22232K	SNW-32	SDAF532	SR-32-0	LER130	300
SDAF22534	5 15/16	7 1/16	24 3/4	9	2 1/2	21 5/8	19 3/8	5 1/2	14 1/4	2 5/16	9 5/8	2 59/64	4	1 1/4	22234K	SNW-34	SDAF534	SR-34-0	LER140	310
SDAF22536	6 7/16	7 1/2	26 3/4	9 3/8	2 3/4	23 5/8	20 7/8	5 7/8	15 3/16	2 9/16	10	2 61/64	4	1 1/4	22236K	SNW-36	SDAF536	SR-36-30	LER148	350
SDAF22538	6 15/16	7 7/8	27 5/8	10	3	23 1/2	21 1/2	6 1/4	16 1/4	2 5/8	10 5/8	3 7/64	4	1 3/8	22238K	SNW-38	SDAF538	SR-38-32	LER224	420
SDAF22540	7 3/16	8 1/4	28 3/4	10 1/2	3 1/4	25	23	6 3/4	17 1/8	2 11/16	11 1/8	3 9/32	4	1 3/8	22240K	SNW-40	SDAF540	SR-40-34	LER228	545
SDAF22544	7 15/16	9 1/2	32	11 1/4	3 1/2	27 7/8	25 5/8	7 1/4	19 1/4	3 3/8	11 7/8	3 17/32	4	1 1/2	22244K	SNW-44	SDAF544	SR-44-36	LER236	665
SERIES SDAF226																				
SDAF22617	2 15/16	4 1/2	15 1/4	6	1 7/8	13 1/8	11 5/8	3 3/8	8 15/16	1 13/16	6 3/4	1 57/64	4	3/4	22317K	SNW-117	SDAF617	SR-20-17	LER59	94
SDAF22618	3 3/16	4 3/4	15 1/2	6 1/8	2	13 1/2	12	3 5/8	9 7/16	2	6 7/8	2 3/64	4	3/4	22318K	SNW-118	SDAF618	SR-21-18	LER69	137
SDAF22620	3 7/16	5 1/4	16 1/2	6 7/8	2 1/4	14 1/2	13 1/4	4 1/8	10 1/2	2 1/8	7 3/8	2 19/64	4	7/8	22320K	SNW-120	SDAF620	SR-24-20	LER75	159
SDAF22622	3 15/16	6	18 3/8	7 1/2	2 3/8	16	14 5/8	4 1/2	11 7/8	2 1/2	8	2 31/64	4	1	22322K	SNW-122	SDAF622	SR-0-22	LER93	189
SDAF22624	4 3/16	6 5/16	21 1/4	7 7/8	2 1/2	18 1/4	17	4 3/4	12 13/16	2 9/16	8 3/8	2 41/64	4	1 1/8	22324K	SNW-124	SDAF624	SR-0-24	LER113	225
SDAF22626	4 7/16	6 11/16	22	8 1/4	2 1/2	19 1/4	17 3/8	5	13 11/16	2 5/8	8 3/4	2 27/64	4	1 1/8	22326K	SNW-126	SDAF626	SR-0-26	LER117	300
SDAF22628	4 15/16	7 1/16	24 3/4	9	2 1/2	21 5/8	19 3/8	5 1/2	14 1/4	2 11/16	9 5/8	3 5/64	4	1 1/8	22328K	SNW-128	SDAF628	SR-0-28	LER122	310
SDAF22630	5 3/16	7 1/2	26 3/4	9 3/8	2 3/4	23 5/8	20 7/8	5 7/8	15 3/16	2 7/8	9 3/4	3 17/64	4	1 1/4	22330K	SNW-130	SDAF630	SR-36-30	LER125	395
SDAF22632	5 7/16	7 7/8	27 5/8	10	3	23 1/2	21 1/2	6 1/4	16 1/4	2 15/16	10 5/8	3 7/16	4	1 3/8	22332K	SNW-132	SDAF632	SR-38-32	LER211	420
SDAF22634	5 15/16	8 1/4	28 3/4	10 1/2	3 1/4	25	23	6 3/4	17 1/8	3 1/16	11 1/8	3 19/32	4	1 3/8	22334K	SNW-134	SDAF634	SR-40-34	LER215	525
SDAF22636	6 7/16	8 7/8	30 1/2	10 3/4	3 1/4	26 3/8	24 1/8	6 7/8	17 15/16	3 7/8	11 3/8	3 47/64	4	1 1/2	22336K	SNW-136	SDAF636	SR-0-36	LER220	645
SDAF22638	6 15/16	9 1/2	32	11 1/4	3 1/2	27 7/8	25 5/8	7 1/4	19 1/4	3 11/16	11 13/16	4 57/64	4	1 1/2	22338K	SNW-138	SDAF638	SR-44-38	LER224	705
SDAF22640	7 3/16	9 7/8	33 1/2	11 3/4	3 1/2	29 1/4	26 5/8	7 5/8	19 15/16	3 3/4	12 1/4	4 5/64	4	1 5/8	22340K	SNW-140	SDAF640	SR-0-40	LER228	825

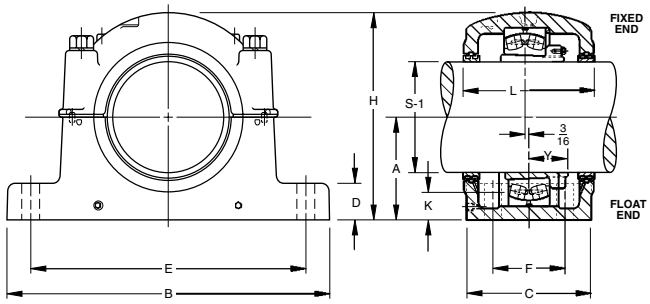
(1) See page B395 for suggested shaft diameter S-1 tolerances.
(2) "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.
(3) Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.
(4) Includes sleeve, locknut and lockwasher. Add shaft size to order.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

B

TAPERED BORE MOUNTING
SAF230K, SDAF230K SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, bearing adapter, locknut and washer, stabilizing ring and triple ring seals.
- If only the pillow block is desired, use the numbers listed in column "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks as described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SAFS 23024).
- Please note that for applications SAF23048 and larger, the shaft size must be included in the part description when ordering (e.g., SAF23048-8 15/16).



Two stabilizing rings are supplied with housings SAF048 through SAF056 and SDAF060K through SDAF076K. For fixed applications ***both rings must be used. Do not use stabilizing rings for float mounting.***

Pillow Block Assembly	Standard Shaft(1) Dia. S-1	A	B	C	D	E (Max.)	E (Min.)	F	H	K Oil Level	L	Y	4 Base Bolts Req'd. Size	Bearing Number	Adapter(4) Assembly Number	Housing(2) Only	Stabilizing(3) Ring	Triple Seal 2 Req'd	Ass'y Wt.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.						lbs.
SERIES SAF230K																			
SAF23024K	4 3/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 9/16	6	1 55/64	3/4	23024K	SNW-3024	SAF024K	SR-20-17	LER113	60
SAF23026K	4 7/16	4 15/16	16 1/2	4 3/4	2	14 1/2	12 5/8	2 3/4	9 9/16	1 11/16	6 3/8	2 1/32	3/4	23026K	SNW-3026	SAF026K	SR-22-19	LER117	76
SAF23028K	4 15/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	1 13/16	7 3/8	2 1/8	3/4	23028K	SNW-3028	SAF028K	SR- 0-20	LER122	90
SAF23030K	5 3/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 5/16	8	2 13/64	7/8	23030K	SNW-3030	SAF030K	SR- 0-21	LER125	125
SAF23032K	5 7/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 1/16	8	2 11/32	7/8	23032K	SNW-3032	SAF032K	SR- 0-22	LER130	132
SAF23034K	5 15/16	6	20 1/8	5 7/8	2 3/8	17 1/8	16	3 3/8	11 3/4	1 3/4	7 3/4	2 33/64	1	23034K	SNW-3034	SAF034K	SR- 0-24	LER140	154
SAF23036K	6 7/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	2 3/16	8 3/4	2 11/16	1	23036K	SNW-3036	SAF036K	SR- 0-26	LER148	212
SAF23038K	6 15/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	1 15/16	8 3/4	2 47/64	1	23038K	SNW-3038	SAF038K	SR-32- 0	LER155	220
SAF23040K	7 3/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 13/16	9 3/8	2 15/16	1	23040K	SNW-3040	SAF040K	SR-34- 0	LER159	295
SAF23044K	7 15/16	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 3/8	10 3/4	3 5/32	1 1/4	23044K	SNW-3044	SAF044K	SR-38-32	LER167	370
SAF23048K-8 7/16	8 7/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 1/4	11 1/8	3 17/32	1 1/4	23048K	SNP-3048-8 7/16	SAF048K-8 7/16	A8897	LER526	430
SAF23048K-8 1/2	8 1/2	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 1/4	11 1/8	3 17/32	1 1/4	23048K	SNP-3048-8 1/2	SAF048K-8 1/2	A8897	LER527	428
SAF23048K-8 15/16	8 15/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 1/4	11 1/8	3 17/32	1 1/4	23048K	SNP-3048-8 15/16	SAF048K-8 15/16	A8897	LER529	422
SAF23048K-9	9	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 1/4	11 1/8	3 17/32	1 1/4	23048K	SNP-3048-9	SAF048K-9	A8897	LER530	420
SAF23052K-9 7/16	9 7/16	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 7/16	2 15/16	11 7/8	3 53/64	1 1/2	23052K	SNP-3052-9 7/16	SAF052K-9 7/16	A8898	LER178-1	587
SAF23052K-9 1/2	9 1/2	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 7/16	2 15/16	11 7/8	3 53/64	1 1/2	23052K	SNP-3052-9 1/2	SAF052K-9 1/2	A8898	LER178	585
SAF23056K-9 15/16	9 15/16	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	2 15/16	12 1/16	3 61/64	1 1/2	23056K	SNP-3056-9 15/16	SAF056K-9 15/16	A8819	ER751	640
SAF23056K-10	10	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	2 15/16	12 1/16	3 61/64	1 1/2	23056K	SNP-3056-10	SAF056K-10	A8819	ER705	635
SAF23056K-10 7/16	10 7/16	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	2 15/16	12 1/16	3 61/64	1 1/2	23056K	SNP-3056-10 7/16	SAF056K-10 7/16	A8819	ER745	625
SAF23056K-10 1/2	10 1/2	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	2 15/16	12 1/16	3 61/64	1 1/2	23056K	SNP-3056-10 1/2	SAF056K-10 1/2	A8819	ER710	620
SERIES SDAF230K																			
SDAF23060K-10 15/16	10 15/16	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 7/16	15 1/2	4 9/32	1 5/8	23060K	SNP-3060-10 15/16	SDAF060K-10 15/16	A8967	ER858	1175
SDAF23060K-11	11	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 7/16	15 1/2	4 9/32	1 5/8	23060K	SNP-3060-11	SDAF060K-11	A8967	ER825	1174
SDAF23064K-11 7/16	11 7/16	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 1/16	15 1/2	4 7/16	1 5/8	23064K	SNP-3064-11 7/16	SDAF064K-11 7/16	A8968	ER861	1275
SDAF23064K-11 1/2	11 1/2	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 1/16	15 1/2	4 7/16	1 5/8	23064K	SNP-3064-11 1/2	SDAF064K-11 1/2	A8968	ER832	1274
SDAF23064K-11 15/16	11 15/16	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 1/16	15 1/2	4 7/16	1 5/8	23064K	SNP-3064-11 15/16	SDAF064K-11 15/16	A8968	ER859	1269
SDAF23064K-12	12	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 1/16	15 1/2	4 7/16	1 5/8	23064K	SNP-3064-12	SDAF064K-12	A8968	ER818	1268
SDAF23068K-12 7/16	12 7/16	12	39	15 1/4	4 3/16	33 1/2	32	10	24	3 7/16	15 3/4	4 13/16	1 7/8	23068K	SNP-3068-12 7/16	SDAF068K-12 7/16	A8969	ER865	1553
SDAF23068K-12 1/2	12 1/2	12	39	15 1/4	4 3/16	33 1/2	32	10	24	3 7/16	15 3/4	4 13/16	1 7/8	23068K	SNP-3068-12 1/2	SDAF068K-12 1/2	A8969	ER866	1552
SDAF23072K-12 15/16	12 15/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/8	16 1/4	4 53/64	1 7/8	23072K	SNP-3072-12 15/16	SDAF072K-12 15/16	A8970	ER869	1632
SDAF23072K-13	13	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/8	16 1/4	4 53/64	1 7/8	23072K	SNP-3072-13	SDAF072K-13	A8970	ER846	1630
SDAF23072K-13 7/16	13 7/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/8	16 1/4	4 53/64	1 7/8	23072K	SNP-3072-13 7/16	SDAF072K-13 7/16	A8970	ER872	1614
SDAF23072K-13 1/2	13 1/2	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/8	16 1/4	4 53/64	1 7/8	23072K	SNP-3072-13 1/2	SDAF072K-13 1/2	A8970	ER823	1610
SDAF23076K-13 15/16	13 15/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/16	16 1/4	5 1/16	1 7/8	23076K	SNP-3076-13 15/16	SDAF076K-13 15/16	A8971	ER875	1687
SDAF23076K-14	14	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/16	16 1/4	5 1/16	1 7/8	23076K	SNP-3076-14	SDAF076K-14	A8971	ER876	1685
SDAF23080K-15	15	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	29	4 7/16	17 5/8	5 17/32	4,2	23080K	SNP-3080-15	SDAF080K-15	1A8974	ER847	2300
SDAF23084K-15 3/4	15 3/4	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	29	4 1/16	17 5/8	5 9/16	4,2	23087K	SNP-3084-15 3/4	SDAF084K-15 3/4	1A8978	ER885	2300
SDAF23088K-16 1/2	16 1/2	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	4 1/2	19 1/4	5 3/4	4,21/4	23088AK	SNP-3088-161/2	SDAF3088K-16 1/2	2A8979	ER958	2550
SDAF23092K-17	17	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	4	19 1/4	5 7/8	4,21/4	23082K	SNP-3092-17	SDAF3092K-17	2A8980	ER838	2850
SDAF23096K-18	18	17	53	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	5 1/8	21 3/4	5 29/32	4,21/4	23096K	SNP-3096-18	SDAF3096K-18	2A8984	ER888	4250
SDAF230/530K-18 1/2	18 1/2	17	53	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	4 3/4	21 3/4	6 1/2	4,21/4	230/500K	SNP-30-500-18 1/2	SDAF30-500K-18 1/2	2A8976	ER978	4350
SDAF230/530K-19 1/2	19 1/2	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	4 13/16	22 1/4	6 27/32	4,21/2	230/530/K	SNP-30-530-19 1/2	SDAF 30-530K-19 1/2		ER926	5200

(1) See page B395 for suggested shaft diameter S-1 tolerances.

(2) "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.

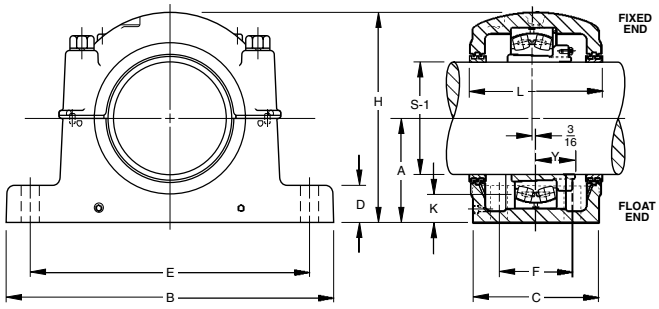
(3) Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

(4) Includes sleeve, locknut, lockwasher or lockplate. Add shaft size to order.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

TAPERED BORE MOUNTING
SDAF231K AND SDAF232K SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, bearing adapter, locknut and washer, stabilizing ring and triple ring seals.
- To order pillow block housing only, use the numbers listed in the "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SDAFS 23152K).



Pillow Block Assembly	Standard Shaft[1] Dia. S-1	A	B	C	D	E (Max.)	E (Min.)	F	H	K Oil Level	L	4 Base Bolts Req'd. Size	Bearing Number	Adapter[4] Assembly Number	Housing[2] Only	Stabi-lizing[3] 2 Req'd	Triple Seal Ring 2 Req'd	Ass'y Wt.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.						lbs.
SERIES SDAF231K																		
SDAF23152K	9 7/16	10 1/4	35	13 1/8	3 3/4	30 1/2	29	8 3/4	20 7/8	3 3/8	13 3/4	1 5/8	23152K	SNP-3152	SDAF3152K	A5679	ER891	1050
SDAF23156K	10 7/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/4	15 3/8	1 5/8	23156K	SNP-3156	SDAF3156K	A8967	ER973	1300
SDAF23160K	10 15/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 1/8	15 3/8	1 5/8	23160K	SNP-3160	SDAF3160K	A8975	ER858	1350
SDAF23164K	11 15/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	25 3/4	4 3/8	16 1/4	1 7/8	23164K	SNP-3164	SDAF3164K	A8970	ER942	1900
SDAF23168K	12 7/16	14	43 3/4	17 3/4	5	38 1/4	36 3/4	10 3/4	27 7/8	4 15/16	18 1/4	2	23168K	SNP-3168	SDAF3168K	A8977	ER975	2550
SDAF23172K	13 7/16	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	5	17 3/4	2	23172K	SNP-3172	SDAF3172K	A8974	ER872	2600
SDAF23176K	13 15/16	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	4 5/8	17 3/4	2	23176K	SNP-3176	SDAF3176K	A8978	ER875	2600
SDAF23180K	15	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	5 1/8	19 1/4	2 1/4	23180K	SNP-3180	SDAF3180K	A8979	ER847	3000
SDAF23184K	15 3/4	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	6	21 3/4	2 1/4	23184K	SNP-3184	SDAF3184K	A8984	ER914	4400
SDAF23188K	16 1/2	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	5 9/16	21 3/4	2 1/4	23188K	SNP-3188	SDAF3188K	A8976	ER947	4600
SDAF23192K	17	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	6	22 1/4	2 1/2	23192K	SNP-3192	SDAF3192K	A8990	ER838	5100
SDAF23196K	18	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	5 1/2	22 1/4	2 1/2	23196K	SNP-3196	SDAF3196K	A8998	ER954	5200
SERIES SDAF232K																		
SDAF23248K	8 15/16	10 1/4	35	13 1/8	3 3/4	30 1/2	29	8 3/4	20 7/8	3 9/16	13 3/4	1 5/8	23248K	SNP-148	SDAF3248K	A5679	ER939	1100
SDAF23252K	9 7/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/4	15 3/8	1 5/8	23252K	SNP-152	SDAF3252K	A8968	ER891	1400
SDAF23256K	10 7/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/8	15 3/8	1 5/8	23256K	SNP-3256	SDAF3256K	A8975	ER973	1400
SDAF23260K	10 15/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	25 3/4	4 1/2	16 1/4	1 7/8	23260K	SNP-3260	SDAF3260K	A8970	ER941	1900
SDAF23264K	11 15/16	14	43 3/4	17 3/4	5	38 1/4	36 3/4	10 3/4	27 7/8	5 1/8	18 1/4	2	23264K	SNP-3264	SDAF3264K	A8977	ER942	2600
SDAF23268K	12 7/16	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	5	17 3/4	2	23268K	SNP-3268	SDAF3268K	A8978	ER944	2700
SDAF23272K	13 7/16	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	5 1/2	19 1/4	2 1/4	23272K	SNP-3272	SDAF3272K	A8979	ER872	3050
SDAF23276K	13 15/16	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	4 3/8	19 1/4	2 1/4	23276K	SNP-3276	SDAF3276K	A8980	ER875	3000
SDAF23280K	14 15/16	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	6	21 3/4	2 1/4	23280K	SNP-3280	SDAF3280K	A8976	ER976	4650
SDAF23284K	15 3/4	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	6 3/8	22 1/4	2 1/2	23284K	SNP-3284	SDAF3284K	A8990	ER951	4900
SDAF23288K	16 1/2	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	5 7/8	22 1/4	2 1/2	23288K	SNP-3288	SDAF3288K	A8988	ER952	5200

[1] See page B395 for suggested shaft diameter S-1 tolerances.

[2] "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required. Add shaft size to order.

[3] Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

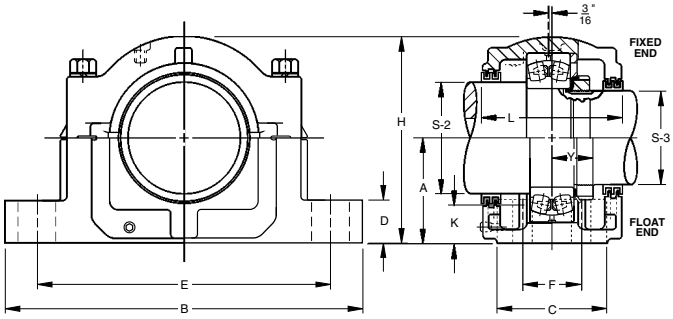
[4] Includes sleeve, locknut and lockwasher. Add shaft size to order.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

B

STRAIGHT BORE MOUNTING
SAF222 AND SAF223 SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, locknut and washer, stabilizing ring and triple ring seals.
- To order pillow block housing only, use the numbers listed in "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SAFS 22217).
- Four-bolt bases are standard on all assemblies, except as noted.



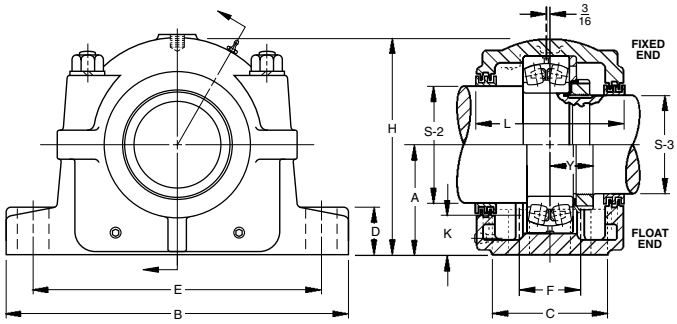
Pillow Block Assembly	Standard Shaft[1] Dia. S-2	S-3	A	B	C	D	E (Max.)	E (Min.)	F	H Level	K Oil	L	Y	Base Bolts Required No.	Size	Bearing Number	Lock Nut	Lock Washer	Housing[2] Only Ring	Stabilizing[3] 1 Req'd 1 Req'd	Triple Seal 1 Req'd S-2	Triple Seal S-3	Ass'y Wt.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.		in.								lbs.
SERIES SAF222																							
SAF22217	3 15/16	3 3/16	3 3/4	13	3 1/2	1 1/4	11	9 7/8	—	7 1/4	1 7/16	4 15/16	1 27/64	2	3/4	22217	AN17	W17	SAF217	SR-17-14	LER89	LER63	43
FSAF22217	3 15/16	3 3/16	3 3/4	13	3 1/2	1 1/4	11	9 7/8	2 1/8	7 1/4	1 7/16	4 15/16	1 27/64	4	5/8	22217	AN17	W17	FSAF217	SR-17-14	LER89	LER63	43
SAF22218	4 1/8	3 3/8	4	13 3/4	3 7/8	1 1/2	11 5/8	10 3/8	—	7 3/4	1 17/32	6 1/4	1 37/64	2	3/4	22218	AN18	W18	SAF218	SR-18-15	LER96	LER72	50
FSAF22218	4 1/8	3 3/8	4	13 3/4	3 7/8	1 1/2	11 5/8	10 3/8	2 1/8	7 3/4	1 17/32	6 1/4	1 37/64	4	5/8	22218	AN18	W18	FSAF218	SR-18-15	LER96	LER72	50
SAF22220	4 1/2	3 13/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	—	8 11/16	1 3/4	6	1 49/64	2	7/8	22220	AN20	W20	SAF220	SR-20-17	LER118	LER106	71
FSAF22220	4 1/2	3 13/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 3/4	6	1 49/64	4	3/4	22220	AN20	W20	FSAF220	SR-20-17	LER118	LER106	71
SAF22222	4 7/8	4 3/16	4 15/16	16 1/2	4 3/4	2	14 1/2	12 5/8	2 3/4	9 9/16	1 7/8	6 3/8	1 61/64	4	3/4	22222	AN22	W22	SAF222	SR-22-19	LER121	LER113	81
SAF22224	5 5/16	4 9/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	1 15/16	7 3/8	2 3/32	4	3/4	22224	AN24	W24	SAF224	SR-24-20	LER127	LER119	90
SAF22226	5 7/8	4 15/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 7/16	8	2 17/64	4	7/8	22226	AN26	W26	SAF226	SR-26-0	LER136	LER122	127
SAF22228	6 1/4	5 5/16	6	20 1/8	5 7/8	2 3/8	17 1/8	16	3 3/8	11 3/4	2 1/8	7 3/4	2 13/32	4	1	22228	AN28	W28	SAF228	SR-28-0	LER144	LER127	149
SAF22230	6 5/8	5 3/4	6 5/16	21 1/4	6 1/4	2 1/2	18 1/4	17	3 3/4	12 1/2	2 3/16	8 3/8	2 37/64	4	1	22230	AN30	W30	SAF230	SR-30-0	LER151	LER134	175
SAF22232	7	6 1/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	2 3/16	8 3/4	2 49/64	4	1	22232	AN32	W32	SAF232	SR-32-0	LER156	LER142	210
SAF22234	7 7/16	6 7/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 5/16	9 3/8	2 59/64	4	1	22234	AN34	W34	SAF234	SR-34-0	LER161	LER148	280
SAF22236	7 13/16	6 7/8	7 1/2	26 3/4	7 1/8	3	23 5/8	20 7/8	4 5/8	15 1/2	2 9/16	9 11/16	2 61/64	4	1	22236	AN36	W36	SAF236	SR-36-0	LER165	LER154	305
SAF22238	8 3/8	7 1/4	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 5/8	10 3/4	3 7/64	4	1 1/4	22238	AN38	W38	SAF238	SR-38-32	LER171	LER160	350
SAF22240	8 3/4	7 5/8	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 11/16	10 13/16	3 9/32	4	1 1/4	22240	AN40	W40	SAF240	SR-40-34	LER175	LER164	420
SAF22244	9 9/16	8 5/16	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 5/8	3 3/8	11 1/2	3 17/32	4	1 1/2	22244	N44	W44	SAF244	SR-44-38	LER179	LER170	590
SERIES SAF223																							
SAF22317	3 15/16	3 3/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	–	8 11/16	1 13/16	6	1 57/64	2	7/8	22317	AN17	W17	SAF317	SR-20-17	LER109	LER188	80
FSAF22317	3 15/16	3 3/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 13/16	6	1 57/64	4	3/4	22317	AN17	W17	FSAF317	SR-20-17	LER109	LER188	80
SAF22318	4 1/8	3 3/8	4 3/4	15 1/2	4 3/8	2	13 1/2	12	2 1/4	9 3/16	2	7	2 3/64	4	3/4	22318	AN18	W18	FSAF318	SR-21-18	LER112	LER191	92
SAF22320	4 1/2	3 13/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	2 1/8	7 3/8	2 19/64	4	3/4	22320	AN20	W20	SAF320	SR-24-20	LER118	LER106	109
SAF22322	4 7/8	4 3/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 1/2	8	2 31/64	4	7/8	22322	AN22	W22	SAF322	SR-0-22	LER121	LER113	145
SAF22324	5 5/16	4 9/16	6 5/16	21 1/4	6 1/4	2 1/2	18 1/4	17	3 3/4	12 1/2	2 9/16	8 3/8	2 41/64	4	1	22324	AN24	W24	SAF324	SR-0-24	LER127	LER119	195
SAF22326	5 7/8	4 15/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 15/16	2 5/8	8 3/4	2 27/32	4	1	22326	AN26	W26	SAF326	SR-0-26	LER136	LER122	235
SAF22328	6 1/4	5 5/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 11/16	9 3/8	3 5/64	4	1	22328	AN28	W28	SAF328	SR-0-28	LER144	LER127	300
SAF22330	6 5/8	5 3/4	7 1/2	26 3/4	7 1/8	3	23 5/8	20 7/8	4 5/8	15 1/2	2 7/8	9 11/16	3 17/64	4	1	22330	AN30	W30	SAF330	SR-36-30	LER151	LER134	335
SAF22332	7	6 1/16	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 15/16	10 3/4	3 7/16	4	1 1/4	22332	AN32	W32	SAF332	SR-38-32	LER156	LER142	405
SAF22334	7 7/16	6 7/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	3 1/16	10 13/16	3 19/32	4	1 1/4	22334	AN34	W34	SAF334	SR-40-34	LER161	LER148	465
SAF22336	7 13/16	6 7/8	8 7/8	31 1/4	8 1/4	3 1/2	26 5/8	24	5 1/4	18 1/2	3 3/8	11 1/4	3 47/64	4	1 1/4	22336	AN36	W36	SAF336	SR-0-36	LER165	LER154	525
SAF22338	8 3/8	7 1/4	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 5/8	3 11/16	11 1/2	3 57/64	4	1 1/2	22338	AN38	W38	SAF338	SR-44-38	LER171	LER160	635
SAF22340	8 3/4	7 5/8	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	3 3/4	12 1/4	4 5/64	4	1 1/2	22340	AN40	W40	SAF340	SR-0-40	LER175	LER164	700

[1] See page B395 for suggested shaft diameter S-2, S-3 tolerances.
[2] "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.
[3] Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

STRAIGHT BORE MOUNTING
SDAF222 AND SDAF223 SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, locknut and washer, stabilizing ring, and triple ring seals.
- To order pillow block housing only, use the numbers listed in the "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks described on this page constitute fixed units.
- To order float units, specify part number plus suffix "float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SDAS 22220).



B

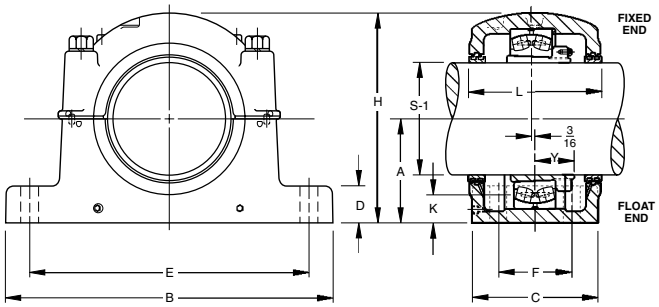
Pillow Block Assembly	Standard Shaft[1] Dia. S-2	Standard Shaft[1] Dia. S-3	A	B	C	D	E (Max.)	E (Min.)	F	H Level	K Oil	L	Y	Base Bolts Required No.	Base Bolts Required Size	Bearing Number	Lock Nut	Lock Washer	Housing[2] Only Ring	Stabilizing[3] 1 Req'd	Triple Seal 1 Req'd S-2	Triple Seal S-3	Ass'y Wt.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.		in.								lbs.
SERIES SDAF222																							
SDAF22220	4 1/2	3 13/16	4 1/2	15 1/4	6	1 7/8	13 1/8	11 5/8	3 3/8	8 15/16	1 3/4	6 3/4	1 49/64	4	3/4	22220	AN20	W20	SDAF220	SR-20-17	LER118	LER106	81
SDAF22222	4 7/8	4 3/16	4 15/16	16 1/2	6 3/4	2 1/8	14 1/2	12 5/8	4	9 7/8	1 7/8	7 1/4	1 61/64	4	7/8	22222	AN22	W22	SDAF222	SR-22-19	LER121	LER113	109
SDAF22224	5 5/16	4 9/16	5 1/4	16 1/2	6 7/8	2 1/4	14 1/2	13 1/4	4 1/8	10 1/2	1 15/16	7 3/8	2 3/32	4	7/8	22224	AN24	W24	SDAF224	SR-24-20	LER127	LER119	113
SDAF22226	5 7/8	4 15/16	6	18 3/8	7 1/2	2 3/8	16	14 5/8	4 1/2	11 7/8	2 7/16	8	2 17/64	4	1	22226	AN26	W26	SDAF226	SR-26-0	LER136	LER122	151
SDAF22228	6 1/4	5 5/16	6	20 1/8	7 1/2	2 3/8	17 1/8	16	4 1/2	12 1/16	2 1/8	7 13/16	2 13/32	4	1	22228	AN28	W28	SDAF228	SR-28-0	LER144	LER127	175
SDAF22230	6 5/8	5 3/4	6 5/16	21 1/4	7 7/8	2 1/2	18 1/4	17	4 3/4	12 13/16	2 3/16	8 3/8	2 37/64	4	1 1/8	22230	AN30	W30	SDAF230	SR-30-0	LER151	LER134	201
SDAF22232	7	6 1/16	6 11/16	22	8 1/4	2 1/2	19 1/4	17 3/8	5	13 11/16	2 3/16	8 3/4	2 49/64	4	1 1/8	22232	AN32	W32	SDAF232	SR-32-0	LER156	LER142	245
SDAF22234	7 7/16	6 7/16	7 1/16	24 3/4	9	2 1/2	21 5/8	19 3/8	5 1/2	14 1/4	2 5/16	9 5/8	2 59/64	4	1 1/4	22234	AN34	W34	SDAF234	SR-34-0	LER161	LER148	300
SDAF22236	7 13/16	6 7/8	7 1/2	26 3/4	9 3/8	2 3/4	23 5/8	20 7/8	5 7/8	15 3/16	2 9/16	10	2 61/64	4	1 1/4	22236	AN36	W36	SDAF236	SR-36-30	LER165	LER154	335
SDAF22238	8 3/8	7 1/4	7 7/8	27 5/8	10	3	23 1/2	21 1/2	6 1/4	16 1/4	2 5/8	10 5/8	3 7/64	4	1 3/8	22238	AN38	W38	SDAF238	SR-38-32	LER240	LER229	405
SDAF22240	8 3/4	7 5/8	8 1/4	28 3/4	10 1/2	3 1/4	25	23	6 3/4	17 1/8	2 11/16	11 1/8	3 9/32	4	1 3/8	22240	AN40	W40	SDAF240	SR-40-34	LER244	LER233	465
SDAF22244	9 9/16	8 5/16	9 1/2	32	11 1/4	3 1/2	27 7/8	25 5/8	7 1/4	19 1/4	3 3/8	11 7/8	3 17/32	4	1 1/2	22244	N44	W44	SDAF240	SR-44-38	LER248	LER239	650
SERIES SDAF223																							
SDAF22317	3 15/16	3 3/16	4 1/2	15 1/4	6	1 7/8	13 1/8	11 5/8	3 3/8	8 15/16	1 3/16	6 3/4	1 57/64	4	3/4	22317	AN17	W17	SDAF317	SR-20-17	LER109	LER188	80
SDAF22318	4 1/8	3 3/8	4 3/4	15 1/2	6 1/8	2	13 1/2	12	3 5/8	9 7/16	2	6 7/8	2 3/64	4	3/4	22318	AN18	W18	SDAF318	SR-21-18	LER112	LER191	92
SDAF22320	4 1/2	3 13/16	5 1/4	16 1/2	6 7/8	2 1/4	14 1/2	13 1/4	4 1/8	10 1/2	2 1/8	7 3/8	2 19/64	4	7/8	22320	AN20	W20	SDAF320	SR-24-20	LER118	LER106	109
SDAF22322	4 7/8	4 3/16	6	18 3/8	7 1/2	2 3/8	16	14 5/8	4 1/2	11 7/8	2 1/2	8	2 31/64	4	1	22322	AN22	W22	SDAF322	SR-0-22	LER121	LER113	145
SDAF22324	5 5/16	4 9/16	6 5/16	21 1/4	7 7/8	2 1/2	18 1/4	17	4 3/4	12 13/16	2 9/16	8 3/8	2 41/64	4	1 1/8	22324	AN24	W24	SDAF324	SR-0-24	LER127	LER119	195
SDAF22326	5 7/8	4 15/16	6 11/16	22	8 1/4	2 1/2	19 1/4	17 3/8	5	13 11/16	2 5/8	8 3/4	2 27/64	4	1 1/8	22326	AN26	W26	SDAF326	SR-0-26	LER136	LER122	280
SDAF22328	6 1/4	5 5/16	7 1/16	24 3/4	9	2 1/2	21 5/8	19 3/8	5 1/2	14 1/4	2 11/16	9 5/8	3 5/64	4	1 1/4	22328	AN28	W28	SDAF328	SR-0-28	LER144	LER127	305
SDAF22330	6 5/8	5 3/4	7 1/2	26 3/4	9 3/8	2 3/4	23 5/8	20 7/8	5 7/8	15 3/16	2 7/8	9 3/4	3 17/64	4	1 1/4	22330	AN30	W30	SDAF330	SR-36-30	LER151	LER134	375
SDAF22332	7	6 1/16	7 7/8	27 5/8	10	3	23 1/2	21 1/2	6 1/4	16 1/4	2 15/16	10 5/8	3 7/16	4	1 3/8	22332	AN32	W32	SDAF332	SR-38-32	LER225	LER217	445
SDAF22334	7 7/16	6 7/16	8 1/4	28 3/4	10 1/2	3 1/4	25	23	6 3/4	17 1/8	3 1/16	11 1/8	3 19/32	4	1 3/8	22334	AN34	W34	SDAF334	SR-40-34	LER230	LER220	525
SDAF22336	7 13/16	6 7/8	8 7/8	30 1/2	10 3/4	3 1/4	26 3/8	24 1/8	6 7/8	17 15/16	3 3/8	11 3/8	3 47/64	4	1 1/2	22336	AN36	W36	SDAF336	SR-0-36	LER234	LER223	635
SDAF22338	8 3/8	7 1/4	9 1/2	32	11 1/4	3 1/2	27 7/8	25 5/8	7 1/4	19 1/4	3 11/16	11 13/16	3 57/64	4	1 1/2	22338	AN38	W38	SDAF338	SR-44-38	LER240	LER229	700
SDAF22340	8 3/4	7 5/8	9 7/8	33 1/2	11 3/4	3 1/2	29 1/4	26 5/8	7 5/8	19 15/16	3 3/4	12 1/4	4 5/64	4	1 5/8	22340	AN40	W40	SDAF340	SR-0-40	LER244	LER233	725

[1] See page B395 for suggested shaft diameter S-2, S-3 tolerances.
[2] "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.
[3] Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

STRAIGHT BORE MOUNTING
SDAF231 AND SDAF232 SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, locknut and washer, stabilizing ring and triple ring seals.
- To order pillow block housing only, use the numbers listed in the "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals, and stabilizing ring.
- Assembly and pillow blocks described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SDAFS 23152).
- For fixed applications, both stabilizing rings must be used. Do not use stabilizing rings for "float" mounting.



Pillow Block Assembly	Standard Shaft[1] Dia. S-2	S-3	A	B	C	D	E (Max.)	E (Min.)	F	H	K Oil Level	L	4 Base Bolts Req'd	Bearing Number	Lock Nut	Lock Washer	Housing[2] Only	Stabilizing[3] Ring 2 Req'd	Triple Seal 1 Req'd S-2	Triple Seal 1 Req'd S-3	Ass'y Wt.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.								lbs.
SERIES SDAF231																					
SDAF23152	11 1/2	9 15/16	10 1/4	35	13 1/8	3 3/4	30 1/2	29	8 3/4	20 7/8	3 3/8	14 1/4	1 5/8	23152	NO52	P52	SDAF3152	A5679	ER832	ER845	1050
SDAF23156	12 1/2	10 3/4	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/4	15 7/8	1 5/8	23156	NO56	P56	SDAF3156	A8967	ER866	ER826	1250
SDAF23160	13	11 1/2	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 1/8	15 7/8	1 5/8	23160	NO60	P60	SDAF3160	A8975	ER824	ER832	1350
SDAF23164	14	12 1/4	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	25 3/4	4 3/8	16 3/4	1 7/8	23164	NO64	P64	SDAF3164	A8970	ER876	ER983	1850
SDAF23168	15	13	14	43 3/4	17 3/4	5	38 1/4	36 3/4	10 3/4	27 7/8	4 15/16	18 3/4	2	23168	NO68	P68	SDAF3168	A8977	ER847	ER846	2450
SDAF23172	16	13 13/16	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	5	18	2	23172	NO72	P72	SDAF3172	A8974	ER809	ER874	2500
SDAF23176	17	14 5/8	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	4 5/8	18	2	23176	NO76	P76	SDAF3176	A8978	ER811	ER946	2500
SDAF23180	17 1/2	15 1/4	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	5 1/8	19 3/4	2 1/4	23180	NO80	P80	SDAF3180	A8979	ER948	ER895	2800
SDAF23184	18 1/2	16 3/16	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	6	22 1/4	2 1/4	23184	NO84	P84	SDAF3184	A8984	ER949	ER914	4300
SDAF23188	19 1/2	17	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	5 9/16	22 1/4	2 1/4	23188	NO88	P88	SDAF3188	A8976	ER950	ER811	4300
SDAF23192	20	17 3/4	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	6	22 3/4	2 1/2	23192	NO92	P92	SDAF3192	A8990	ER808	ER953	5000
SERIES SDAF232																					
SDAF23248	10 1/2	9 3/16	10 1/4	35	13 1/8	3 3/4	30 1/2	29	8 3/4	20 7/8	3 9/16	14 1/4	1 5/8	23248	NO48	P48	SDAF3248	A5679	ER840	ER945	1100
SDAF23252	11 1/2	9 15/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/4	15 7/8	1 5/8	23252	NO52	P52	SDAF3252	A8968	ER832	ER845	1350
SDAF23256	12 1/2	10 3/4	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/8	15 7/8	1 5/8	23256	NO56	P56	SDAF3256	A8975	ER866	ER826	1400
SDAF23260	13	11 1/2	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	25 3/4	4 1/2	16 3/4	1 7/8	23260	NO60	P60	SDAF3260	A8970	ER846	ER856	1900
SDAF23264	14	12 1/4	14	43 3/4	17 3/4	5	38 1/4	36 3/4	10 3/4	27 7/8	5 1/8	18 3/4	2	23264	NO64	P64	SDAF3264	A8977	ER876	ER983	2500
SDAF23268	15	13	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	5	18	2	23268	NO68	P68	SDAF3268	A8978	ER847	ER846	2650
SDAF23272	16	13 13/16	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	5 1/2	19 3/4	2 1/4	23272	NO72	P72	SDAF3272	A8979	ER809	ER874	2950
SDAF23276	17	14 5/8	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	4 3/8	19 3/4	2 1/4	23276	NO76	P76	SDAF3276	A8980	ER811	ER946	3050
SDAF23280	17 1/2	15 1/4	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	6	22 1/4	2 1/4	23280	NO80	P80	SDAF3280	A8976	ER948	ER895	4500
SDAF23284	18 1/2	16 3/16	18	54 1/2	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	6 3/8	22 3/4	2 1/2	23284	NO84	P84	SDAF3284	A8990	ER955	ER951	5000
SDAF23288	19 1/2	17	18	54 1/2	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	5 7/8	22 3/4	2 1/2	23288	NO88	P88	SDAF3288	A8988	ER956	ER838	5050

[1] See page B395 for suggested shaft diameter S-2, S-3 tolerances.
[2] "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.
[3] Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

SHAFT DIAMETERS

SUGGESTED S-1, S-2, S-3 SHAFT DIAMETERS (INCHES)

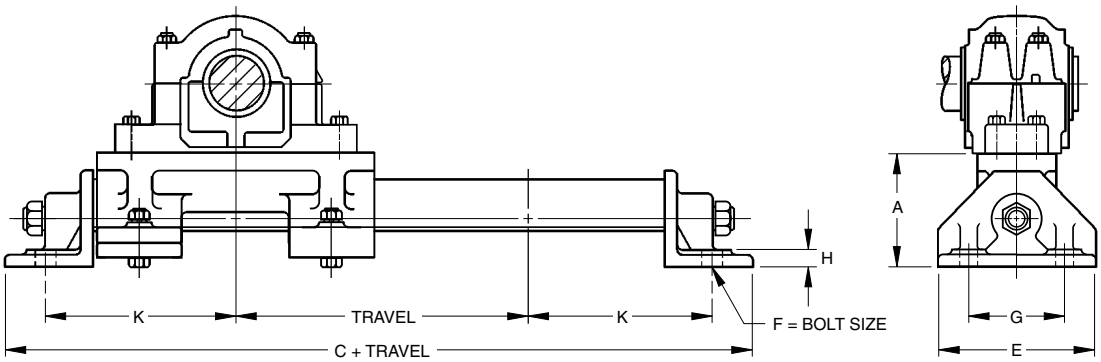
	max.	min.
1 7/16	1.4375	1.4345
1 11/16	1.6875	1.6845
1 7/8	1.8750	1.8720
1 15/16	1.9375	1.9345
2 1/16	2.0625	2.0585
2 1/8	2.1250	2.1210
2 3/16	2.1875	2.1835
2 1/4	2.2500	2.2460
2 3/8	2.3750	2.3710
2 7/16	2.4375	2.4335
2 9/16	2.5625	2.5585
2 5/8	2.6250	2.6210
2 11/16	2.6875	2.6835
2 13/16	2.8125	2.8085
2 7/8	2.8750	2.8710
2 15/16	2.9375	2.9335
3	3.0000	2.9960
3 1/16	3.0625	3.0585
3 3/16	3.1875	3.1835
3 1/4	3.2500	3.2460
3 3/8	3.3750	3.3710
3 7/16	3.4375	3.4335
3 5/8	3.6250	3.6210
3 15/16	3.9375	3.9335
4 1/8	4.1250	4.1200
4 3/16	4.1875	4.1825
4 7/16	4.4375	4.4325
4 1/2	4.5000	4.4950
4 9/16	4.5625	4.5575
4 7/8	4.8750	4.8700
4 15/16	4.9375	4.9325
5 3/16	5.1875	5.1825
5 5/16	5.3125	5.3075
5 7/16	5.4375	5.4325
5 3/4	5.7500	5.7450
5 7/8	5.8750	5.8700
5 15/16	5.9375	5.9325
6 1/16	6.0625	6.0575
6 1/4	6.2500	6.2450
6 7/16	6.4375	6.4325
6 5/8	6.6250	6.6200
6 7/8	6.8750	6.8700
6 15/16	6.9375	6.9325
7	7.0000	6.9950
7 3/16	7.1875	7.1825

	max.	min.
7 1/4	7.2500	7.2450
7 7/16	7.4375	7.4325
7 5/8	7.6250	7.6200
7 13/16	7.8125	7.8075
7 15/16	7.9375	7.9325
8 5/16	8.3125	8.3065
8 3/8	8.3750	8.3690
8 7/16	8.4375	8.4315
8 1/2	8.5000	8.4940
8 3/4	8.7500	8.7440
8 15/16	8.9375	8.9315
9	9.0000	8.9940
9 7/16	9.4375	9.4315
9 1/2	9.5000	9.4940
9 9/16	9.5625	9.5565
9 15/16	9.9375	9.9315
10	10.0000	9.9940
10 7/16	10.4375	10.4305
10 1/2	10.5000	10.4930
10 15/16	10.9375	10.9305
11	11.0000	10.9930
11 7/16	11.4375	11.4305
11 1/2	11.5000	11.4930
11 15/16	11.9375	11.9305
12	12.0000	11.9930
12 7/16	12.4375	12.4295
12 1/2	12.5000	12.4920
12 15/16	12.9375	12.9295
13	13.0000	12.9920
13 7/16	13.4375	13.4295
13 1/2	13.5000	13.4920
13 15/16	13.9375	13.9295
14	14.0000	13.9920
15	15.0000	14.9920
16	16.0000	15.9920
17	17.0000	16.9920
17 1/2	17.5000	17.4920
18 1/2	18.5000	18.4920
19 1/2	19.5000	19.4920
20	20.0000	19.9920

Triple lip seals for other shaft diameters are available upon special order.

TU TAKE-UP UNITS

- The same care taken in the selection of stationary pillow blocks must be applied to selecting the proper take-up unit.
- Load requirements should be carefully evaluated before specifying a particular Timken take-up assembly.
- The pedestal is made of stress-relieved cast iron. End bases are made of ductile iron. The guide rail and screw are steel.
- Units are available with travel lengths from 12 to 36 inches, in 6-inch increments.
- Catalog numbers shown here are for the TU take-up unit only; pillow block assemblies must be ordered separately.
- Both two- and four-bolt pedestals are available and must be specified.

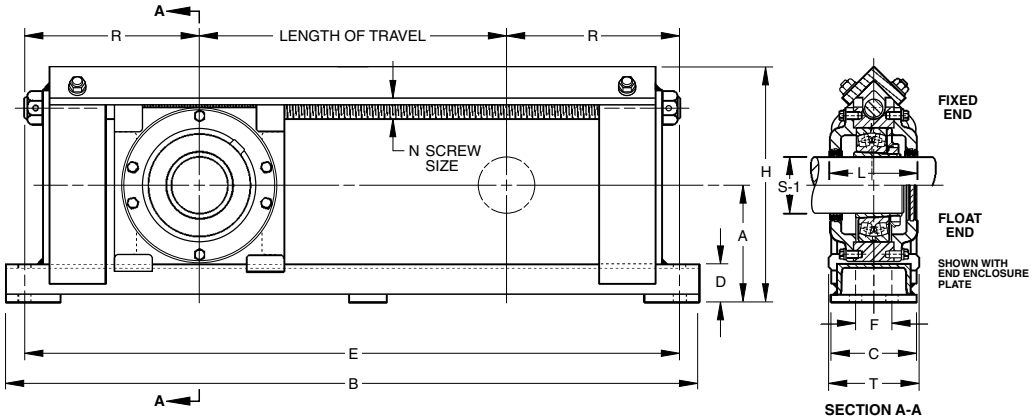


TU Take-Up Unit Catalog Number	Pillow Block Housing Number (SAF or SDAF)			A	C	E	F Bolt Size	G	H	K
				in.	in.	in.	in.	in	in.	in.
TU-3x*	515L	—	—	4 7/8	20	6 1/2	5/8	4	3/4	8 1/4
TU-4x*	516L	—	517L	5	21 3/4	6 1/2	3/4	4	3/4	9 1/8
TU-5x*	518L	—	615L	5 1/4	23	7 1/2	3/4	5	3/4	9 3/4
TU-6x*	520L	—	617L	5 1/2	24 3/4	7 1/2	3/4	5	7/8	10 3/4
TU-7x*	522L	524L	620L	6	26	9	3/4	6 1/2	1	11 1/2
TU-8x*	526L	—	622L	6	28	9	3/4	6 1/2	1	12 1/2
TU-8-1x*	528L	—	—	6	29 1/2	9	3/4	6 1/2	1	13 1/4

* Enter 12, 18, 24, 30 or 36 to indicate travel in inches.

TTU TAKE-UP UNITS

- The same care taken in the selection of stationary pillow blocks must be applied to selecting the proper take-up unit.
- Load requirements should be carefully evaluated before specifying a particular take-up assembly.
- Frame assembly and adjusting screw of TTU units are made of steel.
- The bearing housing is cast iron. Steel or ductile iron housings are additional options.
- Units include housing for adapter mounted bearings only, for either fixed or float position (be sure to specify).
- One stabilizing ring is included for fixed position assemblies.
- Sealing is triple ring labyrinth or end closures.
- For extremely contaminated environments, the DUSTAC seal is suggested. (See the next page for more information on DUSTAC.)



Take-Up Unit and Frame Number (Travel in Bold)	Standard Shaft[1] Dia. S-1	A	B	C	D	E	F	G Bolt Size	H	L	N	R	T	Bearing Number	Adapter[3] Assembly Number	Stabilizing[2] Ring 1 Req'd	Triple Seal 2 Req'd	Approx. Wt.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.						lbs.
TTU-55-**12**	1 15/16	4 5/8	28 1/2	3 1/2	1 3/4	26 1/2	-	5/8	9	4	3/4	7 1/4	4	22211K	SNW-11	SR-11-0	LER24	55
TTU-55-**18**		4 5/8	34 1/2	3 1/2	1 3/4	32 1/2	-	5/8	9	4	3/4	7 1/4	4	22211K	SNW-11	SR-11-0	LER24	60
TTU-55-**24**		4 5/8	40 1/2	3 1/2	1 3/4	38 1/2	-	5/8	9	4	3/4	7 1/4	4	22211K	SNW-11	SR-11-0	LER24	65
TTU-65-**12**	2 3/16	5	29 1/2	3 1/2	1 3/4	27 1/2	-	5/8	10	4 1/2	3/4	7 3/4	4	22213K	SNW-13	SR-13-0	LER29	60
TTU-65-**18**		5	35 1/2	3 1/2	1 3/4	33 1/2	-	5/8	10	4 1/2	3/4	7 3/4	4	22213K	SNW-13	SR-13-0	LER29	65
TTU-65-**24**		5	41 1/2	3 1/2	1 3/4	39 1/2	-	5/8	10	4 1/2	3/4	7 3/4	4	22213K	SNW-13	SR-13-0	LER29	70
TTU-75-**6**	2 7/16	5 3/16	24 1/2	3 1/2	1 3/4	22 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	65
TTU-75-**12**		5 3/16	30 1/2	3 1/2	1 3/4	28 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	70
TTU-75-**18**		5 3/16	36 1/2	3 1/2	1 3/4	34 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	75
TTU-75-**24**		5 3/16	42 1/2	3 1/2	1 3/4	40 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	80
TTU-75-**30**		5 3/16	48 1/2	3 1/2	1 3/4	46 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	85
TTU-85-**6**	2 15/16	6	26 1/2	4 5/8	2	24 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	95
TTU-85-**12**		6	32 1/2	4 5/8	2	30 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	100
TTU-85-**18**		6	38 1/2	4 5/8	2	36 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	105
TTU-85-**24**		6	44 1/2	4 5/8	2	42 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	110
TTU-85-**30**		6	50 1/2	4 5/8	2	48 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	115
TTU-100-**12**	3 7/16	6 5/8	34 1/4	4 5/8	2	32	2	3/4	13 7/8	6	1 1/8	10	5 1/2	22220K	SNW-20	SR-20-17	LER102	140
TTU-100-**18**		6 5/8	40 1/4	4 5/8	2	38	2	3/4	13 7/8	6	1 1/8	10	5 1/2	22220K	SNW-20	SR-20-17	LER102	145
TTU-100-**24**		6 5/8	46 1/4	4 5/8	2	44	2	3/4	13 7/8	6	1 1/8	10	5 1/2	22220K	SNW-20	SR-20-17	LER102	150
TTU-100-**30**		6 5/8	52 1/4	4 5/8	2	50	2	3/4	13 7/8	6	1 1/8	10	5 1/2	22220K	SNW-20	SR-20-17	LER102	155
TTU-110-**12**	3 15/16	7 3/4	38 1/2	5 5/8	2 1/4	36	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	200
TTU-110-**18**		7 3/4	44 1/2	5 5/8	2 1/4	42	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	210
TTU-110-**24**		7 3/4	50 1/2	5 5/8	2 1/4	48	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	220
TTU-110-**30**		7 3/4	56 1/2	5 5/8	2 1/4	54	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	230
TTU-110-**36**		7 3/4	62 1/2	5 5/8	2 1/4	60	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	240
TTU-130-**12**	4 7/16	8 5/8	45 3/4	8 3/4	2 3/4	40 3/4	5	1 1/8	18 7/8	7 1/4	2	14 3/8	10	22226K	SNW-26	SR-26-0	LER117	360
TTU-130-**18**		8 5/8	51 3/4	8 3/4	2 3/4	46 3/4	5	1 1/8	18 7/8	7 1/4	2	14 3/8	10	22226K	SNW-26	SR-26-0	LER117	380
TTU-130-**24**		8 5/8	57 3/4	8 3/4	2 3/4	52 3/4	5	1 1/8	18 7/8	7 1/4	2	14 3/8	10	22226K	SNW-26	SR-26-0	LER117	400
TTU-130-**30**		8 5/8	63 3/4	8 3/4	2 3/4	58 3/4	5	1 1/8	18 7/8	7 1/4	2	14 3/8	10	22226K	SNW-26	SR-26-0	LER117	420
TTU-140-**12**	4 15/16	9 1/2	49 1/2	9 3/4	3	44 1/2	5 1/2	1 1/4	20 3/8	7 1/2	2 1/4	16 1/4	11	22228K	SNW-28	SR-28-0	LER122	460
TTU-140-**18**		9 1/2	55 1/2	9 3/4	3	50 1/2	5 1/2	1 1/4	20 3/8	7 1/2	2 1/4	16 1/4	11	22228K	SNW-28	SR-28-0	LER122	480
TTU-140-**24**		9 1/2	61 1/2	9 3/4	3	56 1/2	5 1/2	1 1/4	20 3/8	7 1/2	2 1/4	16 1/4	11	22228K	SNW-28	SR-28-0	LER122	510
TTU-140-**30**		9 1/2	67 1/2	9 3/4	3	62 1/2	5 1/2	1 1/4	20 3/8	7 1/2	2 1/4	16 1/4	11	22228K	SNW-28	SR-28-0	LER122	530

[1] See page B395 for suggested shaft diameter S-1 tolerances.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

[2] Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

[3] Includes sleeve, locknut and lockwasher. Add shaft size to order.

DUSTAC™ SHAFT SEAL

- Suggested for pillow blocks used in extremely contaminated environments, such as taconite mines.
- Provides protection against residual and airborne contaminants that exceeds the triple labyrinth shaft seal.
- Contributes significantly to extending bearing life; reduces costs by helping prevent premature bearing damage.
- Because of its unique design, no special finish is required on the shaft. DUSTAC is a patented device utilizing a V-shaped nitrile ring, which rotates with the shaft and applies pressure to the cartridge face to exclude contaminates.

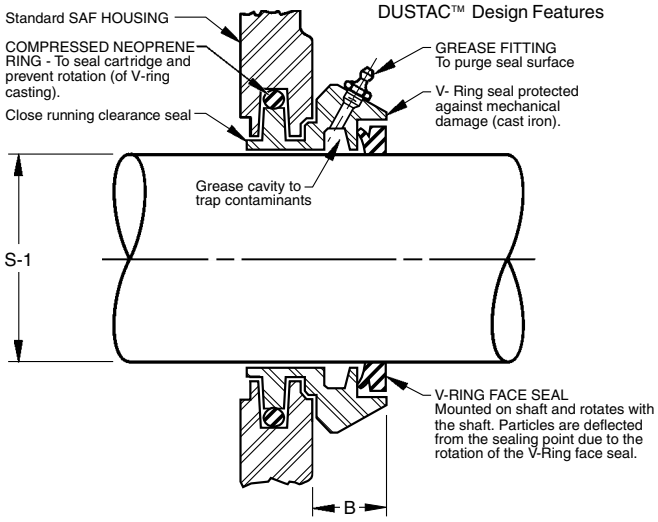
Pillow Block Housing Number		Shaft Diameter	Assembly Standout	DUSTAC™ Seal	V-Ring Seal	O-Ring	End Plug
500	600	S-1	B	Assembly			
515	615	2 7/16	59/64	DV-37	V-60-A	2-228	EPS-4
516	616	2 11/16	59/64	DV-44	V-65-A	2-231	EPS-5
517	—	2 15/16	1	DV-53	V-75-A	2-230	EPS-6
518	—	3 3/16	1	DV-69	V-80-A	2-235	EPS-9
520	620	3 7/16	1	DV-102	V-85-A	2-234	EPS-11
522	622	3 15/16	1	DV-109	V-100-A	2-239	EPS-13
524	624	4 3/16	1 1/16	DV-113	V-110-A	2-238	EPS-14
526	626	4 7/16	1 1/16	DV-117	V-110-A	2-242	EPS-15
528	628	4 15/16	1 1/16	DV-122	V-130-A	2-244	EPS-16
530	630	5 3/16	1 1/16	DV-125	V-130-A	2-247	EPS-17
532	632	5 7/16	1 1/16	DV-130	V-140-A	2-249	EPS-18
534	634	5 15/16	1 1/16	DV-140	V-150-A	2-253	EPS-20
536	636	6 7/16	1 9/64	DV-148	V-160-A	2-259	EPS-21
538	638	6 15/16	1 9/64	DV-155	V-180-A	2-259	EPS-22
540	640	7 3/16	1 9/64	DV-159	V-180-A	2-259	EPS-23
544	—	7 15/16	1 15/32	DV-167	V-200-A	2-262	EPS-25

ORDER INSTRUCTIONS

- Shaft seal may be ordered in place of the standard LER triple ring seals supplied with the pillow blocks listed. They also are available to retrofit existing installations.
- To order any pillow block housings with DUSTAC shaft seal on both sides, add the suffix "DV" to the number (e.g., SAF2522DV).
- To order pillow block housings with DUSTAC shaft seal and one end closed, add the suffix "DC" to the number (e.g., SAF22522DC).
- Standard sizes of DUSTAC shaft seals are shown in the table. Other sizes are available upon request.

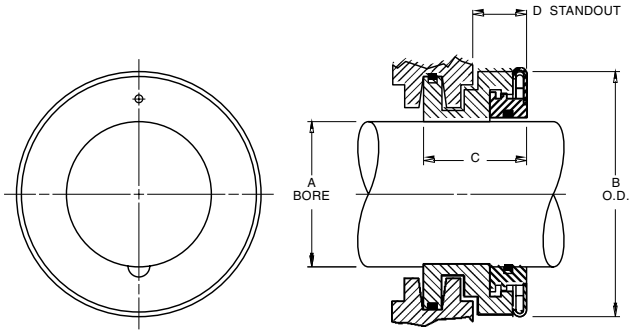
INSTALLATION PROCEDURE

1. Check shaft diameters to print specification. Remove any burrs or sharp edges. Be sure shaft surface is clean and dry beyond the area of seal location.
2. Expand the V-ring seal over the shaft to the approximate inboard position (reference dimension "B" in the tables). *Make sure the lip of the seal faces the bearing.*
3. Slide the seal cartridge onto the shaft until the V-ring fits into its cavity.
4. Mount the bearing, sleeve, lockwasher and locknut in normal manner and adjust for internal clearance.
5. If both ends have seals, repeat steps 2 and 3 with the V-ring going on last with its lip facing the bearing.
6. Thoroughly clean the housing base and remove any paint or burrs from the mating surfaces of the housing cap.
7. Lower shaft, bearing and seals into the housing base, taking care to guide the seals into the seal grooves.
8. On each shaft there must be only one fixed bearing. If bearing is to be fixed, the stabilizing ring can be inserted between the bearing outer ring and the housing shoulder on the locknut side of the bearing. All other bearings on this shaft should be centered in the housing.
9. The upper half of the housing or cap should be thoroughly cleaned and checked for burrs. Place it over the bearing and seals. The dowel pins will align the cap to the base. NOTE: housing caps and bases are not interchangeable.
10. After cap bolts are tightened, it is most important to position the V-ring seal to its proper fitted width. This is accomplished by moving the seal until it is flush with the outside face of the cavity. This provides proper compression of the lip against the cartridge face.



TORR-GARD SEALS

- Using the TORR-GARD greatly increases the operating time between maintenance intervals of rotating equipment.
- Used in split pillow blocks.
- Endures extreme environments such as pulp and paper, chemical and mining because of its exceptional design.
- Two-piece labyrinth seal of Teflon® PTFE fluoropolmer resin. The assembly inhibits the passage of contaminants or lubricants and prevents the components from coming apart during installation and service.
- Installation is simple compared to many other lip-contact type seals and is more effective in reducing lubricant loss, improving plant safety. It is also environmentally friendly.



OTHER BENEFITS INCLUDE:

- Drop-in style eliminates machining or modification to housing.
- Interchangeable with LER or Taconite seals.
- Available for standard SAF and SNH pillow blocks (1 3/4 in. to 8 in. shaft diameter).
- Minimizes lubricant leakage.
- Accommodates greater shaft misalignment or eccentricity.
- Reduced number of components over conventional seals.

TACONITE SEALS

FTV SERIES

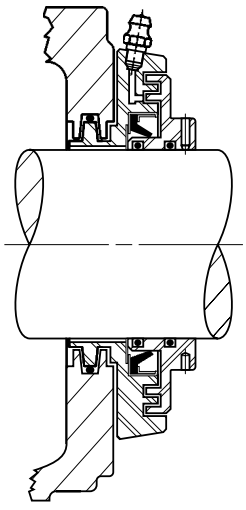
FLINGER TACONITE SEAL WITH V RING

- Combines the qualities of the face labyrinth seal and the DUSTAC seal to improve the sealing efficiency for extremely contaminated environments.
- The rotating flinger, added to the basic design, incorporates face labyrinth grooves and compressing the O-ring in the bore. This protects against incursion of foreign matters and ensures regular pressure of the V-ring to the cartridge face.

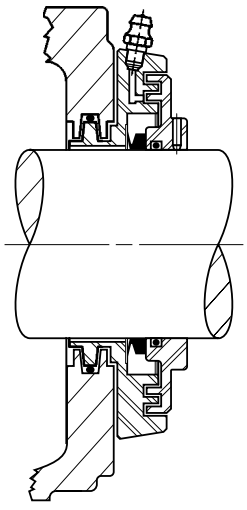
FTL SERIES

FLINGER TACONITE SEAL WITH LIP SEAL

- The FTL seal has the same property as the FTV Series, but above the V-ring is substituted to a lip seal working directly on the Flinger Lip to prevent the shaft of any grooving.
- The FTV and FTL Taconite seals can be substituted in either ER or LER ring SAF pillow block series and do not require modifications to the standard housings.
- **NOTE:** Flinger Taconite seals can be substituted to “ER” or “LER” seal. Add the suffix “L” to the number when it is for a housing using LER Seals (e.g., TFV-515L for SAF-515L pillow block).



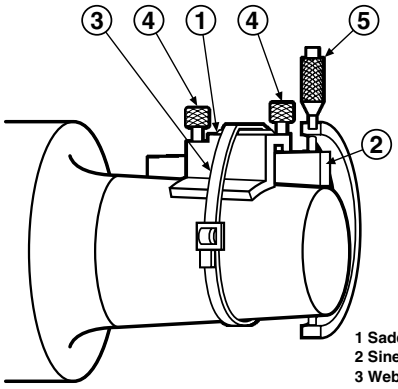
FTL



FTV

SINE BAR GAGES

- Tapered bore, anti-friction bearings are mounted either on adapter sleeves or on tapered shaft seats.
- In cases where tapered bore bearings are mounted directly on the shaft, the shaft must conform to the tapered bore of the bearing to assure proper fit. If proper fit is not achieved, the results could be:
  1. Turning of the bearing inner race on the shaft.
  2. Uneven loading of the bearing.
  3. Severe inner race hoop stress.
  4. Insufficient support (back-up) of the inner race on the shaft.
- All of these conditions could lead to premature bearing damage. Therefore, the manufacture, maintenance and measurement of accurate shaft tapers is important.
- There are two accepted ways of measuring tapered shafts: ring gages and sine bar gages.
- Precision measurement of tapered shafts is difficult with ring gages and may be impossible in the case of large shafts, where gages are large, cumbersome and heavy.
- Sine bar gages provide an accurate and easy method of measurement.
- Lightweight and easy to handle and learn, sine bar gages achieve precise gaging of the shaft size and taper.



1 Saddle
2 Sine Bar
3 Web Clamp
4 Locking Screws
5 Micrometer (not included)

- A complete set for measurement of 1:12 shaft tapers consists of 3 in., 4 in., 5 1/2 in., 7 in., 10 in. and 14 in. sine bar gages, sine bar saddle no. T-5491-C, web clamp no. T-5489-A and a wooden box no. T-5224-C. A complete set for 1:30 shaft tapers consists of 4 in., 6 in., 8 in. and 12 in. sine bar gages.
- Sine bars can be purchased individually, or in any combination of sizes to meet your individual needs.
- All sine bars require a sine bar saddle and web clamp. A wooden box is optional.
- For information on the use of sine bars, prices and delivery, consult your Timken representative.

PART NUMBER	SIZE INCH	FOR BEARINGS
T-3071-C	3.0000	22232K to 22240K
T-3071-C	3.0000	22322K to 22328K
T-3071-C	3.0000	23040K to 23048K
T-3071-C	3.0000	23130K to 23136K
T-3071-C	3.0000	23226K to 23230K
		23960K to 23972K
T-3072-C	4.0000	22248K to 22256K
T-3072-C	4.0000	22330K to 22340K
T-3072-C	4.0000	23052K to 23076K
T-3072-C	4.0000	23138K to 23148K
T-3072-C	4.0000	23232K to 23240K
		23976K to 239/560K
T-3073-C	5.5000	22260K to 22264K
T-3073-C	5.5000	22344K to 22356K
T-3073-C	5.5000	23080K to 230/500K
T-3073-C	5.5000	23152K to 23164K
T-3073-C	5.5000	23244K to 23256K
		239/600K to 239/710K

Note: All sine bars require a sine bar saddle, T-5491-C and a web clamp T-5489-A.

PART NUMBER	SIZE INCH	FOR BEARINGS
T-3074-C	7.0000	230/530K to 230/750K
T-3074-C	7.0000	23168K to 23196K
T-3074-C	7.0000	23260K to 23276K
		239/750K to 239/1120K
T-3075-C	10.0000	230/800K to 230/1180
T-3075-C	10.0000	231/500K to 231/710K
T-3075-C	10.0000	23280K to 232/530K
		230/1250 and up
T-3076-C	14.0000	231/750K and up
T-3076-C	14.0000	232/560K and up
		239/118K and up
T-5476-C	4.0000	24040K to 24056K
T-5476-C	4.0000	24132K to 24144K
T-5477-C	6.0000	24060K to 24084K
T-5477-C	6.0000	24148K to 24160K
T-5478-C	8.0000	24089K to 240/630K
T-5478-C	8.0000	24164K to 24192K
T-5479-C	12.0000	240/670K and up
T-5479-C	12.0000	24196K and up

The table above represents the sine bar sizes developed for a full range of tapered bore bearings with 1:12 and a 1:30 taper. Additional sizes are available to fit a variety of width and taper combinations. Consult your local Timken representative for availability.

HYDRAULIC NUTS

INTRODUCTION

- Designed to install and remove tapered bore bearings with minimal effort.
- Allow better control of the bearing internal clearance reduction without damaging the bearing or other components.
- Substantially reduces downtime during installation or removal of tapered bore bearings.

DESCRIPTION

- Consist of a female threaded ring and a male ring with two O-ring seals.
- All hydraulic nuts are supplied with:
  - Quick connection fittings (male ¼ in. B.S.P. and female 3/8 in. N.P.T.).
  - Two pipe plugs ¼" B.S.P.
  - One set of spare O-rings.

ORDERING COMPONENTS:

- To order spare components for the hydraulic nuts, order part numbers as listed below:
  - O-ring Seal Kits:
    Use the hydraulic nut part number plus the number 132.
    Example: **HMVC 40/132**
  - Pipe Plug ¼ in. B.S.P.:
    Use the hydraulic nut part number plus the number 647.
    Example: **HMVC 40/647**
  - Quick Connection Fittings (male ¼ in. B.S.P. and female $^3/_8$ in. N.P.T.):
    Use the hydraulic nut part number plus the number 849.
    Example: **HMVC 40/849**

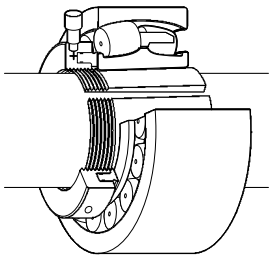
ENGINEERING SERVICES

- Special applications should be referred to a Timken representative for review.

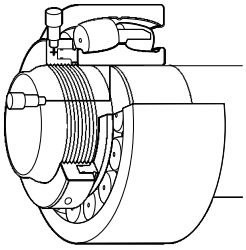
INSTRUCTIONS

- When the hydraulic nut is used, the piston must be in the innermost position.
- For this operation, please ensure that the valve of the hydraulic hose is disconnected from the nut so that the nut is not under pressure.
- To contract the piston inside the female threaded ring, insert a rod or bar in one of the four drilled holes located on the outside diameter of the female threaded ring.
- Screw the hydraulic nut on the thread with the piston in contact with the surface, until the groove machined on the outside diameter of the piston near the outboard face is level with the face of the female threaded ring.
- One of the two threaded holes must be plugged with the ¼" B.S.P. pipe plug before the hydraulic nut is pressurized.
- The maximum pressure permissible in the hydraulic nut is 14,000 psi (110 Kpa).
- The oil viscosity suggested is 1400 SUS (300cst) at operating temperature (SAE 90 oil).
- To avoid overextension of the piston, a second groove has been machined on the outside diameter of the piston inboard of the one used to judge contraction.
- When this second groove is level with the face of the female threaded ring, the piston has reached its length of travel as shown in the illustration. If the second groove of the piston travels past the face of the female threaded ring the hydraulic nut can be damaged.
- Should the oil start to leak from the piston area, it is certain that the O-ring seals are damaged or worn and need to be replaced.
- When the hydraulic nut is not in use, ensure that the threaded holes are plugged to prevent entry of contaminants in the piston cavity.
- To help prevent against corrosion during storage, apply a coat of light oil on the hydraulic nut surfaces.
- Contact your Timken representative to receive special warnings against reasonably unforeseen dangers.

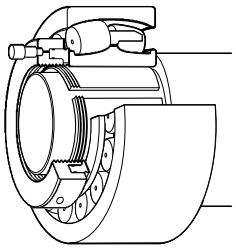
INSTALLATION



Hydraulic nut used to mount the bearing on a pull type sleeve.

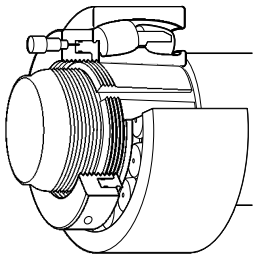


Hydraulic nut used to mount the bearing on tapered journal.



Hydraulic nut used to mount the bearing on a push type adapter sleeve.

REMOVAL



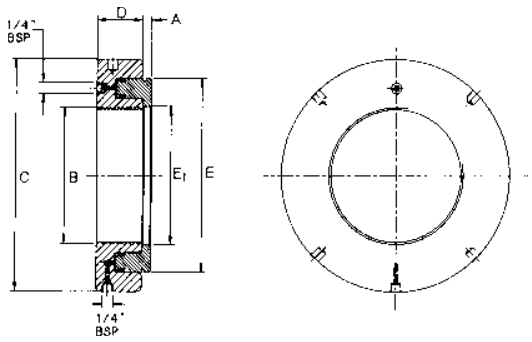
Hydraulic nut used to withdraw a push type adapter sleeve.

HYDRAULIC NUTS – METRIC

Part Number	Threads B	C	D	Dimensions E	E_1	A	Piston Length of Travel	Piston Area	Assembly weight
	mm	mm	mm	mm	mm	mm	mm	mm^2	kg.
HMV - 10	M 50X1.5	114	38	86	51	4	5	2900	2.5
HMV - 12	M 60X2	125	38	94	61	5	5	3200	2.8
HMV - 13	M 65X2	135	38	101	66	5	5	3500	3.0
HMV - 14	M 70X2	140	38	107	71	5	5	3900	3.3
HMV - 15	M 75X2	145	38	112	76	5	5	4100	3.5
HMV - 16	M 80X2	150	38	117	81	5	5	4200	3.8
HMV - 17	M 85X2	155	38	122	86	5	5	4400	3.9
HMV - 18	M 90X2	160	38	127	91	5	5	4800	4.1
HMV - 19	M 95X2	165	38	133	96	5	5	5000	4.4
HMV - 20	M 100X2	170	38	138	101	6	5	5200	4.5
HMV - 21	M 105X2	175	38	143	106	6	5	5400	5.4
HMV - 22	M 110X2	180	38	149	111	6	5	5700	5.7
HMV - 23	M 115X2	185	38	154	116	6	5	5900	5.1
HMV - 24	M 120X2	190	38	159	121	6	5	6100	5.3
HMV - 25	M 125X2	195	38	164	126	6	5	6300	5.4
HMV - 26	M 130X2	200	38	170	131	6	5	6500	5.7
HMV - 27	M 135X2	205	38	175	136	6	5	6700	5.9
HMV - 28	M 140X2	210	38	180	141	7	5	6900	6.1
HMV - 29	M 145X2	215	39	186	146	7	5	7300	6.5
HMV - 30	M 150X2	220	39	190	151	7	5	7500	6.6
HMV - 31	M 155X3	225	39	198	156	7	5	8100	6.9
HMV - 32	M 160X3	235	40	206	161	7	6	8600	7.7
HMV - 33	M 165X3	240	40	209	166	7	6	9000	8.0
HMV - 34	M 170X3	245	41	215	171	7	6	9500	8.4
HMV - 36	M 180X3	255	41	227	181	7	6	10300	9.1
HMV - 38	M 190X3	270	42	239	191	8	7	11500	10.8
HMV - 40	M 200X3	280	43	251	201	8	8	12500	11.4
HMV - 41	Tr 205X4	290	43	256	207	8	8	12900	12.2
HMV - 42	Tr 210X4	295	44	262	212	8	9	13500	12.5
HMV - 43	Tr 215X4	300	44	267	217	8	9	13800	13.0
HMV - 44	Tr 220X4	305	44	273	222	8	9	14400	13.4
HMV - 45	Tr 225X4	315	45	280	227	8	9	15200	14.6
HMV - 46	Tr 230X4	320	45	285	232	8	9	15600	14.8
HMV - 47	Tr 235X4	325	46	291	237	8	10	16200	16.0
HMV - 48	Tr 240X4	330	46	296	242	9	10	16500	16.3
HMV - 50	Tr 250X4	345	46	307	252	9	10	17800	17.6
HMV - 52	Tr 260X4	355	47	319	262	9	11	18800	19.0
HMV - 54	Tr 270X4	370	48	330	272	9	12	19700	20.4
HMV - 56	Tr 280X4	380	49	341	282	9	12	21100	22.0
HMV - 58	Tr 290X4	390	49	353	292	9	13	22600	22.5
HMV - 60	Tr 300X4	405	51	364	302	10	14	23600	25.6
HMV - 62	Tr 310X5	415	52	375	312	10	14	24900	27.0
HMV - 64	Tr 320X5	430	53	387	322	10	14	26300	29.6
HMV - 66	Tr 330X5	440	53	397	332	10	14	27000	31.0
HMV - 68	Tr 340X5	450	53	408	342	10	14	28400	32.5
HMV - 69	Tr 345X5	455	54	414	347	10	14	29400	33.6
HMV - 70	Tr 350X5	465	56	420	352	10	14	30000	35.0
HMV - 72	Tr 360X5	475	56	431	362	10	15	31300	37.0
HMV - 73	Tr 365X5	482	57	436	367	11	15	31700	38.5
HMV - 74	Tr 370X5	490	57	442	372	11	16	32800	39.2
HMV - 76	Tr 380X5	500	58	452	382	11	16	33600	41.0
HMV - 77	Tr 385X5	505	58	459	387	11	16	34700	42.0
HMV - 80	Tr 400X5	525	60	475	402	11	17	36700	46.0
HMV - 82	Tr 410X5	535	61	486	412	11	17	38300	48.2
HMV - 84	Tr 420X5	545	61	498	422	11	17	40000	50.4
HMV - 86	Tr 430X5	555	62	508	432	11	17	40800	53.0
HMV - 88	Tr 440X5	565	62	519	442	12	17	42500	55.0
HMV - 90	Tr 450X5	580	64	530	452	12	17	44100	58.2
HMV - 92	Tr 460X5	590	64	541	462	12	17	45000	61.0
HMV - 94	Tr 470X5	600	65	552	472	12	18	46900	63.7
HMV - 96	Tr 480X5	612	65	563	482	12	19	48500	65.0
HMV - 98	Tr 490X5	625	66	573	492	12	19	49800	69.0
HMV - 100	Tr 500X5	635	67	585	502	12	19	52000	71.5
HMV - 102	Tr 510X6	645	68	596	512	12	20	53300	75.0
HMV - 104	Tr 520X6	657	68	606	522	13	20	54200	77.0
HMV - 106	Tr 530X6	670	69	617	532	13	21	56200	80.0
HMV - 108	Tr 540X6	680	69	629	542	13	21	58200	83.0
HMV - 110	Tr 550X6	692	70	639	552	13	21	59200	86.0
HMV - 112	Tr 560X6	705	71	650	562	13	22	61200	90.0
HMV - 114	Tr 570X6	715	72	661	572	13	23	63200	93.0
HMV - 116	Tr 580X6	725	72	671	582	13	23	64200	96.0
HMV - 120	Tr 600X6	750	73	693	602	13	23	67400	100.0
HMV - 126	Tr 630X6	780	74	726	632	14	23	72900	110.0
HMV - 130	Tr 650X6	805	75	747	652	14	23	76200	116.0
HMV - 134	Tr 670X6	825	76	768	672	14	24	79500	123.0
HMV - 138	Tr 690X6	850	77	791	692	14	25	84200	130.0
HMV - 142	Tr 710X7	870	78	812	712	15	25	87700	137.0
HMV - 150	Tr 750X7	915	79	855	752	15	25	97000	150.0
HMV - 160	Tr 800X7	970	80	908	802	16	25	104000	173.0
HMV - 170	Tr 850X7	1020	83	962	852	16	26	114600	190.0
HMV - 180	Tr 900X7	1070	86	1015	902	17	30	124000	210.0
HMV - 190	Tr 950X8	1125	86	1069	952	17	30	135600	238.0
HMV - 200	Tr 1000X8	1180	88	1122	1002	17	34	145600	263.0
HMV - 212	Tr 1060X8	1255	95	1184	1063	18	34	161200	325.0
HMV - 216	Tr 1080X8	1280	100	1206	1083	18	34	167400	345.0
HMV - 224	Tr 1120X8	1340	106	1250	1123	19	36	178200	410.0
HMV - 236	Tr 1180X8	1420	115	1320	1183	22	40	189200	530.0

HMV - 10 through HMV - 40 have a Metric ISO fine thread profile.
HMV - 41 through HMV-236 have a Metric ISO trapezoidal thread.

HYDRAULIC NUTS – ENGLISH



Part Number	B Maj. Dia.	Threads no. per inch	C	D	Dimensions E	E1	A	Piston Length of Travel	Piston Area	Assembly weight
			inch	inch	inch	inch	inch	inch	inch	lbs.
HMVC - 10	1.967	18	4.488	1.496	3.386	2.008	0.157	0.197	4.5	5.5
HMVC - 12	2.360	18	4.921	1.496	3.701	2.402	0.197	0.197	5.0	6.2
HMVC - 13	2.548	18	5.315	1.496	3.976	2.598	0.197	0.197	5.4	6.6
HMVC - 14	2.751	18	5.512	1.496	4.213	2.795	0.197	0.197	6.0	7.3
HMVC - 15	2.933	12	5.709	1.496	4.409	2.992	0.197	0.197	6.3	7.7
HMVC - 16	3.137	12	5.906	1.496	4.606	3.189	0.197	0.197	6.5	8.4
HMVC - 17	3.340	12	6.102	1.496	4.803	3.386	0.197	0.197	6.8	8.6
HMVC - 18	3.527	12	6.299	1.496	5.000	3.583	0.197	0.197	7.4	9.0
HMVC - 19	3.730	12	6.496	1.496	5.236	3.780	0.197	0.197	7.7	9.7
HMVC - 20	3.918	12	6.693	1.496	5.433	3.976	0.236	0.197	8.1	10.0
HMVC - 22	4.325	12	7.087	1.496	5.866	4.370	0.236	0.197	8.8	12.5
HMVC - 24	4.716	12	7.480	1.496	6.260	4.764	0.236	0.197	9.5	11.7
HMVC - 26	5.106	12	7.874	1.496	6.693	5.157	0.236	0.197	10.1	12.5
HMVC - 28	5.497	12	8.268	1.496	7.087	5.551	0.276	0.197	10.7	13.4
HMVC - 30	5.888	12	8.661	1.535	7.480	5.945	0.276	0.197	11.6	14.5
HMVC - 32	6.284	8	9.252	1.575	8.110	6.339	0.276	0.236	13.3	17.0
HMVC - 34	6.659	8	9.645	1.614	8.465	6.732	0.276	0.236	14.7	18.5
HMVC - 36	7.066	8	10.039	1.615	8.858	7.126	0.276	0.236	16.0	20.0
HMVC - 38	7.472	8	10.630	1.653	9.409	7.520	0.315	0.276	17.8	23.1
HMVC - 40	7.847	8	11.024	1.693	9.882	7.913	0.315	0.276	19.4	25.1
HMVC - 44	8.628	8	12.008	1.732	10.748	8.740	0.315	0.354	22.3	29.5
HMVC - 48	9.442	6	12.992	1.811	11.654	9.528	0.354	0.394	25.6	35.9
HMVC - 52	10.192	6	13.976	1.850	12.559	10.315	0.354	0.433	29.1	41.8
HMVC - 56	11.004	6	14.961	1.929	13.425	11.102	0.354	0.472	32.7	48.4
HMVC - 60	11.785	6	15.945	2.008	14.331	11.890	0.394	0.551	36.6	56.3
HMVC - 64	12.562	6	16.929	2.087	15.236	12.677	0.394	0.551	40.8	65.1
HMVC - 68	13.334	5	17.717	2.087	16.063	13.465	0.394	0.551	44.0	71.5
HMVC - 72	14.170	5	18.701	2.205	16.969	14.252	0.394	0.590	48.5	81.4
HMVC - 76	14.957	5	19.685	2.283	17.795	15.039	0.433	0.630	52.1	90.2
HMVC - 80	15.745	5	20.669	2.362	18.701	15.827	0.433	0.669	56.9	101.2
HMVC - 84	16.532	5	21.457	2.401	19.606	16.614	0.433	0.669	62.0	110.9
HMVC - 88	17.319	5	22.244	2.441	20.433	17.402	0.472	0.669	65.9	121.0
HMVC - 92	18.107	5	23.228	2.520	21.299	18.189	0.472	0.669	69.8	134.2
HMVC - 96	18.894	5	24.094	2.559	22.165	18.976	0.472	0.748	75.2	143.0
HMVC - 100	19.682	5	25.000	2.598	23.031	19.764	0.472	0.748	80.6	157.3
HMVC - 106	20.867	4	26.378	2.716	24.291	20.945	0.512	0.827	87.1	176.0
HMVC - 112	21.923	4	27.756	2.795	25.591	22.126	0.512	0.866	94.9	198.0
HMVC - 120	23.623	4	29.528	2.874	27.283	23.701	0.512	0.905	104.5	220.0
HMVC - 126	24.804	4	30.709	2.913	28.583	24.882	0.551	0.905	113.0	242.0
HMVC - 134	26.379	4	32.480	2.992	30.236	26.457	0.551	0.945	123.2	270.6
HMVC - 142	27.961	3	34.252	3.071	31.969	28.031	0.590	0.984	135.9	301.4
HMVC - 150	29.536	3	36.024	3.110	33.661	29.606	0.590	0.984	150.4	330.0
HMVC - 160	31.504	3	38.189	3.150	35.748	31.575	0.630	0.984	161.2	380.6
HMVC - 170	33.473	3	40.157	3.268	37.874	33.543	0.630	1.024	177.6	418.0
HMVC - 180	35.441	3	42.126	3.386	39.960	35.511	0.669	1.181	192.2	462.0
HMVC - 190	37.410	3	44.291	3.386	42.087	37.480	0.669	1.181	210.2	523.6

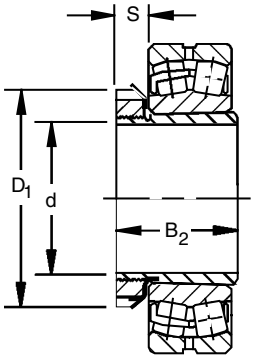
HMVC - 10 through HMVC - 64 have American National Threads Class 3.
HMVC -68 through HMVC-190 have Acme General Purpose Threads Class 3G.

B

SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

SNW/SNP - PULL TYPE SLEEVE, LOCKNUT, LOCKWASHER/LOCKPLATE ASSEMBLIES

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.
- SNW assembly consists of a sleeve, locknut and lockwasher.
- SNP assembly consists of a sleeve, locknut and lockplate.



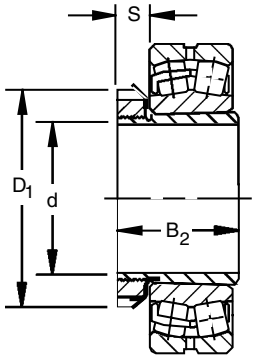
Tapered bore bearing plus SNW.

Bearing Number	Accessory Numbers				Shaft Dimensions		Adapter Dimensions			SNW/SNP Assembly Weight
	Assembly	Sleeve	Locknut	Lockwasher Lockplate	d Diameter	Tolerance +.000" 0	B_2	S	D_1	
					in.	in.	in.	in.	in.	lbs.
SERIES 222K										
22209K	SNW-09	S-09	N-09	W-09	1 7/16	-.003	1 37/64	1/2	2 17/32	0.6
22210K	SNW-10	S-10	N-10	W-10	1 11/16	-.003	1 49/64	9/16	2 11/16	0.7
22211K	SNW-11	S-11	N-11	W-11	1 15/16	-.003	1 27/32	9/16	2 31/32	0.8
22212K	SNW-12	S-12	N-12	W-12	2 1/16	-.004	1 63/64	19/32	3 5/32	1.1
22213K	SNW-13	S-13	N-13	W-13	2 3/16	-.004	2 3/32	5/8	3 3/8	1.4
22214K	SNW-14	S-14	N-14	W-14	2 5/16	-.004	2 11/64	5/8	3 5/8	1.8
22215K	SNW-15	S-15	AN-15	W-15	2 7/16	-.004	2 19/64	43/64	3 7/8	2.0
22216K	SNW-16	S-16	AN-16	W-16	2 11/16	-.004	2 3/8	43/64	4 5/32	2.4
22217K	SNW-17	S-17	AN-17	W-17	2 15/16	-.004	2 31/64	45/64	4 13/32	3.0
22218K	SNW-18	S-18	AN-18	W-18	3 3/16	-.004	2 41/64	25/32	4 21/32	3.0
22219K	SNW-19	S-19	AN-19	W-19	3 5/16	-.004	2 49/64	13/16	4 15/16	3.3
22220K	SNW-20	S-20	AN-20	W-20	3 7/16	-.004	2 7/8	27/32	5 3/16	4.4
22222K	SNW-22	S-22	AN-22	W-22	3 15/16	-.004	3 13/64	29/32	5 23/32	5.0
22224K	SNW-24	S-24	AN-24	W-24	4 3/16	-.005	3 15/32	15/16	6 1/8	6.7
22226K	SNW-26	S-26	AN-26	W-26	4 7/16	-.005	3 49/64	1	6 3/4	8.6
22228K	SNW-28	S-28	AN-28	W-28	4 15/16	-.005	3 63/64	1 1/16	7 3/32	10.3
22230K	SNW-30	S-30	AN-30	W-30	5 3/16	-.005	4 15/64	1 1/8	7 11/16	13.5
22232K	SNW-32	S-32	AN-32	W-32	5 7/16	-.005	4 37/64	1 3/16	8 1/16	15.6
22234K	SNW-34	S-34	AN-34	W-34	5 15/16	-.005	4 27/32	1 7/32	8 21/32	19.4
22236K	SNW-36	S-36	AN-36	W-36	6 7/16	-.005	5 1/32	1 1/4	9 1/16	20.5
22238K	SNW-38	S-38	AN-38	W-38	6 15/16	-.005	5 17/64	1 9/32	9 15/32	23.4
22240K	SNW-40	S-40	AN-40	W-40	7 3/16	-.005	5 31/64	1 11/32	9 27/32	30.5
22244K	SNW-44	S-44	N-044	W-44	7 15/16	-.005	5 29/32	1 3/8	11	33.0
SERIES 230K										
23024K	SNW-3024	S-3024	N-024	W-024	4 3/16	-.005	2 61/64	13/16	5 11/16	6.1
23026K	SNW-3026	S-3026	N-026	W-026	4 7/16	-.005	3 15/64	7/8	6 1/8	7.5
23028K	SNW-3028	S-3028	N-028	W-028	4 15/16	-.005	3 11/32	15/16	6 1/2	8.4
23030K	SNW-3030	S-3030	N-030	W-030	5 3/16	-.005	3 31/64	31/32	7 1/8	9.8
23032K	SNW-3032	S-3032	N-032	W-032	5 7/16	-.005	3 23/32	1 1/32	7 1/2	11.8
23034K	SNW-3034	S-3034	N-034	W-034	5 15/16	-.005	4 1/64	1 1/16	7 7/8	13.3
23036K	SNW-3036	S-3036	N-036	W-036	6 7/16	-.005	4 11/32	1 3/32	8 1/4	15.2
23038K	SNW-3038	S-3038	N-038	W-038	6 15/16	-.005	4 13/32	1 1/8	8 11/16	16.7
23040K	SNW-3040	S-3040	N-040	W-040	7 3/16	-.005	4 3/4	1 3/16	9 7/16	19.7
23044K	SNW-3044	S-3044	N-044	W-044	7 15/16	-.005	5 1/8	1 1/4	10 1/4	24.4
23048K	SNP-3048	S-3048	N-048	P-48	8 15/16	-.006	5 7/16	1 11/32	11 7/16	32.2
23052K	SNP-3052	S-3052	N-052	P-52	9 7/16	-.006	6 1/64	1 13/32	12 3/16	41.1
23056K	SNP-3056	S-3056	N-056	P-56	10 7/16	-.007	6 3/16	1 1/2	13	45.4
23060K	SNP-3060	S-3060	N-060	P-60	10 15/16	-.007	6 47/64	1 9/16	14 3/16	58.9
23064K	SNP-3064	S-3064	N-064	P-64	11 15/16	-.007	6 61/64	1 21/32	15	65.7
23068K	SNP-3068	S-3068	N-068	P-68	12 7/16	-.008	7 35/64	1 25/32	15 3/4	77.8
23072K	SNP-3072	S-3072	N-072	P-72	13 7/16	-.008	7 37/64	1 25/32	16 1/2	86.2
23076K	SNP-3076	S-3076	N-076	P-76	13 15/16	-.008	7 3/4	1 57/64	17 3/4	94.3
23080K	SNP-3080	S-3080	N-080	P-80	15	-.008	8 13/32	2 1/16	18 1/2	100.0

SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

SNW/SNP - PULL TYPE SLEEVE, LOCKNUT, LOCKWASHER/LOCKPLATE ASSEMBLIES

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.
- SNW assembly consists of a sleeve, locknut and lockwasher.
- SNP assembly consists of a sleeve, locknut and lockplate.



Tapered bore bearing plus SNW.

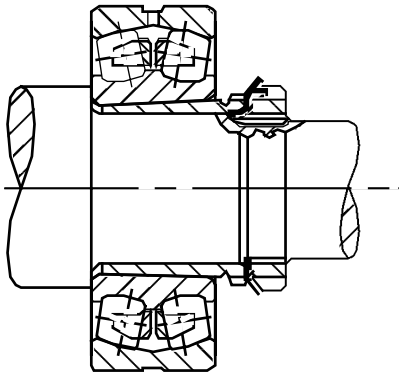
B

Bearing Number		Accessory Numbers				Shaft Dimensions		Adapter Dimensions			SNW/SNP Assembly Weight
		Assembly	Sleeve	Locknut	Lockwasher Lockplate	d Diameter	Tolerance +.000" 0	B_2	S	D_1	
						in.	in.	in.	in.	in.	lbs.
SERIES 223K AND 232K											
22308K		SNW-108	S-108	N-08	W-08	1 5/16	-.003	2 1/64	1/2	2 1/4	0.8
22309K		SNW-109	S-109	N-09	W-09	1 7/16	-.003	2 9/64	1/2	2 17/32	0.8
22310K		SNW-110	S-110	N-10	W-10	1 11/16	-.003	2 25/64	9/16	2 11/16	0.9
22311K		SNW-111	S-111	N-11	W-11	1 15/16	-.003	2 33/64	9/16	2 31/32	0.9
22312K		SNW-112	S-112	N-12	W-12	2 1/16	-.004	2 21/32	19/32	3 5/32	1.2
22313K		SNW-113	S-113	N-13	W-13	2 3/16	-.004	2 49/64	5/8	3 3/8	1.7
22314K		SNW-114	S-114	N-14	W-14	2 5/16	-.004	2 61/64	5/8	3 5/8	2.3
22315K		SNW-115	S-115	AN-15	W-15	2 7/16	-.004	3 5/64	43/64	3 7/8	3.0
22316K		SNW-116	S-116	AN-16	W-16	2 11/16	-.004	3 13/64	43/64	4 5/32	3.2
22317K		SNW-117	S-117	AN-17	W-17	2 15/16	-.004	3 5/16	45/64	4 13/32	3.5
22318K		SNW-118	S-118	AN-18	W-18	3 3/16	-.004	3 35/64	25/32	4 21/32	4.0
22319K		SNW-119	S-119	AN-19	W-19	3 5/16	-.004	3 45/64	13/16	4 15/16	5.0
22320K	23220K	SNW-120	S-120	AN-20	W-20	3 7/16	-.004	3 31/32	27/32	5 3/16	6.2
22322K	23222K	SNW-122	S-122	AN-22	W-22	3 15/16	-.004	4 11/32	29/32	5 23/32	6.5
22324K	23224K	SNW-124	S-124	AN-24	W-24	4 3/16	-.005	4 41/64	15/16	6 1/8	8.0
22326K	23226K	SNW-126	S-126	AN-26	W-26	4 7/16	-.005	4 63/64	1	6 3/4	12.4
22328K	23228K	SNW-128	S-128	AN-28	W-28	4 15/16	-.005	5 21/64	1 1/16	7 3/32	13.0
22330K	23230K	SNW-130	S-130	AN-30	W-30	5 3/16	-.005	5 5/8	1 1/8	7 11/16	17.6
22332K	23232K	SNW-132	S-132	AN-32	W-32	5 7/16	-.005	5 59/64	1 3/16	8 1/16	18.5
22334K	23234K	SNW-134	S-134	AN-34	W-34	5 15/16	-.005	6 3/16	1 7/32	8 21/32	21.0
22336K	23236K	SNW-136	S-136	AN-36	W-36	6 7/16	-.005	6 29/64	1 1/4	9 1/16	22.5
22338K	23238K	SNW-138	S-138	AN-38	W-38	6 15/16	-.005	6 3/4	1 9/32	9 15/32	28.0
22340K	23240K	SNW-140	S-140	AN-40	W-40	7 3/16	-.005	7 3/32	1 11/32	9 27/32	36.0
22344K	23244K	SNW-144	S-144	N-044	W-44	7 15/16	-.005	7 9/32	1 3/8	11	47.0
22348K	23248K	SNP-148	S-148	N-048	P-48	8 15/16	-.006	8 7/64	1 11/32	11 7/16	38.3
22352K	23252K	SNP-152	S-152	N-052	P-52	9 7/16	-.006	8 49/64	1 13/32	12 13/16	53.4
22356K	23256K	SNP-3256	S-3256	N-056	P-56	10 7/16	-.007	8 15/16	1 1/2	13	61.3
SERIES 231K											
23122K		SNW-3122	S-22	N-022	W-022	3 15/16	-.004	3 13/64	25/32	5 5/32	4.2
23124K		SNW-3124	S-24	N-024	W-024	4 3/16	-.005	3 15/32	13/16	5 11/16	5.8
23126K		SNW-3126	S-26	N-026	W-026	4 7/16	-.005	3 49/64	7/8	6 1/8	8.3
23128K		SNW-3128	S-28	N-028	W-028	4 15/16	-.005	3 63/64	15/16	6 1/2	8.8
23130K		SNW-3130	S-30	N-030	W-030	5 3/16	-.005	4 15/64	31/32	7 1/8	13.7
23132K		SNW-3132	S-32	N-032	W-032	5 7/16	-.005	4 37/64	1 1/32	7 1/2	13.3
23134K		SNW-3134	S-34	N-034	W-034	5 15/16	-.005	4 27/32	1 1/16	7 7/8	16.1
23136K		SNW-3136	S-36	N-036	W-036	6 7/16	-.005	5 1/32	1 3/32	8 1/4	17.1
23138K		SNW-3138	S-38	N-038	W-038	6 15/16	-.005	5 17/64	1 1/8	8 11/16	19.7
23140K		SNW-3140	S-40	N-040	W-040	7 3/16	-.005	5 31/64	1 3/16	9 7/16	28.4
23144K		SNW-3144	S-44	N-044	W-044	7 15/16	-.005	5 29/32	1 1/4	10 1/4	28.1
23148K		SNP-3148	S-48	N-048	P-48	8 15/16	-.006	6 41/64	1 11/32	11 7/16	36.0
23152K		SNP-3152	S-52	N-052	P-52	9 7/16	-.006	7 19/32	1 13/32	12 3/16	39.0
23156K		SNP-3156	S-3156	N-056	P-56	10 7/16	-.007	7 49/64	1 1/2	13	60.0
23160K		SNP-3160	S-3160	N-060	P-60	10 15/16	-.007	8 3/8	1 9/16	14 3/16	65.0
23164K		SNP-3164	S-3164	N-064	P-64	11 15/16	-.007	9 7/64	1 21/32	15	70.0

SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

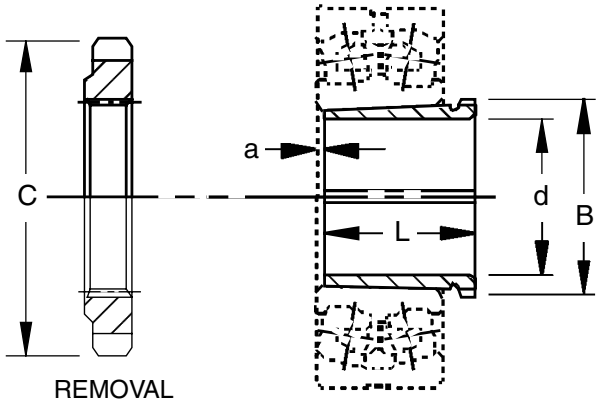
PUSH TYPE REMOVABLE SLEEVE, LOCKNUT AND LOCKWASHER

- The chart below shows dimensions for adapter assemblies and components used in the tapered bore bearings on shafts.



B

Bearing Number	Accessory Numbers				Shaft Dimensions		Adapter Dimensions			C	Sleeve Weight
	Sleeve	Locknut	Lockwasher Lockplate	Removal Nut	d Diameter	Tolerance +.000" 0	B Pitch Diameter	L	a	Removal Nut O.D.	
					mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.
SERIES 222K											
22216K	SK-8022	N-14	W-14	AN-18	70 2.7559	–.10 –.004	88.19 3.472	50 1.969	3.50 0.138	118.39 4.661	0.5 1.2
22217K	SK-8522	AN-15	W-15	AN-19	75 2.9528	–.10 –.004	93.35 3.675	52 2.047	3.50 0.138	125.55 4.943	0.6 1.4
22218K	SK-9022	AN-16	W-16	AN-20	80 3.1496	–.10 –.004	98.12 3.863	53 2.087	3.50 0.138	131.90 5.193	0.6 1.5
22219K	SK-9522	AN-17	W-17	AN-21	85 3.3465	–.10 –.004	103.28 4.066	57 2.244	4.00 0.157	138.25 5.443	0.8 1.8
22220K	SK-10022	AN-18	W-18	AN-22	90 3.5433	–.10 –.004	109.12 4.269	59 2.323	4.00 0.157	145.39 5.724	0.9 2.0
22222K	SK-11022	AN-20	W-20	ARN-22	100 3.9370	–.10 –.004	119.94 4.722	65 2.559	4.00 0.157	158.75 6.250	1.1 2.4
22224K	SK-12022	AN-22	W-22	ARN-24	110 4.3307	–.13 –.005	130.28 5.129	72 2.835	4.00 0.157	174.63 6.875	1.4 3.1
22226K	SK-13022	AN-22	W-22	ARN-26	115 4.5276	–.13 –.005	141.38 5.566	78 3.071	4.00 0.15.7	184.15 7.250	2.2 5.0
22228K	SK-14022	AN-24	W-24	RN-28	125 4.9213	–.13 –.005	152.73 6.013	82 3.228	5.00 0.197	200.03 7.875	2.6 5.8
22230K	SK-15022	AN-26	W-26	RN-30	135 5.3150	–.13 –.005	163.04 6.419	88 3.465	5.00 0.197	209.55 8.250	3.0 6.8
22232K	SK-16022	AN-28	W-28	RN-32	140 5.5118	–.13 –.005	173.76 6.841	96 3.780	5.00 0.197	225.43 8.875	4.5 9.9
22234K	SK-17022	AN-30	W-30	RN-34	150 5.9055	–.13 –.005	184.07 7.247	104 4.095	5.00 0.197	234.95 9.250	5.2 11.5
22236K	SK-18022	AN-32	W-32	RN-36	160 6.2992	–.13 –.005	194.79 7.669	104 4.095	5.00 0.197	247.65 9.750	5.6 12.5
22238K	SK-19022	AN-34	W-34	RN-38	170 6.6929	–.13 –.005	205.92 8.107	112 4.409	5.00 0.197	269.88 10.625	6.5 14.5
22240K	SK-20022	AN-36	W-36	N-044	180 7.0866	–.13 –.005	217.02 8.544	118 4.646	5.00 0.197	279.53 11.005	7.4 16.3
22244K	SK-22022	AN-40	W-40	N-048	200 7.8740	–.13 –.005	236.98 9.330	130 5.118	6.00 0.236	290.65 11.443	8.8 19.6
22248K	SK-24022	N-44	W-44	N-052	220 8.6614	–.15 –.006	256.03 10.080	144 5.669	6.00 0.236	309.70 12.193	11.0 24.3
22252K	SK-26022	N-048	P-48	N-056	240 9.4488	–.15 –.006	276.66 10.892	155 6.102	6.00 0.236	330.33 13.005	14.0 30.9
22256K	SK-28022	N-052	P-52	RN-56	260 10.2362	–.15 –.006	301.27 11.861	155 6.102	8.00 0.315	425.45 16.750	15.0 33.1
22260K	SK-30022	N-056	P-56	RN-60	280 11.0236	–.15 –.006	325.88 12.830	170 6.693	8.00 0.315	416.10 16.382	17.7 39.2
22264K	SK-32022	N-060	P-60	RN-64	300 11.8110	–.15 –.006	345.72 13.611	180 7.087	10.00 0.394	431.8 17.000	21.0 46.3



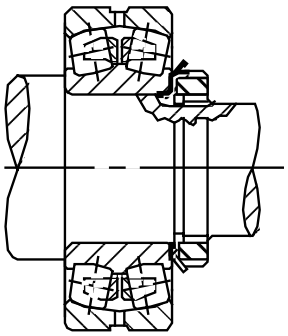
Tapered bore bearing mounted with push type removable sleeve.

Bearing Number	Accessory Numbers				Shaft Dimensions		Adapter Dimensions			C	Sleeve Weight
	Sleeve	Locknut	Lockwasher Lockplate	Removal Nut	d Diameter	Tolerance +.000" 0	B Pitch Diameter	L	a	Removal Nut O.D.	
					mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.
SERIES 223K											
22308K	SK-4023	N-07	W-07	N-09	35 1.3780	–.08 –.003	43.94 1.730	40 1.575	3.00 0.118	64.41 2.536	0.1 0.2
22309K	SK-4523	N-08	W-08	N-10	40 1.5748	–.08 –.003	49.02 1.930	44 1.732	3.00 0.118	68.40 2.693	0.1 0.3
22310K	SK-5023	N-09	W-09	RN-10	45 1.7717	–.08 –.003	55.04 2.167	50 1.969	3.00 0.118	76.20 3.000	0.2 0.4
22311K	SK-5523	N-10	W-10	RN-11	50 1.9685	–.08 –.003	60.20 2.370	54 2.126	3.00 0.118	81.76 3.219	0.2 0.5
22312K	SK-6023	N-11	W-11	RN-12	55 2.1654	–.10 –.004	65.76 2.589	57 2.244	3.50 0.138	87.33 3.438	0.3 0.6
22313K	SK-6523	N-12	W-12	AN-15	60 2.3622	–.10 –.004	73.10 2.878	61 2.402	3.50 0.138	98.55 3.880	0.3 0.8
22314K	SK-7023	N-12	W-12	AN-16	60 2.3622	–.10 –.004	78.28 3.082	65 2.559	3.50 0.138	105.69 4.161	0.6 1.5
22315K	SK-7523	N-13	W-13	AN-17	65 2.5591	–.10 –.004	83.44 3.285	69 2.717	3.50 0.138	112.04 4.411	0.8 1.7
22316K	SK-8023	N-14	W-14	AN-18	70 2.7559	–.10 –.004	88.19 3.472	72 2.835	3.50 0.138	118.39 4.661	0.9 2.0
22317K	SK-8523	AN-15	W-15	AN-19	75 2.9528	–.10 –.004	93.35 3.675	75 2.953	3.50 0.138	125.55 4.943	1.0 2.2
22318K	SK-9023	AN-16	W-16	AN-20	80 3.1496	–.10 –.004	98.12 3.863	80 3.150	3.50 0.138	131.90 5.193	1.1 2.5
22319K	SK-9523	AN-17	W-17	AN-21	85 3.3465	–.10 –.004	103.28 4.066	85 3.346	4.00 0.157	138.25 5.443	1.3 2.9
22320K	SK-10023	AN-18	W-18	AN-22	90 3.5433	–.10 –.004	109.12 4.269	90 3.543	4.00 0.157	145.39 5.724	1.5 3.3
22322K	SK-11023	AN-20	W-20	ARN-22	100 3.9370	–.10 –.004	119.94 4.722	98 3.858	4.00 0.157	158.75 6.250	1.9 4.2
22324K	SK-12023	AN-22	W-22	ARN-24	110 4.3307	–.13 –.005	130.28 5.129	105 4.134	4.00 0.157	174.63 6.875	2.2 5.0
22326K	SK-13023	AN-22	W-22	ARN-26	115 4.5276	–.13 –.005	141.38 5.566	115 4.528	4.00 0.157	184.15 7.250	3.6 8.0
22328K	SK-14023	AN-24	W-24	RN-28	125 4.9213	–.13 –.005	152.73 6.013	125 4.921	5.00 0.197	200.03 7.875	4.3 9.5
22330K	SK-15023	AN-26	W-26	RN-30	135 5.3150	–.13 –.005	163.04 6.419	135 5.315	5.00 0.197	209.55 8.250	5.1 11.4
22332K	SK-16023	AN-28	W-28	RN-32	140 5.5118	–.13 –.005	173.76 6.841	140 5.512	6.00 0.236	225.43 8.875	7.0 15.5
22334K	SK-17023	AN-30	W-30	RN-34	150 5.9055	–.13 –.005	184.07 7.247	146 5.748	6.00 0.236	234.95 9.250	7.8 17.2
22336K	SK-18023	AN-32	W-32	RN-36	160 6.2992	–.13 –.005	194.79 7.669	154 6.063	6.00 0.236	247.65 9.750	9.1 20.2
22338K	SK-19023	AN-34	W-34	RN-38	170 6.6929	–.13 –.005	205.92 8.107	160 6.299	7.00 0.276	269.88 10.625	10.0 22.1
22340K	SK-20023	AN-36	W-36	N-044	180 7.0866	–.13 –.005	217.02 8.544	170 6.693	7.00 0.276	279.53 11.005	11.4 25.2
22344K	SK-22023	AN-40	W-40	N-048	200 7.8740	–.13 –.005	236.98 9.330	181 7.126	8.00 0.315	290.65 11.443	13.3 29.5
22348K	SK-24023	N-44	W-44	N-052	220 8.6614	–.15 –.006	256.03 10.080	189 7.441	8.00 0.315	309.70 12.193	15.5 34.2
22352K	SK-26023	N-048	P-48	N-056	240 9.4488	–.15 –.006	276.66 10.892	200 7.874	8.00 0.315	330.33 13.005	18.2 40.2
22356K	SK-28023	N-052	P-52	RN-56	260 10.2362	–.15 –.006	301.27 11.861	210 8.268	10.00 0.394	425.45 16.75	22.0 48.5

SHAFT ADAPTER ACCESSORIES FOR STRAIGHT BORE BEARINGS

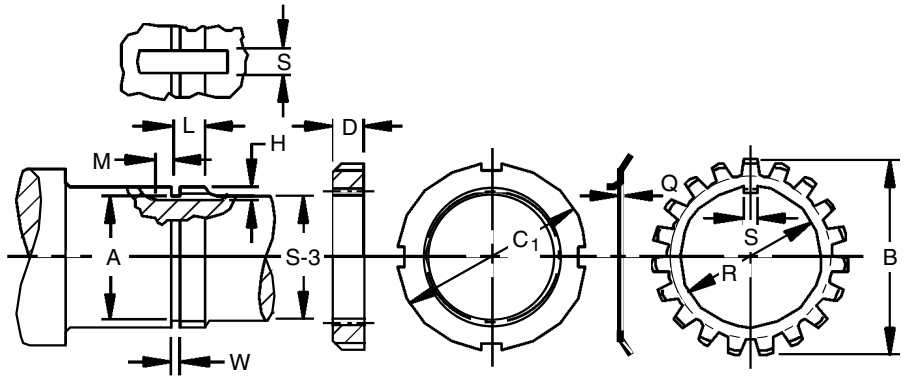
LOCKNUT AND LOCKWASHER

- The chart below shows dimensions for locknuts and lockwashers used in the mounting of straight bore bearings on shafts.
- Other dimensions and tolerances related to shaft configurations are also shown.
- Dimensions are presented according to bearing bore size and are applicable to bearings in the various series (e.g., 222 and 223 etc.).



Bearing Bore	Locknut	Lockwasher	Threads Per Inch	Threads					
				Major Diameter Min.	Major Diameter Max.	Pitch Diameter Min.	Pitch Diameter Max.	Minor Dia.	A Relief Dia.
mm				mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
35	N 07	W 07	18	34.740 1.3678	34.950 1.3760	33.930 1.3359	34.030 1.3399	33.220 1.3078	32.820 1.2922
40	N 08	W 08	18	39.490 1.5548	39.700 1.5630	38.670 1.5224	38.780 1.5269	37.970 1.4948	37.570 1.4792
45	N 09	W 09	18	44.670 1.7588	44.880 1.7670	43.850 1.7264	43.960 1.7309	43.150 1.6988	42.750 1.6832
50	N 10	W 10	18	49.750 1.9588	49.960 1.9670	48.930 1.9264	49.050 1.9309	48.230 1.8988	47.830 1.8832
55	N 11	W 11	18	54.580 2.1488	54.790 2.1570	53.740 2.1158	53.870 2.1209	53.060 2.0888	52.660 2.0732
60	N 12	W 12	18	59.740 2.3518	59.940 2.3600	58.900 2.3188	59.030 2.3239	58.210 2.2918	57.820 2.2762
65	N 13	W 13	18	64.510 2.5398	64.720 2.5480	63.670 2.5068	63.800 2.5119	62.990 2.4798	62.590 2.4642
70	N 14	W 14	18	69.670 2.7428	69.880 2.7510	68.830 2.7098	68.960 2.7149	68.140 2.6828	67.750 2.6672
75	AN 15	W 15	12	74.210 2.9218	74.500 2.9330	72.990 2.8735	73.120 2.8789	71.900 2.8308	71.110 2.7995
80	AN 16	W 16	12	79.400 3.1258	79.680 3.1370	78.160 3.0770	78.310 3.0829	77.080 3.0348	76.290 3.0035
85	AN 17	W 17	12	84.550 3.3288	84.840 3.3400	83.310 3.2800	83.460 3.2859	82.240 3.2378	81.450 3.2065
90	AN 18	W 18	12	89.300 3.5158	89.590 3.5270	88.020 3.4655	88.210 3.4729	86.990 3.4248	86.200 3.3935
95	AN 19	W 19	12	94.460 3.7188	94.740 3.7300	93.180 3.6685	93.370 3.6759	92.150 3.6278	91.350 3.5965
100	AN 20	W 20	12	99.230 3.9068	99.520 3.9180	97.960 3.8565	98.140 3.8639	96.920 3.8158	96.130 3.7845
105	AN 21	W 21	12	104.410 4.1108	104.700 4.1220	103.110 4.0596	103.320 4.0679	102.100 4.0198	101.310 3.9885
110	AN 22	W 22	12	109.570 4.3138	109.860 4.3250	108.270 4.2626	108.480 4.2709	107.260 4.2228	106.460 4.1915
120	AN 24	W 24	12	119.500 4.7048	119.790 4.7160	118.200 4.6536	118.410 4.6619	117.190 4.6138	116.400 4.5825
130	AN 26	W 26	12	129.410 5.0948	129.690 5.1060	128.110 5.0436	128.320 5.0519	127.100 5.0038	126.300 4.9725
140	AN 28	W 28	12	139.340 5.4858	139.620 5.4970	138.040 5.4346	138.250 5.4429	137.030 5.3948	136.230 5.3635
150	AN 30	W 30	12	149.270 5.8768	149.560 5.8880	147.970 5.8256	148.180 5.8339	146.960 5.7858	146.160 5.7545
160	AN 32	W 32	8	159.230 6.2688	159.610 6.2840	157.320 6.1937	157.550 6.2028	155.720 6.1306	154.920 6.0993
170	AN 34	W 34	8	168.750 6.6438	169.140 6.6590	166.850 6.5687	167.080 6.5778	165.240 6.5056	164.450 6.4743
180	AN 36	W 36	8	179.090 7.0508	179.480 7.0660	177.180 6.9757	177.410 6.9848	175.580 6.9126	174.790 6.8813
190	AN 38	W 38	8	189.400 7.4568	189.790 7.4720	187.500 7.3817	187.730 7.3908	185.890 7.3186	185.100 7.2873
200	AN 40	W 40	8	198.930 7.8318	199.310 7.8470	196.960 7.7544	197.250 7.7658	195.420 7.6936	194.620 7.6623
220	N 044	W 44	8	218.770 8.6128	219.150 8.6280	216.780 8.5347	217.090 8.5468	215.250 8.4746	214.460 8.4433

(1) See page B395 for suggested S-3 shaft limits.



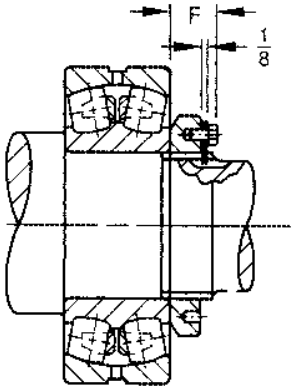
Shaft						Locknut		Lockwasher			
S-3[1]	W +1/64 0	L +1/64 0	H +1/64 0	S +1/64 0	M +1/64 0	C_1	D	Q	R	B	S
mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
31.750 1 1/4	2.4 3/32	12.7 1/2	2.4 3/32	4.8 3/16	3.2 1/8	52.39 2 1/16	11.40 0.448	1.30 0.050	36.00 1.416	57.20 2 1/4	4.50 0.176
36.510 1 7/16	3.2 1/8	13.5 17/32	2.4 3/32	7.9 5/16	3.2 1/8	57.15 2 1/4	11.40 0.448	1.50 0.058	40.70 1.603	62.70 2 15/32	7.40 0.290
42.860 1 11/16	3.2 1/8	13.5 17/32	2.4 3/32	7.9 5/16	4.0 5/32	64.30 2 17/32	11.40 0.448	1.50 0.058	46.20 1.817	69.50 2 47/64	7.40 0.290
47.630 1 7/8	3.2 1/8	15.1 19/32	2.4 3/32	7.9 5/16	4.0 5/32	68.30 2 11/16	13.00 0.510	1.50 0.058	51.20 2.017	74.20 2 59/64	7.40 0.290
52.390 2 1/16	3.2 1/8	15.1 19/32	3.2 1/8	7.9 5/16	4.0 5/32	75.40 2 31/32	13.00 0.510	1.60 0.063	56.10 2.207	79.00 3 7/64	7.40 0.290
57.150 2 1/4	3.2 1/8	15.9 5/8	3.2 1/8	7.9 5/16	4.0 5/32	80.20 3 5/32	13.70 0.541	1.60 0.063	61.60 2.425	85.00 3 11/32	7.40 0.290
61.910 2 7/16	3.2 1/8	16.7 21/32	3.2 1/8	7.9 5/16	4.0 5/32	85.70 3 3/8	14.60 0.573	1.60 0.063	66.40 2.613	90.90 3 37/64	7.40 0.290
66.680 2 5/8	3.2 1/8	16.7 21/32	3.2 1/8	7.9 5/16	6.4 1/4	92.10 3 5/8	14.60 0.573	1.60 0.063	71.50 2.816	97.20 3 53/64	7.40 0.290
71.440 2 13/16	4.0 5/32	17.5 11/16	3.2 1/8	7.9 5/16	6.4 1/4	98.40 3 7/8	15.30 0.604	1.60 0.072	76.30 3.003	104.40 4 7/64	7.40 0.290
76.200 3	4.0 5/32	17.5 11/16	3.2 1/8	9.5 3/8	6.4 1/4	105.60 4 5/32	15.30 0.604	1.80 0.072	81.50 3.207	111.10 4 3/8	9.00 0.353
80.960 3 3/16	4.0 5/32	16.7 21/32	3.2 1/8	9.5 3/8	6.4 1/4	111.90 4 13/32	16.10 0.635	1.80 0.072	87.00 3.425	117.50 4 5/8	9.00 0.353
85.730 3 3/8	4.0 5/32	20.6 13/16	4.0 5/32	9.5 3/8	6.4 1/4	118.30 4 21/32	17.70 0.698	2.40 0.094	91.70 3.612	125.40 4 15/16	9.00 0.353
90.490 3 9/16	4.0 5/32	21.4 27/32	4.0 5/32	9.5 3/8	6.4 1/4	125.40 4 15/16	18.50 0.729	2.40 0.094	97.30 3.830	132.60 5 7/32	9.00 0.353
96.840 3 13/16	4.0 5/32	22.2 7/8	4.0 5/32	9.5 3/8	7.9 5/16	131.80 5 3/16	19.30 0.760	2.40 0.094	102.10 4.018	139.70 5 1/2	9.00 0.353
100.010 3 15/16	4.0 5/32	22.2 7/8	4.0 5/32	9.5 3/8	7.9 5/16	138.10 5 7/16	19.30 0.760	2.40 0.094	107.20 4.222	144.90 5 45/64	9.00 0.353
106.360 4 3/16	4.0 5/32	23 29/32	4.8 3/16	9.5 3/8	7.9 5/16	145.30 5 23/32	20.10 0.791	3.20 0.125	112.40 4.425	154.00 6 1/16	9.00 0.353
115.890 4 9/16	4.0 5/32	23.8 15/16	4.8 3/16	9.5 3/8	7.9 5/16	155.60 6 1/8	20.90 0.823	3.20 0.125	122.70 4.831	164.30 6 15/32	9.00 0.353
125.410 4 15/16	4.0 5/32	25.4 1	4.8 3/16	12.7 1/2	7.9 5/16	171.50 6 3/4	22.50 0.885	3.20 0.125	132.70 5.226	178.60 7 1/32	11.10 0.435
134.940 5 5/16	4.0 5/32	27 1 1/16	4.8 3/16	15.9 5/8	7.9 5/16	180.20 7 3/32	24.10 0.948	3.20 0.125	142.70 5.617	188.90 7 7/16	15.00 0.590
146.050 5 3/4	4.0 5/32	28.6 1 1/8	5.6 7/32	15.9 5/8	9.5 3/8	195.30 7 11/16	24.90 0.979	4.00 0.156	152.90 6.018	204.80 8 1/16	15.00 0.590
153.990 6 1/16	6.4 1/4	30.2 1 3/16	6.0 15/64	15.9 5/8	9.5 3/8	204.80 8 1/16	26.40 1.041	4.00 0.156	163.20 6.424	214.30 8 7/16	15.00 0.590
163.510 6 7/16	6.4 1/4	31 1 7/32	6.0 15/64	19.1 3/4	9.5 3/8	219.90 8 21/32	27.30 1.073	4.00 0.156	172.70 6.799	230.20 9 1/16	18.20 0.715
174.630 6 7/8	6.4 1/4	31.8 1 1/4	6.0 15/64	19.1 3/4	9.5 3/8	230.20 9 1/16	28.00 1.104	4.00 0.156	183.00 7.206	239.70 9 7/16	18.20 0.715
184.150 7 1/4	6.4 1/4	32.5 1 9/32	6.0 15/64	19.1 3/4	9.5 3/8	240.50 9 15/32	28.80 1.135	4.00 0.156	193.30 7.612	250.80 9 7/8	18.20 0.715
193.680 7 5/8	6.4 1/4	34.1 1 11/32	6.0 15/64	22.2 7/8	9.5 3/8	250.00 9 27/32	30.40 1.198	4.00 0.156	203.60 8.017	261.90 10 5/16	21.30 0.840
211.140 8 5/16	6.4 1/4	34.9 1 3/8	9.5 3/8	27.0 1 1/16	9.5 3/8	279.40 11	31.80 1.250	3.20 0.125	221.10 8.703	290.50 11 7/16	23.90 0.940

[1] See page B395 for suggested S-3 shaft limits.

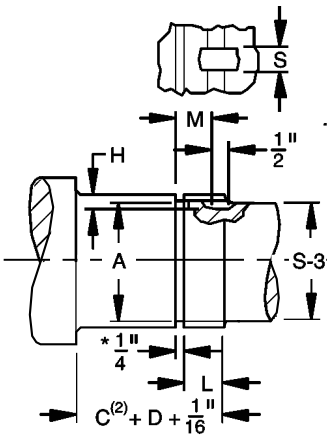
SHAFT ADAPTER ACCESSORIES FOR STRAIGHT BORE BEARINGS

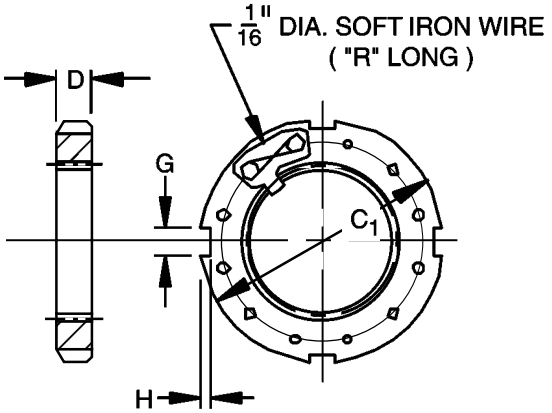
LOCKNUT AND LOCKPLATE

- The chart below shows dimensions for locknuts and lockplates used in the mounting of straight bore bearings on shafts.
- Other dimensions and tolerances related to shaft configuratiosn are also shown.
- Dimensions are presented according to bearing bore size and are applicable to bearings in the various series (e.g., 222,223 etc.).



Bearing Bore	Locknut	Lockplate	Threads Per Inch	Threads					
				Major Diameter Min.	Major Diameter Max.	Pitch Diameter Min.	Pitch Diameter Max.	Minor Dia.	A Relief Dia.
mm				mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
240	N 048	P 48	6	239.31 9.4218	239.83 9.442	236.76 9.3213	237.08 9.3337	234.63 9.2374	233.44 9.1905
260	N 052	P 52	6	258.36 10.1718	258.88 10.192	255.8 10.0707	256.13 10.0837	253.68 9.9874	252.49 9.9405
280	N 056	P 56	6	278.99 10.9838	279.50 11.004	276.42 10.8827	276.75 10.8957	274.31 10.7994	273.11 10.7525
300	N 060	P 60	6	298.83 11.7648	299.34 11.785	296.26 11.6637	296.59 11.6767	294.14 11.5804	292.95 11.5335
320	N 064	P 64	6	318.56 12.5418	319.08 12.562	315.98 12.4402	316.32 12.4537	313.88 12.3574	312.69 12.3105
340	N 068	P 68	5	337.49 13.287	337.90 13.303	334.95 13.187	335.36 13.203	332.31 13.083	331.11 13.036
360	N 072	P 72	5	358.60 14.118	359.00 14.134	356.06 14.018	356.46 14.034	353.42 13.914	352.22 13.867
380	N 076	P 76	5	378.59 14.905	378.99 14.921	376.05 14.805	376.45 14.821	373.41 14.701	372.21 14.654
400	N 080	P 80	5	398.60 15.693	399.01 15.709	396.06 15.593	396.47 15.609	393.42 15.489	392.23 15.442
420	N 084	P 84	5	418.59 16.480	419.00 16.496	416.05 16.380	416.46 16.396	413.41 16.276	412.22 16.229
440	N 088	P 88	5	438.58 17.267	438.99 17.283	436.05 17.167	436.45 17.183	433.40 17.063	432.21 17.016
460	N 092	P 92	5	458.60 18.055	459.00 18.071	456.06 17.955	456.46 17.971	453.42 17.851	452.22 17.804
480	N 096	P 96	5	478.59 18.842	478.99 18.858	476.05 18.742	476.45 18.758	473.41 18.638	472.21 18.591
500	N 500	P 500	5	498.60 19.630	499.01 19.646	496.06 19.530	496.47 19.546	493.42 19.426	492.23 19.379
530	N 530	P 530	4	528.50 20.807	529.01 20.827	525.32 20.682	525.83 20.702	522.15 20.557	520.55 20.494
560	N 560	P 560	4	558.50 21.988	559.00 22.008	555.32 21.863	555.83 21.883	552.15 21.738	550.55 21.675
600	N 600	P 600	4	598.50 23.563	599.01 23.583	595.33 23.438	595.83 23.458	592.15 23.313	590.55 23.250
630	N 630	P 630	4	628.50 24.744	629.01 24.764	625.32 24.619	625.83 24.639	622.15 24.494	520.55 24.431
670	N 670	P 670	4	668.50 26.319	669.01 26.339	665.33 26.194	665.84 26.214	662.15 26.069	660.55 26.006
710	N 710	P 710	3	708.33 27.887	709.02 27.914	704.09 27.720	704.77 27.747	700.02 27.56	698.42 27.497
750	N 750	P 750	3	748.34 29.462	749.02 29.489	744.09 29.295	744.78 29.322	740.03 29.135	738.43 29.072
800	N 800	P 800	3	798.32 31.430	799.01 31.457	794.08 31.263	794.77 31.290	790.02 31.103	788.42 31.040
850	N 850	P 850	3	848.34 33.399	849.02 33.426	844.09 33.232	844.78 33.259	840.03 33.072	838.43 33.009
900	N 900	P 900	3	898.32 35.367	899.01 35.394	894.08 35.200	894.77 35.227	890.02 35.040	888.42 34.977
950	N 950	P 950	3	948.33 37.336	949.02 37.363	944.09 37.169	944.78 37.196	940.03 37.009	938.43 36.946





* Sizes N670 and above : 3/8"

Shaft					Locknut / Lockplate					
S-3(1)	L +1/64 0	H +1/64 0	S +1/64 0	M +1/64 0	C_1	D	G	H ±.010"	R	F
mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
233.36 9 3/16	42.86 1 11/16	11.1 7/16	28.6 1 1/8	34.9 1 3/8	290.5 11 7/16	34.1 1 11/32	22.48 0.885	9.5 3/8	203.2 8	43.26 1 45/64
252.41 9 15/16	45.24 1 25/32	11.1 7/16	30.2 1 3/16	37.3 1 15/32	309.6 12 3/16	35.7 1 13/32	22.48 0.885	9.5 3/8	228.6 9	44.85 1 49/64
273.05 10 3/4	47.63 1 7/8	11.1 7/16	31.8 1 1/4	39.7 1 9/16	330.2 13	38.1 1 1/2	25.65 1.010	9.5 3/8	228.6 9	47.23 1 55/64
292.1 11 1/2	49.21 1 15/16	11.1 7/16	34.9 1 3/8	41.3 1 5/8	360.4 14 3/16	39.7 1 9/16	25.65 1.010	12.7 1/2	254.0 10	50.01 1 31/32
312.74 12 5/16	51.59 2 1/32	11.1 7/16	36.5 1 7/16	43.7 1 23/32	381.0 15	42.1 1 21/32	25.65 1.010	12.7 1/2	254.0 10	52.39 2 1/16
331.79 13 1/16	56.36 2 7/32	11.1 7/16	38.1 1 1/2	48.4 1 29/32	400.1 15 3/4	45.2 1 25/32	25.65 1.010	12.7 1/2	279.4 11	55.56 2 3/16
350.84 13 13/16	56.36 2 7/32	12.7 1/2	38.1 1 1/2	48.4 1 29/32	419.1 16 1/2	45.2 1 25/32	32.00 1.260	12.7 1/2	279.4 11	55.56 2 3/16
371.48 14 5/8	59.53 2 11/32	12.7 1/2	38.1 1 1/2	51.59 2 1/32	450.9 17 3/4	48.4 1 29/32	32.00 1.260	15.1 19/32	304.8 12	61.12 2 13/32
390.53 15 3/8	63.50 2 1/2	12.7 1/2	41.3 1 5/8	55.6 2 3/16	469.9 18 1/2	52.4 2 1/16	32.00 1.260	15.1 19/32	330.2 13	65.09 2 9/16
411.16 16 3/16	63.50 2 1/2	12.7 1/2	41.3 1 5/8	55.6 2 3/16	490.5 19 5/16	52.4 2 1/16	35.18 1.385	15.1 19/32	330.2 13	65.09 2 9/16
431.80 17	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	520.7 20 1/2	60.3 2 3/8	35.18 1.385	15.1 19/32	355.6 14	75.41 2 31/32
450.85 17 3/4	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	539.8 21 1/4	60.3 2 3/8	35.18 1.385	15.1 19/32	406.4 16	75.41 2 31/32
469.9 18 1/2	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	560.4 22 1/16	60.3 2 3/8	38.35 1.510	15.1 19/32	406.4 16	75.41 2 31/32
489.0 19 1/4	79.4 3 1/8	12.7 1/2	46.0 1 13/16	71.4 2 13/16	579.4 22 13/16	68.3 2 11/16	38.35 1.510	15.1 19/32	406.4 16	83.3 3 9/32
517.5 20 3/8	79.4 3 1/8	12.7 1/2	46.0 1 13/16	71.4 2 13/16	630.2 24 13/16	68.3 2 11/16	41.53 1.635	20.6 13/16	425.5 16 3/4	83.3 3 9/32
549.3 21 5/8	85.7 3 3/8	12.7 1/2	46.0 1 13/16	77.8 3 1/16	649.3 25 9/16	74.6 2 15/16	41.53 1.635	20.6 13/16	476.3 18 3/4	89.7 3 17/32
587.4 23 1/8	85.7 3 3/8	12.7 1/2	46.0 1 13/16	77.8 3 1/16	700.1 27 9/16	74.6 2 15/16	41.53 1.635	20.6 13/16	508.0 20	89.7 3 17/32
619.1 24 3/8	85.7 3 3/8	12.7 1/2	50.8 2	77.8 3 1/16	730.3 28 3/4	74.6 2 15/16	47.88 1.885	20.6 13/16	520.7 20 1/2	92.1 3 5/8
657.2 25 7/8	90.5 3 9/16	12.7 1/2	50.8 2	82.6 3 1/4	779.5 30 11/16	79.4 3 1/8	47.88 1.885	20.6 13/16	546.1 21 1/2	96.8 3 13/16
695.3 27 3/8	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	830.3 32 11/16	90.5 3 9/16	51.30 2.020	25.4 1	571.5 22 1/2	108.0 4 1/4
736.6 29	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	870.0 34 1/4	90.5 3 9/16	57.66 2.270	25.4 1	584.2 23	108.0 4 1/4
787.4 31	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	920.8 36 1/4	90.5 3 9/16	57.66 2.270	25.4 1	616.0 24 1/4	108.0 4 1/4
835.0 32 7/8	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	979.5 38 9/16	90.5 3 9/16	64.01 2.520	25.4 1	647.7 25 1/2	108.0 4 1/4
885.8 34 7/8	111.1 4 3/8	15.9 5/8	50.8 2	103.2 4 1/16	1030.3 40 9/16	100.0 3 15/16	64.01 2.520	25.4 1	666.8 26 1/4	117.5 4 5/8
933.5 36 3/4	114.3 4 1/2	19.1 3/4	50.8 2	108 4 1/4	1092.2 43	100.0 3 15/16	64.01 2.520	25.4 1	692.2 27 1/4	117.5 4 5/8

(1) See page B395 for suggested S-3 shaft limits.

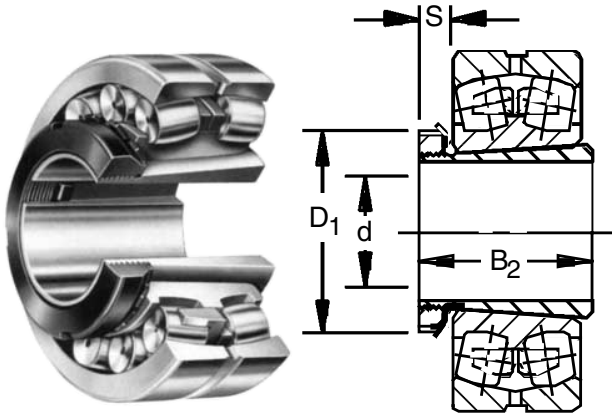
(2) C is outer ring width that may be obtained from bearing dimension tables.

B

METRIC ADAPTER ACCESSORIES

PULL TYPE SLEEVES, LOCKNUTS AND WASHERS TO METRIC STANDARDS

- Sleeve numbers with the prefix "H" are listed in the chart below and are for metric standard shafts. Use metric standard locknuts, indicated by the prefix "KM" on nut number and metric standard washer, indicated by prefix "MB" on washer number.
- Metric standard sleeves are also available with bores to English standard shafts by changing letter prefix designation to "HE".
- Sleeves with bores for American standard shafts are available by using the prefix "HA".



EXAMPLES:

H 316	complete assembly of sleeve with 70 mm bore, locknut and lockwasher
HE 316	complete assembly of sleeve with 2 ¾ in. bore, locknut and lockwasher
HA 316	complete assembly of sleeve with 2 11/16 in. bore, locknut and lockwasher

Note: Sleeves are not sold as separate units.

Bearing		Catalog Numbers			Adapter Dimensions							
			Assembly Inlcudes		d Standard Shaft Diameter							
Series 222	Series 231	Sleeve Assembly Number	Nut Number	Lockwasher Number	H	HE	HA	Tol. +0.000	B_2	S	D_1	Assembly Weight
					mm	inch	inch	inch	mm	mm	mm	lbs.
22211K	—	H 311	KM11	MB11	50	2	1 15/16	-0.004	45	12	75	0.7
22213K	—	H 313	KM13	MB13	60	2 1/4	2 3/16	-0.004	50	14	85	1.0
22215K	—	H 315	KM15	MB15	65	2 1/2	2 7/16	-0.004	55	15	98	1.8
22216K	—	H 316	KM16	MB16	70	2 3/4	2 11/16	-0.004	59	17	105	2.2
22217K	—	H 317	KM17	MB17	75	3	2 15/16	-0.004	63	18	110	2.6
22218K	—	H 318	KM18	MB18	80	3 1/4	3 3/16	-0.004	65	18	120	3.0
22219K	—	H 319	KM19	MB19	85	3 1/4	3 5/16	-0.004	68	19	125	3.4
22220K	—	H 320	KM20	MB20	90	3 1/2	3 7/16	-0.004	71	20	130	3.7
22222K	23122K	H 322	KM22	MB22	100	4	3 15/16	-0.004	77	21	145	4.8
22224K	23124K	H 3124	KM24	MB24	110	4 1/4	4 3/16	-0.005	88	22	155	5.8
22226K	23126K	H 3126	KM26	MB26	115	4 1/2	4 7/16	-0.005	92	23	165	8.0
22228K	23128K	H 3128	KM28	MB28	125	5	4 15/16	-0.005	97	24	180	9.5
22230K	23130K	H 3130	KM30	MB30	135	5 1/4	5 3/16	-0.005	111	26	195	12.2
22232K	23132K	H 3132	KM32	MB32	140	5 1/2	5 7/16	-0.005	119	28	210	16.9
22234K	23134K	H 3134	KM34	MB34	150	6	5 15/16	-0.005	122	29	220	18.5
22236K	23136K	H 3136	KM36	MB36	160	6 1/2	6 7/16	-0.005	131	30	230	20.9
22238K	23138K	H 3138	KM38	MB38	170	6 3/4	6 15/16	-0.005	141	31	240	23.8
22240K	23140K	H 3140	KM40	MB40	180	7	7 3/16	-0.005	150	32	250	26.7
22244K	23144K	H 3144A	HMS3144	MS44	200	—	7 15/16	-0.005	158	32	280	33.5

Bearing		Catalog Numbers			Adapter Dimensions							
			Assembly Inlcudes		d Standard Shaft Diameter							
Series 223	Series 232	Sleeve Assembly Number	Nut Number	Lockwasher Number	H	HE	HA	Tol. +0.000	B_2	S	D_1	Assembly Weight
					mm	inch	inch	inch	mm	mm	mm	lbs.
22308K	23208K	H 2308	KM8	MB8	35	1 1/4	1 5/16	-.003	46	10	58	0.4
22309K	23209K	H 2309	KM9	MB9	40	1 1/2	1 7/16	-.003	50	11	65	0.6
22310K	23210K	H 2310	KM10	MB10	45	1 3/4	1 11/16	-.003	55	12	70	0.8
22311K	23211K	H 2311	KM11	MB11	50	2	1 15/16	-.003	59	12	75	0.9
22313K	23213K	H 2313	KM13	MB13	60	2 1/4	2 3/16	-.004	65	14	85	1.2
22315K	23215K	H 2315	KM15	MB15	65	2 1/2	2 7/16	-.004	73	15	98	2.3
22316K	23216K	H 2316	KM16	MB16	70	2 3/4	2 11/16	-.004	78	17	105	2.8
22317K	23217K	H 2317	KM17	MB17	75	3	2 15/16	-.004	82	18	110	3.2
22318K	23218K	H 2318	KM18	MB18	80	—	3 3/16	-.004	86	18	120	3.7
22320K	23220K	H 2320	KM20	MB20	90	3 1/2	3 7/16	-.004	97	20	130	4.7
22322K	23222K	H 2322	KM22	MB22	100	4	3 15/16	-.004	105	21	145	6.0
22324K	23224K	H 2324	KM24	MB24	110	4 1/4	4 3/16	-.004	112	22	155	7.0
22326K	23226K	H 2326	KM26	MB26	115	4 1/2	4 7/16	-.005	121	23	165	10.1
22328K	23228K	H 2328	KM28	MB28	125	5	4 15/16	-.005	131	24	180	12.2
22330K	23230K	H 2330	KM30	MB30	135	5 1/4	5 3/16	-.005	139	26	195	14.6
22332K	23232K	H 2332	KM32	MB32	140	5 1/2	5 7/16	-.005	147	28	210	20.2
22334K	23234K	H 2334	KM34	MB34	150	6	5 15/16	-.005	154	29	220	22.5
22336K	23236K	H 2336	KM36	MB36	160	6 1/2	6 7/16	-.005	161	30	230	24.9
22338K	23238K	H 2338	KM38	MB38	170	6 3/4	6 15/16	-.005	169	31	240	27.8
22340K	23240K	H 2340	KM40	MB40	180	7	7 3/16	-.005	176	32	250	30.6
—	23244K	H 2344A	HM44T	MB44	200	—	—	-.005	186	35	280	37.9
—	23248K	H 2348A	HM48T	MB48	220	—	—	-.006	199	37	300	44.5
—	23252K	H 2352A	HM52T	MB52	240	—	—	-.006	211	39	330	54.9
—	23256K	H 2356A	HM56T	MB56	260	—	—	-.007	224	41	350	63.1
—	23260K	H 3260	HM3160	MS3160	280	—	—	-.007	240	40	380	75.2
—	23264K	H 3264	HM3164	MS3164	300	—	—	-.007	258	42	400	86.7

NOTES

SPHERICAL PLAIN

Overview: Timken's spherical plain bearings consist of a spherically ground inner ring housed in a mating outer ring without any rolling elements.

- **Sizes:** 12.7 mm - 600 mm bore (0.5 in. - 23.622 in.).
- **Markets:** Construction, mining, metals, power generation, oils and gas, aggregate, paper and forest products.
- **Applications:** Articulation joints, A-frames, cylinders (steering, lift, tilt, dump), struts, traction bars.
- **Features:** Lubrication grooves and holes, seals to retain lubricant and prevent contamination, special materials available.
- **Benefits:** Can carry radial and axial loads in a small envelope and can accommodate moderate misalignment.

Spherical Plain Bearings

One, two, or three digit "Series" number.

For inch series, the number indicates the nominal bore size (e.g., 10 is 1.00 in.) or an approximate bore size (e.g., 17 is 1.75 in.).

For metric series, the number indicates the exact bore size (e.g., 40 is 40 mm).

Seal Designator:
TT reinforced rubber seals
SS synthetic resin seals

7 **SF** **12** – **SS**

SF spherical plain type (radial inch); single fractured outer ring
SFH spherical plain type (radial inch); single fractured outer ring, wide inner ring
SBB spherical plain type (radial inch); double fractured outer ring
SBT spherical plain angular contact type (radial inch)
FS spherical plain type (radial metric); single fractured outer ring
FSH spherical plain type (radial metric); single fractured outer ring, wide inner ring

One, two, or three digit number.

For inch series, the number indicates the exact bore size in $^{1}/_{16}$ths of an inch (e.g., 12 refers to $^{12}/_{16}$ in. which is a $^{3}/_{4}$ in. bore).

For metric series, the number indicates the exact outside diameter size (e.g., 62 is 62 mm).

B

Spherical Plain Bearings

SPHERICAL PLAIN BEARINGS

INTRODUCTION

The spherical plain bearing has a spherically shaped inner ring with a ground cylindrical bore for shaft mounting. The cylindrical outer surface of the outer ring permits convenient mounting in a housing.

Spherical plain bearings offer the following advantages:

- High capacity
- Ability to accommodate misalignment
- Superior performance in low frequency oscillating applications
- Simplified housing and shaft design
- Easy installation
- Radial types available with seals

For all types of spherical plain bearings, both the inner and outer rings are manufactured from through-hardened steel and are precision ground.

The dimensional data lists spherical plain bearings successively by larger bore sizes.

Timken also supplies spherical plain bearings made to special designs. These include standard design bearings made with special materials, clearances, and finishes or bearings with special configurations, such as extended inner rings.

GENERAL FEATURES

METAL ON METAL BEARINGS

Rings are phosphate treated and coated with molybdenum disulfide (MoS_2) to minimize friction of contacting surfaces.

These bearings are available as radial types (SF Series and FS Series) and angular contact thrust (SBT Series).

SF and FS Series include lubrication holes and grooves in both inner and the outer rings to permit relubrication through either the shaft or housing.

SBT angular contact bearings have lubricating holes and grooves in the outer ring for relubrication through the housing.

SF and FS Series are available with integral seals as SF…TT, SF…SS, FS…TT and FS…SS, and incorporate lip seals designed to retain lubricant and protect the spherical surfaces from external contamination.

BEARING TYPES

SF & FS

These bearings are designed primarily to carry radial loads and handle moderate misalignment. The outer ring is usually fractured axially in one place, parallel to its axis, to permit assembly of the bearing rings, which do not have loading slots.

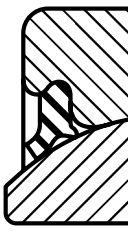
These types can also be supplied with double-fractured outer rings (designation SBB) when this feature is desired for easier assembly in an application.

SF and FS

SF…TT, SF…SS, FS…TT, FS…SS

These bearings are dimensionally interchangeable with the SF and FS Series, and have the same general characteristics. However, they also incorporate lip seals.

The seals are securely retained in the outer ring and will withstand high grease pressures during relubrication. Positive retention of the seals assures full distribution of the lubricant to all bearing surfaces. SF…TT and FS…TT incorporate two reinforced nitrile rubber seals. SF…SS and FS…SS are assembled with synthetic resin seals; Operating temperatures of the seals should not exceed 212° F (100° C).



SF and FS

SBT & SBDT

These bearings are designed for single direction thrust loading and some misalignment. Inner and outer rings are separable. The raceways are essentially hemispherical, and the rings are designed to provide maximum spherical raceway contact in the axial direction.

The SBDT style is designed for single direction thrust loading while the SBDT style is designed for thrust loading in two directions

SBT

SBDT

INTERNAL CLEARANCES

Radial internal clearance is defined as the total possible movement of the inner ring relative to the outer ring in a radial direction. Axial internal clearance is the total possible movement of the inner relative to the outer ring in an axial direction.

Radial internal clearances listed for the SF and FS Series are for finish ground, unmounted bearings prior to fracture of the outer ring. The molybdenum disulfide coating reduces this clearance by a maximum of .05 mm (.002 in.). The maximum interference fits using suggested housing and shaft dimensions will maintain a satisfactory minimum internal clearance in the mounted condition, accommodating coating thickness, outer ring compression, and inner ring expansion.

LOAD RATINGS

DYNAMIC LOAD RATINGS

SF & FS

The dynamic load rating listed in the tables of dimensions is based on a maximum stress level of 85 megapascals (approximately 12,300 psi) between the sliding contact surfaces. It is the maximum load suggested for bearings subjected to intermittent operation with periodic lubrication.

The dynamic load rating is based on the radially projected area of the inner ring bore under the condition where, with the suggested fitting practice and periodic lubrication, rotation normally takes place.

For intermittent loading and operation, the applied radial load should not exceed the dynamic load rating. For constant loading and continuous operation, the applied radial load should not exceed 75 percent of the dynamic load rating. For dynamic or static thrust loading, use 25 percent of the respective radial load rating value should be used. For combined radial and thrust ratings, consult your Timken representative.

SBT

The dynamic load rating is based on the same stress levels as SF shown above and is the maximum thrust load suggested for extended life with periodic lubrication. It is based on the axially projected area of the spherical surfaces in contact. Where the shaft shoulder supports high thrust loads, it is suggested that hardened shafts be employed.

EQUIVALENT THRUST LOAD

SBT

For combined radial and thrust loading under intermittent dynamic conditions, the equivalent thrust load (T_e) must not exceed the dynamic load rating. For constant loading and continuous operation, the equivalent load (T_e), or the axial load (T) when the radial load (R) is zero, must not exceed 70 percent of the dynamic load rating:

$T_e = T + 1.4R$

T_e = Equivalent thrust load per bearing

T = Applied thrust load and/or preload

R = Applied radial load per bearing

The limit load rating of all spherical plain bearings listed is the maximum static load that can be applied to the bearing. This load should not be exceeded. The ultimate, or static fracture rating of the bearing is at least 1.5 times the limit load rating.

Shaft and housing stresses should be checked when the applied load approaches the limit load rating since the shaft or housing may then become the critical factor.

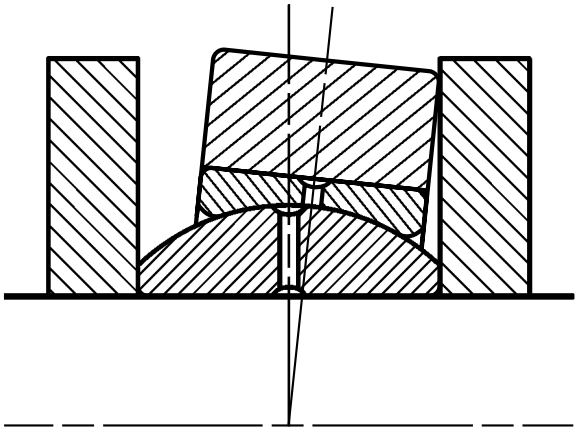
MISALIGNMENT

In many applications, the degree of misalignment of the radial types of spherical plain bearings is determined by the side clearance between the yoke and the bearing housing as illustrated.

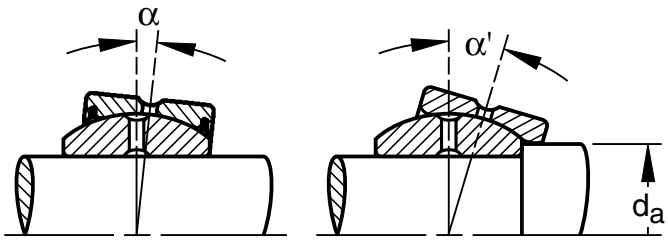
When the bearing is mounted without such restrictions, a larger misalignment can be accommodated: α is the maximum angle of misalignment for sealed bearings as illustrated. If α is exceeded, the seal lips will slide off the spherical surface. Seal effectiveness is then lost and damage to the seal lip will occur if contact is made between the seal lip and shaft shoulder.

Greater misalignment under light to medium loads is possible with unsealed plain radial bearings as shown by angle α'. This requires limiting the shaft shoulder diameter to the suggested dimension (d_a) and also requires sufficient side clearance for the outer ring and housing.

Misalignment greater than α' reduces the load carrying ability of the radial plain spherical bearings. When extreme misalignment is present, the strength of the shaft in shear and bending should be carefully checked, since the shaft support may be some distance away from the bearing.



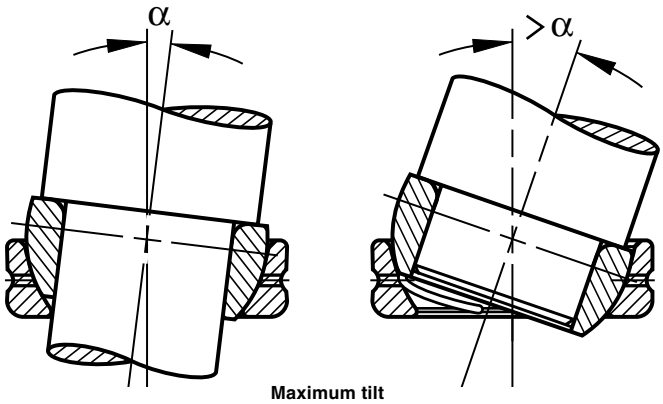
Side clearance between yoke and bearing housing



Maximum tilt sealed bearing

Maximum tilt unsealed bearing

Type SBT angular contact bearing permits a tilting angle α provided the housing shoulder clears the shaft. Such misaligment is limited by the bore of the outer ring touching the through shaft, as shown. A larger angle of misalignment is possible where a stub shaft is used. If the tilting angle exceeds α, your Timken representative should be consulted for suggestions.



Maximum tilt
(provided housing shoulder clears shaft)

HOUSING DESIGN

The housing should be strong enough to support the loads applied to the bearings without distortion or risk of fatigue damage.

When using a housing of the type illustrated, with a load applied in directions "X" or "Y", the compressive yield strength of the housing material should be greater than the applied load divided by (B_a • D).

When the load is applied in direction "Y", the yield strength of the housing in tension should be greater than the applied load times $K/B_a(D_a-D)$, where K is a stress concentration factor from Table 1.

The suggested housing bore tolerances closely approximate N7 tolerances. This produces an interference fit that ensures proper rounding of the outer ring. Light metal housings or housings with thin cross sections may require a tighter fit. An interference fit in the housing is also necessary to prevent creeping by the outer ring with resultant wear of the housing bore and shoulder. Split housings should be avoided.

To resist thrust loads, the bearing should be mounted as shown in the mounting details above the table dimensions.

When plain angular contact bearings (SBT) are axially loaded, the housing expands. For proper and safe bearing function, it is vital to provide a substantial section for the housing. If the thrust limit load ratings are applied for these bearings, not only should the section of the housing be generous, but the housing bore diameter (d_b) must not be exceeded. This not only supports the thrust load, but strengthens the housing in the radial direction as well.

The suggested housing bore for the Type SBT angular contact bearing produces a tight transition fit.

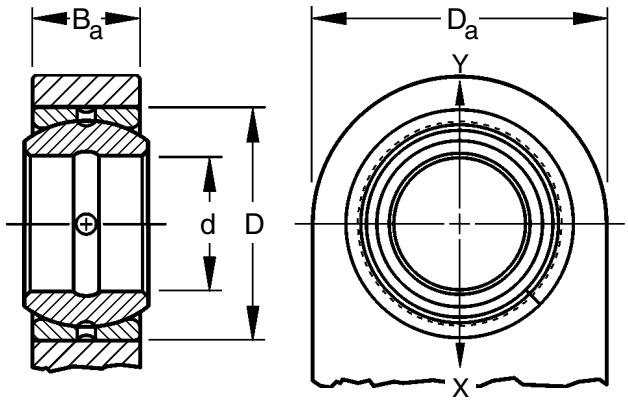
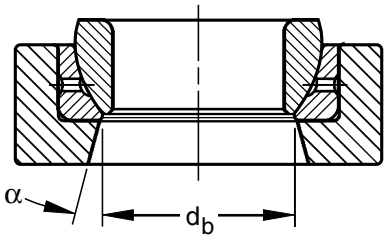


TABLE 1 – STRESS CONCENTRATION FACTOR

D_a/D	K	D_a/D	K	D_a/D	K
1.2	1.8	1.8	2.4	3	3.7
1.4	2	2	2.7	4	4.7
1.6	2.2	2.5	3.2	5	5.5



Housing section - angular contact bearing

SHAFT DESIGN

In applications with heavy radial loads, although alignment takes place at the spherical bearing surface, rotation or oscillation normally occurs between the bore of the inner ring and the shaft even though an interference fit may have been used. For this reason, and to facilitate assembly, the shaft dimensions listed in the tables should be used.

To obtain satisfactory performance with heavy loads or under abrasive conditions, the shaft should be hardened to 655 VPN or 58 HRC minimum. Additionally, the shaft should have sufficient strength to withstand the applied loads in both shear and bending. The surface finish of the bearing seat should not exceed 0.8 micrometers or 32 microinches (on the Ra scale). The shaft should always be supported as close to the inner ring as possible to minimize bending.

When the loads are light, it is possible to prevent rotation between the inner ring and shaft by using an ISO m6 shaft tolerance or by clamping across the inner ring. Under these conditions, a fully hardened shaft is not necessary.

When the bearing is loaded axially, the load is transmitted between the end face of the inner ring and the adjacent shaft shoulder. The shoulder surface must be of sufficient strength and hardness not to deform permanently under load. If the inner ring is to rotate, the finish of this surface should not exceed 0.8 micrometers or 32 microinches (on the Ra scale).

LUBRICATION (SF, FS, SBT)

The dry film lubricant (MoS_2) is sufficient for static applications and for relatively short periods of dynamic operation.

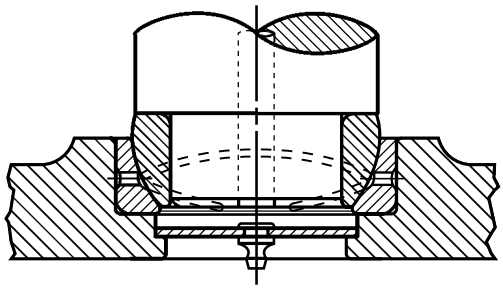
The bonds between the rings and MoS_2 coating may be destroyed by any fluid including oils, greases and water. Any abrasive material present on the dynamic bearing surfaces will ruin the MoS_2 coating. If the bearing is subjected to such operating or environmental conditions, it is necessary to relubricate frequently.

The radial bearings, both with and without seals, have lubricating holes and grooves in both the inner and outer rings, permitting relubrication through either the shaft or the housing.

The angular contact bearings have lubricating holes and grooves in the outer ring for relubrication through the bearing housing. The lubrication grooves in the spherical bore of the outer ring traverse a pattern designed to provide effective lubrication. These grooves extend into the small bore of the ring, permitting relubrication through the end of the housing as illustrated.

The relubrication cycle will depend on the magnitude of the load, frequency and amplitude of oscillation, environmental conditions and the effectiveness of the sealing used to exclude foreign materials from the bearing surfaces.

If bearings are relubricated, the dynamic load rating depends on the film strength of the added lubricant. High quality EP greases are suggested for best results.



SBT – Relubricatable mounting

TEMPERATURE

Spherical plain bearings without seals will operate satisfactorily up to temperatures of 392° F (200° C). For operation at greater temperatures, special materials and lubricants will be required. Operating temperatures for sealed bearings should not exceed 212° F (100° C).

SHAFT FITS

- The shaft diameters listed in the dimension tables show the suggested fits for normal service.
- The table below is to be used only for applications where a shaft interference fit is required. Consult your Timken representative for suggestions.

(SF, SFH, FS, FSH, SBT) BEARINGS,
Shaft Diameter Tolerance for Interference Fit for Inch and Metric Series

Bore Diameter, d				Shaft Tolerance m6			
mm		inch		mm		inch	
over	incl.	over	incl.	high	low	high	low
10	18	0.3937	0.7087	+0.018	+0.007	+0.0007	+0.0003
18	30	0.7087	1.1811	+0.021	+0.008	+0.0008	+0.0003
30	50	1.1811	1.9685	+0.025	+0.009	+0.0010	+0.0004
50	80	1.9685	3.1496	+0.030	+0.011	+0.0012	+0.0005
80	120	3.1496	4.7244	+0.035	+0.013	+0.0014	+0.0005
120	180	4.7244	7.0866	+0.040	+0.015	+0.0016	+0.0006
180	250	7.0866	9.8425	+0.046	+0.017	+0.0018	+0.0007

TOLERANCES

- Tolerances on pages B412-B420 list the nominal bearing dimensions.
- Tolerances for these dimensions are listed in Tables 1 through 4. They are expressed as variances from nominal.
- Metric-inch conversions are shown in the following tables.

TABLE 1 INNER RING (FS, FSH) BEARINGS, METRIC SERIES

Bore Diameter, d				Single Mean Bore Diameter, d_{mp}(1)				Width, B1			
mm		inch		mm		inch		mm		in.	
over	incl.	over	incl.	high	low	high	low	high	low	high	low
10	18	0.3937	0.7087	+0	-0.008	+0	-0.0003	+0	-0.12	+0	-0.005
18	30	0.7087	1.1811	+0	-0.010	+0	-0.0004	+0	-0.12	+0	-0.005
30	50	1.1811	1.9685	+0	-0.012	+0	-0.0005	+0	-0.12	+0	-0.005
50	80	1.9685	3.1496	+0	-0.015	+0	-0.0006	+0	-0.15	+0	-0.006
80	120	3.1496	4.7244	+0	-0.020	+0	-0.0008	+0	-0.20	+0	-0.008
120	180	4.7244	7.0866	+0	-0.025	+0	-0.0010	+0	-0.25	+0	-0.010
180	250	7.0866	9.8425	+0	-0.030	+0	-0.0012	+0	-0.30	+0	-0.012
250	315	9.8425	12.4015	+0	-0.035	+0	-0.0014	+0	-0.35	+0	-0.014

(1) "Single Mean Diameter" is defined as the mean diameter in a single radial plane.

TABLE 2 OUTER RING (FS, FSH) BEARINGS, METRIC SERIES

Outside Diameter, D				Single Mean Outside Diameter, D_{mp}(2)				Width, B			
mm		inch		mm		inch		mm		in.	
over	incl.	over	incl.	high	low	high	low	high	low	high	low
18	30	0.7087	1.1811	+0	-0.009	+0	-0.0004	+0	-0.24	+0	-0.009
30	50	1.1811	1.9685	+0	-0.011	+0	-0.0004	+0	-0.24	+0	-0.009
50	80	1.9685	3.1496	+0	-0.013	+0	-0.0005	+0	-0.30	+0	-0.012
80	120	3.1496	4.7244	+0	-0.015	+0	-0.0006	+0	-0.40	+0	-0.016
120	150	4.7244	5.9055	+0	-0.018	+0	-0.0007	+0	-0.50	+0	-0.020
150	180	5.9055	7.0866	+0	-0.025	+0	-0.0010	+0	-0.50	+0	-0.020
180	250	7.0866	9.8425	+0	-0.030	+0	-0.0012	+0	-0.60	+0	-0.024
250	315	9.8425	12.4015	+0	-0.035	+0	-0.0014	+0	-0.70	+0	-0.028
315	400	12.4015	15.7480	+0	-0.040	+0	-0.0016	+0	-0.80	+0	-0.031
400	500	15.7480	19.6850	+0	-0.045	+0	-0.0018	+0	-0.90	+0	-0.035

(2) Tolerances apply before coating with MoS_2 and fracturing outer ring.
"Single Mean Diameter" is defined as the mean diameter in a single radial plane.

TABLE 3 INNER RING (SF, SFH, SBT, SBDT) BEARINGS, INCH SERIES

Bore Diameter, d				Single Mean Bore Diameter, d_{mp}(1)				Width, B1			
mm		inch		mm		inch		mm		in.	
over	incl.	over	incl.	high	low	high	low	high	low	high	low
11.112	50.800	0.4375	2.0000	+0	-0.013	+0	-0.0005	+0	-0.13	+0	-0.005
50.800	76.200	2.0000	3.0000	+0	-0.015	+0	-0.0006	+0	-0.13	+0	-0.005
76.200	120.650	3.0000	4.7500	+0	-0.020	+0	-0.0008	+0	-0.13	+0	-0.005
120.6500	152.400	4.7500	6.0000	+0	-0.025	+0	-0.0010	+0	-0.13	+0	-0.005

(1) "Single Mean Diameter" is defined as the mean diameter in a single radial plane.

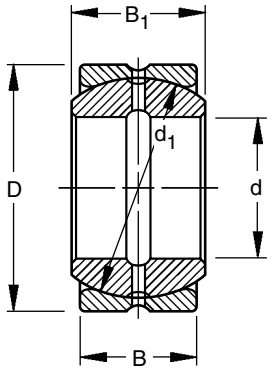
TABLE 4 OUTER RING (SF, SFH, SBT, SBDT) BEARINGS, INCH SERIES

Outside Diameter, D				Single Mean Outside Diameter, D_{mp}(2)				Width, B			
mm		inch		mm		inch		mm		in.	
over	incl.	over	incl.	high	low	high	low	high	low	high	low
20.638	50.800	0.8125	2.0000	+0	-0.013	+0	-0.0005	+0	-0.13	0	-0.005
50.800	80.962	2.0000	3.1875	+0	-0.015	+0	-0.0006	+0	-0.13	0	-0.005
80.962	120.650	3.1875	4.7500	+0	-0.020	+0	-0.0008	+0	-0.13	0	-0.005
120.650	177.800	4.7500	7.0000	+0	-0.025	+0	-0.0010	+0	-0.13	0	-0.005
177.800	222.250	7.0000	8.7500	+0	-0.030	+0	-0.0012	+0	-0.13	0	-0.005

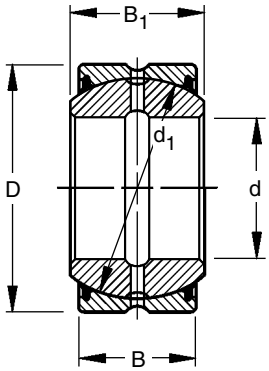
(2) Tolerances apply before coating with MoS_2 and fracturing outer ring.
"Single Mean Diameter" is defined as the mean diameter in a single radial plane.

RADIAL BEARINGS TYPE SF

- Unit assembly consisting of a solid, spherical O.D. inner ring and a spherical I.D. outer ring.
- Outer ring has a single fracture to permit assembly.
- Both inner and outer rings are phosphate treated and then coated with molybdenum disulphide (MoS_2).
- Bearings 7SF12 through 50SBB80 are available with reinforced rubber seals. To order, add suffix "-TT" to bearing designation – Example: 25SF40-TT.
- Bearings 27SF44 through 608BB96 are available with synthetic resin seals. To order, add suffix "-SS" to bearing designation – Example: 27SF44-SS.
- Before ordering any bearing, check for availability.
- Metric-inch conversions have been included. The controlling dimensions are in inches.
- For tolerances, see Tables 3 and 4. Dimensions listed are after the bearing has been coated with molybdenum disulphide.
- The axial internal clearance is approximately three times the radial internal clearance.
- α is the maximum tilting angle for sealed radial bearings. To utilize the maximum tilting angle α for unsealed radial bearings, the suggested shaft shoulder diameter, d_a, shown in the drawing on the facing page, must not be exceeded.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.



Type SF



Types SF-TT, SF-SS

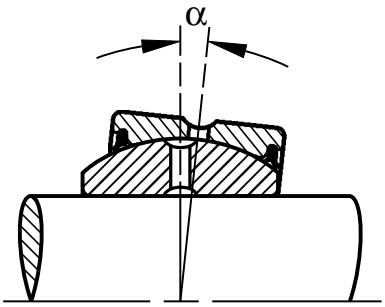
DIMENSIONS - LOAD RATINGS

Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B_1		Outer ring Width B		Spherical Diameter d_1 (Ref.)		Radial Clearance* (unmounted) mm		Radial Clearance* (unmounted) in.		Load Ratings Radial Limit Load Rating	Load Ratings Dynamic Radial Load Rating
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	min.	max.	min.	max.	lbf.	lbf.
5SF8	12.700	0.5000	22.225	0.8750	11.10	0.437	9.52	0.375	18.26	0.719	0.004	0.008	0.10	0.20	8330	2690
6SF10	15.875	0.6250	26.988	1.0625	13.89	0.547	11.91	0.469	22.83	0.899	0.004	0.008	0.10	0.20	13000	4200
7SF12	19.050	0.7500	31.750	1.2500	16.66	0.656	14.27	0.562	27.43	1.080	0.005	0.009	0.13	0.23	18700	6070
8SF14	22.225	0.8750	36.512	1.4375	19.43	0.765	16.66	0.656	31.95	1.258	0.005	0.009	0.13	0.23	25500	8250
10SF16	25.400	1.0000	41.275	1.6250	22.22	0.875	19.05	0.750	36.50	1.437	0.005	0.009	0.13	0.23	33300	10800
12SF20	31.750	1.2500	50.800	2.0000	27.76	1.093	23.80	0.937	45.59	1.795	0.005	0.009	0.13	0.23	52000	16800
13SF22	34.925	1.3750	55.562	2.1875	30.15	1.187	26.19	1.031	49.20	1.937	0.005	0.009	0.13	0.23	61300	20100
15SF24	38.100	1.5000	61.912	2.4375	33.32	1.312	28.58	1.125	54.74	2.155	0.005	0.009	0.13	0.23	75000	24300
17SF28	44.450	1.7500	71.438	2.8125	38.89	1.531	33.32	1.312	63.88	2.515	0.005	0.009	0.13	0.23	102000	33000
20SF32	50.800	2.0000	80.962	3.1875	44.45	1.750	38.10	1.500	73.02	2.875	0.005	0.009	0.13	0.23	133000	43200
22SF36	57.150	2.2500	90.488	3.5625	50.01	1.969	42.85	1.687	82.17	3.235	0.006	0.010	0.15	0.25	169000	54600
25SF40	63.500	2.5000	100.012	3.9375	55.55	2.187	47.62	1.875	91.19	3.590	0.006	0.010	0.15	0.25	208000	67400
27SF44	69.850	2.7500	111.125	4.3750	61.11	2.406	52.37	2.062	100.33	3.950	0.006	0.010	0.15	0.25	252000	81600
30SF48	76.200	3.0000	120.650	4.7500	66.68	2.625	57.15	2.250	109.52	4.312	0.006	0.010	0.15	0.25	300000	97100
32SF52	82.550	3.2500	130.175	5.1250	72.24	2.844	61.90	2.437	118.74	4.675	0.007	0.011	0.18	0.28	353000	114000
35SF56	88.900	3.5000	139.700	5.5000	77.77	3.062	66.68	2.625	128.02	5.040	0.007	0.011	0.18	0.28	410000	132000
37SF60	95.250	3.7500	149.225	5.8750	83.34	3.281	71.42	2.812	136.91	5.390	0.007	0.011	0.18	0.28	467000	152000
40SF64	101.600	4.0000	158.750	6.2500	88.90	3.500	76.20	3.000	146.05	5.750	0.007	0.011	0.18	0.28	533000	173000
45SBB72	114.300	4.5000	177.800	7.0000	100.00	3.937	85.72	3.375	164.46	6.475	0.007	0.011	0.18	0.28	673000	218000
50SBB80	127.000	5.0000	196.850	7.7500	111.13	4.375	95.25	3.750	182.63	7.190	0.007	0.011	0.18	0.28	833000	270000
60SBB96	152.400	6.0000	222.250	8.7500	120.65	4.750	104.78	4.125	207.16	8.156	0.007	0.011	0.18	0.28	1050000	351000

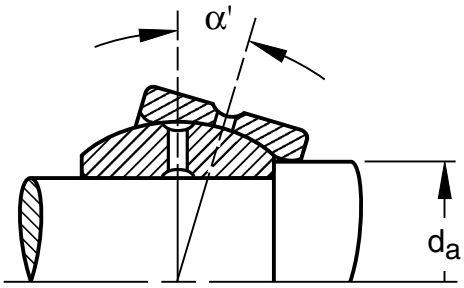
* Prior to coating with MoS_2 and fracturing outer ring.

MOUNTING

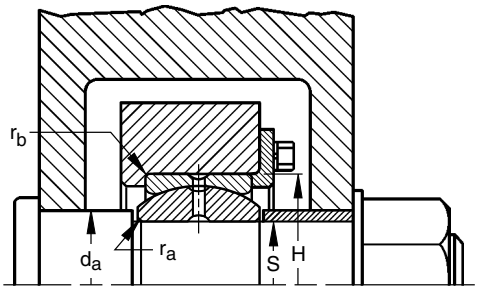
- Housing bore dimensions listed below are applicable to bearings mounted in steel.
- Because of fracturing, the outer ring may be slightly out-of-round.
- Roundness will be restored when the bearing is mounted in a housing of sufficient cross section.
- Preferred shaft and housing bore dimensions are listed below.
- Refer to the m6 tolerance limits per ANSI B4.1 in the Shaft Diameter Tolerance table on page B410 for a shaft interference fit.



Maximum tilt
for sealed bearing



Maximum tilt
for bearing without seals



Mounting detail

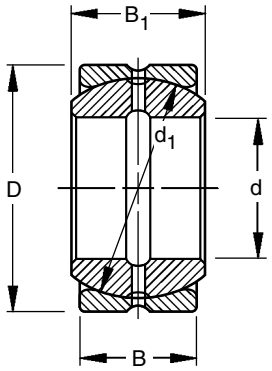
MOUNTING DIMENSIONS

Weight (Approx.)		Tilting Angle		Shaft Shoulder Diameter d_a		Shaft Fillet Radius* r_a† (Max.)		Housing Fillet Radius r_b‡ (Max.)		Shaft Diameter S				Housing Bore H			
		α	α'							mm		in.		mm		in.	
kg	lbs.	deg.	deg.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	max.	min.	min.	max.
0.020	0.044	5.5	14	14.3	0.56	*	*	0.6	0.022	12.695	12.685	0.4998	0.4994	22.197	22.217	0.8739	0.8747
0.036	0.079	6	14	17.8	0.70	*	*	0.8	0.032	15.870	15.860	0.6248	0.6244	26.960	26.980	1.0614	1.0622
0.057	0.126	6	14.5	21.4	0.84	*	*	0.8	0.032	19.042	19.029	0.7497	0.7492	31.717	31.742	1.2487	1.2497
0.087	0.193	6	14.5	25.0	0.98	*	*	0.8	0.032	22.217	22.204	0.8747	0.8742	36.479	36.504	1.4362	1.4372
0.125	0.276	6	14.5	28.6	1.12	*	*	0.8	0.032	25.392	25.379	0.9997	0.9992	41.242	41.267	1.6237	1.6247
0.234	0.516	6	14.5	35.7	1.41	*	*	0.8	0.032	31.740	31.725	1.2496	1.2490	50.762	50.792	1.9985	1.9997
0.349	0.770	5.5	14	38.9	1.53	*	*	0.8	0.032	34.915	34.900	1.3746	1.3740	55.524	55.554	2.1860	2.1872
0.424	0.934	6	14.5	43.3	1.70	*	*	0.8	0.032	38.090	38.075	1.4996	1.4990	61.874	61.904	2.4360	2.4372
0.649	1.430	6	15.5	50.0	1.97	*	*	0.8	0.032	44.440	44.425	1.7496	1.7490	71.399	71.429	2.8110	2.8122
0.939	2.070	6	15.5	57.2	2.25	*	*	0.8	0.032	50.790	50.772	1.9996	1.9989	80.914	80.950	3.1856	3.1870
1.324	2.920	6	14	65.1	2.56	*	*	0.8	0.032	57.140	57.122	2.2496	2.2489	90.439	90.475	3.5606	3.5620
1.855	4.090	6	14	72.2	2.84	*	*	0.8	0.032	63.490	63.472	2.4996	2.4989	99.964	100.000	3.9356	3.9370
2.440	5.380	6	12	79.4	3.12	0.6	0.022	0.8	0.032	69.840	69.822	2.7496	2.7489	111.077	111.113	4.3731	4.3745
3.116	6.870	6	12	86.5	3.41	0.6	0.022	0.8	0.032	76.190	76.172	2.9996	2.9989	120.594	120.635	4.7478	4.7494
3.914	8.630	6	12	94.1	3.70	0.6	0.022	0.8	0.032	82.537	82.514	3.2495	3.2486	130.119	130.160	5.1228	5.1244
4.853	10.700	6	12	101.0	3.97	0.6	0.022	0.8	0.032	88.887	88.864	3.4995	3.4986	139.644	139.685	5.4978	5.4994
5.897	13.000	6	12	108.0	4.25	0.6	0.022	0.8	0.032	95.237	95.214	3.7495	3.7486	149.169	149.210	5.8728	5.8744
7.076	15.600	6	11.5	116.0	4.56	0.6	0.022	0.8	0.032	101.587	101.564	3.9995	3.9986	158.694	158.735	6.2478	6.2494
9.934	21.900	6	12	130.0	5.12	0.8	0.032	1.1	0.044	114.287	114.264	4.4995	4.4986	177.744	177.785	6.9978	6.9994
13.472	29.700	6	12	144.0	5.69	0.8	0.032	1.1	0.044	126.985	126.960	4.9994	4.9984	196.784	196.830	7.7474	7.7492
17.600	38.800	5	10.5	168.0	6.59	0.8	0.032	1.1	0.044	152.385	152.360	5.9994	5.9984	222.184	222.230	8.7474	8.7492

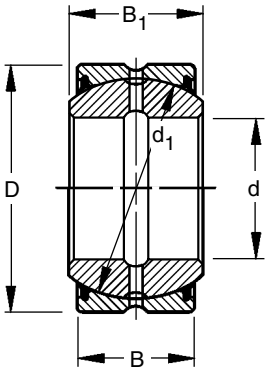
* For bearing sizes 5SF8 through 25SF40, shaft and shoulder should be undercut to eliminate fillet.
† Equal to minimum inner ring bore chamfer.
‡ Equal to minimum outer ring O.D. chamfer.

RADIAL BEARINGS TYPE FS

- Type FS spherical plain radial bearing is a unit assembly consisting of a solid, spherical O.D. inner ring and a spherical I.D. outer ring.
- The outer ring has a single fracture to permit assembly. Both inner and outer rings are phosphate treated and then coated with molybdenum disulphide (MoS2).
- Bearings 16FS30 through 60FS90 are available with reinforced rubber seals. To order, add suffix "TT" to bearing designation - Example: 16FS30-TT.
- Bearings 70FS105 through 300FS430 are available with synthetic resin seals. To order, add suffix "SS" to bearing designation - Example: 70FS105-SS.
- Before ordering any bearing, check for availability.
- Type FS bearings are a metric series which follows proposed International Standards Organization (ISO) standards. Metric-Inch conversions given are for the convenience of the user. The controlling dimensions are in millimeters.
- For tolerances of nominal dimensions see the tables 1 and 2 on page B411. Dimensions listed are before coating with molybdenum disulphide. The axial internal clearance is approximately three times the radial internal clearance.
- α is the maximum tilting angle for sealed radial bearings. To utilize the maximum tilting angle for unsealed radial bearings the suggested shaft shoulder diameter da1 shown in the drawing on facing page must not be exceeded.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.



Type FS



Type FS-TT, FS-SS

DIMENSIONS - LOAD RATINGS

Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B_1		Outer ring Width B		Spherical Diameter d_1 (Ref.)		Radial Clearance* (unmounted) mm		Radial Clearance* (unmounted) in.		Load Ratings Radial Limit Load Rating	Load Ratings Dynamic Radial Load Rating
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	min.	max.	min.	max.	lbf.	lbf.
12FS22	12	.4724	22	0.8661	10	.394	7	.276	19	.748	0.10	0.22	.004	.009	8630	2290
14FS26	14	.5512	26	1.0236	12	.472	9	.354	22	.866	0.10	0.22	.004	.009	11600	3210
16FS30	16	.6300	30	1.1811	14	.551	10	.394	25	.984	0.10	0.22	.004	.009	14400	4280
20FS35	20	.7874	35	1.3780	16	.630	12	.472	30	1.181	0.12	0.24	.005	.010	21500	6110
24FS42	24	.9449	42	1.6142	20	.787	16	.630	36	1.417	0.12	0.24	.005	.010	31000	9170
30FS47	30	1.1811	47	1.8504	22	.866	18	.709	41	1.614	0.12	0.24	.005	.010	40200	12600
35FS55	35	1.3780	55	2.1654	25	.984	20	.787	48	1.890	0.12	0.24	.005	.010	55100	16700
40FS62	40	1.5748	62	2.4409	28	1.102	22	.866	55	2.165	0.12	0.24	.005	.010	72300	21400
45FS68	45	1.7717	68	2.6772	32	1.260	25	.984	60	2.362	0.12	0.24	.005	.010	86100	27500
50FS75	50	1.9685	79	2.9528	35	1.378	28	1.102	67	2.638	0.12	0.24	.005	.010	107000	33400
60FS90	60	2.3622	90	3.5433	44	1.732	36	1.417	81	3.150	0.14	0.26	.006	.011	157000	50400
70FS105	70	2.7559	105	4.1339	49	1.929	40	1.575	94	3.701	0.14	0.26	.006	.011	211000	65500
80FS120	80	3.1496	120	4.7244	55	2.165	45	1.772	107	4.213	0.14	0.26	.006	.011	274000	84100
90FS130	90	3.5433	130	5.1181	60	2.362	50	1.968	117	4.606	0.14	0.26	.006	.011	327000	103000
100FS150	100	3.9370	150	5.9055	70	2.756	55	2.165	134	5.276	0.14	0.26	.006	.011	429000	134000
110FS160	110	4.3307	160	6.2992	70	2.756	55	2.165	143	5.630	0.14	0.26	.006	.011	489000	147000
120FS180	120	4.7244	180	7.0866	85	3.346	70	2.756	160	6.299	0.14	0.26	.006	.011	612000	195000
140FS210	140	5.5118	210	8.2677	90	3.543	70	2.756	187	7.362	0.16	0.28	.006	.011	836000	241000
160FS230	160	6.2992	230	9.0551	105	4.134	80	3.150	206	8.110	0.16	0.28	.006	.011	1020000	321000
180FS260	180	7.0866	260	10.2362	105	4.134	80	3.150	234	9.213	0.16	0.28	.006	.011	1300000	361000
200FS290	200	7.8740	290	11.4173	130	5.118	100	3.937	265	10.433	0.18	0.30	.007	.012	1680000	497000
220FS320	220	8.6614	320	12.5984	135	5.315	100	3.937	286	11.260	0.18	0.30	.007	.012	1960000	568000
240FS340	240	9.4488	340	13.3858	140	5.512	100	3.937	306	12.047	0.18	0.30	.007	.012	2240000	642000
260FS370	260	10.2362	370	14.5669	150	5.906	110	4.331	333	13.110	0.20	0.32	.008	.013	2650000	745000
280FS400	280	11.0236	400	15.7480	155	6.102	120	4.724	360	14.173	0.20	0.32	.008	.013	3100000	829000
300FS430	300	11.8110	430	16.9291	165	6.496	120	4.724	386	15.197	0.20	0.32	.008	.013	3560000	946000

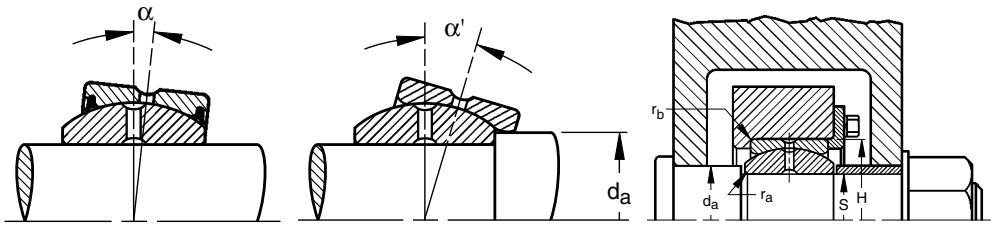
* Prior to fracturing outer ring.

MOUNTING

- Due to fracturing, the outer ring may be slightly out-of-round. Roundness will be restored, however, when the bearing is mounted in a housing of sufficient cross section.
- The preferred shaft tolerance is f6 as listed below per ANSI B4.2. To obtain a shaft interference fit, refer to the m6 tolerance limits listed in the Shaft Diameter Tolerance table on page B410.

LOAD RATING

- The "dynamic load rating" is the maximum load suggested for extended life with periodic lubrication. It is based upon the radially projected area of the inner ring bore and an allowable stress level of 85 megapascals (approximately 12,300 psi).
- For intermittent loading and intermittent operation, the applied radial load should not exceed the dynamic load rating. For constant loading and continuous operation, the applied radial load should not exceed 75 percent of the dynamic load rating. For dynamic or static thrust loading, use 25 percent of respective radial load values. For combined radial and thrust loading, consult your Timken representative.
- The "limit load rating" is the maximum static load that can be applied to a Timken spherical plain bearing. Shaft and housing stresses should be checked when the load approaches the limit load rating since the shaft or housing may then become the critical member. The ultimate, or static fracture, rating of the bearing is at least 1.5 times the limit load rating.
- Load ratings are given in pounds-force:
  1 lbf = 0.454kgf = 4.448 N.



Maximum tilt for sealed bearing

Maximum tilt for bearing without seals

Mounting detail

MOUNTING DIMENSIONS

Weight (Approx.)		Tilting Angle		Shaft Shoulder Diameter d_a		Shaft Fillet Radius* r_a† (Max.)		Housing Fillet Radius r_b‡ (Max.)		Shaft Diameter S				Housing Bore H			
		α	α'							mm		in.		mm		in.	
kg	lbs.	deg.	deg.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	max.	min.	min.	max.
	.038	10.0	11.5	16	.63	0.5	.02	0.5	.02	11.984	11.973	.4718	.4714	21.977	21.995	.8650	.8658
	.065	8.5	14.5	18	.71	0.5	.02	0.5	.02	13.984	13.973	.5506	.5502	25.972	25.993	1.0225	1.0233
	.115	10.0	16.0	20	.79	0.5	.02	0.5	.02	15.984	15.973	.6293	.6289	29.972	29.993	1.1800	1.1808
	.149	8.5	14.0	25	.98	0.5	.02	0.6	.02	19.980	19.967	.7866	.7861	34.967	34.992	1.3767	1.3777
	.257	7.0	12.5	29	1.14	0.5	.02	0.6	.02	23.980	23.967	.9441	.9436	41.967	41.992	1.6522	1.6532
	.337	6.0	10.5	34	1.38	0.5	.02	0.6	.02	29.980	29.967	1.1803	1.1798	46.967	46.992	1.8491	1.8501
	.523	6.5	10.5	40	1.61	0.6	.02	0.8	.03	34.975	34.959	1.3770	1.3764	54.961	54.991	2.1638	2.1650
	.729	7.0	10.5	47	1.85	0.6	.02	0.8	.03	39.975	39.959	1.5738	1.5732	61.961	61.991	2.4394	2.4406
	.948	7.5	10.5	50	2.01	0.6	.02	0.8	.03	44.975	44.959	1.7707	1.7701	67.961	67.991	2.6756	2.6768
	1.27	6.5	10.0	56	2.24	0.6	.02	0.8	.03	49.975	49.959	1.9675	1.9669	74.961	74.991	2.9512	2.9524
	2.32	6.5	11.0	66	2.64	0.8	.03	1.0	.04	59.970	59.951	2.3610	2.3603	89.955	89.990	3.5415	3.5429
	3.53	6.0	9.5	80	3.15	0.8	.03	1.0	.04	69.970	69.951	2.7547	2.7540	104.955	104.990	4.1321	4.1335
	5.20	6.0	7.5	92	3.62	0.8	.03	1.0	.04	79.970	79.951	3.1484	3.1477	119.955	119.990	4.7226	4.7240
	6.28	5.5	7.5	100	3.94	1.0	.04	1.0	.04	89.964	89.942	3.5419	3.5410	129.948	129.988	5.1161	5.1177
	10.1	7.0	8.5	114	4.49	1.0	.04	1.0	.04	99.964	99.942	3.9356	3.9347	149.948	149.988	5.9035	5.9051
	10.9	6.0	7.5	125	4.92	1.0	.04	1.0	.04	109.964	109.942	4.3293	4.3284	159.948	159.988	6.2972	6.2988
	18.1	6.0	7.5	136	5.35	1.0	.04	1.0	.04	119.964	119.942	4.7230	4.7221	179.948	179.988	7.0846	7.0862
	25.6	6.5	7.0	164	6.46	1.0	.04	1.0	.04	139.957	139.932	5.5101	5.5091	209.940	209.986	8.2654	8.2674
	32.3	7.5	9.0	177	6.97	1.0	.04	1.0	.04	159.957	159.932	6.2975	6.2965	229.940	229.986	9.0528	9.0548
	42.8	6.5	7.0	209	8.23	1.0	.04	1.0	.04	179.957	179.932	7.0849	7.0839	259.934	259.986	10.2336	10.2356
	66.5	7.0	7.5	231	9.09	1.0	.04	1.0	.04	199.950	199.921	7.8720	7.8709	289.934	289.986	11.4147	11.4167
	82.3	7.5	8.0	252	9.92	1.0	.04	1.0	.04	219.950	219.921	8.6594	8.6583	319.927	319.984	12.5956	12.5978
	90.1	8.0	9.0	272	10.70	1.0	.04	1.0	.04	239.950	239.921	9.4468	9.4457	339.927	339.984	13.3830	13.3852
	17	7.0	8.5	297	11.69	1.0	.04	1.0	.04	259.944	259.912	10.2340	10.2327	369.927	369.984	14.5641	14.5663
	47	6.0	7.0	325	12.80	1.0	.04	1.0	.04	279.944	279.912	11.0214	11.0201	399.927	399.984	15.7452	15.7474
	77	7.0	9.0	349	13.74	1.0	.04	1.0	.04	299.944	299.912	11.8088	11.8075	429.920	429.983	16.9260	16.9285

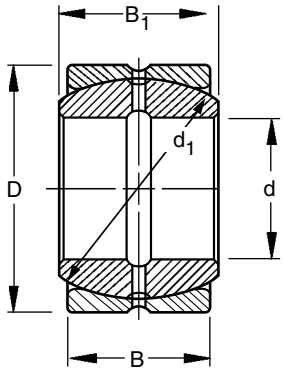
* For bearing sizes 5SF8 through 25SF40, shaft and shoulder should be undercut to eliminate fillet.
† Equal to minimum inner ring bore chamfer.
‡ Equal to minimum outer ring O.D. chamfer.

RADIAL BEARINGS TYPE FSH

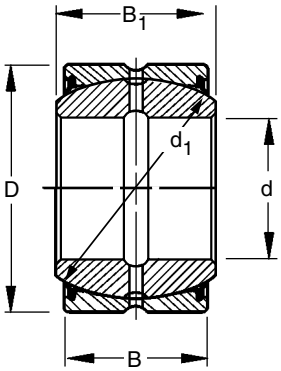
- The FSH spherical plain radial bearing is a unit assembly consisting of a solid spherical O.D. inner ring and a spherical I.D. outer ring.
- The outer ring has a single fracture to permit assembly. Both inner and outer rings are phosphate treated and then coated with molybdenum disulphide (MoS2). The type FSH bearing is similar to type FS, but the inner ring bore diameter has been reduced and the width made greater to increase the spherical surface. This permits greater misalignment while maintaining full bearing contact.
- Bearings 14FSH30 through 50FSH90 are available with reinforced rubber seals. To order, add suffix "TT" to bearing designation - Example: 14FSH30-TT.
- Bearings 60FSH105 through 280FSH430 are available with synthetic resin seals. To order, add suffix "SS" to bearing designation - Example: 60FSH105-SS.
- Before ordering any bearing, check for availability.

DIMENSIONS

- Type FSH bearings are a metric series which follows proposed International Standards Organization (ISO) standards. Metric Inch conversions given are for the convenience of the user. The controlling dimensions are in millimeters.
- For tolerances of nominal dimensions, see Tables 1 and 2 on page B411. Dimensions listed are before coating with molybdenum disulphide. The axial internal clearance is approximately three times the radial internal clearance.
- α is the maximum tilting angle for sealed radial bearings. To utilize the maximum tilting angle for unsealed radial bearings, the suggested shaft shoulder diameter da1 shown in the drawing on facing page must not be exceeded.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.



Type FSH



Type SFH TT, SFH SS

DIMENSIONS - LOAD RATINGS

Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B_1		Outer ring Width B		Spherical Diameter d_1 (Ref.)		Radial Clearance* (unmounted) mm		Radial Clearance* (unmounted) in.		Load Ratings Radial Limit Load Rating	Load Ratings Dynamic Radial Load Rating
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	min.	max.	min.	max.	lbf.	lbf.
12FSH26	12	.4724	26	1.0236	15	.591	9	.354	22	.866	0.10	0.22	.004	.009	11600	3440
14FSH30	14	.5512	30	1.1811	16	.630	10	.394	25	.984	0.10	0.22	.004	.009	14400	4280
16FSH35	16	.6300	35	1.3780	20	.787	12	.472	30	1.181	0.12	0.24	.005	.010	21500	6110
20FSH42	20	.7874	42	1.6142	25	.984	16	.630	36	1.417	0.12	0.24	.005	.010	31000	9550
24FSH47	24	.9449	47	1.8504	28	1.102	18	.709	41	1.614	0.12	0.24	.005	.010	40200	12800
30FSH55	30	1.1811	55	2.1654	32	1.260	20	.787	48	1.890	0.12	0.24	.005	.010	55100	18300
35FSH62	35	1.3780	62	2.4409	35	1.378	22	.866	55	2.165	0.12	0.24	.005	.010	72300	23400
40FSH68	40	1.5748	68	2.6772	40	1.575	25	.984	60	2.362	0.12	0.24	.005	.010	86100	30600
45FSH75	45	1.7717	75	2.9528	43	1.693	28	1.102	67	2.638	0.12	0.24	.005	.010	107000	37000
50FSH90	50	1.9685	90	3.5433	56	2.205	36	1.417	81	3.150	0.14	0.26	.006	.011	157000	53500
60FSH105	60	2.3622	105	4.1339	63	2.480	40	1.575	94	3.701	0.14	0.26	.006	.011	211000	72200
70FSH120	70	2.7559	120	4.7244	70	2.756	45	1.772	107	4.213	0.14	0.26	.006	.011	274000	93600
80FSH130	80	3.1496	130	5.1181	75	2.953	50	1.968	117	4.606	0.14	0.26	.006	.011	327000	115000
90FSH150	90	3.5433	150	5.9055	85	3.346	55	2.165	134	5.276	0.14	0.26	.006	.011	429000	146000
100FSH160	100	3.9370	160	6.2992	85	3.346	55	2.165	143	5.630	0.14	0.26	.006	.011	489000	162000
110FSH180	110	4.3307	180	7.0866	100	3.937	70	2.756	160	6.299	0.14	0.26	.006	.011	612000	210000
120FSH210	120	4.7244	210	8.2677	115	4.528	70	2.756	187	7.362	0.16	0.28	.006	.011	836000	264000
140FSH230	140	5.5118	230	9.0551	130	5.118	80	3.150	206	8.110	0.16	0.28	.006	.011	1020000	348000
160FSH260	160	6.2992	260	10.2362	135	5.315	80	3.150	234	9.213	0.16	0.28	.006	.011	1300000	413000
180FSH290	180	7.0866	290	11.4173	155	6.102	100	3.937	265	10.433	0.18	0.30	.007	.012	1680000	533000
200FSH320	200	7.8740	320	12.5984	165	6.496	100	3.937	286	11.260	0.18	0.30	.007	.012	1960000	631000
220FSH340	220	8.6614	340	13.3858	175	6.890	100	3.937	306	12.047	0.18	0.30	.007	.012	2240000	736000
240FSH370	240	9.4488	370	14.5669	190	7.480	110	4.331	333	13.110	0.20	0.32	.008	.013	2650000	871000
260FSH400	260	10.2362	400	15.7480	205	8.071	120	4.724	360	14.173	0.20	0.32	.008	.013	3100000	1020000
280FSH430	280	11.0236	430	16.9291	210	8.268	120	4.724	386	15.197	0.20	0.32	.008	.013	3560000	1120000

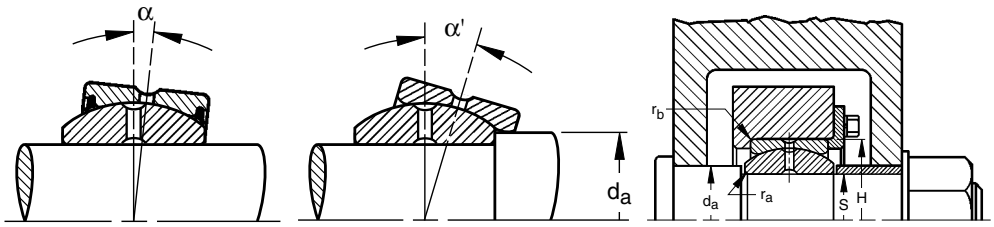
* Prior to fracturing outer ring.

MOUNTING

- The housing bore dimensions given below are applicable to bearings mounted in steel.
- Due to fracturing, the outer ring may be slightly out-of-round. Roundness will be restored, however, when the bearing is mounted in a housing of sufficient cross section.
- The preferred shaft tolerance is f6 as listed below per ANSI B4.2. To obtain a shaft interference fit, refer to the m6 tolerance limits listed in the Shaft Diameter Tolerance table on page B410.

LOAD RATING

- The "dynamic load rating" is the maximum load suggested for extended life with periodic lubrication. It is based upon the radially projected area of the inner ring bore and allowable stress level of 85 megapascals (approximately 12,300 psi).
- For intermittent loading and intermittent operation, the applied radial load should not exceed the dynamic load rating for constant loading and continuous operation, the applied radial load should not exceed 75 percent of the dynamic load rating. For dynamic or static thrust loading, use 25 percent of respective radial load rating values. For combined radial and thrust loading, consult your Timken representative.
- The "limit load rating" is the maximum static load that can be applied to a Timken spherical plain bearing. Shaft and housing stresses should be checked when the load approaches the limit load rating since the shaft or housing may then become the critical member. The ultimate or static fracture rating of the bearing is at least 1.5 times the limit load rating.
- Load ratings are given in pounds force:
  1 lbf = 0.454 kgf = 4.448N.



Maximum tilt for sealed bearing

Maximum tilt for bearing without seals

Mounting detail

MOUNTING DIMENSIONS

Weight (Approx.)	Tilting Angle		Shaft Shoulder Diameter d_a		Shaft Fillet Radius* r_a† (Max.)		Housing Fillet Radius r_b‡ (Max.)		Shaft Diameter S				Housing Bore H			
	α	α'							mm		in.		mm		in.	
lbs.	deg.	deg.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	max.	min.	min.	max.
.069	18.5	25.0	16	.63	0.5	.02	0.5	.02	11.984	11.973	.4718	.4714	25.972	25.993	1.0225	1.0233
.130	16.0	22.0	19	.75	0.5	.02	0.5	.02	13.984	13.973	.5506	.5502	29.972	29.993	1.1800	1.1808
.171	18.0	27.0	21	.83	0.5	.02	0.6	.02	15.984	15.973	.6293	.6289	34.967	34.992	1.3767	1.3777
.298	17.5	26.5	24	.94	0.5	.02	0.6	.02	19.980	19.967	.7866	.7861	41.967	41.992	1.6522	1.6532
.397	17.0	23.0	29	1.14	0.5	.02	0.6	.02	23.980	23.963	.9441	.9436	46.967	46.992	1.8491	1.8501
.574	17.0	24.0	34	1.34	0.5	.02	0.8	.03	29.980	29.967	1.1803	1.1798	54.961	54.991	2.1638	2.1650
.794	15.5	24.5	39	1.54	0.6	.02	0.8	.03	34.975	34.959	1.3770	1.3764	61.961	61.991	2.4394	2.4406
.982	17.0	21.0	44	1.73	0.6	.02	0.8	.03	39.975	39.959	1.5738	1.5732	67.961	67.991	2.6756	2.6768
1.31	15.0	20.0	50	1.97	0.6	.02	0.8	.03	44.975	44.959	1.7707	1.7701	74.961	74.991	2.9512	2.9524
2.63	17.0	23.5	57	2.24	0.6	.02	1.0	.04.	49.975	49.959	1.9675	1.9669	89.955	89.990	3.5415	3.5429
3.91	16.5	22.5	67	2.64	0.8	.03	1.0	.04	59.970	59.951	2.3610	2.3603	104.955	104.990	4.1321	4.1335
5.62	15.5	20.5	77	3.03	0.8	.03	1.0	.04	69.970	69.951	2.7547	2.7540	119.955	119.990	4.7226	4.7240
6.66	14.5	18.5	87	3.43	0.8	.03	1.0	.04	79.970	79.951	3.1484	3.1477	129.948	129.988	5.1161	5.1177
10.4	15.0	19.5	98	3.86	1.0	.04	1.0	.04	89.964	89.942	3.5419	3.5410	149.948	149.988	5.9035	5.9051
11.5	13.5	18.0	110	4.33	1.0	.04	1.0	.04	99.964	99.942	3.9356	3.9347	159.948	159.988	6.2972	6.2988
17.9	12.5	15.5	122	4.80	1.0	.04	1.0	.04	109.964	109.942	4.3293	4.3284	179.948	179.988	7.0846	7.0862
29.7	15.5	23.5	132	5.20	1.0	.04	1.0	.04	119.964	119.942	4.7230	4.7221	209.940	209.986	8.2654	8.2674
35.8	16.0	20.5	152	5.98	1.0	.04	1.0	.04	139.957	139.932	5.5101	5.5091	229.940	229.986	9.0528	9.0548
48.9	15.0	21.0	176	6.93	1.0	.04	1.0	.04	159.957	159.932	6.2975	6.2965	259.934	259.986	10.2336	10.2356
71.5	13.0	20.5	196	7.72	1.0	.04	1.0	.04	179.957	179.932	7.0849	7.0839	289.934	289.986	11.4147	11.4167
88.2	14.5	19.5	220	8.66	1.0	.04	1.0	.04	199.950	199.921	7.8720	7.8709	319.927	319.984	12.5956	12.5978
96.4	15.5	19.0	243	9.57	1.0	.04	1.0	.04	219.950	219.921	8.6594	8.6583	339.927	339.984	13.3830	13.3852
124	15.5	19.5	263	10.35	1.0	.04	1.0	.04	239.950	239.921	9.4468	9.4457	369.927	369.984	14.5641	14.5663
157	15.0	19.5	283	11.14	1.0	.04	1.0	.04	259.944	259.912	10.2340	10.2327	399.927	399.984	15.7452	15.7474
188	14.5	20.0	310	12.20	1.0	.04	1.0	.04	279.944	279.912	11.0214	11.0201	429.920	429.983	16.9260	16.9285

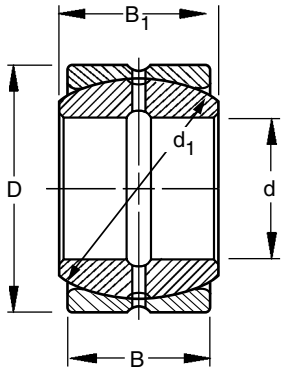
* For bearing sizes 5SF8 through 25SF40, shaft and shoulder should be undercut to eliminate fillet.
† Equal to minimum inner ring bore chamfer.
‡ Equal to minimum outer ring O.D. chamfer.

RADIAL BEARINGS TYPE SFH

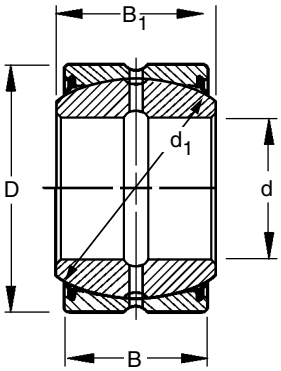
- The SFH spherical plain radial bearing is a unit assembly consisting of a solid spherical O.D. inner ring and a spherical I.D. outer ring. The outer ring has a single fracture to permit assembly. Both inner and outer rings are phosphate treated and then coated with molybdenum disulphide (MoS_2).
- The type SFH bearing is similar to type SF, but the inner ring bore diameter has been reduced and the width made greater to increase the spherical surface. This permits greater misalignment yet maintains full bearing contact.
- Bearings 12SFH24 through 22SFH40 are available with reinforced rubber seals. To order, add suffix "TT" to bearing designation - Example: 22SFH40-TT.
- Bearings 25SFH44 through 55SFH96 are available with synthetic resin seals. To order, add suffix "SS" to bearing designation - Example: 25SFH44-SS.
- Before ordering any bearing, check for availability.

DIMENSIONS

- Inch-metric conversions given are for the convenience of the user. The controlling dimensions are in inches.
- For tolerances of nominal dimensions, see Tables 2 and 2A on page B411. Dimensions listed are after coating with MoS_2 except outer ring O.D. and internal clearance are before coating and fracturing. The axial internal clearance is approximately three times the radial internal clearance.
- α is the maximum tilting angle for sealed radial bearings. To utilize the maximum tilting angle for unsealed radial bearings, the suggested shaft shoulder diameter d_a, shown in the drawing on facing page must not be exceeded.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.



Type SFH



Type SFH TT, SFH SS

DIMINSIONS - LOAD RATINGS

Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B_1		Outer ring Width B		Spherical Diameter d_1 (Ref.)		Radial Clearance* (unmounted) mm		Radial Clearance* (unmounted) in.		Load Ratings Radial Limit Load Rating	Load Ratings Dynamic Radial Load Rating
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	min.	max.	min.	max.	lbf.	lbf.
12SFH24	31.750	1.2500	61.912	2.4375	35.31	1.390	28.58	1.125	54.74	2.155	0.13	0.23	.005	.009	75000	21400
15SFH28	38.100	1.5000	71.438	2.8125	40.13	1.580	33.32	1.312	63.88	2.515	0.13	0.23	.005	.009	102000	29200
17SFH32	44.450	1.7500	80.962	3.1875	46.23	1.820	38.10	1.500	73.02	2.875	0.13	0.23	.005	.009	133000	39300
20SFH36	50.800	2.0000	90.488	3.5625	52.58	2.070	42.85	1.687	82.17	3.235	0.15	0.25	.006	.010	169000	51000
22SFH40	57.150	2.2500	100.012	3.9375	58.88	2.318	47.62	1.875	91.19	3.590	0.15	0.25	.006	.010	208000	64000
25SFH44	63.500	2.5000	111.125	4.3750	64.64	2.545	52.37	2.062	100.33	3.950	0.15	0.25	.006	.010	252000	78400
27SFH48	69.850	2.7500	120.650	4.7500	70.87	2.790	57.15	2.250	109.52	4.312	0.15	0.25	.006	.010	300000	94600
30SFH52	76.200	3.0000	130.175	5.1250	76.76	3.022	61.90	2.437	118.74	4.675	0.18	0.28	.007	.011	353000	112000
32SFH56	82.550	3.2500	139.700	5.5000	82.93	3.265	66.68	2.625	128.02	5.040	0.18	0.28	.007	.011	410000	131000
35SFH60	88.900	3.5000	149.225	5.8750	90.42	3.560	71.42	2.812	136.91	5.390	0.18	0.28	.007	.011	467000	154000
37SFH64	95.250	3.7500	158.750	6.2500	94.95	3.738	76.20	3.000	146.05	5.750	0.18	0.28	.007	.011	533000	173000
40SFH72	101.600	4.0000	177.800	7.0000	107.32	4.225	85.72	3.375	164.46	6.475	0.18	0.28	.007	.011	673000	208000
45SFH80	114.300	4.5000	196.850	7.7500	119.13	4.690	95.25	3.750	182.63	7.190	0.18	0.28	.007	.011	833000	260000
55SFH96	139.700	5.5000	222.250	8.7500	125.73	4.950	104.78	4.125	207.16	8.156	0.18	0.28	.007	.011	1050000	336000

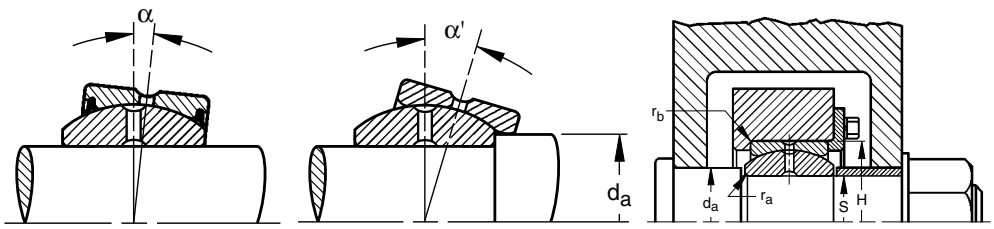
* Prior to fracturing outer ring.

MOUNTING

- The housing bore dimensions given below are applicable to bearings mounted in steel.
- Due to fracturing, the outer ring may be slightly out-of-round. Roundness will be restored, however, when the bearing is mounted in a housing of sufficient cross section.
- The preferred shaft tolerance is g6 as listed below per ANSI B4.1. To obtain a shaft interference fit, refer to the m6 tolerance limits listed in the Shaft Diameter Tolerance table on page B410.

LOAD RATING

- The "dynamic load rating" is the maximum load suggested for extended life with periodic lubrication. It is based upon the radially projected area of the inner ring bore and an allowable stress level of 85 megapascals (approximately 12,300 psi).
- For intermittent loading and intermittent operation, the applied radial load should not exceed the dynamic load rating. For constant loading and continuous operation, the applied radial load shoud not exceed 75 percent of the dynamic load rating. For dynamic or static thrust loading, use 25 percent of respective radial load rating values. For combined radial and thrust loading, consult your Timken representative.
- The "limit load rating" is the maximum static load that can be applied to a Timken spherical plain bearing. Shaft and housing stresses should be checked when the load approaches the limit load rating since the shaft or housing may then become the critical member. The ultimate, or static fracture, rating of the bearing is at least 1.5 times the limit load rating.
- Load ratings are given in pounds force:
  1lbf = 0.454 kgf = 4.448N.



Maximum tilt for sealed bearing

Maximum tilt for bearing without seals

Mounting detail

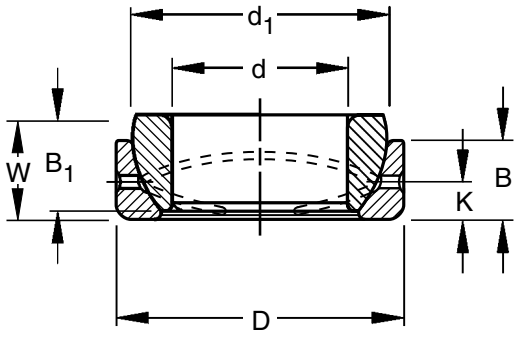
MOUNTING DIMENSIONS

Weight (Approx.)	Tilting Angle α	Tilting Angle α'	Shaft Shoulder Diameter d_a		Shaft Fillet Radius* r_a† (Max.)		Housing Fillet Radius r_b‡ (Max.)		Shaft Diameter S mm		Shaft Diameter S in.		Housing Bore H mm		Housing Bore H in.	
lbs.	deg.	deg.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	max.	min.	min.	max.
1.00	8.5	16.5	41.9	1.64	1.0	.040	0.8	.032	31.740	31.725	1.2496	1.2490	61.874	61.904	2.4360	2.4372
1.60	7.0	15.5	49.8	1.95	1.0	.040	0.8	.032	38.090	38.075	1.4996	1.4990	71.399	71.429	2.8110	2.8122
2.50	7.5	16.0	56.6	2.22	1.5	.060	0.8	.032	44.440	44.425	1.7496	1.7490	80.914	80.950	3.1856	3.1870
3.70	8.0	16.0	63.2	2.48	1.5	.060	0.8	.032	50.790	50.772	1.9996	1.9989	90.439	90.475	3.5606	3.5620
4.40	8.5	16.5	69.6	2.74	1.5	.060	0.8	.032	57.140	57.122	2.2496	2.2489	99.964	100.000	3.9356	3.9370
6.50	8.5	14.0	76.7	3.02	2.0	.080	0.8	.032	63.490	63.472	2.4996	2.4989	111.077	111.113	4.3731	4.3745
8.00	8.5	14.0	83.6	3.28	2.0	.080	0.8	.032	69.840	69.822	2.7496	2.7489	120.594	120.635	4.7478	4.7494
9.60	8.5	14.0	90.7	3.56	2.0	.080	0.8	.032	76.190	76.172	2.9996	2.9989	130.119	130.160	5.1228	5.1244
11.7	8.5	14.0	97.5	3.83	2.0	.080	0.8	.032	82.537	82.514	3.2495	3.2486	139.544	139.685	5.4978	5.4994
15.0	9.5	15.0	103	4.04	2.0	.080	0.8	.032	88.887	88.864	3.4995	3.4986	149.169	149.210	5.8728	5.8744
19.5	9.0	14.5	111	4.36	2.0	.080	0.8	.032	95.237	95.214	3.7495	3.7486	158.694	158.735	6.2478	6.2494
22.5	9.0	14.5	125	4.90	2.0	.080	1.1	.044	101.587	101.564	3.9995	3.9986	177.744	177.785	6.9978	6.9994
30.0	9.0	14.5	138	5.44	2.0	.080	1.1	.044	114.287	114.264	4.4995	4.4986	196.784	196.830	7.7474	7.7492
45.0	6.5	12.0	165	6.48	2.0	.080	1.1	.044	139.685	139.660	5.4994	5.4984	222.184	222.230	8.7474	8.7492

* For bearing sizes 5SF8 through 25SF40, shaft and shoulder should be undercut to eliminate fillet.
† Equal to minimum inner ring bore chamfer.
‡ Equal to minimum outer ring O.D. chamfer.

ANGULAR CONTACT BEARINGS TYPE SBT

- Separable assembly consisting of an inner and outer ring with hemispherically shaped surfaces that mate with each other.
- Both inner and outer rings are phosphate-treated and coated with molybdenum disulphide (MoS_2).
- If a Timken ring is assembled with a ring of another make, consult your Timken representative.
- To order inner and outer rings separately, specify by adding suffix "-OR" for outer ring or "-IR" for inner ring.
- Metric-inch conversions are provided for the convenience of the user. The controlling dimensions are in inches.
- See Table 2 and 3 for tolerances. Dimensions listed are after the bearing has been coated with molybdenum disulphide.
- α is the maximum tilting angle through the shaft. A stub shaft can be used to obtain a larger angle.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.

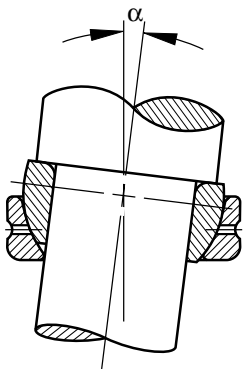


DIMINSIONS - LOAD RATINGS

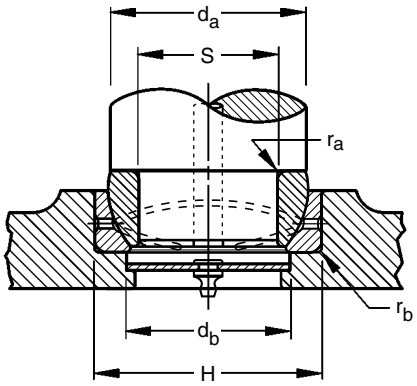
Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B_1		Outer ring Width B		Spherical Diameter d_1 (Ref.)		Radial Clearance* (unmounted) mm		Radial Clearance* (unmounted) in.		Load Ratings Radial Limit Load Rating	Load Ratings Dynamic Radial Load Rating
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	min.	max.	min.	max.	lbf.	lbf.
5SBT80	0.5000	12.700	0.8750	22.225	0.270	6.86	0.190	4.83	0.300	7.62	0.094	2.39	0.719	18.26	4600	1860
6SBT10	0.6250	15.875	1.0625	26.988	0.340	8.64	0.250	6.35	0.370	9.40	0.109	2.77	0.899	22.83	7600	3080
7SBT12	0.7500	19.050	1.2500	31.750	0.410	10.41	0.310	7.87	0.440	11.18	0.125	3.18	1.080	27.43	11100	4500
8SBT14	0.8750	22.225	1.4375	36.512	0.480	12.19	0.380	9.65	0.520	13.21	0.172	4.37	1.258	31.95	15400	6210
10SBT16	1.0000	25.400	1.6250	41.275	0.550	13.97	0.440	11.18	0.600	15.24	0.203	5.16	1.437	36.50	19400	7860
12SBT20	1.2500	31.750	2.0000	50.800	0.700	17.78	0.550	13.97	0.740	18.80	0.234	5.94	1.795	45.59	31000	12500
13SBT22	1.3750	34.925	2.1875	55.562	0.770	19.56	0.600	15.24	0.840	21.34	0.281	7.14	1.937	49.20	37000	15100
15SBT24	1.5000	38.100	2.4375	61.912	0.840	21.34	0.660	16.76	0.910	23.11	0.312	7.92	2.155	54.74	44500	18300
17SBT28	1.7500	44.450	2.8125	71.438	0.980	24.89	0.790	20.07	1.070	27.18	0.328	8.33	2.515	63.88	60000	24400
20SBT32	2.0000	50.800	3.1875	80.962	1.130	28.70	0.920	23.37	1.230	31.24	0.375	9.52	2.875	73.02	79000	32300
22SBT36	2.2500	57.150	3.5625	90.488	1.270	32.26	1.050	26.67	1.390	35.31	0.453	11.51	3.235	82.17	100000	40800
25SBT40	2.5000	63.500	3.9375	100.012	1.420	36.07	1.180	29.97	1.540	39.12	0.500	12.70	3.590	91.19	126000	51500
27SBT44	2.7500	69.850	4.3750	111.125	1.560	39.62	1.275	32.38	1.700	43.18	0.515	13.08	3.950	100.33	154000	62150
30SBT48	3.0000	76.200	4.7500	120.650	1.710	43.43	1.405	35.69	1.860	47.24	0.578	14.68	4.312	109.52	186000	75000
32SBT52	3.2500	82.550	5.1250	130.175	1.860	47.24	1.545	39.24	2.030	51.56	0.656	16.66	4.675	118.74	218000	87500
35SBT56	3.5000	88.900	5.5000	139.700	2.000	50.80	1.675	42.54	2.180	55.37	0.703	17.86	5.040	128.02	257000	102400
37SBT60	3.7500	95.250	5.8750	149.225	2.150	54.61	1.805	45.85	2.340	59.44	0.765	19.43	5.390	136.91	295000	118500
40SBT64	4.0000	101.600	6.2500	158.750	2.300	58.42	1.935	49.15	2.500	63.50	0.781	19.84	5.750	146.05	336000	135000
45SBT72	4.5000	114.300	7.0000	177.800	2.590	65.79	2.195	55.75	2.800	71.12	0.875	22.22	6.475	164.46	432000	173500
50SBT80	5.0000	127.000	7.7500	196.850	2.880	73.15	2.455	62.36	3.130	79.50	1.000	25.40	7.190	182.63	524000	211000
60SBT96	6.0000	152.400	8.7500	222.250	3.100	78.74	2.615	66.42	3.375	85.72	1.370	34.80	8.156	207.16	585000	235000

MOUNTING

- Housing bore dimensions listed are appropriate for bearings mounted in steel.
- Suggested diameters of shoulder supports should be used to assure proper function of the bearing.
- Preferred shaft and housing bore dimensions are listed below per ANSI B4.1.
- Refer to the m6 tolerance limits listed in the Shaft Diameter Tolerance table on page B410 for shaft interference fit.
- Bearings are to be mounted with sufficient axial preload to ensure contact of the spherical surfaces under all load conditions.



Maximum tilt for bearing



Mounting detail

MOUNTING DIMENSIONS

Weight (Approx.)		Tilting Angle (Max.)	Shaft Shoulder Diameter d_a		Shaft Fillet Radius r_a† (Max.)		Housing Shoulder Diameter d_b		Housing Filet Radius r_b‡ (Max.)		Shaft Diameter S				Housing Bore H			
											mm		in.		mm		in.	
kg	lbs.	deg.	mm	in.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	min.	max.	min.	max.
0.013	0.029	7	0.67	17.0	0.020	0.5	0.57	14.5	0.020	0.5	0.4998	0.4994	12.695	12.685	0.8739	0.8747	22.197	22.217
0.025	0.056	6	0.84	21.3	0.030	0.8	0.70	17.8	0.030	0.8	0.6248	0.6244	15.870	15.860	1.0614	1.0622	26.960	26.980
0.038	0.083	6	1.02	25.9	0.040	1.0	0.84	21.3	0.040	1.0	0.7497	0.7492	19.042	19.029	1.2487	1.2497	31.717	31.742
0.050	0.110	5.5	1.23	31.2	0.080	2.0	0.97	24.6	0.080	2.0	0.8747	0.8742	22.217	22.204	1.4362	1.4372	36.479	36.504
0.085	0.188	6	1.40	35.6	0.080	2.0	1.12	28.4	0.080	2.0	0.9997	0.9992	25.392	25.379	1.6237	1.6247	41.242	41.267
0.159	0.351	6	1.71	43.4	0.080	2.0	1.39	35.3	0.080	2.0	1.2496	1.2490	31.740	31.725	1.9985	1.9997	50.762	50.792
0.213	0.470	4	1.89	48.0	0.100	2.5	1.48	37.6	0.100	2.5	1.3746	1.3740	34.915	34.900	2.1860	2.1872	55.524	55.554
0.300	0.662	5.5	2.05	52.1	0.100	2.5	1.66	42.2	0.100	2.5	1.4996	1.4990	38.090	38.075	2.4360	2.4372	61.874	61.904
0.458	1.010	6	2.36	59.9	0.100	2.5	1.95	49.5	0.100	2.5	1.7496	1.7490	44.440	44.425	2.8110	2.8122	71.399	71.429
0.671	1.480	5.5	2.75	69.8	0.140	3.6	2.22	56.4	0.140	3.6	1.9996	1.9989	50.790	50.772	3.1856	3.1870	80.914	80.950
0.948	2.090	5.5	3.06	77.7	0.140	3.6	2.50	63.5	0.140	3.6	2.2496	2.2489	57.140	57.122	3.5606	3.5620	90.439	90.475
1.129	2.490	5	3.37	85.6	0.140	3.6	2.75	69.9	0.140	3.6	2.4996	2.4989	63.490	63.472	3.9356	3.9370	99.964	100.000
1.751	3.860	5	3.71	94.2	0.180	4.6	3.03	77.0	0.180	4.6	2.7496	2.7489	69.840	69.822	4.3731	4.3745	111.077	111.113
2.277	5.020	5	4.07	103.0	0.180	4.6	3.30	83.8	0.180	4.6	2.9996	2.9989	76.190	76.172	4.7478	4.7494	120.594	120.635
2.885	6.360	5	4.42	112.0	0.180	4.6	3.58	90.9	0.180	4.6	3.2495	3.2486	82.537	82.514	5.1228	5.1244	130.119	130.160
3.570	7.870	5	4.77	121.0	0.180	4.6	3.85	97.8	0.180	4.6	3.4995	3.4986	88.887	88.864	5.4978	5.4994	139.644	139.685
4.350	9.590	4.5	5.11	130.0	0.180	4.6	4.10	104.0	0.180	4.6	3.7495	3.7486	95.237	95.214	5.8728	5.8744	149.169	149.210
5.262	11.600	4.5	5.43	138.0	0.180	4.6	4.37	111.0	0.180	4.6	3.9995	3.9986	101.587	101.564	6.2478	6.2494	158.694	158.735
7.756	17.100	4.5	6.14	156.0	0.180	4.6	4.90	125.0	0.180	4.6	4.4995	4.4986	114.287	114.264	6.9978	6.9994	177.744	177.785
11.068	24.400	4.5	6.83	174.0	0.180	4.6	5.47	139.0	0.180	4.6	4.9994	4.9984	126.984	126.959	7.7474	7.7492	196.784	196.830
17.373	38.300	4.5	7.75	197.0	0.180	4.6	6.50	165.0	0.180	4.6	5.9994	5.9984	152.385	152.360	8.7474	8.7492	222.184	222.230

† Equal to minimum inner ring bore chamfer.
‡ Equal to minimum outer ring O.D. chamfer.

THRUST BEARINGS

Overview: Timken thrust bearings are designed specifically to manage thrust loads and provide high-shock-load resistance in industrial and automotive applications. We manufacture seven basic designs of thrust bearings that include ball, crossed roller, cylindrical, machined tapered (TTHD, V-Flat, screwdown), stamped tapered, spherical and needle.

- **Sizes:** 35 mm - 2940 mm (1375 in. - 115.75 in.).
- **Markets:** Aggregate, Machine Tool, Metals, Oil, Power Generation.
- **Applications:** Cone crushers, crane hooks, oil well swivels, extruders, pulverizer drives, rolling mills, machine tool spindles & tables, drilling rig hydraulic heads, gear boxes, pre-heater fans.
- **Benefits:** High performance and application flexibility. Large range of product offering.

Ball and Roller Thrust Bearings

From the three-digit "Series" number, it is known this is an inch size bearing. "50" is read as "5.0" and represents approximate or actual bore.

The series number (always three numerals) represents a specific size cage assembly.

50	TVB	190	A	A	XXX

TVB	thrust ball bearings
TVL	angular contact thrust ball bearings
DTVL	angular contact thrust ball bearings – upper and lower complement of balls
TSR	thrust spherical roller bearings
TTVF	thrust tapered roller bearings
TTVS	thrust tapered roller bearings – with aligning washer
TTSV, TTSX	thrust tapered roller bearings – full complement
TP	thrust cylindrical roller bearings
TPS	thrust cylindrical roller bearings – with aligning washer
TTHD	thrust tapered roller bearings

modification to inner ring

modification to outer ring

descriptive of modification code

B

Ball and Roller Thrust Bearings

INTRODUCTION

Six basic designs of ball and roller thrust bearings are available: ball, cross roller, cylindrical, machine tapered (TTHD, V-Flat, Screwdown), stamped tapered and spherical tapered roller. Dimensional data for all styles are presented in order bybore size.

Engineering data such as tolerances, shaft and housing fits, and life and load rating calculations are found in the engineering section of this catalog.

BEARING TYPES

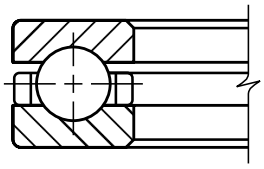
BALL THRUST BEARINGS

Ball thrust bearings provide optimum performance in high-speed installations, particularly where loads are generally lighter. Two types including axial (TVB), and angular contact (TVL) are available. The DTVL Type is offered with both an upper and lower complement of angular contact balls and three race elements. The standard tolerances for ball thrust bearings (both types) are equivalent to ABEC 1 where applicable. Higher precision tolerances are available. Consult your Timken representative for information on such installations.

TVB

TVB Types are separable, consisting of two hardened and ground steel washers. Precision ground and lapped balls run in a grooved raceway separated by a bronze cage. Other materials may be specified for the cage, depending on the application.

Most TVB bearings include washers of the same bore and outside diameter. Housings should be designed to clear the O.D. of rotating races, with shafts stepped to clear the bore of stationary washers. Provides axial rigidity, but are not suggested if radial load is expected. The TVB is exceptionally easy to mount with the rotating washer usually shaft mounted. The stationary washer should be housed with an outside diameter clearance that allows the bearing to assume a normal operating position.



TVB

TVL

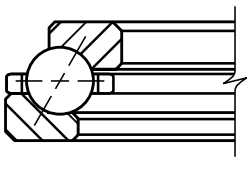
TVL Types provide exceptionally low friction, are cool running and have quiet operation when operated at high speeds. They are also less sensitive to misalignment. Consult your Timken representative for assistance in determining limits of such loading for specific applications.

Although ball thrust bearings have been designed exclusively for thrust loads, the TVL bearing will accommodate some radial loading. Consult your Timken representative for assistance in determining the limits of such loading for specific applications.

Hardened and ground steel races of TVL bearings enclose a complement of precision ground and lapped steel balls, separated by a bronze cage. Other material may be specified as required.

Not strictly an annular ball bearing, the larger ring is identified as the outer ring; the smaller as the inner. Inner ring is usually the rotating element and is shaft mounted. Outer ring is normally stationary and should be mounted with an outside diameter clearance that allows the bearing to assume a normal operating position. If combined loads are expected, the outer ring must be radially located in the housing.

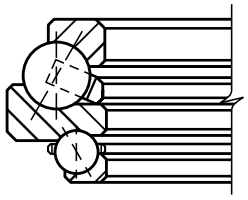
TVL bearings should always be operated under thrust loading. If a constant thrust load is not normally present, it should be imposed by springs or other devices.



TVL

DTVL

The DTVL has an upper and lower complement of angular contact balls and three race elements. It is capable of carrying thrust in one direction, comparable to the TVL Series and lighter thrust in the opposite direction.



DTVL

SPHERICAL ROLLER THRUST BEARINGS

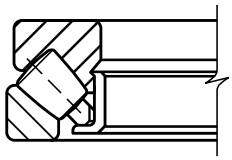
TSR

A combination radial and thrust bearing designed to operate even if shaft and housing are, or become, misaligned under load. A favored bearing when conditions include heavy loads, difficulties in establishing or maintaining housing alignment or when shaft deflection can be expected.

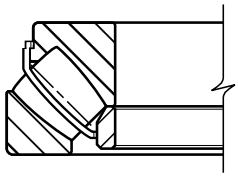
Shaft deflections and housing distortions caused by shock or heavy loads (which lead to misalignment) are compensated for by the internal self-alignment of the bearing elements during operation. Corner loading of rollers, a condition that limits service life on other types of bearings, cannot develop in spherical roller thrust bearings.

The TSR achieves high thrust capacity and allows axial misalignment between the inner ring and the outer ring of up to ±2.5°. Spherically contoured rollers, arranged in a steep angular position, not only accept high axial loads, but also moderate radial loads. "E" styles, (EM-machined bronze cage, EJ- stamped steel cage) have increased capacity. Should extreme conditions of loading and/or speed under misalignment be anticipated, contact your Timken representative before ordering.

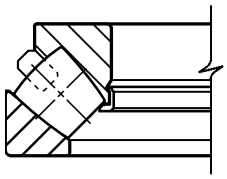
The inherent compensation for misalignment, provided by the spherical roller bearings, offers the designer the opportunity to use weldments for housing frames instead of complex castings. This eliminates high-cost machining operations. When castings are preferred, bore alignment is less critical if spherical roller bearings are specified.



TSR



TSR-EJ



TSR-EM

CYLINDRICAL ROLLER THRUST BEARINGS

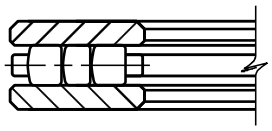
Timken's cylindrical roller thrust bearings are designed to operate under heavy loads at moderate speeds. Standard versions can be operated at peripheral speeds (bearing O.D.) of up to 3000 feet per minute. Special design features are available for both the bearing and mounting permitting even higher rotational speeds for this type of bearing. Two types of cylindrical roller thrust bearings, TP and TPS, are available.

TP

Type TP bearings include two flat hardened and ground steel washers with a cage retainer holding one or more controlled contour rollers in each pocket. If specifications call for two or more rollers per pocket, they are manufactured to different lengths. The longer rollers are placed in alternate positions in adjacent pockets. Overlapping roller paths prevent "grooving" of the races and prolong bearing life. Due to the simplicity of design, standard TP thrust bearings are among the most economical to buy and install.

Minor radial displacement of the races does not affect the operation of the TP bearing, resulting in manufacturing economies and simplified installation.

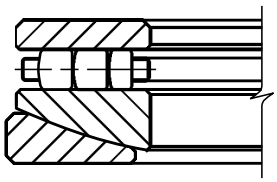
Shaft and housing seats must be square to the axis of rotation to prevent initial misalignment problems.



TP

TPS

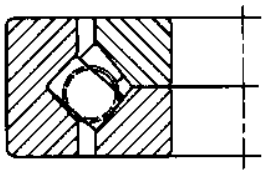
The TPS design is similar to the TP style, except the bottom washer assembly is comprised of two races, with the contacting faces spherically ground. The TPS bearing is self-adjusting to initial misalignment. It is not suggested for installations where alignment may be continuously changing (dynamic misalignment).



TPS

TXR

The crossed roller bearing is ideal for machine tool applications such as vertical boring mills, vertical grinding machines and other similar applications. A crossed roller bearing is comprised of two sets of bearing races and rollers brought together at right angles to each other – with alternate rollers facinig in oposite directions – and within a section height not much greater than that of a single bearing housing.



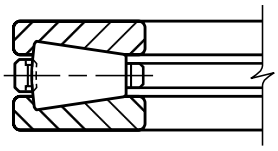
TXR

TAPERED ROLLER THRUST BEARINGS

Timken true rolling tapered roller thrust bearings include rollers that have conical sections. These bearings have been engineered so that the rollers and raceways form a cone in which the vertex is on the center line of the bearing. This bearing geometry assures a true rolling motion. In addition, the large end of each tapered roller is spherically ground so that its curvature conforms with the concave face of the washer rib. Pressure between the rib and roller, under load, guides the rollers accurately. Timken manufactures five types of tapered roller thrust bearings: standard (TTHD), V-Flat (TTVF) self-aligning V-Flat (TTVS), concave washer (TTSV), and convex washer (TTSX).

TTHD

The TTHD design has an identical pair of hardened and ground steel washers with tapered raceways. Both washers have the same bore and O.D., therefore housings should be designed to clear the O.D. of rotating washers and shafts stepped to clear the bore of stationary washers. Controlled contour tapered rollers are equally spaced by a cage. The TTHD bearing is well-suited for applications where extremely high thrust loads and heavy shock may be encountered as in crane hooks. For very low speed applications with unusually high loading, TTHD bearings can be supplied with a full complement of rollers. These bearings are identified in the tables by suffix 00278 following the bearing number. Applications for full-complement bearings should be reviewed by your Timken representative to ensure selection of the proper bearing.



TTHD

TTVF, TTVS, TTSV, TTSX

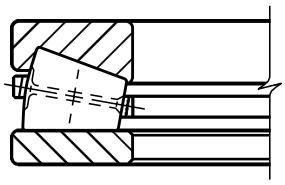
V-Flat Tapered Roller thrust bearings (TTVF and TTVS) combine the outstanding features of tapered thrust and cylindrical roller bearings, offering the highest possible capacity of any thrust bearing of its size. The V-Flat design includes one flat washer and one with a tapered raceway matching the rollers. The design was originally developed for screwdown applications in metal rolling mills where thrust loads exceeding one million pounds are common. The V-Flat bearings have exceptional dynamic capacity within a given envelope and provides static capacity. They have been highly successful in heavily loaded extruders, in cone crushers and other applications where a wide range of operating conditions are found. Most sizes utilize cages with hardened pins through the center of the rollers, allowing closer spacing of the rollers to maximize capacity.

Smaller sizes have brass cages, designed for unidirectional retention of rollers.

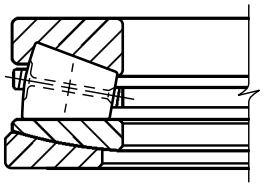
Both the pin type and brass cage are designed to permit a full flow of lubricant to all critical surfaces, providing cooler operation.

Self-aligning V-Flat bearings (TTVS) employ the same basic roller and raceway design, except the lower washer is in two pieces, with the contacting faces spherically ground permitting self-alignment under conditions of initial misalignment. TTVS bearings should not used if dynamic misalignment (changing under load) is expected.

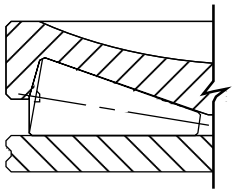
- The contact surface of each roller of the V-Flat bearings has a controlled contour wherein the ends are slightly relieved. This optimizes stress distribution by avoiding concentration of stress in the raceways at the ends of the rollers.
- Conformity between roller end and the rib is controlled to enhance the flow of lubricant between these surfaces, allowing the development of a hydrodynamic oil film between the end of the roller and the guiding surface of the rib.
- Full roller complement designs (TTSV and TTSX) do not have conventional bores, but are provided with center inserts for attachment purposes as well as for lifting.
- The TTSV and TTSX designs offer the highest capacity but at a somewhat reduced speed capability as compared with other V-Flat types.
- The TTSV and TTSX bearings encompass tapered rollers between two raceways. One raceway is flat and the other raceway forms the surface of a cone. The conical raceway has a washer with a rib to resist the radial component of the thrust force caused by the inclined plane and to guide the rollers.



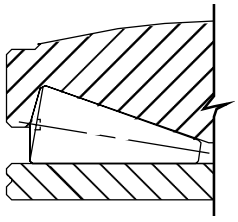
TTVF



TTVS



TTSV



TTSX

- Lines extended from the TTSV and TTSX roller-to-raceway contact surfaces converge to form a cone. The vertex of this cone is common with the centerline of the bearing and the plane of the raceway surface of the flat washer.
- The TTSV and TTSX design achieves true rolling motion between the tapered rollers and both raceways with no sliding or skidding at any point on the rolling surfaces. The flat raceway permits radial displacement without affecting the operation of the bearing.

TTSP

The types TTSP and TTSPS (not shown) thrust bearings are made up of two tapered thrust races, rollers, cage and outside retainer which holds the components together during shipping and installation. The types TTSP and TTSPS thrust bearings are exployed extensively in the steering pivot positions of automotive and industrial applications.

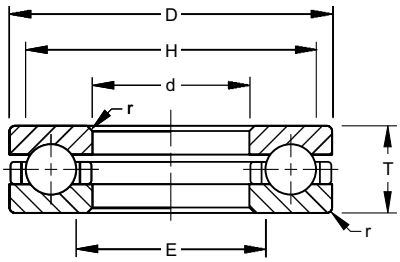
TTC, TTCS

The types TTC, TTCS and TTCL (not shown) thrust bearings consist of two tapered thrust races, rollers and an outside retainer and are cageless. The outside retainer holds the assembly together for shipping and installation. Types TTC, TTCS and TTCL bearings are thrust bearings specifically designed for oscillating applications These types are identical with the exception of the retainer construction.

BALL THRUST BEARINGS

TYPE TVB

- Designed for optimum performance in high speed installations.
- Provide axial rigidity, but are not suggested if radial loading is expected.
- Exceptionally easy to mount, with the rotating washer usually shaft-mounted.



DIMENSIONS – LOAD RATINGS

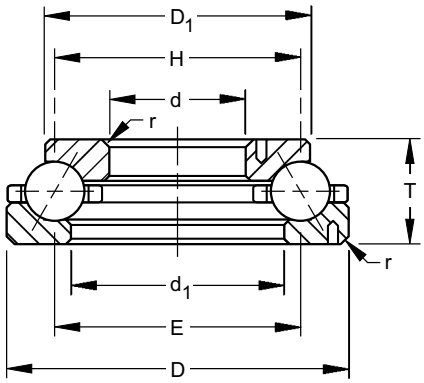
Bearing Number	Bore d	O.D. D	Height T (min.)	Shoulder Diameter		Fillet Radius[1] r (max.)	Wt.	Load Rating	
				Shaft H (min.)	Housing E (max.)			Static Load Rating C_{oa}	Dynamic Load Rating C_t
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.
50TVB190	**127.000** 5.0000	**184.150** 7.2500	**41.275** 1.6250	**170.7** 6.72	**140.5** 5.53	**2.4** 0.09	**3.4** 7.2	**583.0** 131000	**169.0** 38000
52TVB253	**133.350** 5.2500	**203.200** 8.0000	**50.800** 2.0000	**185.7** 7.31	**150.8** 5.94	**2.4** 0.09	**5.5** 12.2	**756.0** 170000	**223.0** 50200
55TVB245	**139.700** 5.5000	**209.550** 8.2500	**47.625** 1.8750	**192.1** 7.56	**157.2** 6.19	**2.4** 0.09	**5.1** 11.3	**770.0** 173000	**231.0** 52000
57TVB248	**146.050** 5.7500	**215.900** 8.5000	**47.625** 1.8750	**198.4** 7.81	**163.5** 6.44	**2.4** 0.09	**5.3** 11.7	**810.0** 182000	**239.0** 53800
60TVB252	**152.400** 6.0000	**222.250** 8.7500	**47.625** 1.8750	**204.8** 8.06	**169.9** 6.69	**2.4** 0.09	**5.6** 12.4	**832.0** 187000	**238.0** 53500
62TVB291	**158.750** 6.2500	**228.600** 9.0000	**47.625** 1.8750	**215.1** 8.47	**172.2** 6.78	**2.4** 0.09	**5.8** 12.8	**867.0** 195000	**245.0** 55100
65TVB293	**165.100** 6.5000	**241.300** 9.5000	**57.150** 2.2500	**224.6** 8.84	**181.8** 7.16	**3.2** 0.12	**7.7** 17.0	**1060.0** 238000	**317.0** 71300
67TVB296	**171.450** 6.7500	**247.650** 9.7500	**57.150** 2.2500	**229.4** 9.03	**189.7** 7.47	**3.2** 0.12	**7.9** 17.5	**1110.0** 251000	**328.0** 73800
70TVB298	**177.800** 7.0000	**254.000** 10.0000	**57.150** 2.2500	**235.7** 9.28	**196.1** 7.72	**3.2** 0.12	**8.2** 18.1	**1170.0** 263000	**339.0** 76300
75TVB343	**190.500** 7.5000	**266.700** 10.5000	**57.150** 2.2500	**250** 9.84	**207.2** 8.16	**3.2** 0.12	**9.1** 20.0	**1140.0** 255000	**321.0** 72300
75TVB344	**190.500** 7.5000	**276.225** 10.8750	**69.850** 2.7500	**258.8** 10.19	**208** 8.19	**3.2** 0.12	**12.7** 27.9	**1390.0** 313000	**407.0** 91400
80TVB346	**203.200** 8.0000	**279.400** 11.0000	**57.150** 2.2500	**262.7** 10.34	**219.9** 8.66	**3.2** 0.12	**8.8** 19.3	**1370.0** 309000	**395.0** 88900
80TVB347	**203.200** 8.0000	**295.275** 11.6250	**76.200** 3.0000	**273.1** 10.75	**222.2** 8.75	**6.4** 0.25	**15.6** 34.5	**1700.0** 382000	**504.0** 113000
85TVB391	**215.900** 8.5000	**292.100** 11.5000	**57.150** 2.2500	**275.4** 10.84	**232.6** 9.16	**3.2** 0.12	**10.1** 22.2	**1280.0** 289000	**349.0** 78400
90TVB393	**228.600** 9.0000	**304.800** 12.0000	**57.150** 2.2500	**288.1** 11.34	**245.3** 9.66	**3.2** 0.12	**9.7** 21.3	**1620.0** 365000	**442.0** 99400
95TVB431	**241.300** 9.5000	**317.500** 12.5000	**57.150** 2.2500	**300.8** 11.84	**258** 10.16	**3.2** 0.12	**11.1** 24.4	**1380.0** 311000	**366.0** 82400
100TVB433	**254.000** 10.0000	**342.900** 13.5000	**57.150** 2.2500	**324.6** 12.78	**272.3** 10.72	**6.4** 0.25	**13.4** 29.5	**1560.0** 351000	**431.0** 96800
105TVB471	**266.700** 10.5000	**355.600** 14.0000	**57.150** 2.2500	**337.3** 13.28	**285.0** 11.22	**6.4** 0.25	**13.9** 30.7	**1810.0** 407000	**476.0** 107000
110TVB472	**279.400** 11.0000	**368.300** 14.5000	**57.150** 2.2500	**350** 13.78	**297.7** 11.72	**6.4** 0.25	**14.5** 31.9	**1870.0** 421000	**486.0** 109000
120TVB511	**304.800** 12.0000	**393.700** 15.5000	**57.150** 2.2500	**375.4** 14.78	**323.1** 12.72	**6.4** 0.25	**15.6** 34.5	**2000.0** 450000	**507.0** 114000
130TVB551	**330.200** 13.0000	**419.100** 16.5000	**63.500** 2.5000	**400.8** 15.78	**348.5** 13.72	**6.4** 0.25	**18** 39.6	**2470.0** 555000	**627.0** 141000
140TVB581	**355.600** 14.0000	**444.500** 17.5000	**63.500** 2.5000	**426.2** 16.78	**373.9** 14.72	**6.4** 0.25	**19.2** 42.3	**2620.0** 590000	**649.0** 146000
150TVB610	**381.000** 15.0000	**482.600** 19.0000	**63.500** 2.5000	**460.4** 18.12	**403.6** 15.89	**6.4** 0.25	**24.8** 54.7	**2620.0** 590000	**649.0** 146000
160TVB640	**406.400** 16.0000	**508.000** 20.0000	**63.500** 2.5000	**482.6** 19.00	**431.8** 17.00	**6.4** 0.25	**26.3** 57.9	**2780.0** 624000	**677.0** 152000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.

ANGULAR CONTACT BALL THRUST BEARINGS

TYPE TVL

- Provides exceptionally low friction, cool running and quiet operation when run at high speeds.
- Although designed exclusively for thrust loads, will accommodate some radial loading.



DIMENSIONS – LOAD RATINGS[2]

Bearing Number	Bore d	O.D. D	Height T	Washers: Small Diameter O.D. D_1	Washers: Large Bore I.D. d_1	Shoulder Diam.: Shaft H (Min.)	Shoulder Diam.: Housing E (Max.)	Dowel Pin (one per Washer): Pin Diameter	Hole Location from Centerline: Small Bore Washer	Hole Location from Centerline: Large Bore Washer	Fillet[1] Radius r (Max.)	Weight	Load Rating: Static Load Rating C_{oa}	Load Rating: Dynamic Load Rating C_t
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.	kN lbs.	kN lbs.
90TVL710	228.600 9.0000	295.275 11.6250	38.100 1.5000	277.81 10.938	246.06 9.688	261.9 10.31	261.9 10.31	— —	— —	— —	3.2 0.12	6.2 13.6	636.0 143000	164.0 36900
120TVL700	304.800 12.0000	406.400 16.0000	57.150 2.2500	368.30 14.500	342.90 13.500	355.6 14.00	355.6 14.00	9.52 0.375	165.1 6.50	190.5 7.50	3.2 0.12	18.5 40.8	1600.0 359000	429.0 96400
150TVL701	381.000 15.0000	520.700 20.5000	84.125 3.3120	482.60 19.000	419.10 16.500	450.8 17.75	450.8 17.75	12.70 0.500	206.4 8.12	244.5 9.62	4.8 0.19	50.2 110.7	2700.0 606000	721.0 162000
170TVL500	431.800 17.0000	635.000 25.0000	88.900 3.5000	565.15 22.250	488.95 19.250	533.4 21.00	533.4 21.00	12.70 0.500	235 9.25	298.4 11.75	7.9 0.31	89.6 197.5	4390.0 986000	1130.0 254000
180TVL605	457.200 18.0000	625.475 24.6250	92.075 3.6250	549.28 21.625	508 20.000	541.3 21.31	541.3 21.31	15.88 0.625	247.6 9.75	285.8 11.25	3.2 0.12	78.4 172.9	4790.0 1076000	1280.0 288000
195TVL470	495.300 19.5000	584.200 23.0000	57.150 2.2500	571.50 22.500	508 20.000	539.8 21.25	539.8 21.25	9.52 0.375	258.8 10.19	281 11.06	3.2 0.12	28.4 62.7	2600.0 585000	596.0 134000
200TVL850	508.000 20.0000	704.850 27.7500	117.475 4.6250	628.68 24.750	565.15 22.250	606.4 23.88	606.4 23.88	15.88 0.625	276.2 10.88	330.2 13.00	6.4 0.25	127.3 280.7	5160.0 1160000	1350.0 303000
201TVL615	511.175 20.1250	628.650 24.7500	66.675 2.6250	590.55 23.250	549.28 21.625	569.9 22.44	569.9 22.44	12.70 0.500	268.3 10.56	300 11.81	3.2 0.12	41.9 92.3	3320.0 746000	787.0 177000
202TVL620	514.350 20.5000	704.850 27.750	114.300 4.5000	622.30 24.500	571.50 22.500	609.6 24.00	609.6 24.00	20.64 0.812	279.4 11.00	327 12.88	6.4 0.25	122.3 269.7	5910.0 1330000	1560.0 351000
227TVL302	577.850 22.7500	774.700 30.5000	117.475 4.6250	704.85 27.750	622.30 24.500	676.3 26.62	676.3 26.62	20.64 0.812	311.2 12.25	365.1 14.38	6.4 0.25	149.8 330.2	6620.0 1490000	1690.0 379000
233TVL303	593.725 23.3750	790.575 31.1250	117.475 4.6250	720.72 28.375	650.88 25.625	692.2 27.25	692.2 27.25	22.22 0.875	320.7 12.62	369.9 14.56	6.4 0.25	150.7 332.2	6850.0 1540000	1730.0 388000
238TVL304	606.425 23.8750	847.725 35.3950	133.350 5.2500	739.78 29.125	688.98 27.125	727.1 28.62	727.1 28.62	22.22 0.875	327 12.88	396.9 15.62	6.4 0.25	212.6 468.7	8510.0 1910000	2200.0 494000
245TVL716	622.300 24.5000	768.350 30.2500	82.550 3.2500	733.42 28.875	680.47 26.790	695.3 27.38	695.3 27.38	12.70 0.500	323.8 12.75	371.5 14.62	3.2 0.12	76.2 168.0	3830.0 861000	863.0 194000
245TVL612	622.300 24.5000	831.850 32.7500	117.475 4.6250	742.95 29.250	679.45 26.750	727.1 28.62	727.1 28.62	15.88 0.625	330.2 13.00	396.9 15.62	6.4 0.25	164.5 362.7	7070.0 1590000	1770.0 397000
252TVL505	341.350 25.2500	793.750 31.2500	88.900 3.5000	746.12 29.375	708.02 27.875	717.6 28.25	717.6 28.25	12.70 0.500	342.9 13.50	376.2 14.81	6.4 0.25	89.3 197.0	5430.0 1220000	1300.0 293000
260TVL635	660.400 26.0000	893.350 35.2500	133.350 5.2500	790.58 31.125	727.08 28.625	777.9 30.62	777.9 30.62	20.64 0.812	355.6 14.00	422.3 16.62	6.4 0.25	226.9 500.4	9520.0 2140000	2370.0 533000
302TVL510	768.350 30.2500	920.750 36.2500	88.900 3.5000	873.12 34.375	835.02 32.875	844.6 33.25	844.6 33.25	12.70 0.500	408 16.06	439.7 17.31	6.4 0.25	105.2 231.9	6360.0 1430000	1450.0 325000
302TVL624	768.350 30.2500	1006.475 39.6250	139.700 5.5000	901.7 35.500	838.2 33.000	887.4 34.94	887.4 34.94	22.22 0.875	409.6 16.12	476.2 18.75	6.4 0.25	271.1 597.8	10600.0 2370000	2540.0 570000
303TVL706	771.525 30.3750	898.525 35.3750	63.500 2.5000	860.42 33.875	809.62 31.875	835 32.88	835 32.88	12.70 0.500	403.2 15.88	431.8 17.00	6.4 0.25	58 128.0	3900.0 877000	7788.0 175000
309TVL707	785.812 30.9375	952.500 37.5000	95.250 3.7500	882.65 34.750	857.25 33.750	870 34.25	870 34.25	15.88 0.625	415.9 16.38	454 17.88	6.4 0.25	117.9 260.0	4230.0 952000	1100.0 248000
310TVL625	787.400 31.0000	1025.525 40.3750	139.700 5.5000	917.58 36.125	893.76 35.188	906.5 35.69	906.5 35.69	22.22 0.875	422.3 16.62	485.8 19.12	6.4 0.25	263.5 581.0	10900.0 2450000	2590.0 582000
317TVL307	806.450 31.7500	1025.525 40.3750	127.000 5.0000	933.45 36.750	873.12 34.375	914.4 36.00	914.4 36.00	22.22 0.875	427 16.81	476.2 18.75	6.4 0.25	240.6 530.6	10900.0 2450000	2590.0 582000
402TVL717	1022.350 40.2500	1181.100 46.5000	88.900 3.5000	1133.48 44.625	1069.98 42.125	1101.7 43.38	1101.7 43.38	19.05 0.750	530.2 20.88	571.5 22.50	6.4 0.25	147.8 326.0	8180.0 1840000	1710.0 384000
410TVL718	1041.400 41.0000	1260.475 49.6250	127.000 5.0000	1189.04 46.812	1112.84 43.812	1150.9 45.31	1150.9 45.31	19.05 0.750	544.5 21.44	606.4 23.88	6.4 0.25	308.8 681.0	14000.0 3140000	3060.0 687000
420TVL721	1066.800 42.0000	1285.875 50.6250	127.000 5.0000	1214.44 47.812	1138.24 44.812	1176.3 46.31	1176.3 46.31	22.22 0.875	560.4 22.06	616 24.25	6.4 0.25	315.2 695.0	14000.0 3140000	3060.0 687000
530TVL719	1346.200 53.0000	1517.650 59.7500	104.775 4.1250	1457.32 57.375	1406.52 55.375	1431.9 56.38	1431.9 56.38	22.22 0.875	695.3 27.38	733.4 28.88	6.4 0.25	229.99 507.0	9080.0 2040000	1830.0 412000
540TVL720	1371.600 54.0000	1619.250 63.7500	139.700 5.5000	1533.52 60.375	1457.32 57.375	1495.4 58.88	1495.4 58.88	22.22 0.875	714.4 28.12	781 30.75	6.4 0.25	480.3 1059.0	18000.0 4060000	3630.0 815000

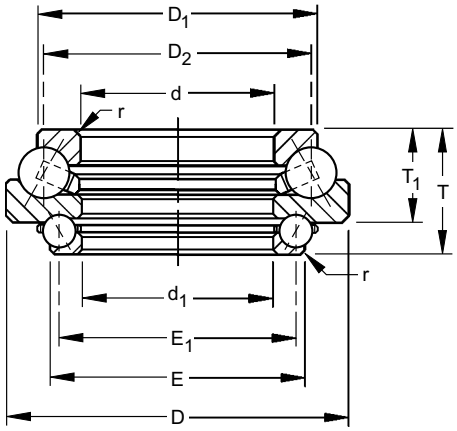
[1] Maximum shaft or housing fillet radius that bearing corners will clear.

[2] See engineering section for application of Equivalent Thrust Load Factors: X = 0.76, Y = 1.00, $\frac{T}{R}$ (min) = 1.56. $\left[\frac{T}{R}\right]$ is Thrust Load ÷ Radial Load

ANGULAR CONTACT BALL THRUST BEARINGS

TYPE DTVL

- Capable of carrying thrust in one direction, plus a lighter thrust in the opposite direction.
- Designed with an upper and lower complement of angular contact balls and three race elements.



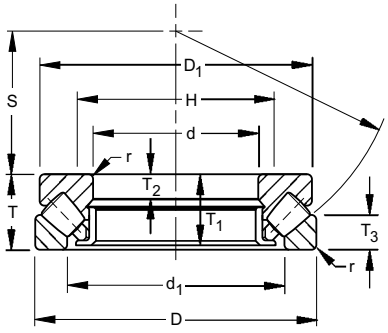
DIMENSIONS – LOAD RATINGS[2]

Bearing Number	Bore				Upper Race		Lower Race					Load Rating		
												Upper		Lower
	Upper d	Lower d_1	O.D. D	Height T	O.D. D_1	Shoulder D_2	O.D. E	Shoulder E_1	T_1	Fillet[1] Radius r (Max.)	Weight	Static Load Rating C_{oa}	Dynamic Load Rating C_t	Static Load Rating C_{oa}
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.	kN lbs.	kN lbs.	kN lbs.
200DTVL722	**508.000** 20.0000	**508.000** 20.0000	**742.95** 29.2500	**171.45** 6.7500	**679.45** 26.750	**616** 24.250	**587.38** 23.125	**558.8** 22.00	**127.000** 5.000	**6.4** 0.25	**177.3** 391.0	**5340** 1200000	**1560** 351000	**2310** 519000
202DTVL723	**514.350** 20.2500	**511.175** 20.1250	**704.85** 27.7500	**158.75** 6.2500	**622.30** 24.500	**609.60** 24.000	**590.55** 23.250	**569.9** 22.44	**114.3** 4.50	**6.4** 0.25	**133.3** 294.0	**5430** 1220000	**1480** 332000	**3750** 844000
235DTVL724	**596.900** 23.5000	**590.550** 23.2500	**838.2** 33.0000	**184.15** 7.2500	**774.70** 30.500	**711.20** 28.000	**676.28** 26.625	**647.7** 25.50	**139.7** 5.50	**6.4** 0.25	**246.2** 543.0	**7560** 1700000	**1970** 443000	**3660** 822000
245DTVL725	**622.300** 24.5000	**619.125** 24.3750	**815.975** 32.1250	**158.75** 6.2500	**730.25** 28.750	**717.60** 28.250	**698.50** 27.500	**677.9** 26.68	**114.3** 4.50	**6.4** 0.25	**157.4** 347.0	**6410** 1440000	**1640** 369000	**4430** 995000
266DTVL726	**676.275** 26.6250	**673.100** 26.5000	**914.4** 36.0000	**193.675** 7.6250	**876.30** 34.500	**787.40** 31.000	**787.4** 31.00	**743** 29.25	**142.88** 5.625	**6.4** 0.25	**296.6** 654.0	**8510** 1910000	**2480** 558000	**6320** 1420000
305DTVL727	**774.700** 30.5000	**768.35** 30.2500	**971.55** 38.2500	**158.75** 6.2500	**885.82** 34.875	**873.10** 34.380	**847.72** 33.38	**827.1** 32.56	**114.3** 4.50	**6.4** 0.25	**194.6** 429.0	**7780** 1750000	**1880** 423000	**5390** 1210000
312DTVL728	**793.750** 31.2500	**787.400** 31.0000	**1006.475** 39.6250	**200.025** 7.8750	**1000.12** 39.375	**895.40** 35.250	**901.7** 35.50	**863.6** 34.00	**139.7** 5.50	**6.4** 0.25	**325.2** 717.0	**10200** 2300000	**2480** 557000	**7200** 1620000
405DTVL729	**1028.700** 40.5000	**1025.525** 40.3750	**1231.9** 48.5000	**158.75** 6.2500	**1143** 45.000	**1130.30** 44.500	**1104.9** 43.50	**1084.3** 42.69	**114.3** 4.50	**6.4** 0.25	**254.4** 561.0	**10200** 2280000	**2240** 504000	**6540** 1470000
412DTVL730	**1047.750** 41.2500	**1041.400** 41.0000	**1260.475** 49.6250	**200.025** 7.8750	**1254.12** 49.375	**1149.40** 45.250	**1155.7** 45.50	**1117.6** 44.00	**139.7** 5.50	**6.4** 0.25	**417.2** 920.0	**12300** 2760000	**2780** 625000	**8230** 1850000
541DTVL731	**1374.775** 54.1250	**1371.600** 54.0000	**1597.025** 62.8750	**247.65** 9.7500	**1536.70** 60.500	**1481.10** 58.310	**1489.08** 58.625	**1447.8** 57.00	**168.28** 6.625	**6.4** 0.25	**654.4** 1443.0	**17700** 3980000	**3580** 804000	**11100** 2500000

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

(2) See engineering section for application of Equivalent Thrust Load Factors: X = 0.76, Y = 1.00, $\frac{T}{R}$ (min) = 1.56. $\left[\frac{T}{R}\right]$ is Thrust Load ÷ Radial Load

SPHERICAL ROLLER THRUST BEARINGS



TYPE TSR

- Design achieves a high thrust capacity with low friction and continuous roller alignment.
- Spherically contoured rollers, arranged in steep angular position, not only accommodates high thrust loads, but supports moderate radial loads as well.
- Low friction of the bearing results from a combination of bearing geometry and manufacturing technology.

TYPE TSR-EM

- Utilize bornze retainers and enhanced internal geometry allowing for higher dynamic load ratings and improved lubrication characteristics.
- Utilizes spherically contoured rollers arranged in a steep angular configuration to accommodate high thrust load alone or in combination with moderate radial loads.
- Possesses inherent dynamic misalignment capabilities.

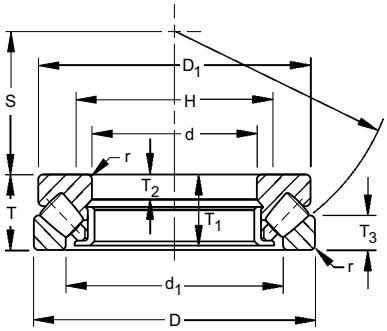
DIMENSIONS – LOAD RATINGS

Bearing Number	Bore d	O.D. D	Height T	Shoulder Diameter		Inner Ring			Outer Ring Height T_3	S	Fillet[1] Radius r (Max.)	Wt.	Load Rating		Approx. Limiting Speed (for Oil Bath Only)	k[2]
				d_1 Housing (Min.)	H Shaft (Max.)	O.D. D_1	Assembly Height T_1	Pilot Height T_2					Static Load Rating C_{oa}	Dynamic Load Rating C_t		
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.	kN lbs.	kN lbs.	RPM	
29422	110 4.3307	230 9.0551	73 2.8740	162 6.378	165 6.496	220 8.661	69 2.717	26 1.024	35 1.378	69 2.717	2.5 0.10	33.4 33.4	1150 260000	800 176000	1500	30
29424	120 4.7244	250 9.8425	78 3.0709	174 6.850	180 7.087	236 9.291	74 2.913	29 1.142	37 1.476	74 2.933	3.0 0.12	18.5 40.7	1180 256000	965 216000	1350	40
29326	130 5.1181	225 8.8583	58 2.2835	171 6.744	177 6.963	215 8.465	55 2.165	19 0.748	29 1.130	75 2.972	2.0 0.08	9.8 21.6	880 197000	600 132000	1700	22
29426	130 5.1181	270 10.6299	85 3.3464	187 7.375	195 7.677	255 10.039	81 3.189	31 1.22	42 1.669	81 3.189	3.0 0.12	23.9 52.6	1730 388000	1120 253000	1250	60
29330	150 5.9055	250 9.8425	60 2.3622	194 7.638	195 7.677	240 9.449	57 2.244	20 0.787	29 1.142	87 3.425	2.0 0.08	12.5 27.5	1140 255000	670 150000	1550	30
29430	150 5.9055	300 11.8110	90 3.5433	213 8.405	220 8.661	285 11.220	86 3.386	32 1.260	44 1.732	92 3.622	3.0 0.12	29.3 64.5	1930 440000	1220 275000	1100	80
29334	170 6.6929	280 11.0236	67 2.6378	216 8.504	220 8.661	270 10.630	64 2.520	23 0.906	32 1.280	96 3.780	2.5 0.10	16.5 36.3	1500 340000	880 196000	1350	50
29434	170 6.6929	340 13.3858	103 4.0551	243 9.567	245 9.646	324 12.756	99 3.898	37 1.457	50 1.968	104 4.094	4.0 0.16	42.4 93.5	2650 600000	1630 365000	950	140
29338EJ	190 7.4803	320 12.5984	78 3.0709	246 9.685	250 9.843	308 12.126	74 2.913	27 1.063	38 1.496	110 4.331	3.0 0.12	25.6 56.5	2442 549000	1481 333000	1150	80
29438EJ	190 7.4803	380 14.9606	115 4.5276	271 10.669	275 10.827	360 14.173	111 4.370	41 1.614	55 2.185	117 4.606	4.0 0.16	60.3 133.0	4168 937000	2482 558000	850	210
29340	200 7.8740	340 13.3858	85 3.3465	264 10.3937	265 10.4331	325 12.7953	81 3.4252	29 1.1417	40 1.5748	114 4.4882	3.0 0.12	29 63	2157 485000	1236 278000	950	100
29440	200 7.8740	400 15.7480	122 4.8031	286 11.254	290 11.417	380 14.961	117 4.606	43 1.693	59 2.323	122 4.803	4.0 0.16	69.8 154.0	3625 815000	2135 480000	800	260
29344	220 8.6614	360 14.1732	85 3.3464	280 11.024	285 11.220	345 13.583	81 3.189	29 1.142	41 1.614	125 4.921	3.0 0.12	33.9 74.8	2500 550000	1340 300000	1000	120
29444	220 8.6614	420 16.5354	122 4.8031	307 12.106	310 12.205	400 15.748	117 4.606	43 1.693	59 2.323	133 5.236	5.1 0.20	73.9 163.0	3800 865000	2200 500000	750	300
29348	240 9.4488	380 14.9606	85 3.3464	300 11.811	300 11.811	365 14.370	81 3.189	29 1.142	41 1.614	135 5.315	3.0 0.12	41.9 92.4	2650 600000	1400 315000	950	140
29448EM	240 9.4488	440 17.3228	122 4.8031	315 12.4016	322 12.6772	385 15.1575	87 3.4252	46 1.8110	61 2.4016	142 5.5906	6.1 0.24	78 171	4884 1098000	2736 615000	750	350

[1] Maximum shaft or housing fillet radius that bearing corners will clear.
[2] Centrifugal force constant. See engineering section for calculations using this factor.

SPHERICAL ROLLER THRUST BEARINGS

TYPE TSR, TSR-EM – *continued*



DIMENSIONS – LOAD RATINGS - *continued*

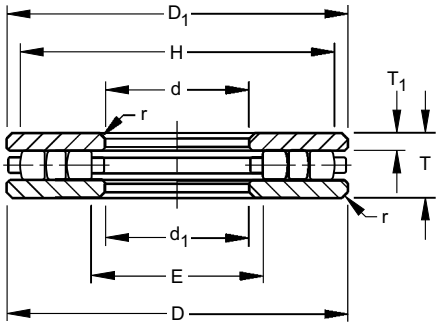
Bearing Number	Bore d	O.D. D	Height T	Shoulder Diameter		Inner Ring			Outer Ring Height T_3	S	Fillet [1] Radius r (Max.)	Wt.	Load Rating		Approx. Limiting Speed (for Oil Bath Only)	k[2]
				d_1 Housing (Min.)	H Shaft (Max.)	O.D. D_1	Assembly Height T_1	Pilot Height T_2					Static Load Rating C_{oa}	Dynamic Load Rating C_t		
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.	kN lbs.	kN lbs.	RPM	
29352	**260** 10.2362	**420** 16.5354	**95** 3.7402	**329** 12.953	**330** 12.992	**405** 15.945	**91** 3.583	**32** 1.260	**45** 1.791	**148** 5.827	**4.0** 0.16	**51.2** 113.0	**3350** 750000	**1800** 400000	**850**	**230**
29452	**260** 10.2362	**480** 18.8976	**132** 5.1968	**357** 14.055	**360** 14.173	**460** 18.110	**127** 5.000	**48** 1.890	**64** 2.520	**154** 6.063	**5.1** 0.20	**103** 227.0	**4900** 1120000	**1800** 620000	**650**	**500**
29360	**300** 11.8110	**480** 18.8976	**109** 4.2913	**379** 14.921	**380** 14.961	**460** 18.110	**105** 4.134	**37** 1.457	**50** 1.988	**168** 6.614	**4.0** 0.16	**76.6** 169.0	**4150** 930000	**2160** 490000	**700**	**350**
29460	**300** 11.8110	**540** 21.2598	**145** 5.7086	**402** 15.827	**410** 16.142	**515** 20.276	**140** 5.512	**52** 2.047	**70** 2.776	**175** 6.890	**5.1** 0.20	**136** 301.0	**6400** 1430000	**3450** 3450	**550**	**780**
29364	**320** 12.5984	**500** 19.6850	**109** 4.2913	**399** 15.709	**400** 15.748	**482** 18.976	**105** 4.134	**37** 1.457	**53** 2.087	**180** 7.087	**4.0** 0.16	**79.8** 176.0	**4300** 980000	**2240** 500000	**650**	**380**
29468	**340** 13.3858	**620** 24.4094	**170** 6.6929	**462** 18.189	**465** 18.307	**590** 23.228	**164** 6.457	**61** 2.402	**82** 3.248	**201** 7.913	**6.1** 0.24	**220** 486.0	**8500** 1900000	**4500** 1020000	**450**	**1350**
29372	**360** 14.1732	**560** 22.0472	**122** 4.8031	**448** 17.638	**450** 17.717	**540** 21.260	**117** 4.606	**41** 1.614	**59** 2.343	**202** 7.953	**4.0** 0.16	**113** 249.0	**5600** 1250000	**2800** 620000	**550**	**640**
29476	**380** 14.9606	**670** 26.3780	**175** 6.8898	**504** 19.842	**510** 20.079	**640** 25.197	**168** 6.614	**63** 2.480	**85** 3.331	**220** 8.740	**6.1** 0.24	**261** 575.0	**9000** 2040000	**4750** 1060000	**410**	**1700**
29576	**380** 14.9606	**820** 32.2835	**265** 10.4330	**570** 22.441	**578** 22.756	**780** 30.709	**226** 10.078	**100** 3.927	**128** 5.062	**241** 9.488	**9.1** 0.36	**824** 1816.0	**17300** 3900000	**9500** 2120000	**280**	**5550**
29380	**400** 15.748	**620** 24.4094	**132** 5.1968	**494** 19.449	**500** 19.685	**596** 23.465	**127** 5.000	**44** 1.732	**64** 2.520	**225** 8.858	**5.1** 0.20	**165** 363.0	**7100** 1600000	**3450** 780000	**500**	**970**
29284EM	**420** 16.5354	**580** 22.8346	**95** 3.7402	**479** 18.8583	**500** 19.685	**542** 21.339	**70** 2.7559	**41** 1.6142	**50** 1.9685	**228** 8.9764	**5.1** 0.20	**70** 154.0	**5329** 1198000	**2624** 590000	**630**	**300**
29388	**440** 17.3228	**680** 26.7717	**145** 5.7089	**548** 21.5748	**563** 22.1654	**657** 25.866	**140** 5.5118	**49** 1.9291	**69** 2.7165	**246** 9.6850	**5.1** 0.20	**180** 397.0	**7588** 1706000	**3647** 820000	**480**	**1400**
29488	**440** 17.3228	**780** 30.7087	**206** 8.1102	**588** 23.150	**595** 23.425	**745** 29.331	**199** 7.835	**74** 2.913	**99** 3.917	**257** 10.118	**7.1** 0.28	**411** 906.0	**13200** 2900000	**6700** 1500000	**320**	**3400**
29392	**460** 18.1102	**710** 27.9528	**150** 5.9055	**566** 22.293	**575** 22.638	**685** 26.969	**144** 5.669	**51** 2.008	**72** 2.857	**257** 10.118	**5.1** 0.20	**220** 486.0	**9300** 2100000	**4400** 1000000	**400**	**1700**
29496EM	**480** 18.8976	**850** 33.4646	**224** 8.8189	**626** 24.6457	**658** 25.9055	**770** 30.315	**159** 6.2598	**93** 3.6614	**110** 4.3307	**279** 10.9843	**9.7** 0.38	**550** 1212.0	**22458** 5049000	**11342** 2550000	**290**	**4700**
294/500	**500** 19.6850	**870** 34.2520	**224** 8.8189	**661** 26.024	**670** 26.378	**830** 32.677	**216** 8.504	**81** 3.189	**107** 4.213	**290** 11.417	**7.1** 0.28	**560** 1235.0	**16000** 3600000	**8000** 1800000	**270**	**4800**
293/530	**530** 20.8661	**800** 31.4961	**160** 6.2992	**648** 25.512	**650** 25.591	**772** 30.394	**154** 6.063	**54** 2.126	**76** 2.992	**295** 11.614	**6.1** 0.24	**288** 634.0	**11000** 2450000	**5100** 1140000	**350**	**2500**
293/600	**600** 23.6220	**900** 35.4331	**180** 7.0866	**727** 28.6220	**730** 28.7402	**868** 34.173	**173** 6.8110	**61** 2.4016	**87** 3.4252	**333** 13.1102	**5.1** 0.20	**635** 1400.0	**16770** 3770000	**7619** 1713000	**320**	**4200**
294/630	**630** 24.8031	**1090** 42.9134	**280** 11.0236	**831** 32.707	**850** 33.465	**1044** 41.102	**271** 10.669	**101** 3.976	**133** 5.236	**365** 14.393	**9.1** 0.36	**1170** 2580.0	**23000** 5200000	**11400** 2550000	**250**	**12200**

[1] Maximum shaft or housing fillet radius that bearing corners will clear.
[2] Centrifugal force constant. See engineering section for calculations using this factor.

CYLINDRICAL ROLLER THRUST BEARINGS

TYPE TP

- Most economical to buy and install because of design simplicity.
- Minor radial displacement of the races does not affect its operation, resulting in manufacturing economies and simplified installation.



DIMENSIONS – LOAD RATINGS

Bearing Number	Bore d	O.D. D	Height T	Washers			Shoulder Diameter		Fillet[1] Radius r (Max.)	Wt.	Load Rating	
				Thickness T_1	Small Diameter O.D. D_1	Large Bore I.D. d_1	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C_{oa}	Dynamic Load Rating C_t
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.
20TP103	50.800 2.0000	152.400 6.0000	34.925 1.3750	9.52 0.375	150.81 5.938	52.39 2.062	141.3 5.56	61.9 2.44	1.6 0.06	3.7 8.1	814 183000	331 74500
20TP104	50.800 2.0000	177.800 7.0000	34.925 1.3750	9.52 0.375	176.21 6.938	52.39 2.062	163.5 6.44	65.1 2.56	1.6 0.06	5.1 11.3	1010 227000	398 89500
30TP106	76.200 3.0000	152.400 6.0000	34.925 1.3750	9.52 0.375	150.81 5.938	77.79 3.062	142.9 5.62	85.7 3.38	1.6 0.06	3.2 7.0	747 168000	340 76500
30TP107	76.200 3.0000	177.800 7.0000	34.925 1.3750	9.52 0.375	176.21 6.938	77.79 3.062	166.7 6.56	87.3 3.44	1.6 0.06	4.6 10.2	1040 234000	414 93200
30TP108	76.200 3.0000	203.200 8.0000	34.925 1.3750	9.52 0.375	201.61 7.938	77.79 3.062	188.9 7.44	90.5 3.56	1.6 0.06	6.3 13.9	1380 311000	520 117000
30TP109	76.200 3.0000	228.600 9.0000	34.925 1.3750	9.52 0.375	227.01 8.938	77.79 3.062	212.7 8.38	92.1 3.62	1.6 0.06	8.2 18.1	1800 405000	636 143000
35TP113	88.900 3.5000	132.558 5.2188	25.400 1.0000	7.14 0.281	130.97 5.156	90.49 3.562	123.8 4.88	97.6 3.84	1.6 0.06	1.4 3.0	381 85600	180 40400
40TP114	101.600 4.0000	177.800 7.0000	44.450 1.7500	12.7 0.500	176.21 6.938	103.19 4.062	168.3 6.62	111.1 4.38	1.6 0.06	5 11.0	1030 231000	503 113000
40TP115	101.600 4.0000	203.200 8.0000	44.450 1.7500	12.7 0.500	201.61 7.938	103.19 4.062	190.5 7.50	114.3 4.50	1.6 0.06	7.1 15.6	1370 308000	589 132000
40TP116	101.600 4.0000	228.600 9.0000	44.450 1.7500	12.7 0.500	227.01 8.938	103.19 4.062	214.3 8.44	115.9 4.56	1.6 0.06	9.5 21.0	1770 397000	676 152000
40TP117	101.600 4.0000	254 10.0000	44.450 1.7500	12.7 0.500	252.41 9.938	103.19 4.062	238.1 9.38	117.5 4.62	1.6 0.06	11.6 25.6	2220 498000	896 202000
50TP119	127 5.0000	203.200 8.0000	44.450 1.7500	12.7 0.500	201.61 7.938	128.59 5.062	190.5 7.50	139.7 5.50	1.6 0.06	5.9 13.1	1280 288000	593 133000
50TP120	127 5.0000	228.600 9.0000	44.450 1.7500	12.7 0.500	227.01 8.938	128.59 5.062	215.9 8.50	139.7 5.50	1.6 0.06	8.3 18.4	1710 385000	716 161000
50TP121	127 5.0000	254 10.0000	50.800 2.0000	14.29 0.562	252.41 9.938	128.59 5.062	239.7 9.44	141.3 5.56	3.2 0.12	12.4 27.4	2180 491000	841 189000
50TP122	127 5.0000	279.400 11.0000	50.800 2.0000	14.29 0.562	277.81 10.938	128.59 5.062	261.9 10.31	144.5 5.69	3.2 0.12	15.8 34.8	2760 620000	996 224000
50TP123	127 5.0000	304.800 12.0000	50.800 2.0000	14.29 0.562	303.21 11.938	128.59 5.062	288.9 11.38	146 5.75	3.2 0.12	19.4 42.8	3290 789000	1170 262000
60TP124	152.400 6.0000	228.600 9.0000	50.800 2.0000	14.29 0.562	227.01 8.938	153.99 6.062	217.5 8.56	163.5 6.44	3.2 0.12	7.6 16.8	1410 317000	600 135000
60TP125	152.400 6.0000	254 10.0000	50.800 2.0000	14.29 0.562	252.41 9.938	153.99 6.062	241.3 9.50	165.1 6.50	3.2 0.12	10.7 23.7	2000 449000	845 190000
60TP126	152.400 6.0000	279.400 11.0000	50.800 2.0000	14.29 0.562	277.81 10.938	153.99 6.062	265.1 10.44	166.7 6.56	3.2 0.12	14.2 31.4	2700 608000	1000 226000
60TP127	152.400 6.0000	304.800 12.0000	50.800 2.0000	14.29 0.562	303.31 11.938	153.99 6.062	287.3 11.31	169.9 6.69	3.2 0.12	17.7 39.4	3220 725000	1110 250000
70TP129	177.800 7.0000	254 10.0000	50.800 2.0000	14.29 0.562	251.62 9.906	180.18 7.094	242.9 9.56	188.9 7.44	3.2 0.12	9.2 20.2	1620 365000	663 149000
70TP130	177.800 7.0000	279.400 11.0000	50.800 2.0000	14.29 0.562	277.02 10.906	180.18 7.094	266.7 10.50	190.5 7.50	3.2 0.12	12.8 28.3	2400 540000	930 209000
70TP131	177.800 7.0000	304.800 12.0000	50.800 2.0000	14.29 0.562	302.42 11.906	180.18 7.094	288.9 11.38	193.7 7.62	3.2 0.12	16.8 37.0	3090 695000	1080 242000
70TP132	177.800 7.0000	355.600 14.0000	76.200 3.0000	20.64 0.812	353.22 13.906	180.18 7.094	335 13.19	198.4 7.81	6.4 0.25	36.3 80.1	4490 1010000	1750 394000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.

CYLINDRICAL ROLLER THRUST BEARINGS

TYPE TP – *continued*

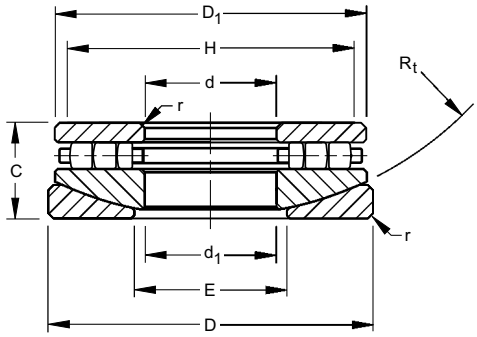
Bearing Number	Bore d	O.D. D	Height T	Washers			Shoulder Diameter		Fillet[1] Radius r (Max.)	Wt.	Load Rating	
				Thickness T_1	Small Diameter O.D. D_1	Large Bore I.D. d_1	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C_{oa}	Dynamic Load Rating C_t
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.
80TP134	**203.2** 8.0000	**304.8** 12.0000	**76.2** 3.0000	**20.64** 0.812	**302.42** 11.906	**205.58** 8.094	**292.1** 11.50	**215.9** 8.50	**6.4** 0.25	**20.5** 45.1	**2660** 599000	**1150** 258000
80TP135	**203.2** 8.0000	**355.6** 14.0000	**76.2** 3.0000	**20.64** 0.812	**353.22** 13.906	**205.58** 8.094	**336.6** 13.25	**222.2** 8.75	**6.4** 0.25	**33** 72.8	**4230** 950000	**1730** 389000
80TP136	**203.2** 8.0000	**406.4** 16.0000	**76.2** 3.0000	**20.64** 0.812	**404.02** 15.906	**205.58** 8.094	**382.6** 15.06	**227.0** 8.94	**6.4** 0.25	**44.5** 98.1	**5740** 1290000	**2310** 520000
90TP139	**228.6** 9.0000	**355.6** 14.0000	**76.2** 3.0000	**20.64** 0.812	**353.22** 13.906	**230.98** 9.094	**339.7** 13.38	**244.5** 9.62	**6.4** 0.25	**29.3** 64.5	**3910** 879000	**1460** 328000
90TP140	**228.6** 9.0000	**406.4** 16.0000	**76.2** 3.0000	**20.64** 0.812	**404.02** 15.906	**230.98** 9.094	**385.8** 15.19	**249.2** 9.81	**6.4** 0.25	**43.6** 96.2	**5560** 1250000	**2140** 482000
100TP143	**254** 10.0000	**406.4** 16.0000	**76.2** 3.0000	**20.64** 0.812	**404.02** 15.906	**256.38** 10.094	**387.4** 15.25	**273.0** 10.75	**6.4** 0.25	**39.5** 86.6	**5160** 1160000	**1750** 394000
100TP144	**254** 10.0000	**457.2** 18.0000	**95.25** 3.7500	**26.19** 1.031	**454.82** 17.906	**256.38** 10.094	**435.0** 17.12	**276.2** 10.88	**6.4** 0.25	**68.8** 151.8	**7210** 1620000	**2690** 604000
100TP145	**254** 10.0000	**508** 20.0000	**95.25** 3.7500	**26.19** 1.031	**505.62** 19.906	**256.38** 10.094	**481.0** 18.94	**281.0** 11.06	**6.4** 0.25	**91.7** 202.2	**9560** 2150000	**3670** 825000
120TP151	**304.8** 12.0000	**457.2** 18.0000	**95.25** 3.7500	**26.19** 1.031	**454.82** 17.906	**307.18** 12.094	**438.2** 17.25	**323.8** 12.75	**6.4** 0.25	**56.7** 125.1	**6340** 1420000	**2300** 518000
120TP152	**304.8** 12.0000	**508** 20.0000	**114.3** 4.5000	**31.75** 1.250	**505.62** 19.906	**307.18** 12.094	**484.2** 19.06	**328.6** 12.94	**6.4** 0.25	**104.5** 230.5	**7900** 1780000	**3300** 743000
120TP153	**304.8** 12.0000	**609.6** 24.0000	**114.3** 4.5000	**31.75** 1.250	**607.22** 23.906	**307.18** 12.094	**584.2** 23.00	**330.2** 13.00	**6.4** 0.25	**168.5** 371.5	**12900** 2900000	**4680** 1050000
140TP158	**355.6** 14.0000	**508** 20.0000	**95.25** 3.7500	**26.19** 1.031	**504.82** 19.875	**358.78** 14.125	**489.0** 19.25	**374.6** 14.75	**6.4** 0.25	**62.6** 138.1	**7200** 1620000	**2610** 588000
140TP159	**355.6** 14.0000	**558.8** 22.0000	**95.25** 3.7500	**26.19** 1.031	**555.62** 21.875	**358.78** 14.125	**535.0** 21.06	**379.4** 14.94	**6.4** 0.25	**89.6** 197.5	**10000** 2250000	**3750** 802000
140TP160	**355.6** 14.0000	**609.6** 24.0000	**95.25** 3.7500	**26.19** 1.031	**606.4** 23.875	**358.78** 14.125	**581.0** 22.88	**384.2** 15.12	**6.4** 0.25	**125.3** 276.2	**12600** 2840000	**4040** 908000
160TP164	**406.4** 16.0000	**558.8** 22.0000	**114.3** 4.5000	**31.75** 1.250	**555.6** 21.875	**409.6** 16.125	**539.8** 21.25	**425.4** 16.75	**6.4** 0.25	**85.9** 189.4	**7860** 1770000	**3090** 695000
160TP165	**406.4** 16.0000	**609.6** 24.0000	**114.3** 4.5000	**31.75** 1.250	**606.4** 23.875	**409.6** 16.125	**585.8** 23.06	**430.2** 16.94	**6.4** 0.25	**121.4** 267.7	**11200** 2510000	**4170** 937000
160TP166	**406.4** 16.0000	**660.4** 26.0000	**114.3** 4.5000	**31.75** 1.250	**657.2** 25.875	**409.6** 16.125	**633.4** 24.94	**433.4** 17.06	**6.4** 0.25	**168.8** 372.1	**13800** 3090000	**4710** 1060000
180TP168	**457.2** 18.0000	**660.4** 26.0000	**127** 5.0000	**34.92** 1.375	**657.2** 25.875	**460.4** 18.125	**635** 25.00	**482.6** 19.00	**6.4** 0.25	**148.8** 328.1	**11800** 2650000	**4090** 919000
180TP169	**457.2** 18.0000	**711.2** 28.0000	**127** 5.0000	**34.92** 1.375	**708.0** 27.875	**460.4** 18.125	**684.2** 26.94	**484.2** 19.06	**6.4** 0.25	**195.3** 430.7	**15500** 3480000	**5480** 1230000
180TP170	**457.2** 18.0000	**762** 30.0000	**139.7** 5.5000	**38.10** 1.500	**758.8** 29.875	**460.4** 18.125	**735.0** 28.94	**484.2** 19.06	**6.4** 0.25	**280.7** 618.9	**19700** 4430000	**6840** 1540000
200TP171	**508** 20.0000	**711.2** 28.0000	**139.7** 5.5000	**38.10** 1.500	**708.0** 27.875	**511.2** 20.125	**685.8** 27.00	**533.4** 21.00	**6.4** 0.25	**178** 392.5	**13100** 2940000	**4710** 1060000
200TP172	**508** 20.0000	**762** 30.0000	**139.7** 5.5000	**38.10** 1.500	**758.8** 29.875	**511.2** 20.125	**736.6** 29.00	**533.4** 21.00	**6.4** 0.25	**232.2** 512.0	**17500** 3930000	**6370** 1430000
200TP173	**508** 20.0000	**812.8** 32.0000	**152.4** 6.0000	**42.07** 1.656	**809.6** 31.875	**511.2** 20.125	**787.4** 31.00	**533.4** 21.00	**6.4** 0.25	**317** 698.9	**22400** 5050000	**7610** 1700000
220TP174	**558.8** 22.0000	**762** 30.0000	**139.7** 5.5000	**38.10** 1.500	**758.8** 29.875	**562** 22.125	**736.6** 29.00	**584.2** 23.00	**6.4** 0.25	**192.7** 425.0	**14200** 3200000	**5070** 1140000
220TP175	**558.8** 22.0000	**812.8** 32.0000	**139.7** 5.5000	**38.10** 1.500	**809.6** 31.875	**562.0** 22.125	**782.6** 30.81	**589.0** 23.19	**6.4** 0.25	**250.6** 552.6	**19000** 4270000	**6570** 1480000
220TP176	**558.8** 22.0000	**863.6** 34.0000	**152.4** 6.0000	**42.07** 1.656	**860.4** 33.875	**562.0** 22.125	**838.2** 33.00	**584.2** 23.00	**6.4** 0.25	**340.9** 751.6	**24500** 5500000	**8200** 1840000
240TP177	**609.6** 24.0000	**812.8** 32.0000	**139.7** 5.5000	**38.10** 1.500	**809.6** 31.875	**612.8** 24.125	**790.6** 31.12	**631.8** 24.88	**9.5** 0.38	**206.5** 455.4	**16000** 3600000	**5650** 1270000
240TP178	**609.6** 24.0000	**863.6** 34.0000	**139.7** 5.5000	**38.10** 1.500	**860.4** 33.875	**612.8** 24.125	**838.2** 33.00	**635.0** 25.00	**9.5** 0.38	**269** 593.2	**20500** 4610000	**6880** 1550000
240TP179	**609.6** 24.0000	**914.4** 36.0000	**152.4** 6.0000	**42.07** 1.656	**911.2** 35.875	**612.8** 24.125	**889.0** 35.00	**635.0** 25.00	**9.5** 0.38	**364.7** 804.2	**25200** 5670000	**8450** 1900000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.

CYLINDRICAL ROLLER THRUST BEARINGS

TYPE TPS

- Similar to Type TP except one washer is spherically ground to seat against an aligning washer. This makes it adaptable to initial misalignment.
- Not suggested for operating conditions where alignment is constantly changing.



DIMENSIONS – LOAD RATINGS

Bearing Number	Bore d	O.D. D	Height C	Aligning Washer radius R_t	Washers		Shoulder Diameter		Fillet[1] Radius r (Max.)	Wt.	Load Rating	
					Small Diameter O.D. D_1	Large Bore I.D. d_1	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C_{oa}	Dynamic Load Rating C_t
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.
20TPS103	**50.800** 2.0000	**160.325** 6.3120	**46.038** 1.8125	**190.50** 7.500	**150.81** 5.938	**52.39** 2.062	**141.3** 5.56	**85.7** 3.38	**1.6** 0.06	**5.2** 11.4	**814** 183000	**331** 74500
20TPS104	**50.800** 2.0000	**185.725** 7.3120	**46.038** 1.8125	**241.30** 9.500	**176.21** 6.938	**52.39** 2.062	**163.5** 6.44	**108.0** 4.25	**1.6** 0.06	**7.12** 15.7	**1010** 227000	**398** 89500
30TPS106	**76.200** 3.0000	**160.325** 6.3120	**46.038** 1.8125	**152.40** 6.000	**150.81** 5.938	**77.79** 3.062	**142.9** 5.62	**101.6** 4.00	**1.6** 0.06	**4.5** 9.9	**747** 168000	**340** 76500
30TPS107	**76.200** 3.0000	**185.725** 7.3120	**46.038** 1.8125	**241.30** 9.500	**176.21** 6.938	**77.79** 3.062	**166.7** 6.56	**111.1** 4.38	**1.6** 0.06	**6.4** 14.2	**1040** 234000	**414** 93200
30TPS108	**76.200** 3.0000	**211.125** 8.3120	**46.038** 1.8125	**304.80** 12.000	**201.61** 7.938	**77.79** 3.062	**188.9** 7.44	**133.4** 5.25	**1.6** 0.06	**8.7** 19.2	**1380** 311000	**520** 117000
35TPS113	**88.900** 3.5000	**138.908** 5.4688	**33.338** 1.3125	**127.00** 5.000	**130.97** 5.156	**91.28** 3.594	**123.8** 4.88	**103.2** 4.06	**1.6** 0.06	**1.9** 4.1	**381** 85600	**180** 40400
40TPS114	**101.600** 4.0000	**187.327** 7.3750	**58.738** 2.3125	**161.93** 6.375	**176.21** 6.938	**103.98** 4.094	**168.3** 6.62	**127** 5.00	**1.6** 0.06	**7.0** 15.4	**1030** 231000	**503** 113000
40TPS115	**101.600** 4.0000	**212.725** 8.3750	**58.738** 2.3125	**215.90** 8.500	**201.61** 7.938	**103.98** 4.094	**190.5** 7.50	**133.4** 5.25	**1.6** 0.06	**10.0** 22.1	**1370** 308000	**589** 132000
40TPS116	**101.600** 4.0000	**238.125** 9.3750	**58.738** 2.3125	**254.00** 10.000	**227.01** 8.938	**103.98** 4.094	**214.3** 8.44	**149.2** 5.88	**1.6** 0.06	**13.4** 29.5	**1770** 397000	**676** 152000
40TPS117	**101.600** 4.0000	**266.7** 10.5000	**58.738** 2.3125	**355.60** 14.000	**252.41** 9.938	**103.98** 4.094	**238.1** 9.38	**165.1** 6.50	**1.6** 0.06	**17.1** 37.7	**2220** 498000	**896** 202000
50TPS119	**127** 5.0000	**215.9** 8.5000	**58.738** 2.3125	**187.33** 7.375	**201.61** 7.938	**130.18** 5.125	**190.5** 7.50	**152.4** 6.00	**1.6** 0.06	**8.4** 18.5	**1280** 288000	**592** 133000
50TPS120	**127** 5.0000	**241.3** 9.5000	**58.738** 2.3125	**266.70** 10.500	**227.01** 8.938	**130.18** 5.125	**215.9** 8.50	**155.6** 6.12	**1.6** 0.06	**11.8** 26.1	**1710** 385000	**716** 161000
50TPS121	**127** 5.0000	**266.7** 10.5000	**66.675** 2.6250	**323.85** 12.750	**252.41** 9.938	**130.18** 5.125	**239.7** 9.44	**158.8** 6.25	**3.2** 0.12	**17.6** 38.7	**2180** 491000	**841** 189000
50TPS122	**127** 5.0000	**292.1** 11.5000	**66.675** 2.6250	**406.40** 16.000	**277.81** 10.938	**130.18** 5.125	**261.9** 10.31	**177.8** 7.00	**3.2** 0.12	**22.1** 48.8	**2760** 620000	**996** 224000
50TPS123	**127.000** 5.0000	**317.5** 12.5000	**66.675** 2.6250	**501.65** 19.750	**303.21** 11.938	**130.18** 5.125	**288.9** 11.38	**184.1** 7.25	**3.2** 0.12	**27.2** 60.0	**3290** 739000	**1170** 262000
60TPS124	**152.400** 6.0000	**241.3** 9.5000	**66.675** 2.6250	**171.45** 6.750	**227.01** 8.938	**155.58** 6.125	**217.5** 8.56	**184.1** 7.25	**3.2** 0.12	**10.8** 23.8	**1410** 317000	**600** 135000
60TPS125	**152.400** 6.0000	**266.7** 10.5000	**66.675** 2.6250	**241.30** 9.500	**252.46** 9.938	**155.58** 6.125	**241.3** 9.50	**187.3** 7.38	**3.2** 0.12	**15.2** 33.5	**2000** 449000	**845** 190000
60TPS126	**152.400** 6.0000	**292.1** 11.5000	**66.675** 2.6250	**342.90** 13.500	**277.81** 10.938	**155.58** 6.125	**265.1** 10.44	**187.3** 7.38	**3.2** 0.12	**20.1** 44.3	**2700** 607000	**1000** 225000
60TPS127	**152.400** 6.0000	**317.5** 12.5000	**66.675** 2.6250	**431.80** 17.000	**303.21** 11.938	**155.58** 6.125	**287.3** 11.31	**190.5** 7.50	**3.2** 0.12	**25.2** 55.6	**3220** 725000	**1110** 250000
70TPS129	**177.800** 7.0000	**266.7** 10.5000	**66.675** 2.6250	**206.38** 8.125	**251.62** 9.906	**180.8** 7.125	**242.9** 9.56	**206.4** 8.12	**3.2** 0.12	**12.7** 27.9	**1620** 365000	**663** 149000
70TPS130	**177.800** 7.0000	**292.100** 11.5000	**66.675** 2.6250	**292.10** 11.500	**277.02** 10.906	**180.98** 7.125	**266.7** 10.50	**209.6** 8.25	**3.2** 0.12	**17.7** 39.1	**2400** 540000	**930** 209000
70TPS131	**177.800** 7.0000	**317.500** 12.5000	**66.675** 2.6250	**390.53** 15.375	**302.42** 11.906	**180.98** 7.125	**288.9** 11.38	**209.6** 8.25	**3.2** 0.12	**23.3** 51.3	**3090** 695000	**1080** 242000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.

CYLINDRICAL ROLLER THRUST BEARINGS

TYPE TPS – *continued*

B

DIMENSIONS – LOAD RATINGS - *continued*

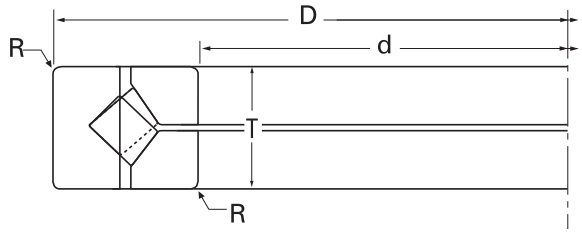
Bearing Number	Bore d	O.D. D	Height C	Aligning Washer radius R_t	Washers		Shoulder Diameter		Fillet[1] Radius r (Max.)	Wt.	Load Rating	
					Small Diameter O.D. D_1	Large Bore I.D. d_1	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C_{oa}	Dynamic Load Rating C_t
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.
70TPS132	**177.800** 7.0000	**374.650** 14.7500	**101.600** 4.0000	**390.53** 15.375	**353.22** 13.906	**180.98** 7.125	**335.0** 13.19	**228.6** 9.00	**6.4** 0.25	**52.6** 115.9	**4490** 1010000	**1750** 394000
80TPS134	**203.200** 8.0000	**323.850** 12.7500	**101.600** 4.0000	**215.90** 8.500	**302.42** 11.906	**207.96** 8.188	**292.1** 11.50	**238.1** 9.38	**6.4** 0.25	**29.8** 65.8	**2660** 599000	**1150** 258000
80TPS135	**203.200** 8.0000	**374.650** 14.7500	**101.600** 4.0000	**304.80** 12.000	**353.22** 13.906	**207.96** 8.188	**336.6** 13.25	**263.5** 10.38	**6.4** 0.25	**47.7** 105.2	**4230** 950000	**1730** 389000
80TPS136	**203.200** 8.0000	**428.625** 16.8750	**101.600** 4.0000	**495.30** 19.500	**404.02** 15.906	**209.55** 8.250	**382.6** 15.06	**266.7** 10.50	**6.4** 0.25	**68.2** 150.4	**5740** 1290000	**2310** 520000
90TPS139	**228.600** 9.0000	**374.650** 14.7500	**101.600** 4.0000	**304.80** 12.000	**353.22** 13.906	**234.95** 9.250	**339.7** 13.38	**263.5** 10.38	**6.4** 0.25	**42.2** 93.1	**3910** 879000	**1460** 328000
90TPS140	**228.600** 9.0000	**428.625** 16.8750	**101.600** 4.0000	**495.30** 19.500	**404.02** 15.906	**234.95** 9.250	**385.8** 15.19	**266.7** 10.50	**6.4** 0.25	**63.3** 139.5	**5560** 1250000	**2140** 482000
100TPS143	**254.000** 10.0000	**428.625** 16.8750	**101.600** 4.0000	**425.45** 16.750	**404.02** 15.906	**260.36** 10.250	**387.4** 15.25	**292.1** 11.50	**6.4** 0.25	**56.2** 124.0	**5160** 1160000	**1750** 394000
100TPS144	**254.000** 10.0000	**479.425** 18.8750	**127.000** 5.0000	**508.00** 20.000	**454.82** 17.906	**260.36** 10.250	**435.0** 17.12	**304.8** 12.00	**6.4** 0.25	**99.5** 219.5	**7210** 1620000	**2690** 604000
100TPS145	**254.000** 10.0000	**530.225** 20.8750	**127.000** 5.0000	**609.6** 24.000	**505.62** 19.906	**260.36** 10.250	**481.0** 18.94	**336.6** 13.25	**6.4** 0.25	**131.8** 290.6	**9560** 2150000	**3670** 825000
120TPS151	**304.800** 12.0000	**479.425** 18.8750	**127.000** 5.0000	**390.53** 15.375	**454.82** 17.906	**311.15** 12.250	**438.2** 17.25	**346.1** 13.62	**6.4** 0.25	**82.1** 181.0	**6340** 1420000	**2300** 518000
120TPS152	**304.800** 12.0000	**530.225** 20.8750	**152.400** 6.0000	**619.13** 24.375	**505.62** 19.906	**311.15** 12.250	**484.2** 19.06	**352.4** 13.88	**6.4** 0.25	**139.4** 307.4	**7900** 1780000	**3300** 743000
120TPS153	**304.800** 12.0000	**631.825** 24.8750	**152.400** 6.0000	**723.90** 28.500	**607.22** 23.906	**311.15** 12.250	**584.2** 23.00	**406.4** 16.00	**6.4** 0.25	**236.9** 522.4	**12900** 2900000	**4680** 1050000
140TPS158	**355.600** 14.0000	**530.225** 20.8750	**123.825** 4.8750	**495.30** 19.500	**504.82** 19.875	**361.95** 14.250	**489.0** 19.25	**393.7** 15.50	**6.4** 0.25	**89.2** 196.6	**7200** 1620000	**2610** 588000
140TPS159	**355.600** 14.0000	**581.025** 22.8750	**123.825** 4.8750	**723.90** 28.500	**555.62** 21.875	**361.95** 14.250	**535.0** 21.06	**393.7** 15.50	**6.4** 0.25	**125.0** 275.6	**10000** 2250000	**3570** 802000
140TPS160	**355.600** 14.0000	**631.825** 24.8750	**123.825** 4.8750	**917.58** 36.125	**606.62** 23.875	**361.95** 14.250	**581.0** 22.88	**415.9** 16.38	**6.4** 0.25	**170.9** 376.9	**12600** 2840000	**4040** 908000
160TPS164	**406.400** 16.0000	**581.025** 22.8750	**152.400** 6.0000	**444.50** 17.500	**555.62** 21.875	**412.75** 16.250	**539.8** 21.25	**444.5** 17.50	**6.4** 0.25	**123.9** 273.2	**7860** 1770000	**3090** 695000
160TPS165	**406.400** 16.0000	**635.000** 25.0000	**152.400** 6.0000	**596.90** 23.500	**606.42** 23.875	**412.75** 16.250	**585.8** 23.06	**457.2** 18.00	**6.4** 0.25	**174.4** 384.6	**11200** 2510000	**4170** 937000
160TPS166	**406.400** 16.0000	**685.800** 27.0000	**152.400** 6.0000	**752.48** 29.625	**657.22** 25.875	**412.75** 16.250	**633.4** 24.94	**469.9** 18.50	**6.4** 0.25	**229.8** 506.7	**13800** 3090000	**4710** 1060000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.

CROSSED ROLLER THRUST BEARINGS

TYPE XR AND JXR

- Withstands high overturning moments.
- Applications include machine tool table bearing for vertical boring and grinding machines. Other applications include various pivot and pedestal applications.
- Dimensions given in the following table relate to bearing type TXRDO, which is the most common form of crossed roller bearing.
- TXRDO bearing has a double outer race and two inner races with rollers spaced by separators.
- Other mounting configurations and sizes of crossed roller bearing can be supplied to meet particular assembly or setting requirements.
- Contact your Timken representative for more information.



B

DIMENSIONS – LOAD RATINGS

Bearing Number	Dimensions				Load Ratings		Factor
	Bore d	O.D. D	Height T	Radius[1] R	Two-Row radial	Thrust	k[2]
	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	
XR496051	203.200 8.0000	279.400 11.0000	31.750 1.2500	1.5 0.06	51300 11500	61600 13800	0.48
JXR637050	300.000 11.8110	400.000 15.7480	37.000 1.4567	1.5 0.06	63000 14200	80100 18000	0.45
JXR652050	310.000 12.2047	425.000 16.7323	45.000 1.7717	2.5 0.10	82200 18500	102000 23000	0.46
XR678052	330.200 13.0000	457.200 18.0000	63.500 2.50000	3.3 0.13	100000 22500	123000 27600	0.47
JXR699050	370.000 14.5669	495.000 19.4882	50.000 1.9685	3.0 0.12	93600 21000	119000 26700	0.45
XR766051	457.200 18.0000	609.600 24.0000	63.500 2.5000	3.3 0.13	141000 31600	178000 40100	0.45
XR820060	580.000 22.8346	760.000 29.9213	80.000 3.1496	6.4 0.25	240000 53900	299000 67200	0.46
XR855053	685.800 27.0000	914.400 36.0000	79.375 3.1250	3.3 0.13	270000 60700	344000 77200	0.45
XR882055	901.700 35.50000	1117.600 44.0000	82.550 3.2500	3.3 0.13	300000 67400	396000 88900	0.44
XR889058	1028.700 40.5000	1327.150 52.2500	114.300 4.5000	3.3 0.13	405000 91000	534000 120000	0.44
XR897051	1549.400 61.0000	1828.800 72.0000	101.600 4.0000	3.3 0.13	518000 116000	699000 157000	0.43

[1] Maximum shaft or housing fillet radius that bearing corners will clear.
[2] Centrifugal force constant. See engineering section for calculations using this factor.

TAPERED ROLLER THRUST BEARINGS

TYPE TTHD

- Consists of two tapered thrust races, rollers and cage.
- All components are separable.
- Generally a heavy-duty bearing and can opeate at a relateively high speed.
- Extensively used in numerous applications including oil well swivels, pulp refiners, extruders and piercing mill thrust blocks.

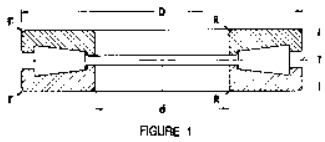
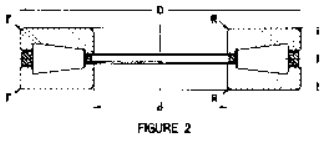


FIGURE 1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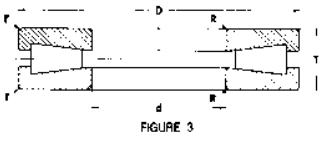
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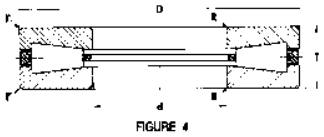
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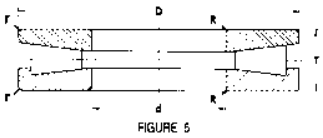
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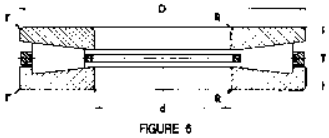
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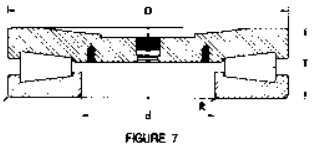
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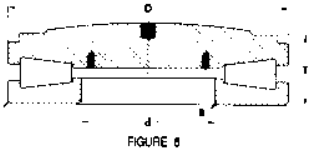
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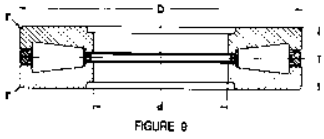
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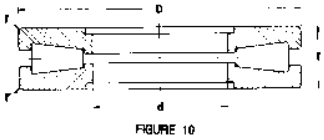
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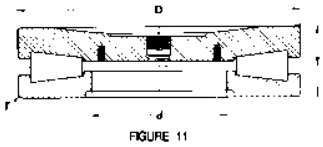
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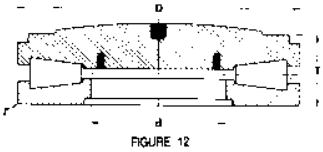
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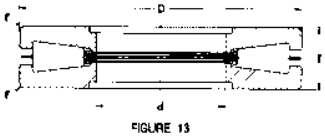


FIGURE 13

Bearing Number	Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Housing Fille Radius r	Mass	Remarks
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
T135	**2** 2	**34.925** 1.3750	**76.200** 3.0000	**15.875** 0.6250	**1.5** 0.06	**1.5** 0.06	**0.4** 0.88	
T135F	**1** 1	**34.925** 1.3750	**76.200** 3.0000	**15.875** 0.6250	**1.5** 0.06	**1.5** 0.06	**0.4** 0.88	
T200A	**2** 2	**50.800** 2.0000	**109.538** 4.3125	**22.225** 0.8750	**2.3** 0.09	**2.3** 0.09	**1.1** 2.40	
T311	**2** 2	**76.200** 3.0000	**161.925** 6.3750	**33.338** 1.3215	**3.3** 0.13	**3.3** 0.13	**3.6** 8.02	
T311F	**1** 1	**76.200** 3.0000	**161.925** 6.3750	**33.338** 1.3215	**3.3** 0.13	**3.3** 0.13	**3.6** 8.02	
***T311FS - T311S**	**8** 8	**76.200** 3.0000	**161.925** 6.3750	**49.212** 1.9375	**3.3** 0.13	**3.3** 0.13	– –	**T311FS - T311S, SPHERICAL RADIUS =** 457.200 mm (18″)
T411	**2** 2	**101.600** 4.0000	**215.900** 8.5000	**46.038** 1.8125	**3.3** 0.13	**3.3** 0.13	**8.9** 19.60	

Bearing Number	Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Housing Fille Radius r	Mass	Remarks
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
T411F	**1** 1	**101.600** 4.0000	**215.900** 8.5000	**46.038** 1.8125	**3.3** 0.13	**3.3** 0.13	**8.9** 19.60	
***T411FAS - T411S**	**8** 8	**76.200** 3.0000	**215.900** 8.5000	**65.088** 2.5625	**3.3** 0.13	**3.3** 0.13	**–** –	**T411FAS - T411S, SHERICAL RADIUS =** 508.000 mm (20″)
T441	**2** 2	**111.760** 4.4000	**223.520** 8.8000	**55.880** 2.2000	**3.3** 0.13	**3.3** 0.13	**11.4** 25.13	
T441F	**1** 1	**111.760** 4.4000	**223.520** 8.8000	**55.880** 2.2000	**3.3** 0.13	**3.3** 0.13	**11.4** 25.13	
T451	**2** 2	**114.300** 4.5000	**250.825** 9.8750	**53.975** 2.1250	**4.0** 0.16	**4.0** 0.16	**15.0** 33.07	
T511	**2** 2	**127.000** 5.0000	**266.700** 10.5000	**58.738** 2.3125	**4.8** 0.19	**4.8** 0.19	**17.8** 39.24	
T511A	**2** 2	**128.588** 5.0625	**266.700** 10.5000	**58.738** 2.3125	**4.8** 0.19	**4.8** 0.19	**17.8** 39.24	
T511F	**1** 1	**127.000** 5.0000	**266.700** 10.5000	**58.738** 2.3125	**4.8** 0.19	**4.8** 0.19	**17.8** 39.24	
***T511FS - T511S**	**8** 8	**127.000** 5.0000	**266.700** 10.5000	**79.375** 3.1250	**4.8** 0.19	**4.8** 0.19	**–** –	**T511FS - T511S, SPHERICAL RADIUS =** 609.600 mm (24″)
***T511FSA - T511S**	**8** 8	**101.600** 4.0000	**266.700** 10.5000	**79.375** 3.1250	**4.8** 0.19	**4.8** 0.19	**–** –	**T511FSA - T511S, SPHERICAL RADIUS =** 609.600 mm (24″)
***T511FSA - T511SA**	**7** 7	**101.600** 4.0000	**266.700** 10.5000	**79.375** 3.1250	**4.8** 0.19	**4.8** 0.19	**–** –	**T511FSA - T511SA, SPHERICAL RADIUS =** 609.600 mm (24″)
T520	**2** 2	**127.000** 5.0000	**250.825** 9.8750	**55.563** 2.1875	**4.8** 0.19	**4.8** 0.19	**13.9** 30.64	
T611	**2** 2	**152.400** 6.0000	**317.500** 12.5000	**69.850** 2.7500	**6.4** 0.25	**6.4** 0.25	**29.3** 64.60	
T611F	**1** 1	**152.400** 6.0000	**317.500** 12.5000	**69.850** 2.7500	**6.4** 0.25	**6.4** 0.25	**29.3** 64.60	
***T611FS - T611S**	**8** 8	**152.400** 6.0000	**317.500** 12.5000	**87.313** 3.4375	**6.4** 0.25	**6.4** 0.25	**–** –	**T611FS - T611S, SPHERICAL RADIUS =** 711.200 mm (28″)
***T611FS - T611SA**	**8** 8	**152.400** 6.0000	**317.500** 12.5000	**87.313** 3.4375	**6.4** 0.25	**6.4** 0.25	**–** –	**T611FS - T611SA, SPHERICAL RADIUS =** 762.000 mm (30″)
***T611FSA - T611SA**	**7** 7	**SOLID**	**317.500** 12.5000	**87.313** 3.4375	**N/A** N/A	**6.4** 0.25	**–** –	**T611FSA - T611SA, SPHERICAL RADIUS =** 762.000 mm (30″)
***T611FS - T611SB**	**8** 8	**152.400** 6.0000	**317.500** 12.5000	**87.313** 3.4375	**6.4** 0.25	**6.4** 0.25	**–** –	**T611FS - T611SB, SPHERICAL RADIUS =** 755.700 mm (29.75″)
T651	**2** 2	**165.100** 6.5000	**311.150** 12.2500	**88.900** 3.5000	**6.4** 0.25	**6.4** 0.25	**38.3** 84.44	
T661	**2** 2	**168.275** 6.6250	**304.800** 12.0000	**69.850** 2.7500	**6.4** 0.25	**6.4** 0.25	**27.8** 61.29	
T691	**2** 2	**174.625** 6.8750	**358.775** 14.1250	**82.550** 3.2500	**6.4** 0.25	**6.4** 0.25	**45.3** 99.87	
T709	**4** 4	**177.800** 7.0000	**431.800** 17.0000	**101.600** 4.0000	**6.4** 0.25	**6.4** 0.25	**86.3** 190.26	
T711	**2** 2	**177.800** 7.0000	**368.300** 14.5000	**82.550** 3.2500	**8.0** 0.31	**8.0** 0.31	**48.4** 106.70	
T711F	**1** 1	**177.800** 7.0000	**368.300** 14.5000	**82.550** 3.2500	**8.0** 0.31	**8.0** 0.31	**48.4** 106.70	
T711FS - T711S	**7** 7	**177.800** 7.0000	**368.300** 14.5000	**104.775** 4.1250	**8.0** 0.31	**8.0** 0.31	**–** –	
***T711FS - T711SA**	**8** 8	**177.800** 7.0000	**368.300** 14.5000	**101.600** 4.0000	**8.0** 0.31	**8.0** 0.31	**–** –	**T711FS - T711SA, SPHERICAL RADIUS =** 762.000 mm (30″)
***T711FSS - T711S**	**7** 7	**SOLID**	**368.300** 14.5000	**104.775** 4.1250	**N/A** N/A	**8.0** 0.31	**–** –	**T711FSS - T711S, SPHERICAL RADIUS =** 622.300 mm (24.5″)
T811	**2** 2	**203.200** 8.0000	**419.100** 16.5000	**92.075** 3.6250	**9.7** 0.38	**9.7** 0.38	**69.3** 152.78	
T811F	**1** 1	**203.200** 8.0000	**419.100** 16.5000	**92.075** 3.6250	**9.7** 0.38	**9.7** 0.38	**69.3** 152.78	
***T811FS - T811S**	**7** 7	**203.200** 8.0000	**419.100** 16.5000	**123.825** 4.8750	**9.7** 0.38	**9.7** 0.38	**–** –	**T811FS - T811S, SPHERICAL RADIUS =** 508.000 mm (20″)
***T811FS - T811SA**	**8** 8	**203.200** 8.0000	**422.275** 16.6250	**115.880** 4.5625	**9.7** 0.38	**9.7** 0.38	**–** –	**T811FS - T811SA, SPHERICAL RADIUS =** 838.200 mm (33″), LOWER RACE OD = 419.100 mm (16.5000″)

THRUST BEARINGS

TYPE TTHD - *continued*

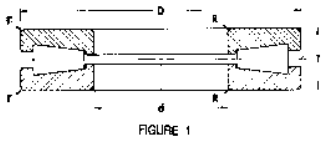


FIGURE 1

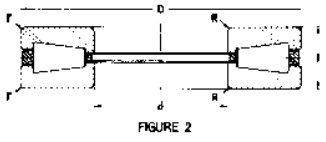
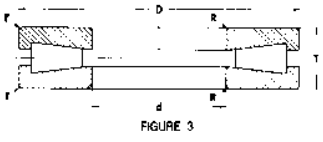


FIGURE 2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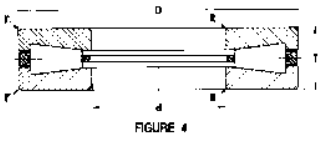
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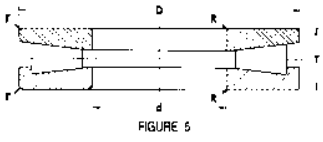
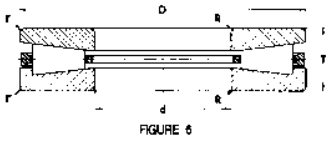


FIGURE 5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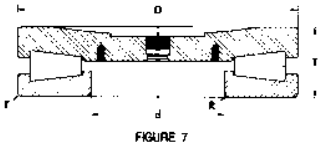
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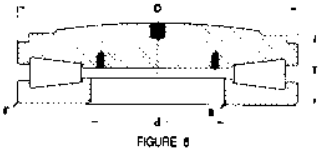
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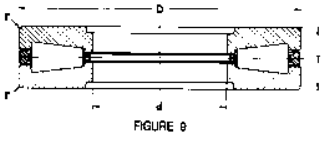
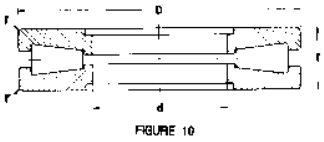


FIGURE 9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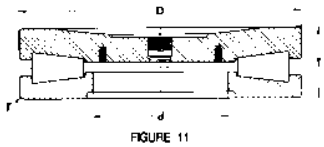


FIGURE 11

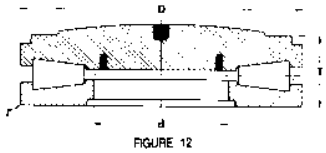


FIGURE 12

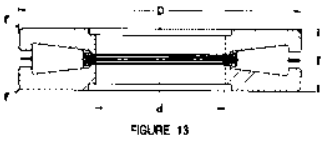


FIGURE 13

Bearing Number	Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Housing Fille Radius r	Mass	Remarks
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
***T811FSA - T811SB**	**7** 7	**SOLID**	**422.275** 16.6250	**120.650** 4.7500	**N/A** N/A	**9.7** 0.38	**–** –	**T811FSA - T811SB, SPHERICAL RADIUS =** 506.000 mm (20"), LOWER RACE OD = 419.100 mm (16.5000")
T811X	**2** 2	**203.200** 8.0000	**419.100** 16.5000	**120.650** 4.7500	**9.7** 0.38	**9.7** 0.38	**92.7** 204.37	
***T811 - T811XA**	**2** 2	**203.200** 8.0000	**419.100** 16.5000	**106.363** 4.1875	**9.7** 0.38	**9.7** 0.38	**–** –	**T811 - T811XA, 2 BORES, OTHER BORE =** 201.613 mm (7.9375")
T911	**9** 9	**228.600** 9.0000	**482.600** 19.0000	**104.775** 4.1250	**N/A** N/A	**11.2** 0.44	**105.0** 231.49	
T911A	**9** 9	**234.950** 9.2500	**482.600** 19.0000	**104.775** 4.1250	**N/A** N/A	**11.2** 0.44	**103.0** 227.08	
T911F	**10** 10	**228.600** 9.0000	**482.600** 19.0000	**104.775** 4.1250	**N/A** N/A	**11.2** 0.44	**–** –	
***T911 -T911A**	**9** 9	**228.600** 9.0000	**482.600** 19.0000	**104.775** 4.1250	**N/A** N/A	**11.2** 0.44	**–** –	**T911 - T911A, 2 BORES, OTHER BORE =** 234.950 mm (9.2500")
***T911FS -T911S**	**11** 11	**228.600** 9.0000	**482.600** 19.0000	**146.050** 5.7500	**N/A** N/A	**11.2** 0.44	**–** –	**T911FS - T911S, SPHERICAL RADIUS =** 635.000 mm (25")
***T911FS -T911SA**	**12** 12	**228.600** 9.0000	**482.600** 19.0000	**131.763** 5.1875	**N/A** N/A	**11.2** 0.44	**–** –	**T911FS - T911SA, SPHERICAL RADIUS =** 1295.400 mm (51")
***T911FS -T911SB**	**12** 12	**228.600** 9.0000	**482.600** 19.0000	**114.300** 4.5000	**N/A** N/A	**11.2** 0.44	**–** –	**T911FS - T911SB, SPHERICAL RADIUS =** 895.350 mm (35.25")
T921	**9** 9	**234.950** 9.2500	**546.100** 21.5000	**127.000** 5.0000	**N/A** N/A	**16.0** 0.63	**171.0** 376.99	

Bearing Number	Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Housing Fille Radius r	Mass	Remarks
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
T921F	**10** 10	**234.950** 9.2500	**546.100** 21.5000	**127.000** 5.0000	**N/A** N/A	**16.0** 0.63	**171.0** 376.99	
T1011	**9** 9	**254.000** 10.0000	**539.750** 21.2500	**117.475** 4.6250	**N/A** N/A	**11.2** 0.44	**147.0** 324.08	
***T1011FS - T1011S**	**12** 12	**254.000** 10.0000	**539.750** 21.2500	**149.225** 5.8750	**N/A** N/A	**11.2** 0.44	– –	**T1011FS - T1011S, SPHERICAL RADIUS =** 1066.8 mm (42″)
***T1011FS - T1011SA**	**11** 11	**254.000** 10.0000	**539.750** 21.2500	**158.750** 6.2500	**N/A** N/A	**11.2** 0.44	– –	**T1011FS - T1011SA, SPHERICAL RADIUS =** 635.000 mm (25″)
***T1011FS - T1011SC**	**11** 11	**254.000** 10.0000	**539.750** 21.2500	**158.750** 6.2500	**N/A** N/A	**11.2** 0.44	– –	**T1011FS - T1011SC, SPHERICAL RADIUS =** 635.000 mm (25″)
T1115	**9** 9	**279.400** 11.0000	**495.300** 19.5000	**133.350** 5.2500	**N/A** N/A	**6.4** 0.25	**125.0** 275.58	
T1120	**9** 9	**279.400** 11.0000	**603.250** 23.7500	**136.525** 5.3750	**N/A** N/A	**11.2** 0.44	**212.0** 467.38	
T1120F	**10** 10	**279.400** 11.0000	**603.250** 23.7500	**136.525** 5.3750	**N/A** N/A	**11.2** 0.44	**212.0** 467.38	
***T1120FS - T1120S**	**12** 12	**279.400** 11.0000	**603.250** 23.7500	**136.525** 5.3750	**N/A** N/A	**11.2** 0.44	– –	**T1120FS - T1120S, SPHERICAL RADIUS =** 1308.1 mm (51.5″)
T1421	**9** 9	**355.600** 14.0000	**533.400** 21.0000	**101.600** 4.0000	**N/A** N/A	**6.4** 0.25	**84.1** 185.41	
T1421F	**10** 10	**355.600** 14.0000	**533.400** 21.0000	**101.600** 4.0000	**N/A** N/A	**6.4** 0.25	**84.1** 185.41	
T1750	**2** 2	**44.450** 1.7500	**84.734** 3.3360	**18.258** 0.7188	**2.3** 0.09	**2.3** 0.09	**0.5** 1.08	
T2520	**2** 2	**63.500** 2.5000	**117.475** 4.6250	**25.400** 1.0000	**2.3** 0.09	**2.3** 0.09	**1.3** 2.95	
***T3004W**	**1** 1	**76.454** 3.0100	**167.081** 6.5780	**44.450** 1.7500	**3.3** 0.13	**N/A** N/A	– –	**T3004W, RETAINER ON OD**
T7519	**2** 2	**190.000** 7.4803	**355.600** 14.0000	**74.219** 2.9220	**6.4** 0.25	**6.4** 0.25	**35.9** 79.15	
***T8920FA - T8920FB**	**11** 11	**168.275** 6.6250	**638.175** 25.1250	**152.400** 6.0000	**N/A** N/A	**11.0** 0.43	– –	**NO SPHERICAL RADIUS**
T9020	**9** 9	**228.600** 9.0000	**431.800** 17.0000	**88.773** 3.4950	**N/A** N/A	**9.7** 0.38	**65.7** 144.84	
***T9030FS - T9030S**	**7** 7	**SOLID**	**482.600** 19.0000	**165.000** 6.5354	**N/A** N/A	**11.2** 0.44	– –	**T9030FS - T9030S, SPHERICAL RADIUS =** 635.000 mm (25″)
***T9030FS - T9030SA**	**8** 8	**SOLID**	**482.600** 19.0000	**150.622** 5.9300	**N/A** N/A	**11.2** 0.44	– –	**T9030FS - T9030SA, SPHERICAL RADIUS =** 1295.400 mm (51″)
***T9030FSA - T9030SA**	**12** 12	**168.275** 6.6250	**482.600** 19.0000	**131.763** 5.1875	**N/A** N/A	**11.2** 0.44	– –	**T9030FSA - T9030SA, SPHERICAL RADIUS =** 1295.400 mm (51″)
***T9030FSA - T9030SB**	**12** 12	**168.275** 6.6250	**482.600** 19.0000	**131.763** 5.1875	**N/A** N/A	**11.2** 0.44	– –	**T9030FSA - T9030SB, SPHERICAL RADIUS =** 1066.800 mm (42″)
T9250F	**10** 10	**234.950** 9.2500	**546.100** 21.5000	**127.000** 5.0000	**N/A** N/A	**16.0** 0.63	– –	
T9250FA	**10** 10	**139.700** 5.5000	**546.100** 21.5000	**127.000** 5.0000	**N/A** N/A	**16.0** 0.63	– –	
***T9250FAS - T9250SA**	**12** 12	**139.700** 5.5000	**549.275** 21.6250	**155.575** 6.1250	**N/A** N/A	**16.0** 0.63	– –	**T9250FAS - T9250SA, SPHERICAL RADIUS =** 1295.400 mm (51″)
***T9250FAS - T9250SC**	**12** 12	**139.700** 5.5000	**549.275** 21.6250	**155.575** 6.1250	**N/A** N/A	**16.0** 0.63	– –	**T9250FAS - T9250SC, SPHERICAL RADIUS =** 1295.400 mm (51″)
***T9250FS - T9250S**	**11** 11	**234.950** 9.2500	**546.100** 21.5000	**168.275** 6.6250	**N/A** N/A	**16.0** 0.63	– –	**T9250FS - T9250S, SPHERICAL RADIUS =** 641.350 mm (25.25″)
***T9250FS - T9250SA**	**12** 12	**234.950** 9.2500	**549.275** 21.6250	**155.575** 6.1250	**N/A** N/A	**16.0** 0.63	– –	**T9250FS - T9250SA, SPHERICAL RADIUS =** 1295.400 mm (51″)
***T9250FS - T9250SB**	**11** 11	**234.950** 9.2500	**546.100** 21.5000	**171.450** 6.7500	**N/A** N/A	**16.0** 0.63	– –	**T9250FS - T9250SB, SPHERICAL RADIUS =** 558.800 mm (22″)
***T12040FS - T12040S**	**12** 12	**304.800** 12.0000	**1146.175** 45.1250	**317.500** 12.5000	**N/A** N/A	**19.0** 0.75	– –	**T12040FS - T12040S, SPHERICAL RADIUS =** 2000.250 mm (78.75″), LOWER RACE OD = 1143.000 mm (45.0000″)
***T14214**	**13** 13	**355.600** 14.0000	**533.400** 21.0000	**101.600** 4.0000	**N/A** N/A	**6.4** 0.25	– –	**T14214, 2 BORES, OTHER BORE =** 355.961 mm (14.0150″)
T14520	**9** 9	**368.300** 14.5000	**603.300** 23.7500	**120.650** 4.7500	**N/A** N/A	**9.7** 0.38	**144.0** 317.47	

THRUST BEARINGS

TYPE TTHD *- continued*

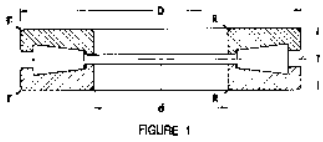


FIGURE 1

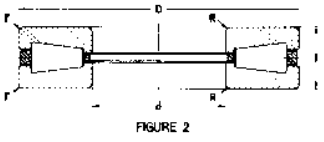
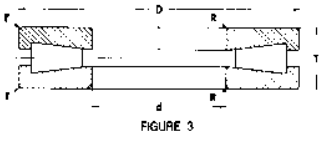


FIGURE 2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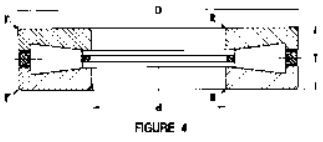
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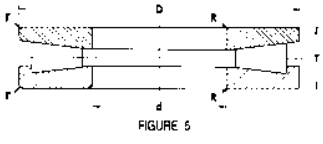
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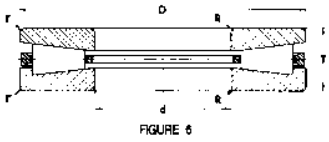
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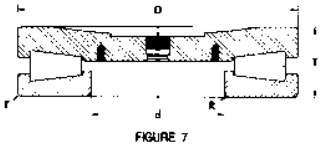
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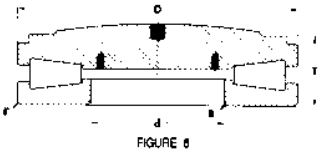
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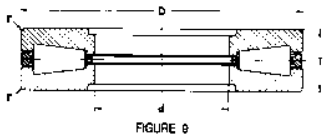


FIGURE 9

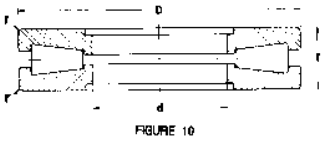


FIGURE 10

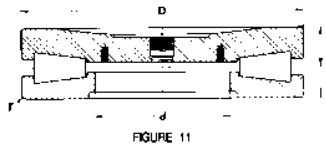


FIGURE 11

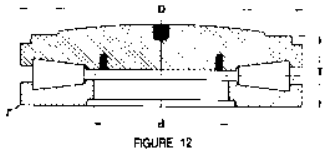


FIGURE 12

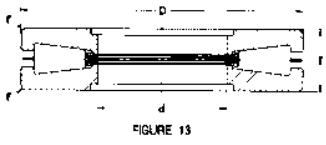


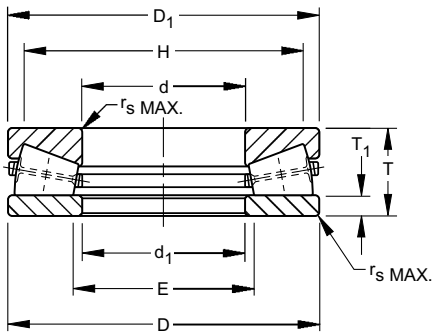
FIGURE 13

Bearing Number	Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Housing Fille Radius r	Mass	Remarks
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
T16021	**9** 9	**406.400** 16.0000	**711.200** 28.0000	**146.050** 5.7500	**N/A** N/A	**9.7** 0.38	**264.0** 582.02	
T16021F	**10** 10	**406.400** 16.0000	**711.200** 28.0000	**146.050** 5.7500	**N/A** N/A	**9.7** 0.38	**264.0** 582.02	
T16050	**9** 9	**406.400** 16.0000	**838.200** 33.0000	**177.800** 7.0000	**N/A** N/A	**12.7** 0.5	**517.0** 1139.79	
T17010FS - T17020S	**12** 12	**431.800** 17.0000	**942.975** 37.1250	**260.350** 10.2500	**N/A** N/A	**12.7** 0.5	– –	
T48000	**9** 9	**1219.200** 48.0000	**1524.000** 60.0000	**136.525** 5.3750	**N/A** N/A	**9.7** 0.38	**596.0** 1313.95	

TAPERED ROLLER THRUST BEARINGS

TYPE TTVF

- Combines the outstanding features of tapered thrust and cylindrical roller bearings to offer the highest possible capacity of any thrust bearing of its size.
- One washer is perfectly flat, while the second includes a tapered raceway matching the rollers.
- Originally developed for screwdown applications in metal rolling mills where thrust loads exceeding one million pounds are common.



DIMENSIONS – LOAD RATINGS

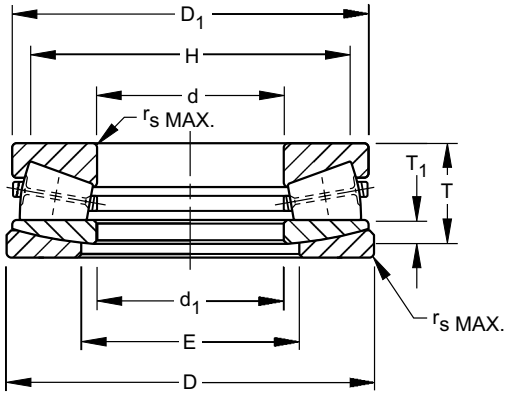
Bearing Number	Bore d	O.D. D	Height T	Washers			Shoulder Diameter		Fillet[1] Radius r (Max.)	Wt.	Load Rating		Approx. Limiting Speed (for Oil Bath Only)
				Thickness T_1	Small Diameter O.D. D_1	Large Bore I.D. d_1	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C_{oa}	Dynamic Load Rating C_t	
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.	RPM
F-3167-B	101.575 3.9990	215.875 8.4990	46.038 1.8125	9.53 0.375	215.14 8.470	102.59 4.039	193.7 7.62	108 4.25	2.5 0.10	9.3 20.5	1570.0 353000	880.0 198000	1350
W-3217-B	127.000 5.0000	266.700 10.5000	58.738 2.3125	12.70 0.500	265.94 10.470	127.51 5.020	238.1 9.38	149.2 5.88	3.6 0.14	18.6 41.0	2570.0 578000	1350.0 304000	1090
S-4055-C	149.974 5.9045	299.720 11.8000	89.692 3.5312	25.40 1.000	298.45 11.750	154 6.063	267.5 10.53	174.6 6.88	3 0.12	35.8 79.0	3350.0 754000	1850.0 416000	970
G-3304-B	168.275 6.6250	304.800 12.0000	69.850 2.7500	14.29 0.562	303.21 11.938	171.45 6.750	277.8 10.94	188.9 7.44	6.4 0.25	25.9 57.0	3730.0 839000	1910.0 429000	950
W-3218-B	177.800 7.0000	368.300 14.5000	82.550 3.2500	17.46 0.688	366.71 14.438	180.98 7.125	336.6 13.25	203.2 8.00	6.1 0.24	49.4 109.0	6270.0 1410000	2940.0 660000	790
F-3094-C	228.575 8.9990	431.749 16.9980	88.900 3.5000	15.88 0.625	430.99 16.968	231.78 9.125	396.9 15.62	257.2 10.12	5.1 0.20	71.7 158.0	7120.0 1600000	3420.0 769000	670
I-2077-C	253.975 9.9990	508.000 20.0000	95.250 3.7500	19.05 0.750	507.19 19.968	256.38 10.094	468.3 18.44	282.6 11.12	6.4 0.25	110.2 243.0	10000.0 2260000	4530.0 1020000	570
R-2927-C	254.000 10.0000	508.000 20.0000	107.950 4.2500	21.43 0.844	506.41 19.938	257.18 10.125	466.7 18.38	285.8 11.25	4.8 0.19	123.4 272.0	12100.0 2720000	5550.0 1250000	570
G-3224-C	256.540 10.1000	546.100 21.5000	165.100 6.5000	34.92 1.375	542.92 21.375	258.76 10.188	515.9 20.31	301.6 11.88	6.1 0.24	227.2 501.0	14900.0 3350000	7900.0 1780000	530
S-4077-C	259.999 10.2362	479.948 18.8956	132.080 5.2000	26.99 1.062	478.36 18.833	263.17 10.361	427 16.81	300 11.81	4.8 0.19	126.5 279.0	8980.0 2020000	4720.0 1060000	610
C-8091-C	279.400 11.0000	603.250 23.7500	136.525 5.3750	30.16 1.188	601.66 23.688	282.58 11.125	552.4 21.75	317.5 12.50	4.8 0.19	230.4 508.0	1770.0 3980000	7890.0 1770000	480
G-3272-C	304.775 11.9990	609.600 24.0000	114.300 4.5000	28.58 1.125	606.81 23.890	307.18 12.094	565.2 22.25	342.9 13.50	6.4 0.25	190.9 421.0	17800.0 3990000	7380.0 1660000	480
E-1994-C	304.800 12.0000	673.100 26.5000	171.450 6.7500	37.31 1.469	671.51 26.438	307.98 12.125	608 23.94	352.4 13.88	7.6 0.30	347.8 767.0	22700.0 5100000	11000.0 2470000	430
F-3090-A	304.800 12.0000	736.600 29.0000	279.400 11.0000	44.45 1.750	735.01 28.938	307.98 12.125	614.4 24.19	385.8 15.19	9.1 0.36	732 1614.0	28000.0 6300000	17100.0 3850000	400
I-2060-C	368.541 14.5095	609.156 23.9825	120.650 4.7500	25.40 1.000	604.84 23.812	371.48 14.625	565.2 22.25	401.6 15.81	9.7 0.38	176 388.0	11800.0 2640000	5840.0 1310000	480
B-8350-C	406.400 16.0000	711.200 28.0000	167.084 6.5781	36.91 1.453	709.61 27.938	409.58 16.125	654 25.75	450.8 17.75	9.1 0.36	356.5 786.0	19900.0 4480000	10300.0 2310000	410
F-3163-C	406.400 16.0000	712.394 28.0470	146.050 5.7500	30.96 1.219	711.28 28.003	409.58 16.125	650.9 25.62	455.6 17.94	7.6 0.30	303.4 669.0	19300.0 4350000	9190.0 2070000	410
F-3131-G	431.800 17.0000	863.600 34.0000	228.600 9.0000	44.45 1.750	862.01 33.938	434.98 17.125	787.4 31.00	489 19.25	10.2 0.40	774.6 1708.0	37700.0 8480000	18800.0 4230000	340
A-6096-C	508.000 20.0000	990.600 39.0000	196.850 7.7500	67.47 2.656	990.60 39.000	508.58 20.062	927.1 36.50	563.6 22.19	12.7 0.50	882.5 1946.0	41500.0 9320000	16700.0 3760000	290
F-3093-A	558.800 22.0000	1066.800 42.0000	285.750 11.2500	57.15 2.250	1065.21 41.938	561.98 22.125	952.5 37.50	639.8 25.19	10.2 0.40	1401.4 3090.0	49400.0 11100000	28000.0 6300000	270
F-3172-C	711.200 28.0000	965.200 38.0000	127.000 5.0000	30.16 1.188	963.61 37.938	714.38 28.125	917.6 36.12	762 30.00	4.8 0.19	354.2 781.0	19600.0 4400000	8670.0 1950000	300
H-2054-G	711.200 28.0000	990.600 39.0000	190.500 7.5000	44.45 1.750	989.01 38.938	712.79 28.062	936.6 36.88	755.6 29.75	10.2 0.40	572.3 1262.0	28000.0 6300000	14200.0 3200000	290
D-2864-C	825.424 32.4970	1168.400 46.0000	127.000 5.0000	31.75 1.250	1168.40 46.000	825.50 32.500	1130.3 44.50	860.4 33.88	14.2 0.56	549.7 1212.0	44100.0 9920000	15600.0 3500000	250
F-3067-C	1219.998 48.0314	1574.869 62.0027	177.800 7.0000	44.45 1.750	1575 62.008	1219.99 48.031	1498.6 59.00	1266.8 49.88	6.4 0.25	1173.2 2587.0	49900.0 11200000	21900.0 4930000	180

[1] Maximum shaft or housing fillet radius that bearing corners will clear.

TAPERED ROLLER THRUST BEARINGS

TYPE TTVS

- Same basic roller and raceway design as the TTVF except that the lower washer is two pieces to permit self-alignment under conditions of initial misalignment.



DIMENSIONS – LOAD RATINGS

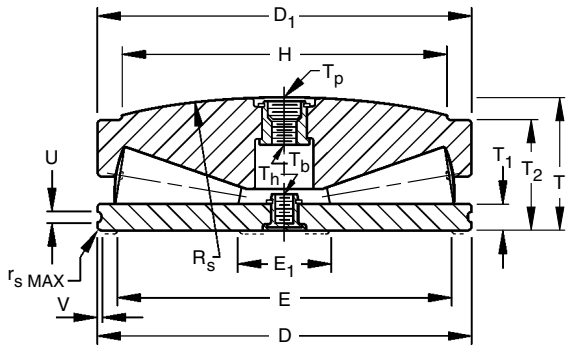
Bearing Number	Bore d	O.D. D	Height T	Washers			Shoulder Diameter		Fillet[1] Radius	Wt.	Load Rating		Approx. Limiting Speed (for Oil Bath Only)
				Thickness T_1	Small Diameter O.D. D_1	Large Bore I.D. d_1	Shaft H (Min.)	Housing E (Max.)	r_s (Max.)		Static Load Rating C_{oa}	Dynamic Load Rating C_t	
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.	RPM
B-7976-C	184.15 7.2500	406.4 16.0000	203.2 8.0000	66.68 2.625	404.81 15.938	187.32 7.375	346.1 13.62	228.6 9.00	6.1 0.24	157.4 347.0	7650.0 1720000	4540.0 1020000	720
B-8824-C	199.374 7.8730	399.948 15.7460	121.841 4.7969	36.4 1.433	396.88 15.625	203.2 8.000	358.8 14.12	240.5 9.47	4.1 0.16	86.2 190.0	7020.0 1580000	3590.0 807000	730
E-2004-C	228.6 9.0000	482.549 18.9980	158.75 6.2500	44.91 1.768	479.55 18.880	231.78 9.125	419.1 16.50	282.6 11.12	4.8 0.19	170.1 375.0	10900.0 2440000	5870.0 1320000	600
H-1685-C	241.3 9.5000	488.899 19.2480	152.4 6.0000	57.15 2.250	482.6 19.000	242.09 9.531	431.8 17.00	279.4 11.00	6.1 0.24	162.8 359.0	9940.0 2240000	4980.0 1120000	600
W-3120-C	253.975 9.9990	508 20.0000	215.9 8.5000	61.91 2.437	504.82 19.875	285.75 11.250	425.4 16.75	317.5 12.50	10.2 0.40	250.8 553.0	9770.0 2200000	6020.0 1350000	580
P-1739-C	304.8 12.0000	609.6 24.0000	215.9 8.5000	61.91 2.437	608.01 23.938	307.98 12.125	536.6 21.12	349.2 13.75	7.6 0.30	359.6 793.0	17800.0 4010000	10000.0 2260000	480
N-2827-G	355.6 14.0000	660.4 26.0000	254 10.0000	76.2 3.000	657.22 25.875	358.78 14.125	577.8 22.75	412.8 16.25	10.2 0.40	483 1065.0	18600.0 4180000	11100.0 2490000	440
B-8424-C	406.4 16.0000	869.95 34.2500	241.3 9.5000	82.55 3.250	887.41 34.938	438.15 17.250	803.3 31.62	463.6 18.25	16.5 0.65	858 1892.0	39000.0 8770000	17700.0 3980000	330

[1] Maximum shaft or housing fillet radius that bearing corners will clear.

TAPERED ROLLER THRUST BEARINGS

TYPE TTSX

- A full roller complement design without a conventional bore.
- Supplied with center inserts for attachment purposes as well as for lifting.
- Offers the highest capacity but at a somewhat reduced speed capability, as compared with other V-Flat types.

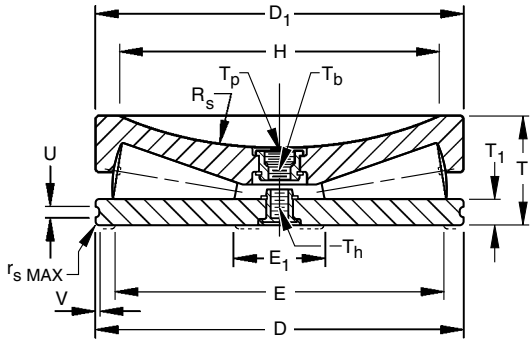


Bearing Number	Screw Extension Dia. min. H	O.D. D	Overall Height T	Height T2	Spherical Radius Rs	Washer Thickness T1	max. rs	Top Washer O.D. D1	Hsg. Shldr. Dia. E	Hsg. Shldr. Dia. E1	Groove Width U	Groove Depth V	Eyebolt Threads Tb	Eyebolt Threads Th	Tp Taper Pipe Plug Thread	Basic Static Thrust Capacity BSTC
	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	lbs.
58 TTSX 908	5.000	5.875	2.164	1.875	18.000	0.500	1/16	5.782	5 3/8	2	0.187	0.046	1/2-13	3/8-16	3/8	299000
68 TTSX 910	6.000	6.875	2.417	2.062	18.000	0.500	1/16	6.782	6 3/8	2 7/8	0.187	0.046	1/2-13	3/8-16	3/8	400000
80 TTSX 914	7.000	8.000	2.977	2.562	20.000	0.625	1/16	7.907	7 3/8	2 7/8	0.250	0.046	1/2-13	3/8-16	3/8	565000
105 TTSX 918	9.000	10.500	3.717	3.187	24.000	0.750	1/16	10.407	9 3/8	3 1/8	0.312	0.078	3/4-10	1/2-13	3/4	985000
126 TTSX 922	11.000	12.625	4.369	3.750	30.000	0.875	1/16	12.532	11 1/2	3 5/8	0.406	0.094	3/4-10	1/2-13	3/4	1515000
148 TTSX 926	13.000	14.875	5.079	4.375	36.000	1.000	1/16	14.782	13 5/8	4 5/8	0.406	0.094	1 1/4-7	1/2-13	1 1/4	2050000
172 TTSX 934 OG778	13.500	17.252	6.495	5.500	33.000	1.250	5/32	17.152	15 5/8	4 9/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	2815000
161 TTSX 930	14.000	16.125	5.542	4.812	40.000	1.125	1/8	16.032	14 5/8	4 9/16	0.406	0.094	1 1/4-7	1/2-13	1 1/4	2430000
161 TTSX 930 AA678	14.000	16.125	6.730	5.616	54.000	1.750	1/16	16.032	14 5/8	4 9/16	–	–	1 1/4-7	1 - 8	1 1/4	2430000
172 TTSX 934	15.000	17.250	5.932	5.125	40.000	1.250	1/8	17.157	15 5/8	4 9/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	2800000
202 TTSX 942 EE2000	15.875	20.250	7.430	6.125	25.000	1.375	1/16	20.532	19	5	–	–	1 1/4-7	1 - 8	1 1/4	4190000
190 TTSX 940	16.500	19.000	5.730	5.125	75.000	1.500	1/16	18.906	18 1/4	7 3/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3460000
190 TTSX 940 OA617	16.500	19.000	6.015	5.125	42.000	1.500	1/16	18.905	18 1/4	5 3/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3620000
190 TTSX 938 BO563	17.000	19.250	6.717	5.750	42.000	1.375	1/8	19.407	17 5/8	4 5/8	–	–	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSX 938 OD452	17.000	19.500	6.635	5.750	46.500	1.375	1/8	12.407	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSX 938	17.000	19.500	6.717	5.750	42.000	1.375	1/8	19.407	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSX 938 DO574	17.000	19.560	6.717	5.750	42.000	1.375	1/8	19.407	17 5/8	4 5/8	–	–	1 1/4-7	1 - 8	1 1/4	3680000
206TTSX 942	18.000	20.625	6.920	6.000	50.000	1.375	1/8	20.532	19	5 1/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4190000
206 TTSX 942 AB551	18.000	20.625	7.937	6.878	42.000	2.238	1/8	20.532	19	5	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4190000
210 TTSX 944 AO574	18.000	21.000	7.000	6.375	78.000	1.250	–	20.906	19 1/2	5	–	–	1 1/4-7	1 - 8	1 1/4	4232000
210 TTSX 944	18.000	21.000	7.000	6.375	78.000	1.250	1/16	20.906	19 1/2	5	0.375	0.375	1 1/4-7	1 - 8	1 1/4	4232000
210 TTSX 944 BA1479	18.000	21.000	7.023	–	78.000	1.250	–	21.000	19 1/2	5	–	–	1 1/4-7	1 - 8	1 1/4	4232000
218 TTSX 946	19.000	21.875	7.514	6.500	50.000	1.500	1/8	21.782	19 7/8	6	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4550000
228 TTSX 950	20.000	22.875	7.629	6.625	56.000	1.500	1/8	22.782	20 3/4	5 1/4	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5130000
228 TTSX 950 AO2017	20.000	22.875	7.629	6.625	56.000	1.500	1/8	22.782	20 3/4	5 1/4	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5130000
228 TTSX 950 OA452	20.000	22.875	7.708	6.625	51.500	1.500	1/8	22.782	20 3/4	5 1/4	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5130000
240 TTSX 954 OC1185	21.000	24.000	8.032	7.000	60.000	1.500	1/8	23.907	22	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5700000
240 TTSX 954	21.000	24.000	8.032	7.000	60.000	1.500	1/8	23.907	22	5 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5700000
252 TTSX 958 00149	22.000	25.250	8.373	7.250	60.000	1.500	1/8	25.157	23 1/8	5 3/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	6290000
252 TTSX 958	22.000	25.250	8.373	7.250	60.000	1.500	1/8	25.157	23 1/8	5 3/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	6290000

TAPERED ROLLER THRUST BEARINGS

TYPE TTSV

- Designed with a full complement of controlled contour rollers without a conventional bore.
- Supplied with center inserts for attachment purposes as well as for lifting.
- Offers the highest capacity but at a somewhat reduced speed capability, as compared with other V-Flat types.



Bearing Number	Screw Extension Dia. min. H	O.D. D	Height T	Spherical Radius Rs	Washer Thickness T1	max. rs	Top Washer O.D. D1	Hsg. Shldr. Dia. E	Hsg. Shldr. Dia. E1	Groove Width U	Groove Depth V	Eyebolt Threads Tb	Eyebolt Threads Th	Tp Taper Pipe Plug Thread	Basic Static Thrust Capacity BSTC
	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	lbs.
58 TTSV 908	5.000	5.875	1.875	9.000	0.500	1/16	5.782	5 3/8	2	0.187	0.046	5/8-11	3/8-16	–	299000
80 TTSV 914 AA508	5.500	8.000	2.563	24.000	0.625	–	7.907	7 3/8	2 7/8	–	–	5/8-11	3/8-16	–	565000
68 TTSV 910	6.000	6.875	2.062	9.000	0.500	1/16	6.782	6 3/8	2 7/8	0.187	0.046	5/8-11	3/8-16	–	400000
80 TTSV 914	7.000	8.000	2.562	10.000	0.625	1/16	7.907	7 3/8	2 7/8	0.250	0.046	5/8-11	3/8-16	–	565000
105 TTSV 918	9.000	10.500	3.187	12.000	0.750	1/16	10.407	9 3/8	3 3/8	0.312	0.078	3/4-10	1/2-13	–	985000
105 TTSV 918 OC1150	9.000	10.500	3.187	14.000	0.750	1/16	10.407	9 3/8	3 1/8	0.312	0.078	3/4-10	1/2-13	–	985000
126 TTSV 922	11.000	12.625	3.750	15.000	0.875	1/16	12.532	11 1/2	3 5/8	0.406	0.094	3/4-10	1/2-13	–	1515000
148 TTSV 926	13.000	14.875	4.375	18.000	1.000	1/16	14.782	13 5/8	4 5/8	0.406	0.094	3/4-10	1/2-13	3/4	2050000
148 TTSV 926 AO529	13.000	14.875	4.375	18.000	1.000	1/16	14.782	13 5/8	4 5/8	0.406	0.094	3/4-10	1/2-13	–	2050000
161 TTSV 930 OA534	13.000	16.125	5.500	20.000	1.125	1/8	16.032	14 5/8	4 9/16	0.406	0.094	3/4-10	1/2-13	3/4	2430000
161 TTSV 930	14.000	16.125	4.812	20.000	1.125	1/8	16.032	14 5/8	4 9/16	0.406	0.094	3/4-10	1/2-13	3/4	2430000
172 TTSV 934	15.000	17.250	5.125	20.000	1.250	1/8	17.157	15 5/8	4 9/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	2800000
172 TTSV 934 BA528	15.000	17.250	5.875	50.000	2.000	–	17.157	15 5/8	4 9/16	–	–	1 1/4-7	1 - 8	1 1/4	2800000
195 TTSV 938 OA452	17.000	19.500	5.750	25.000	1.375	1/8	19.407	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSV 938	17.000	19.500	5.750	22.000	1.375	1/8	19.407	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSV 938 OC902	17.000	19.500	5.750	25.000	1.375	1/8	19.250	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3610000
195 TTSV 938 LE1722	17.000	19.500	5.750	36.000	1.375	1/4	19.407	17 5/8	4 5/8	0.953	0.130	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSV 938 DB508	17.000	19.500	5.750	50.000	1.383	–	19.407	17 5/8	4 5/8	–	–	1 1/4-7	1 - 8	1 1/4	3680000
206 TTSV 942	18.000	20.625	6.000	25.000	1.375	1/8	20.532	19	5 1/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4190000
210 TTSV 944 CA1481	18.000	21.000	7.000	50.000	1.125	–	21.000	19 1/2	5	–	–	1 1/4-7	1 - 8	1 1/4	4232000
210 TTSV 944 DA 1708	18.000	21.000	7.500	50.000	1.750	–	21.000	19 1/2	5	–	–	1 1/4-7	1 - 8	1 1/4	4232000
212 TTSV 942 EA1740	18.000	21.250	6.250	25.000	1.625	7/16	21.250	19	5	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4190000
218 TTSV 946	19.000	21.875	6.500	25.000	1.500	1/8	21.782	19 7/8	6	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4550000
228 TTSV 950	20.000	22.875	6.625	28.000	1.500	1/8	22.782	20 3/4	5 1/4	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5130000
240 TTSV 954	21.000	24.000	7.000	30.000	1.500	1/8	23.907	22	5 3/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5700000
252 TTSV 958	22.000	25.250	7.250	30.000	1.500	1/8	25.157	23 1/8	5 3/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	6290000

TAPERED ROLLER THRUST BEARINGS

TYPE TTSP

- The types TTSP and TTSPS (not shown) thrust bearings are made up of two tapered thrust races, rollers, cage and outside retainer which holds the components together during shipping and installation.
- These bearings are employed extensively in the steering pivot positions of automotive and industrial applications.

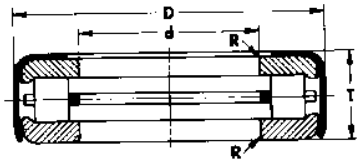


FIGURE 1

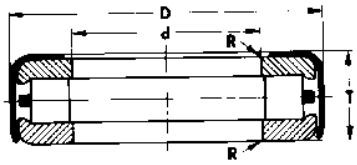


FIGURE 2

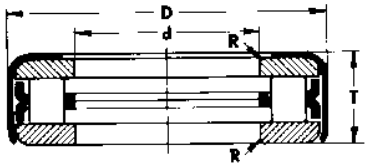


FIGURE 3

Bearing Number		Fig No.	Bore	Outside Diameter	Width	Shaft Fillet Radius	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer		d	D	T	R		
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
T63	T63W	1 1	16.129 0.6350	41.275 1.6250	12.700 0.5000	0.8 0.03	0.08 0.18	
T76	T76W	1 1	19.304 0.7600	41.275 1.6250	13.487 0.5310	0.8 0.03	0.08 0.18	
T77	T77W	1 1	19.304 0.7600	41.275 1.6250	12.700 0.5000	0.8 0.03	0.07 0.15	
T82	T82W	1 1	20.879 0.8220	41.275 1.6250	13.487 0.5310	0.8 0.03	0.07 0.15	
T86		1 1	20.257 0.7975	39.688 1.5625	14.288 0.5625	1.3 0.05	0.07 0.15	
T88	T88W	1 1	22.479 0.8850	48.021 1.8906	15.088 0.5940	0.8 0.03	0.11 0.24	
T89		1 1	22.479 0.8850	48.021 1.8906	15.875 0.6250	0.8 0.03	0.12 0.26	
*T92		2 2	23.825 0.9380	44.958 1.7700	13.487 0.5310	0.8 0.03	– –	T92 HAS 2 BORES, OTHER BORE =24.054 mm (.9470"), R = .08 mm (.03").
T93		2 2	24.054 0.9470	44.958 1.7700	13.487 0.5310	0.8 0.03	0.09 0.20	
T94	T94W	1 1	24.054 0.9470	48.021 1.8906	15.088 0.5940	0.8 0.03	0.11 0.24	
T95	T95W	1 1	24.130 0.9500	50.800 2.0000	15.875 0.6250	0.8 0.03	0.13 0.29	
T101	T101W	1 1	25.654 1.0100	50.800 2.0000	15.875 0.6250	0.8 0.03	0.13 0.29	
*T101X		1 1	25.146 0.9900	50.800 2.0000	15.875 0.6250	0.8 0.03	– –	T101X HAS 2 BORES, OTHER BORE =24.654 mm (1.0100").
*T102		1 1	25.654 1.0100	50.800 2.0000	16.916 0.6660	0.8 0.03	– –	T102 HAS EXTENDED RETAINER, RETAINER "C" DIMENSION - 20.384 mm (.8025"). EXTENSION INSIDE DIAMETER = 35.052 mm (1.3800")
T104	T104W	1 1	26.289 1.0350	50.800 2.0000	15.875 0.6250	0.8 0.03	0.13 0.29	
*T105		1 1	25.654 1.0100	50.800 2.0000	15.875 0.6250	0.8 0.03	– –	T105 HAS 2 BORES, OTHER BORE = 27.299 mm (1.0720").
T107	T107W	1 1	27.299 1.0720	50.800 2.0000	15.875 0.6250	0.8 0.03	0.12 0.26	
T110	T110W	1 1	28.829 1.1350	53.188 2.0940	15.875 0.6250	0.8 0.03	0.14 0.31	
T113	T113W	1 1	28.829 1.1350	55.562 2.1875	15.875 0.6250	0.8 0.03	0.15 0.33	

* See remarks column.

TAPERED ROLLER THRUST BEARINGS

TYPE TTSP – *continued*

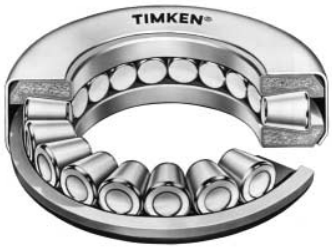
Bearing Number		Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer							
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
*T114	*T114W	1 1	25.654 1.0100	55.562 2.1875	15.875 0.6250	0.8 0.03	– –	T114 AND T114W HAVE 2 BORES, OTHER BORE = 28.829 mm (1.1350").
*T114X		2 2	28.829 1.1350	50.800 2.0000	15.875 0.6250	0.8 0.03	– –	T114X HAS 2 CAGES AND 2 BORES, OTHER BORE = 29.261 mm (1.1520").
T119	T119W	1 1	30.416 1.1975	55.562 2.1875	15.875 0.6250	0.8 0.03	0.15 0.33	
T120		2 2	30.416 1.1975	54.745 2.1553	11.430 0.4500	0.8 0.03	0.11 0.24	
T121		1 1	30.716 1.2093	55.562 2.1875	15.875 0.6250	0.8 0.03	0.16 0.35	
T126	T126W	1 1	32.004 1.2600	55.562 2.1875	15.875 0.6250	0.8 0.03	0.14 0.31	
*T126A	T126AW	1 1	32.004 1.2600	55.562 2.1875	15.875 0.6250	0.8 0.03	0.14 0.31	T126A - 2 CAGES
T139	T139W	1 1	35.179 1.3850	58.738 2.3125	15.875 0.6250	0.8 0.03	0.15 0.33	
*T139KP		1 1	35.179 1.3850	58.738 2.3125	15.875 0.6250	0.8 0.03	0.15 0.33	RACES ARE CADMIUM PLATED.
T142	T142W	1 1	35.179 1.3850	62.708 2.4688	19.431 0.7650	0.8 0.03	0.23 0.51	
T149	T149W	1 1	38.303 1.5080	65.883 2.5938	19.431 0.7650	0.8 0.03	0.24 0.53	
T158		1 1	40.234 1.5840	65.883 2.5938	19.431 0.7650	0.8 0.03	0.23 0.51	
T199	T199W	1 1	51.054 2.0100	74.612 2.9375	15.875 0.6250	0.8 0.03	0.20 0.44	
T309	T309W	1 1	78.583 3.0938	102.395 4.0313	15.875 0.6250	0.8 0.03	0.29 0.64	
T387	T387W	1 1	96.425 3.8750	127.000 5.0000	17.463 0.7650	0.8 0.03	0.50 1.10	
T484		1 1	123.012 4.8430	152.400 6.0000	17.463 0.6875	0.8 0.03	0.63 1.39	
T581		1 1	147.638 5.8125	177.800 7.0000	17.463 0.6875	0.8 0.03	0.89 1.96	
T1760		3 3	44.623 1.7568	76.200 3.0000	10.922 0.4300	0.8 0.03	0.18 0.4	

* See remarks column.

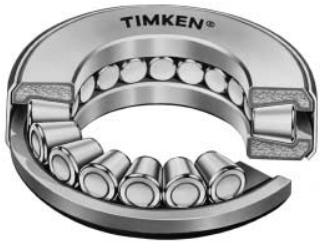
TAPERED ROLLER THRUST BEARINGS

TYPE TTC-TTCS

- The types TTC, TTCS and TTCL (not shown) thrust bearings consist of two tapered thrust races, rollers and an outside retainer and are cageless.
- The outside retainer holds the assembly together for shipping and installation.
- These thrust bearings are specifically designed for oscillating applications.
- These types are identical with the exception of the retainer construction.



TTC



TTCS

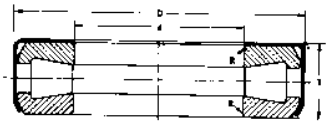


FIGURE 1

FIGURE 2

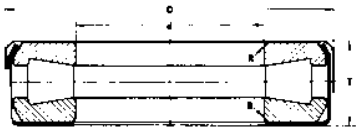


FIGURE 3

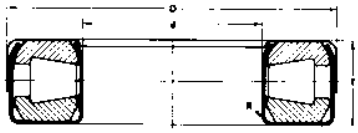


FIGURE 4

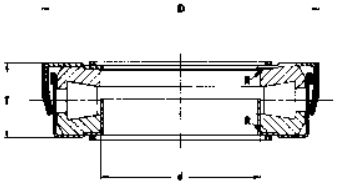


FIGURE 5

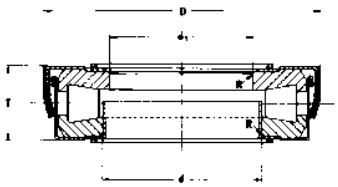


FIGURE 6

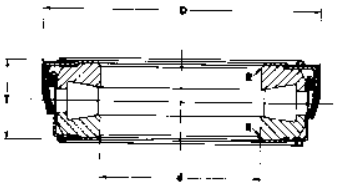


FIGURE 7

Bearing Number		Fig No.	Bore	Outside Diameter	Width	Shaft Fillet Radius	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer		d	D	T	R		
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
T127	**T127W**	**1** 1	**32.004** 1.2600	**66.675** 2.6250	**19.446** 0.7656	**0.8** 0.03	**0.31** 0.68	
T128		**2** 2	**32.004** 1.2600	**66.675** 2.6250	**18.654** 0.7344	**0.8** 0.03	**0.29** 0.64	
T130		**1** 1	**27.102** 1.0670	**66.675** 2.6250	**19.446** 0.7656	**0.8** 0.03	**0.34** 0.75	
T136		**2** 2	**35.179** 1.3850	**66.675** 2.6250	**18.654** 0.7344	**0.8** 0.03	**0.28** 0.62	
T138	**T138W**	**1** 1	**35.179** 1.3850	**66.675** 2.6250	**19.446** 0.7656	**0.8** 0.03	**0.30** 0.66	
***T138XS**		**SPCL**	**35.179** 1.3850	**66.675** 2.6250	**19.446** 0.7656	**0.8** 0.03	– –	**T138XS HAS 2 BORES, OTHER BORE = 35.387 mm** (1.3972″)
T144	**T144W**	**1** 1	**36.754** 1.4470	**66.675** 2.6250	**19.446** 0.7656	**1.5** 0.06	**0.29** 0.64	
***T144XA**		**SPCL**	**36.754** 1.4470	**66.675** 2.6250	**19.446** 0.7656	**1.5** 0.06	– –	**T144XA HAS 2 BORES, OTHER BORE = 37.137 mm** (1.4621″)
T151	**T151W**	**1** 1	**38.354** 1.5100	**72.619** 2.8590	**21.433** 0.8438	**0.8** 0.03	**0.37** 0.82	
T151X		**1** 1	**38.354** 1.5100	**69.444** 2.7340	**20.726** 0.8160	**0.8** 0.03	**0.37** 0.82	

* See remarks column.

TAPERED ROLLER THRUST BEARINGS

TYPE TTC-TTCS – *continued*

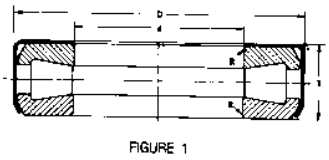


FIGURE 1

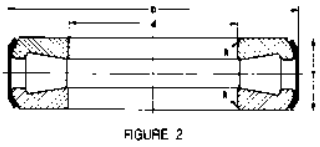


FIGURE 2

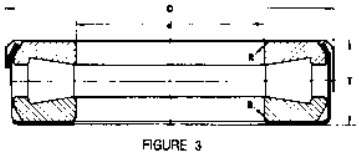


FIGURE 3

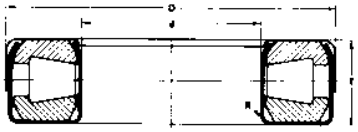


FIGURE 4

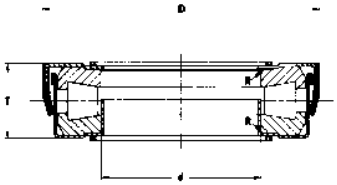


FIGURE 5

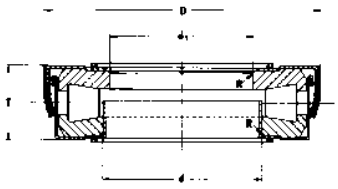


FIGURE 6

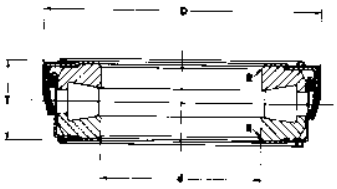


FIGURE 7

Bearing Number		Fig No.	Bore	Outside Diameter	Width	Shaft Fillet Radius	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer		d	D	T	R		
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
T152		2 2	38.354 1.5100	72.619 2.8590	20.638 0.8125	0.8 0.03	0.35 0.77	
T157	T157W	1 1	39.954 1.5730	72.619 2.8590	21.433 0.8438	0.8 0.03	0.37 0.82	
T163	T163W	1 1	41.529 1.6350	72.619 2.8590	21.433 0.8438	0.8 0.03	0.35 0.77	
T163X	T163XW	1 1	41.529 1.6350	72.619 2.8590	21.433 0.8438	2.0 0.80	0.35 0.77	
T169	T169W	1 1	43.104 1.6970	82.956 3.2660	23.812 0.9375	0.8 0.03	0.55 1.21	
T176	T176W	1 1	44.704 1.7600	82.956 3.2660	23.812 0.9375	0.8 0.03	0.54 1.19	
T177		1 1	45.000 1.7717	73.000 2.8740	20.000 0.7874	0.8 0.03	0.32 0.71	
T177A		1 1	45.484 1.7907	73.000 2.8740	20.000 0.7874	0.8 0.03	0.33 0.73	
*T177XA		SPCL	45.000 1.7717	73.127 2.8790	20.000 0.7874	0.8 0.03	– –	T177XA HAS 2 BORES, OTHER BORE = 45.484mm (1.7907")
T177S		5 5	45.000 1.7717	74.500 2.9331	20.221 0.7961	0.8 0.03	0.35 0.77	
T178		1 1	40.401 1.5906	73.000 2.8740	19.000 0.7480	0.8 0.03	– –	
T182	T182W	1 1	46.279 1.8220	82.956 3.2660	23.812 0.9375	0.8 0.03	0.52 1.15	
T188	T188W	1 1	47.879 1.8850	82.956 3.2660	23.812 0.9375	0.8 0.03	0.52 1.15	
T188X		4 4	47.879 1.8850	83.774 3.2970	24.130 0.9500	2.3 0.09	– –	
T189	T189W	2 2	47.879 1.8850	82.956 3.2660	23.020 0.9063	0.8 0.03	0.50 1.10	

* See remarks column.

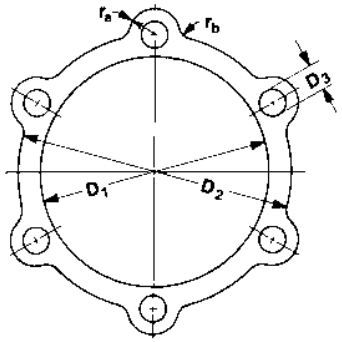
Bearing Number		Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer							
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
T193	**T193W**	**2** 2	**49.454** 1.9470	**93.269** 3.6720	**26.187** 1.0310	**0.8** 0.03	**0.80** 1.76	
T194	**T194W**	**1** 1	**49.454** 1.9470	**93.269** 3.6720	**26.975** 1.0620	**0.8** 0.03	**0.81** 1.79	
T201	**T201W**	**2** 2	**51.054** 2.0100	**93.269** 3.6720	**26.187** 1.0310	**3.3** 0.13	**0.77** 1.70	
T202	**T202W**	**1** 1	**51.054** 2.0100	**93.269** 3.6720	**26.975** 1.0620	**3.3** 0.13	**0.80** 1.76	
T208	**T208W**	**1** 1	**52.629** 2.0720	**93.269** 3.6720	**26.975** 1.0620	**0.8** 0.03	**0.79** 1.74	
T209	**T209W**	**2** 2	**52.629** 2.0720	**93.269** 3.6720	**26.187** 1.0310	**0.8** 0.03	**0.75** 1.65	
T251	**T251W**	**1** 1	**63.754** 2.5100	**111.125** 4.3750	**26.988** 1.0625	**0.8** 0.03	**1.07** 2.36	
T252	**T252W**	**2** 2	**63.754** 2.5100	**111.125** 4.3750	**25.796** 1.0156	**0.8** 0.03	**1.07** 2.23	
T301	**T301W**	**2** 2	**76.454** 3.0100	**133.350** 5.2500	**33.338** 1.3125	**2.3** 0.09	**1.87** 4.12	
	T301X	**2** 2	**76.454** 3.0100	**133.350** 5.2500	**33.338** 1.3125	**2.3** 0.09	– –	
T302	**T302W**	**1** 1	**76.454** 3.0100	**133.350** 5.2500	**34.925** 1.3750	**2.3** 0.09	**1.99** 4.39	
T350		**2** 2	**88.900** 3.5000	**133.350** 5.2500	**33.335** 1.3124	**2.8** 0.11	**1.41** 3.11	
T402	**T402W**	**2** 2	**102.108** 4.0200	**179.619** 7.0716	**44.450** 1.7500	**1.5** 0.06	**4.84** 10.67	
T600	**T600W**	**1** 1	**152.400** 8.0000	**241.300** 9.5000	**76.200** 3.0000	**3.3** 0.13	**14.10** 31.09	
T1260	**T1260W**	**1** 1	**32.004** 1.2600	**55.562** 2.1875	**15.875** 0.6250	**0.8** 0.03	**0.17** 0.37	
***T1380**		**SPCL** SPCL	**35.179** 1.3850	**59.400** 2.3386	**15.875** 0.6250	**0.8** 0.03	**0.35** 0.77	**2 PIECE SEAL**
T1921		**1** 1	**46.279** 1.8220	**80.010** 3.1500	**15.977** 0.6290	**0.8** 0.03	**0.34** 0.75	
T4020		**2** 2	**102.108** 4.0200	**179.619** 7.0716	**31.750** 1.2500	**1.5** 0.06	**3.7** 8.16	

* See remarks column.

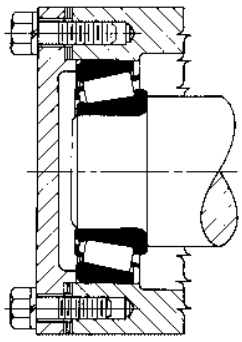
NOTES

CUP SHIMS

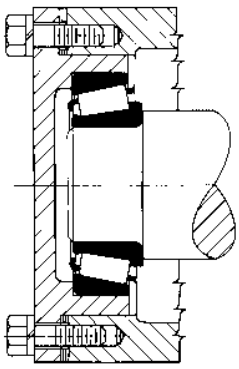
STANDARD METAL SHIMS FOR CUP ADJUSTMENT BEARINGS



Shims 0.13 mm (0.005 in.), 0.18 mm (0.007 in.) and 0.51 mm (0.020 in.) thick.



Without carrier



With carrier
Carrier section should be equal to average cup wall section.

Suggested shim sets consist of three 0.13 mm (0.005 in.), three 0.18 mm (0.007 in.), and one 0.51 mm (0.020 in.) thick shims. When ordering, specify the exact quantity for each part number. Shims shown in this table are made from aluminum, brass, or steel shim stock.

Cup Shims part number identifies the following:

	Shim	size	thickness(inches)
	K2	00	00

example

K2	06	05	covers number 6 shim 0.13 mm (0.005 in.) thick
K2	06	07	covers number 6 shim 0.18 mm (0.007 in.) thick
K2	06	20	covers number 6 shim 0.51 mm (0.020 in.) thick

DIMENSIONS ARE IN MILLIMETERS / INCHES

Shim Part Numbers			Cap Screws						
0.13 0.005 Thick	0.18 0.007 Thick	0.51 0.020 Thick	No.	Size	D_1	D_2	D_3	r_a	r_b
K20605	K20607	K20620	4	6.4 0.25	35.8 1.41	47.8 1.88	7.1 0.28	6.4 0.25	3.0 0.12
K20705	K20707	K20720	4	6.4 0.25	45.2 1.78	57.2 2.25	7.1 0.28	6.4 0.25	3.0 0.12
K20805	K20807	K20820	4	9.7 0.38	51.6 2.03	69.8 2.75	10.4 0.41	9.7 0.38	4.8 0.19
K20905	K20907	K20920	4	9.7 0.38	59.4 2.34	76.2 3.00	10.4 0.41	9.7 0.38	4.8 0.19
K21005	K21007	K21020	4	9.7 0.38	65.8 2.59	82.6 3.25	10.4 0.41	9.7 0.38	4.8 0.19
K21105	K21107	K21120	4	9.7 0.38	70.6 2.78	88.9 3.50	10.4 0.41	9.7 0.38	4.8 0.19
K21205	K21207	K21220	4	9.7 0.38	77.0 3.03	95.2 3.75	10.4 0.41	9.7 0.38	4.8 0.19
K21405	K21407	K21420	4	9.7 0.38	89.7 3.53	108.0 4.25	10.4 0.41	9.7 0.38	4.8 0.19

DIMENSIONS ARE IN MILLIMETERS / INCHES

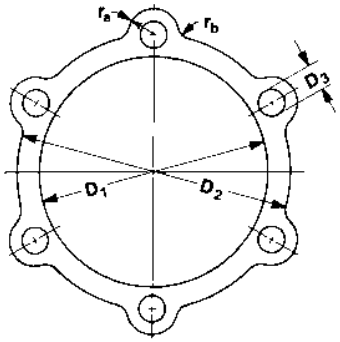
Shim Part Numbers			Cap Screws						
0.13 0.005 Thick	0.18 0.007 Thick	0.51 0.020 Thick	No.	Size	D_1	D_2	D_3	r_a	r_b
K21505	K21507	K21520	4	9.7 0.38	96.0 3.78	114.3 4.50	10.4 0.41	9.7 0.38	4.8 0.19
K21605	K21607	K21620	4	12.7 0.50	102.4 4.03	127.0 5.00	13.5 0.53	12.7 0.50	6.4 0.25
K21705	K21707	K21720	4	12.7 0.50	108.7 4.28	133.4 5.25	13.5 0.53	12.7 0.50	6.4 0.25
K21805	K21807	K21820	4	12.7 0.50	115.1 4.53	139.7 5.50	13.5 0.53	12.7 0.50	6.4 0.25
K21905	K21907	K21920	6	12.7 0.50	121.4 4.78	146.0 5.75	13.5 0.53	12.7 0.50	6.4 0.25
K22005	K22007	K22020	6	12.7 0.50	127.8 5.03	152.4 6.00	13.5 0.53	12.7 0.50	6.4 0.25
K22205	K22207	K22220	6	12.7 0.50	140.5 5.53	165.1 6.50	13.5 0.53	12.7 0.50	6.4 0.25
K22405	K22407	K22420	6	12.7 0.50	153.2 6.03	177.8 7.00	13.5 0.53	12.7 0.50	6.4 0.25

THESE PARTS HAVE BEEN DESIGNED AND DEVELOPED FOR USE WITH TIMKEN BEARINGS ONLY.

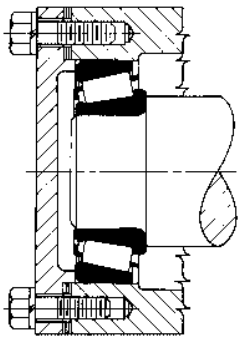
B

CUP SHIMS

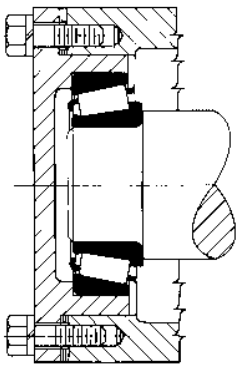
STANDARD METAL SHIMS FOR CUP ADJUSTMENT BEARINGS



Shims 0.13 mm (0.005 in.), 0.18 mm (0.007 in.) and 0.51 mm (0.020 in.) thick.



Without carrier



With carrier
Carrier section should be equal to average cup wall section.

Suggested shim sets consist of three 0.13 mm (0.005 in.), three 0.18 mm (0.007 in.), and one 0.51 mm (0.020 in.) thick shims. When ordering, specify the exact quantity for each part number. Shims shown in this table are made from aluminum, brass, or steel shim stock.

Cup Shims part number identifies the following:

Shim	size	thickness(inches)
K2	00	00

example

K2	06	05	covers number 6 shim 0.13 mm (0.005 in.) thick
K2	06	07	covers number 6 shim 0.18 mm (0.007 in.) thick
K2	06	20	covers number 6 shim 0.51 mm (0.020 in.) thick

DIMENSIONS ARE IN MILLIMETERS / INCHES

Shim Part Numbers			Cap Screws						
0.13 0.005 Thick	0.18 0.007 Thick	0.51 0.020 Thick	No.	Size	D_1	D_2	D_3	r_a	r_b
K22505	K22507	K22520	6	15.7 0.62	159.5 6.28	190.5 7.50	16.8 0.66	15.7 0.62	7.9 0.31
K22605	K22607	K22620	6	15.7 0.62	165.9 6.53	196.8 7.75	16.8 0.66	15.7 0.62	7.9 0.31
K22705	K22707	K22720	6	15.7 0.62	172.2 6.78	203.2 8.00	16.8 0.66	15.7 0.62	7.9 0.31
K22905	K22907	K22920	6	15.7 0.62	184.9 7.28	215.9 8.50	16.8 0.66	15.7 0.62	7.9 0.31
K23005	K23007	K23020	6	15.7 0.62	191.3 7.53	222.2 8.75	16.8 0.66	15.7 0.62	7.9 0.31
K23205	K23207	K23220	6	15.7 0.62	204.0 8.03	235.0 9.25	16.8 0.66	15.7 0.62	7.9 0.31
K23405	K23407	K23420	6	15.7 0.62	216.7 8.53	247.6 9.75	16.8 0.66	15.7 0.62	7.9 0.31
K23605	K23607	K23620	6	15.7 0.62	229.4 9.03	260.4 10.25	16.8 0.66	15.7 0.62	7.9 0.31

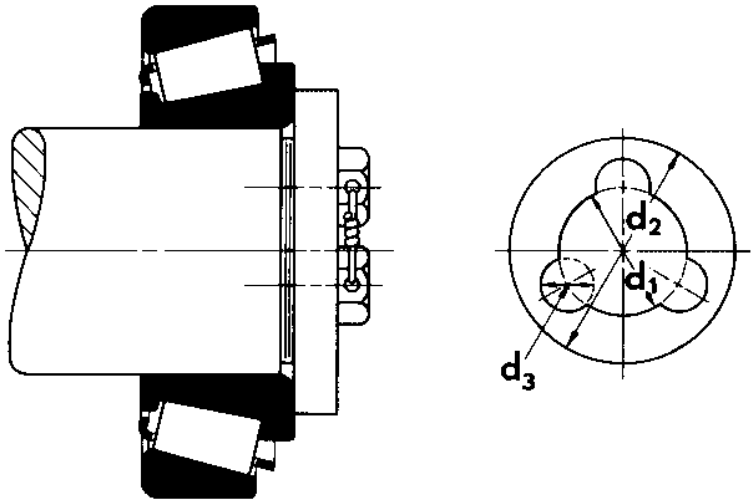
DIMENSIONS ARE IN MILLIMETERS / INCHES

Shim Part Numbers			Cap Screws						
0.13 0.005 Thick	0.18 0.007 Thick	0.51 0.020 Thick	No.	Size	D_1	D_2	D_3	r_a	r_b
K23805	K23807	K23820	8	15.7 0.62	242.1 9.53	273.0 10.75	16.8 0.66	15.7 0.62	7.9 0.31
K24005	K24007	K24020	8	19.0 0.75	254.8 10.03	292.1 11.50	19.8 0.78	19.0 0.75	9.7 0.38
K24105	K24107	K24120	8	19.0 0.75	267.5 10.53	304.8 12.00	19.8 0.78	19.0 0.75	9.7 0.38
K24205	K24207	K24220	8	19.0 0.75	296.2 11.66	333.2 13.12	19.8 0.78	19.0 0.75	9.7 0.38
K24405	K24407	K24420	8	19.0 0.75	318.3 12.53	355.6 14.00	19.8 0.78	19.0 0.75	9.7 0.38
K24605	K24607	K24620	8	22.4 0.88	343.7 13.53	387.4 15.25	23.9 0.94	22.4 0.88	11.2 0.44
K24805	K24807	K24820	8	22.4 0.88	369.1 14.53	412.8 16.25	23.9 0.94	22.4 0.88	11.2 0.44
K25005	K25007	K25020	8	25.4 1.00	394.5 15.53	444.5 17.50	26.9 1.06	25.4 1.00	12.7 0.50
K25205	K25207	K25220	8	25.4 1.00	419.9 16.53	469.9 18.50	26.9 1.06	25.4 1.00	12.7 0.50

THESE PARTS HAVE BEEN DESIGNED AND DEVELOPED FOR USE WITH TIMKEN BEARINGS ONLY.

CONE SHIMS

STANDARD METAL SHIMS FOR CONE ADJUSTED BEARINGS



Suggested shim sets consist of three 0.13 mm (0.005 in.), three 0.18 mm (0.007 in.), and one 0.51 mm (0.020 in.) thick shims.
When ordering, specify the exact quantity for each part number.

Shims shown in this table are made from aluminum, brass, or steel shim stock.

Shims		Shaft	Cap Screws		d_1	d_2	d_3
Part Number	Thickness	Size	No.	Size			
T50605	0.13 0.005	63.5 2.50	3	12.7 0.50	35.1 1.38	60.5 2.38	14.2 0.56
T50606	0.18 0.007	to					
T50607	0.51 0.020	73.2 2.88					
T50608	0.13 0.005	76.2 3.00	3	12.7 0.50	44.4 1.75	73.2 2.88	14.2 0.56
T50609	0.18 0.007	to					
T50610	0.51 0.020	85.9 3.38					
T50611	0.13 0.005	88.9 3.50	3	12.7 0.50	57.2 2.25	85.9 3.38	14.2 0.56
T50612	0.18 0.007	to					
T50613	0.51 0.020	104.6 4.12					
T45882	0.13 0.005	108.0 4.25	3	15.7 0.62	76.2 3.00	103.1 4.06	17.5 0.69
T50633	0.18 0.007	to					
T45884	0.51 0.020	117.3 4.62					
T45885	0.13 0.005	120.6 4.75	3	15.7 0.62	88.9 3.50	117.3 4.62	17.5 0.69
T50634	0.18 0.007	to					
T45887	0.51 0.020	124.0 4.88					

Shims		Shaft	Cap Screws		d_1	d_2	d_3
Part Number	Thickness	Size	No.	Size			
T50614	0.13 0.005	127.0 5.00	4	19.0 0.75	88.9 3.50	124.0 4.88	20.6 0.81
T50615	0.18 0.007	to					
T50616	0.51 0.020	136.7 5.38					
T50617	0.13 0.005	139.7 5.50	4	19.0 0.75	88.9 3.50	136.7 5.38	20.6 0.81
T50618	0.18 0.007	to					
T50619	0.51 0.020	149.4 5.88					
T50620	0.13 0.005	152.4 6.00	6	19.0 0.75	101.6 4.00	149.4 5.88	20.6 0.81
T50621	0.18 0.007	to					
T50622	0.51 0.020	174.8 6.88					
T50623	0.13 0.005	177.8 7.00	6	25.4 1.00	127.0 5.00	174.8 6.88	26.9 1.06
T50624	0.18 0.007	to					
T50625	0.51 0.020	200.2 7.88					
T50626	0.13 0.005	203.2 8.00	6	31.8 1.25	152.4 6.00	200.2 7.88	33.3 1.31
T50627	0.18 0.007						
T50628	0.51 0.020						

THESE PARTS HAVE BEEN DESIGNED AND DEVELOPED FOR USE WITH TIMKEN BEARINGS ONLY.

LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS

STANDARD LOCKNUTS, LOCKWASHERS AND TONGUED WASHER ASSEMBLIES

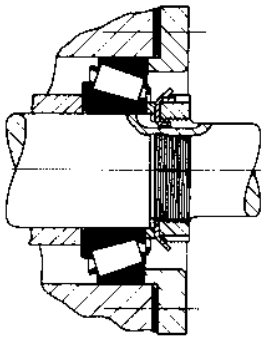


Figure 1

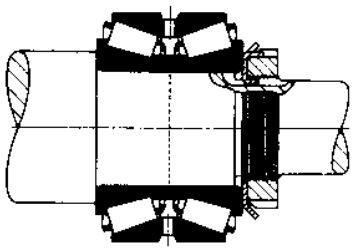


Figure 2

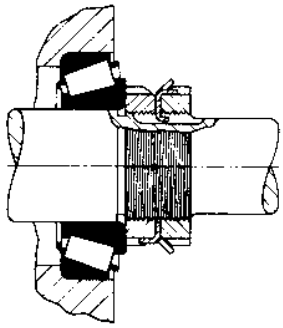


Figure 3

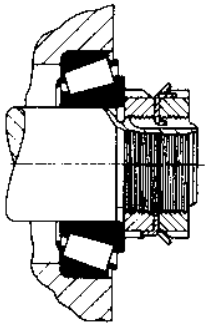


Figure 4

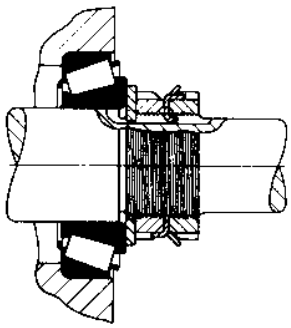


Figure 5

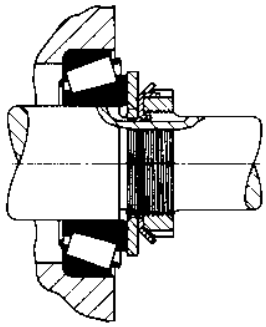


Figure 6

The designs shown in figures 1 to 6 show various methods of using standard locknuts, lockwashers, and tongued washers. A single locknut and lockwasher can be used to clamp the cone against a sleeve, shown in figure 1, or directly against a shaft shoulder. A narrow spacer is applied between the front face of the cone and the lockwasher so that the lockwasher will clear the bearing cage by a minimum of 3 mm (0.12 in.). The spacer outside diameter should be made a minimum of 6 mm (0.24 in.) smaller than the cage inside diameter, but must still provide the suggested cone backing diameter. Figure 2 shows another clamped design using a single locknut and lockwasher with a two-row bearing of either type TDO with cone spacer or type TNA. Since no cage clearance problem is present, the narrow spacer shown in figure 1 is unnecessary.

Figures 3, 4, and 5 indicate an adjustable bearing arrangement using two locknuts and a lockwasher. These may be used with either single or two-row bearing of the types permitting a cone adjusted arrangement. The design in figure 3 allows the maximum shaft extension diameter that can be used with a shaft thread outside diameter, which will be less than the cone bore. Figure 4 shows an alternate design with smaller thread diameter and corresponding smaller locknuts and lockwasher. The locknut outside diameter, minus 2 times "r", must not be less than the suggested cone backing diameter. Figure 5 indicates the use of a tongued washer located between the inner locknut and cone. This is intended for applications where the cones are applied with loose fits on hardened stationary shafts as found in many automotive applications. The hardened tongued washers are not sold by The Timken Company.

When space does not permit the use of two locknuts and a lockwasher in an adjustable arrangement, and a single locknut and a lockwasher is used, then a tongued washer must be placed between the cone and lockwasher as illustrated in figure 6. This is necessary to provide adequate backing for the cone, in most cases, and to prevent damage to the lockwasher if the cone should creep on the shaft. The tongued washers are available from The Timken Company.

LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS - METRIC

STANDARD LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS FOR TAPERED ROLLER BEARINGS

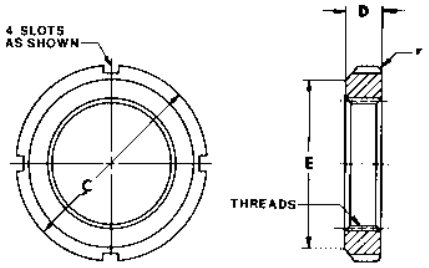


Figure 1 - LOCKNUTS

Threads are ISO 965/1, Class 5H

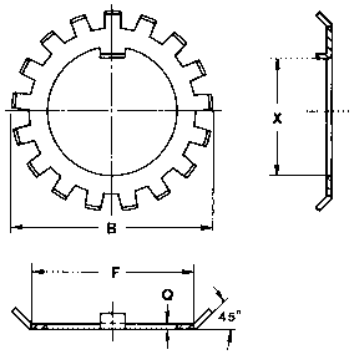


Figure 2 - LOCKWASHERS

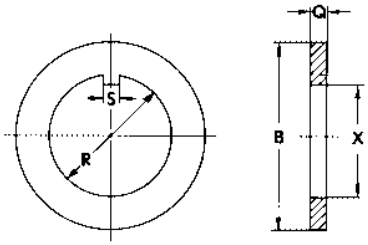


Figure 3 - TONGUED WASHERS

DIMENSIONS ARE IN MILLIMETERS

Locknut Dimensions							Lockwasher Dimensions					Tongued Washer Dimensions						
	Threads												Bore R				Key	
ABMA Locknut Number	Minimum Value of Major Diameter	Thread Series	Outside Diameter C	Thickness D	Face Outside Diameter E	r	ABMA Lockwasher Number	Maximum Diameter Over Tangs B	Face Diameter F	Thickness Q	Number of Tangs	Tongued Washer Number	Min.	Max.	Outside Diameter B	Thickness Q	S Max.	X Min.
KMH2	15.000	M15X1	25.000	8.000	21.000	1.17	MBB2	28.000	21.000	1.41	11	MW2	15.095	15.205	22.000	3.25	4.0	12.195
KMH3	17.000	M17X1	28.000	8.000	24.000	1.17	MBB3	32.000	24.000	1.41	11	MW3	17.095	17.205	24.000	3.25	4.0	14.195
KMH4	20.000	M20X1	32.000	9.000	26.000	1.17	MBB4	36.000	26.000	1.41	11	MW4	20.110	20.240	29.000	3.25	4.0	17.295
KMH4.4	22.000	M22X1	34.000	9.000	28.000	1.17	MBB4.4	38.000	28.000	1.41	11	MW4.4	22.110	22.240	31.000	3.25	4.0	19.710
KMH5	25.000	M25X1.5	38.000	10.000	32.000	1.17	MBB5	42.000	32.000	1.41	13	MW5	25.110	25.240	40.000	3.25	5.0	21.910
KMH5.6	28.000	M28X1.5	42.000	10.000	36.000	1.17	MBB5.6	46.000	36.000	1.41	13	MW5.6	28.110	28.240	40.000	3.25	5.0	24.910
KMH6	30.000	M30X1.5	45.000	10.000	38.000	1.17	MBB6	49.000	38.000	1.41	13	MW6	30.110	30.240	45.000	3.25	5.0	26.910
KMH6.4	32.000	M32X1.5	48.000	11.000	40.000	1.59	MBB6.4	52.000	40.000	1.41	13	MW6.4	32.120	32.280	50.000	3.25	5.0	29.010
KMH7	35.000	M35X1.5	52.000	11.000	44.000	1.59	MBB7	57.000	44.000	1.41	13	MW7	35.120	35.280	52.000	3.25	6.0	31.820
KMH8	40.000	M40X1.5	58.000	11.000	50.000	1.59	MBB8	62.000	50.000	1.78	13	MW8	40.120	40.280	57.000	4.20	6.0	36.520
KMH9	45.000	M45X1.5	65.000	12.000	56.000	1.59	MBB9	69.000	56.000	1.78	13	MW9	45.130	45.290	68.000	4.20	6.0	41.530
KMH10	50.000	M50X1.5	70.000	13.000	61.000	1.59	MBB10	74.000	61.000	1.78	13	MW10	50.130	50.290	76.000	4.20	6.0	46.530
KMH11	55.000	M55X2	75.000	13.000	67.000	1.59	MBB11	81.000	67.000	1.78	17	MW11	55.140	55.330	79.000	4.20	8.0	51.140
KMH12	60.000	M60X2	80.000	14.000	73.000	1.59	MBB12	86.000	73.000	1.78	17	MW12	60.140	60.330	88.000	4.70	8.0	55.940
KMH13	65.000	M65X2	85.000	14.000	79.000	2.38	MBB13	92.000	79.000	1.78	17	MW13	65.140	65.330	90.000	4.70	8.0	60.940
KMH14	70.000	M70X2	92.000	14.000	85.000	2.38	MBB14	98.000	85.000	1.78	17	MW14	70.150	70.340	103.000	4.70	8.0	65.950
KMH15	75.000	M75X2	98.000	15.000	90.000	2.38	MBB15	104.000	90.000	2.24	17	MW15	75.150	75.340	103.000	5.70	8.0	70.550
KM16	80.000	M80X2	105.000	15.000	95.000	2.38	MBB16	112.000	95.000	2.24	17	MW16	80.150	80.340	111.000	5.70	10.0	75.150
KM17	85.000	M85X2	110.000	16.000	102.000	2.38	MBB17	119.000	102.000	2.24	17	MW17	85.170	85.390	116.000	5.70	10.0	80.150
KM18	90.000	M90X2	120.000	16.000	108.000	2.38	MBB18	126.000	108.000	2.73	17	MW18	90.170	90.390	121.000	7.62	10.0	84.670
KM19	95.000	M95X2	125.000	17.000	113.000	3.18	MBB19	133.000	113.000	2.73	17	MW19	95.170	95.390	126.000	7.62	10.0	89.670
KM20	100.000	M100X2	130.000	18.000	120.000	3.18	MBB20	142.000	120.000	2.73	17	MW20	100.170	100.390	131.000	7.62	12.0	94.670
KM21	105.000	M105X2	140.000	18.000	126.000	3.18	MBB21	145.000	126.000	2.73	17	MW21	105.180	105.400	125.000	7.62	12.0	99.670
KM22	110.000	M110X2	145.000	19.000	133.000	3.18	MBB22	154.000	133.000	3.25	17	MW22	110.180	110.400	136.000	7.62	12.0	104.180
KM23	115.000	M115X2	150.000	19.000	137.000	3.18	MBB23	159.000	137.000	3.25	17	MW23	115.180	115.400	144.000	7.62	12.0	109.180
KM24	120.000	M120X2	155.000	20.000	138.000	3.18	MBB24	164.000	138.000	3.72	17	MW24	120.180	120.400	150.000	9.57	14.0	113.180
KM25	125.000	M125X2	160.000	21.000	148.000	3.18	MBB25	170.000	148.000	3.72	17	MW25	125.200	125.450	138.000	9.57	14.0	118.180
KM26	130.000	M130X2	165.000	21.000	149.000	3.18	MBB26	175.000	149.000	3.72	17	MW26	130.200	130.450	166.000	9.57	14.0	123.200

FOR AVAILABILITY OF METRIC LOCKNUTS, LOCKWASHERS, AND TONGUED WASHERS, CONSULT YOUR TIMKEN COMPANY REPRESENTATIVE.

B

LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS - INCHES

STANDARD LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS FOR TAPERED ROLLER BEARINGS

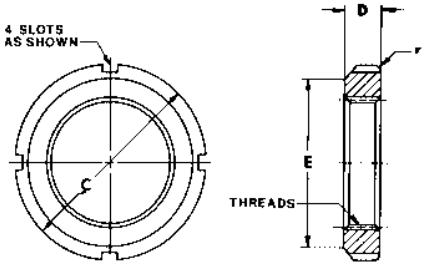


Figure 1 - LOCKNUTS

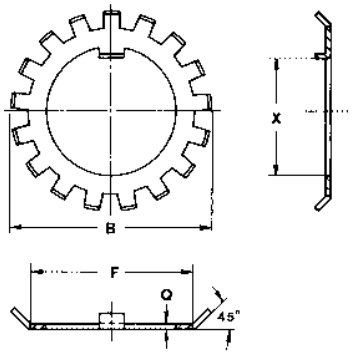


Figure 2 - LOCKWASHERS

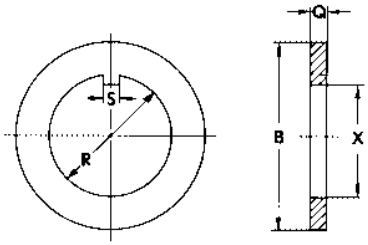


Figure 3 - TONGUED WASHERS

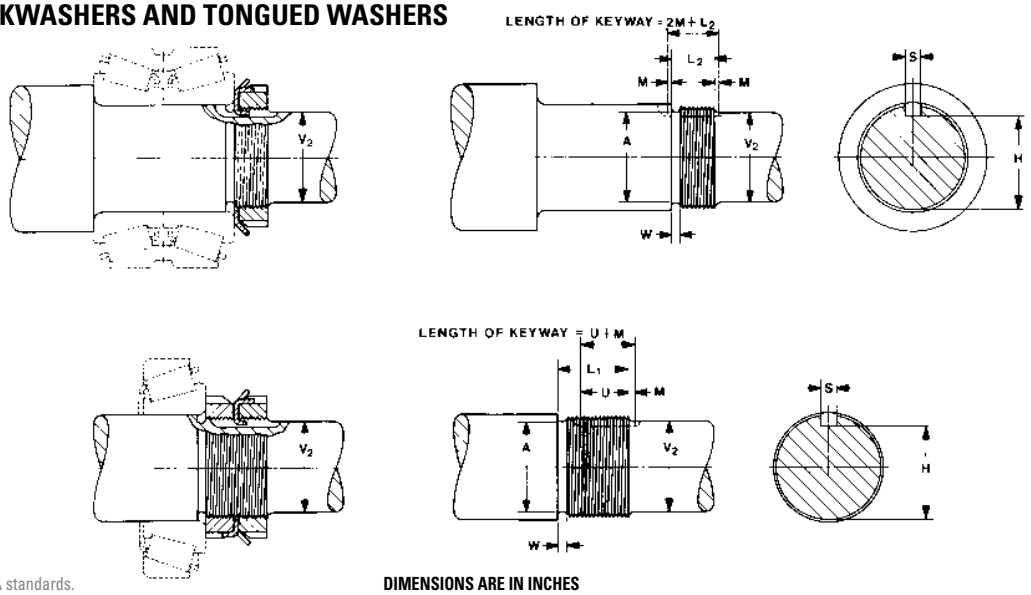
Threads are American National, Form NS, Class 3, with thread length based on 45° chamfer.

DIMENSIONS ARE IN INCHES

Locknut Dimensions							Lockwasher Dimensions					Tongued Washer Dimensions						
	Threads												Bore R				Key	
ABMA Locknut Number	Minimum Value of Major Diameter	Thread Series	Outside Diameter C	Thickness D	Face Outside Diameter E	r	ABMA Lockwasher Number	Maximum Diameter Over Tangs B	Face Diameter F	Thickness Q	Number of Tangs	Tongued Washer Number	Min.	Max.	Outside Diameter B	Thickness Q	S Max.	X Min.
N-00	0.391	32	0.755	0.229	0.625	0.047	TW100	0.891	0.625	0.032	9	K91500	0.406	0.421	0.798	0.109	0.120	0.334
N-01	0.469	32	0.880	0.323	0.719	0.047	TW101	1.031	0.719	0.032	9	K91501	0.484	0.499	0.923	0.109	0.120	0.412
N-02	0.586	32	1.005	0.323	0.813	0.047	TW102	1.156	0.813	0.048	11	K91502	0.601	0.616	1.173	0.125	0.120	0.513
N-03	0.664	32	1.130	0.354	0.938	0.047	TW103	1.344	0.938	0.048	11	K91503	0.679	0.694	1.173	0.125	0.120	0.591
N-04	0.781	32	1.380	0.385	1.125	0.047	TW104	1.563	1.125	0.052	11	K91504	0.801	0.816	1.423	0.125	0.176	0.713
N-05	0.969	32	1.568	0.416	1.281	0.047	TW105	1.703	1.281	0.052	13	K91505	0.989	1.009	1.860	0.125	0.176	0.897
N-06	1.173	18	1.755	0.416	1.500	0.047	TW106	1.953	1.500	0.052	13	K91506	1.193	1.213	1.860	0.125	0.176	1.081
TN-065	1.312	18	2.068	0.448	1.813	0.063	TW065	2.234	1.813	0.052	15	K915065	1.333	1.353	2.173	0.125	0.176	1.221
TN-07	1.376	18	2.068	0.448	1.813	0.063	TW107	2.250	1.813	0.052	15	K91507	1.396	1.416	2.173	0.125	0.176	1.284
TN-08	1.563	18	2.255	0.448	2.000	0.063	TW108	2.484	2.000	0.062	15	K91508	1.583	1.603	2.735	0.156	0.290	1.461
TN-09	1.767	18	2.536	0.448	2.281	0.063	TW109	2.719	2.281	0.062	17	K91509	1.792	1.817	2.735	0.156	0.290	1.670
TN-10	1.967	18	2.693	0.510	2.438	0.063	TW110	2.922	2.438	0.062	17	K91510	1.992	2.017	3.235	0.156	0.290	1.870
TN-11	2.157	18	2.974	0.510	2.656	0.063	TW111	3.094	2.656	0.062	17	K91511	2.182	2.207	3.235	0.156	0.290	2.060
TN-12	2.360	18	3.161	0.541	2.844	0.063	TW112	3.328	2.844	0.072	17	K91512	2.400	2.425	3.735	0.187	0.290	2.248
TN-13	2.548	18	3.380	0.573	3.063	0.094	TW113	3.563	3.063	0.072	19	K91513	2.588	2.613	3.735	0.187	0.290	2.436
TN-14	2.751	18	3.360	0.573	3.313	0.094	TW114	3.813	3.313	0.072	19	K91514	2.791	2.816	3.735	0.187	0.290	2.639
TAN-15	2.933	12	3.880	0.604	3.563	0.094	TW115	4.047	3.563	0.085	19	K91515	2.973	3.003	4.173	0.218	0.290	2.808
TAN-16	3.137	12	4.161	0.604	3.844	0.094	TW116	4.391	3.844	0.085	19	K91516	3.177	3.207	4.173	0.218	0.353	3.012
TAN-17	3.340	12	4.411	0.635	4.031	0.094	TW117	4.625	4.031	0.085	19	K91517	3.395	3.425	4.610	0.218	0.353	3.230
TAN-18	3.527	12	4.661	0.698	4.281	0.094	TW118	4.953	4.281	0.115	19	K91518	3.582	3.612	5.110	0.250	0.353	3.387
TAN-19	3.730	12	4.943	0.729	4.563	0.125	TW119	5.234	4.563	0.115	19	K91519	3.800	3.830	5.110	0.250	0.353	3.605
TAN-20	3.918	12	5.193	0.760	4.813	0.125	TW120	5.484	4.813	0.115	19	K91520	3.988	4.018	5.610	0.250	0.353	3.778
TAN-21	4.122	12	5.443	0.760	5.000	0.125	TW121	5.703	5.000	0.115	19	K91521	4.192	4.222	5.610	0.250	0.353	3.982
TAN-22	4.325	12	5.724	0.791	5.281	0.125	TW122	6.000	5.281	0.130	19	K91522	4.395	4.425	6.110	0.281	0.353	4.170
TAN-24	4.716	12	6.130	0.823	5.688	0.125	TW124	6.531	5.688	0.155	19	K91524	4.801	4.831	6.735	0.375	0.353	4.551
TAN-26	5.106	12	6.755	0.885	6.188	0.125	TW126	7.047	6.188	0.155	19	K91526	5.191	5.226	7.485	0.375	0.435	4.921
TAN-128	5.497	12	7.099	1.198	6.531	0.125	TW128	7.438	6.531	0.155	19	K91528	5.582	5.617	7.485	0.375	0.590	5.312
TAN-130	5.888	12	7.693	1.260	7.063	0.125	TW130	8.063	7.063	0.193	19	K91530	5.983	6.018	7.985	0.375	0.590	5.675
TAN-132	6.284	8	8.068	1.291	7.438	0.156	TW132	8.453	7.438	0.193	19	K91532	6.389	6.424	8.485	0.375	0.590	6.081
TAN-134	6.659	8	8.661	1.354	8.031	0.156	TW134	9.078	8.031	0.193	19	K91534	6.764	6.799	8.985	0.375	0.715	6.456
TAN-136	7.066	8	9.068	1.416	8.375	0.156	TW136	9.438	8.375	0.193	19	K91536	7.171	7.206	9.235	0.375	0.715	6.863
TAN-138	7.472	8	9.474	1.416	8.781	0.156	TW138	9.859	8.781	0.193	19	K91538	7.577	7.612	9.735	0.375	0.715	7.269
TAN-140	7.847	8	9.849	1.510	9.156	0.156	TW140	10.406	9.156	0.193	19	K91540	7.982	8.017	10.110	0.375	0.840	7.674

LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS

SHAFT THREAD AND KEYWAY DIMENSIONS FOR STANDARD LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS



These dimensions are ABMA standards.

DIMENSIONS ARE IN INCHES

ABMA Locknut Number	threads										Shaft Ext. Dia. V2	Thread Length		Keyway			
	Number Per Inch	Major Fiameter			Pitch Diameter (1)			Minor Dia.	Relief Diameter A	Relief Width W +0.016 0.000		L1 +0.016 -0.000	L2 +0.016 -0.000	Depth H	Width S +0.016 -0.000	M +0.016 0.000	U +0.016 -0.000
		Max.	Tol.	Min.	Max.	Tol.	Min.	Max.			Max.			Max.			
N-00	32	0.391	0.0054	0.3856	0.3707	0.0026	0.3681	0.3257	0.3371 ± 0.005	0.062	0.312	0.593	0.375	0.287	0.125	0.094	0.469
N-01	32	0.469	0.0054	0.4636	0.4487	0.0026	0.4461	0.4307	0.4151 ± 0.005	0.062	0.406	0.781	0.468	0.366	0.125	0.094	0.562
N-02	32	0.586	0.0054	0.5806	0.5657	0.0030	0.5627	0.5477	0.5321 ± 0.005	0.062	0.500	0.812	0.500	0.485	0.125	0.094	0.594
N-03	32	0.664	0.0054	0.6586	0.6437	0.0030	0.6407	0.6257	0.6101 ± 0.005	0.062	0.562	0.875	0.531	0.564	0.125	0.094	0.625
N-04	32	0.781	0.0054	0.7756	0.7607	0.0034	0.7573	0.7427	0.7271 ± 0.005	0.062	0.703	0.906	0.531	0.676	0.188	0.094	0.625
N-05	32	0.969	0.0054	0.9636	0.9487	0.0034	0.9453	0.9307	0.9151 ± 0.005	0.062	0.875	1.000	0.593	0.835	0.188	0.125	0.719
N-06	18	1.173	0.0082	1.1648	1.1369	0.0040	1.1329	1.1048	1.0892 ± 0.005	0.093	1.062	1.000	0.593	1.040	0.188	0.125	0.719
TN-065	18	1.312	0.0082	1.3043	1.2764	0.0040	1.2724	1.2443	1.2287 ± 0.005	0.093	1.188	1.062	0.625	1.180	0.188	0.125	0.750
TN-07	18	1.376	0.0082	1.3678	1.3399	0.0040	1.3359	1.3078	1.2922 ± 0.005	0.093	1.250	1.062	0.625	1.244	0.188	0.125	0.750
TN-08	18	1.563	0.0082	1.5548	1.5269	0.0045	1.5224	1.4948	1.4792 ± 0.005	0.093	1.438	1.062	0.625	1.422	0.312	0.125	0.750
TN-09	18	1.767	0.0082	1.7588	1.7309	0.0045	1.7264	1.6988	1.6832 ± 0.005	0.125	1.656	1.062	0.625	1.628	0.312	0.156	0.781
TN-10	18	1.967	0.0082	1.9588	1.9309	0.0045	1.9264	1.8988	1.8832 ± 0.005	0.125	1.859	1.187	0.687	1.830	0.312	0.156	0.844
TN-11	18	2.157	0.0082	2.1488	2.1209	0.0051	2.1158	2.0888	2.0732 ± 0.005	0.125	2.047	1.187	0.687	2.021	0.312	0.156	0.844
TN-12	18	2.360	0.0082	2.3518	2.3239	0.0051	2.3188	2.2918	2.2762 ± 0.005	0.125	2.250	1.281	0.750	2.194	0.312	0.156	0.906
TN-13	18	2.548	0.0082	2.5398	2.5119	0.0051	2.5068	2.4798	2.4642 ± 0.005	0.125	2.422	1.343	0.781	2.382	0.312	0.156	0.938
TN-14	18	2.751	0.0082	2.7428	2.7149	0.0051	2.7098	2.6828	2.6672 ± 0.005	0.125	2.625	1.343	0.781	2.586	0.312	0.250	1.000
TAN-15	12	2.933	0.0112	2.9218	2.8789	0.0054	2.8735	2.8308	2.7995 ± '0.010	0.156	2.781	1.406	0.812	2.737	0.312	0.250	1.031
TAN-16	12	3.137	0.0112	3.1258	3.0829	0.0059	3.0770	3.0348	3.0035 ± 0.010	0.156	3.000	1.406	0.812	2.938	0.375	0.250	1.031
TAN-17	12	3.340	0.0112	3.3288	3.2859	0.0059	3.2800	3.2378	3.2065 ± 0.010	0.156	3.188	1.468	0.843	3.141	0.375	0.250	1.062
TAN-18	12	3.527	0.0112	3.5158	3.4729	0.0074	3.4655	3.4248	3.3935 ± 0.010	0.156	3.375	1.625	0.937	3.298	0.375	0.250	1.156
TAN-19	12	3.730	0.0112	3.7188	3.6759	0.0074	3.6685	3.6278	3.5965 ± 0.010	0.156	3.562	1.687	0.968	3.502	0.375	0.250	1.188
TAN-20	12	3.918	0.0112	3.9068	3.8639	0.0074	3.8565	3.8158	3.7845 ± 0.010	0.156	3.766	1.750	1.000	3.690	0.375	0.312	1.281
TAN-21	12	4.122	0.0112	4.1108	4.0679	0.0083	4.0596	4.0198	3.9885 ± 0.010	0.156	3.938	1.750	1.000	3.894	0.375	0.312	1.281
TAN-22	12	4.325	0.0112	4.3138	4.2709	0.0083	4.2626	4.2228	4.1915 ± 0.010	0.156	4.156	1.812	1.031	4.098	0.375	0.312	1.312
TAN-24	12	4.716	0.0112	4.7048	4.6619	0.0083	4.6536	4.6138	4.5825 ± 0.010	0.156	4.531	1.906	1.093	4.458	0.375	0.312	1.375
TAN-26	12	5.106	0.0112	5.0948	5.0519	0.0083	5.0436	5.0038	4.9725 ± 0.010	0.156	4.906	2.031	1.156	4.844	0.500	0.312	1.438
TAN-128	12	5.497	0.0112	5.4858	5.4429	0.0083	5.4346	5.3948	5.3635 ± 0.010	0.156	5.297	2.656	1.468	5.229	0.625	0.312	1.750
TAN-130	12	5.888	0.01125	5.8768	5.8339	0.0083	5.8256	5.7858	5.7545 ± 0.010	0.156	5.656	2.812	1.562	5.590	0.625	0.375	1.906
TAN-132	8	6.284	0.0152	6.2688	6.2028	0.0091	6.1937	6.1306	6.0993 ± 0.010	0.250	6.062	2.875	1.593	5.956	0.625	0.375	1.938
TAN-134	8	6.659	0.0152	6.6438	6.5778	0.0091	6.5687	6.5056	6.4743 ± 0.010	0.250	6.438	3.000	1.656	6.326	0.750	0.375	2.000
TAN-136	8	7.066	0.0152	7.0508	6.9848	0.0091	6.9757	6.9126	6.8813 ± 0.010	0.250	6.844	3.125	1.718	6.734	0.750	0.375	2.062
TAN-138	8	7.472	0.0152	7.4568	7.3908	0.0091	7.3817	7.3186	7.2873 ± 0.010	0.250	7.250	3.125	1.718	7.141	0.750	0.375	2.062
TAN-140	8	7.847	0.0152	7.8318	7.7658	0.0114	7.7544	7.6936	7.6623 ± 0.010	0.250	7.625	3.312	1.812	7.510	0.875	0.375	2.125

NOTES

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TIMKEN

NEEDLE ROLLER BEARINGS

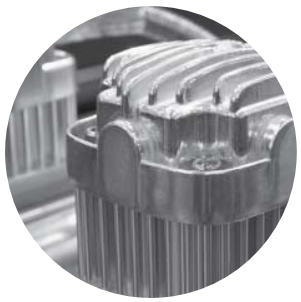
C

C NEEDLE ROLLER BEARINGS

NEEDLE ROLLER AND CAGE RADIAL ASSEMBLIES

Overview: Needle roller and cage assemblies are a complement of needle rollers held in place by a cage. The mating shaft and housing are normally used as inner and outer raceways. The unitized design allows for easy handling and installation. Controlled-contour rollers reduce end stresses and permit operation under moderate misalignment. A variety of cage designs, styles and materials, as well as multiple roller paths and segmented constructions, meet broad application requirements.

- **Sizes:** 6 mm - 150 mm bore.
- **Markets:** Automotive and truck transmissions, agricultural and construction equipment, two-cycle engines, pumps and compressors.
- **Features:** Special coatings and platings; split and segmented designs for simplified mounting; engineered polymer cages.
- **Benefits:** High load capacity and high limiting speed within the smallest envelope.



Radial Needle Roller and Cage Assemblies – Metric Nominal Dimensions

Prefix
K needle roller and cage assembly

Outside diameter
28 = 28 mm
65 = 65 mm

K **24** x **28** x **10** **H**

Bore diameter
24 = 24 mm
49 = 49 mm

Width
10 = 10 mm
38 = 38 mm

Suffix
BE hardened steel cage (for crankpin position)
H hardened steel cage
SE hardened steel cage (for wristpin position)
TN molded cage of reinforced engineered polymer
ZW double-row
F machined cage
FH machined cage, case hardened
VH machined cage, hardened and tempered

Radial Needle Roller and Cage Assemblies – Inch Nominal Dimensions

Prefixes
WJ needle roller and cage assembly
WJC needle roller and cage assembly

Width
16 = $^{16}/_{16}$ = 1 in.

WJ - **20** **26** **16**

Bore
20 = $^{20}/_{16}$ = 1 $^{1}/_{4}$ in.

Outside Diameter
26 = $^{26}/_{16}$ = 1 $^{5}/_{8}$ in.

Needle Roller Bearings and Cage Radial Assemblies

C

NEEDLE ROLLER AND CAGE RADIAL ASSEMBLIES

METRIC SERIES

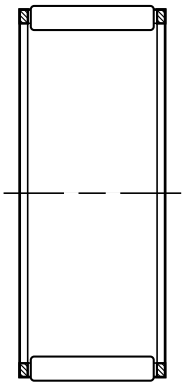
Timken® Torrington® metric series needle roller and cage radial assemblies are available in a variety of sizes and designs. This catalog includes the most popular, standardized and non-standard designs.

REFERENCE STANDARDS ARE:

- **ISO 3030** – Needle roller bearings – Needle roller and cage radial assemblies – Boundary dimensions and tolerances
- **DIN 5405 Part 1** – Rolling bearings – needle bearings – Radial needle roller and cage assemblies.
- **ANSI/ABMA 18.1** – Needle roller bearings – Radial, metric design.

Before selecting specific metric series needle roller and cage radial assemblies, the engineering section of this catalog should be reviewed.

Types of Metric Series Needle Roller and Cage Radial Assemblies



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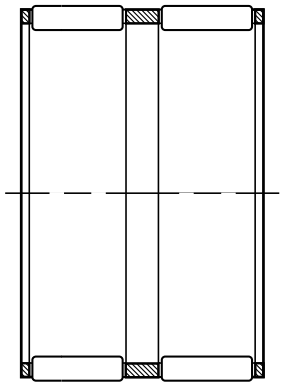


K ... ZW

Suffixes	
TN	molded cage of reinforced engineered polymer
ZW	double - row
TNZW	molded cage of reinforced engineered polymer – double - row
H	hardened steel cage
F	machined cage
FH	machined cage, case hardened
FV	machined cage, hardened and tempered

CONSTRUCTION

Needle roller and cage radial assemblies have a steel cage that provides both inward and outward retention for the needle rollers. The designs provide maximum cage strength consistent with the inherent high load ratings of needle roller bearings. Accurate guidance of the needle rollers by the cage bars allows for operation at high speeds. Needle roller and cage assemblies have either one or two rows of needle rollers.

Also listed are metric series needle roller and cage assemblies using molded, one piece glass reinforced engineered polymer cages (suffix TN). These operate well at temperatures up to 120° C over extended periods. However, care should be exercised when these assemblies are lubricated with oils containing additives as service life may be reduced if the operating temperature exceeds 100° C. At such high temperatures oil can deteriorate with time and it is suggested that oil change intervals are observed.

Needle rollers with relieved ends used in these assemblies are made of high carbon chrome steel, through-hardened, ground and lapped to close tolerances for diameter and roundness. See the engineering section of this catalog for further discussion of relieved end rollers.

DIMENSIONAL ACCURACY

NEEDLE ROLLER GROUPS (GAGES)

Metric series needle roller and cage radial assemblies are supplied with needle roller complements subdivided into groups (gages) shown in Table 1. The groups are at Timken's option if nothing to the contrary is agreed upon at the time of ordering. This is in accordance with Grade G2 specified in ISO 3096 standard (see needle rollers, page C326). The group limits of the needle rollers are indicated on the package. Labels of identifying colors show the group limits of the needle rollers. The needle roller and cage assemblies of one shipment usually contain needle rollers with group limits of between 0 to -2, and -5 to -7 mm (colors red, blue and white). Information on needle roller and cage assemblies with needle rollers of different group limits will be supplied on request.

TABLE 1 – NEEDLE ROLLER GROUP LIMITS (GRADE G2)

Group Tolerance µm		Marking	Identifying color of label or on package
0	-2	P0M2	
-1	-3	M1M3	red
-2	-4	M2M4	
-3	-5	M3M5	blue
-4	-6	M4M6	
-5	-7	M5M7	white (gray)
-6	-8	M6M8	
-7	-9	M7M9	green
-8	-10	M8M10	
-9	-11	M9M11	yellow

In the marking of the gages, P identifies zero (0) or plus (+), M identifies minus (-).

MOUNTING DIMENSIONS

DESIGN OF RACEWAYS

Needle roller and cage radial assemblies use the housing bore as the outer raceway and the shaft as the inner raceway. In order to realize full bearing load rating and life the housing bore and the shaft raceways must have the correct geometric and metallurgical characteristics. The housing should be of sufficient cross section to maintain adequate roundness and running clearance under load. Additional design details for housings and shafts used as outer and inner raceway can be found in the engineering section of this catalog. The only limit to precision of the radial clearance of a mounted assembly is the capability of the user to hold close tolerances on the inner and outer raceways. The suggested shaft tolerances listed in Table 2 are based on housing bore tolerance G6 and apply to metric series radial needle roller and cage assemblies with needle rollers of group limits between P0M2 and M5M7.

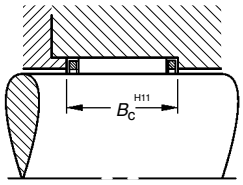
TABLE 2 – SUGGESTED SHAFT TOLERANCES FOR HOUSING BORES MACHINED TO G6

Nominal shaft diameter in mm	≤ 80	> 80
RADIAL CLEARANCE	**SHAFT TOLERANCE**	
smaller than normal	j5	h5
normal	h5	g5
larger than normal	g6	f6

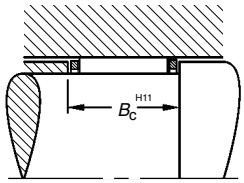
AXIAL GUIDANCE REQUIREMENTS

Needle roller and cage radial assembly must be axially guided by shoulders or other suitable means. The end guiding surfaces should be hardened to minimize wear and must provide sufficient axial clearance to prevent end locking of the assembly. Length tolerance H11 is suggested.

If end guidance is provided by a housing shoulder at one end and by a shaft shoulder at the other end the shaft must be axially positioned to prevent end locking of needle roller and cage assembly. The housing and shaft shoulder heights should be 70 to 90 percent of the needle roller diameter to provide proper axial guidance.



Guidance in the housing



Guidance on the shaft

MOUNTING IN SETS

Needle roller and cage radial assemblies that are mounted side by side must have needle rollers of the same group limits to ensure uniform load distribution.

LUBRICATION

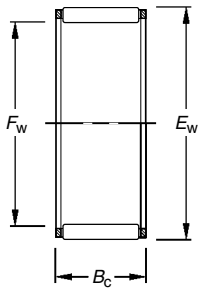
Oil is the preferred lubricant for most applications. In critical applications involving high speeds, ample oil flow must be provided. Where assemblies are subjected to high centrifugal forces, such as in epicyclic gearing, or inertia forces as in the small end of a connecting rod, the contact pressure between the cage and the raceway guiding surface becomes critical. The allowable contact pressure depends on a combination of the induced force and the rubbing velocity between the cage and raceway and the rate of lubricant flow. Consult your Timken representative when cages will be subjected to high induced forces.

SPECIAL DESIGNS

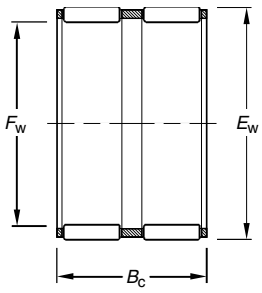
Needle roller and cage radial assemblies made to special dimensions or configurations, such as those which are split to assemble around a one piece crankshaft, can be made available on special order. Special coated or plated cages to enhance life under conditions of marginal lubrication and high induced forces can also be made available.

SINGLE-ROW, DOUBLE-ROW ASSEMBLIES

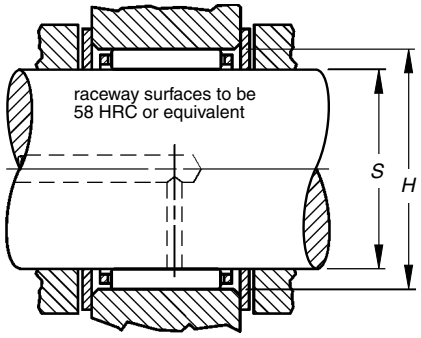
METRIC SERIES



K



K.ZW



Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Grease	Limiting Speed Oil		Mounting Dimensions mm/in. Max.	Mounting Dimensions mm/in. Min.	Mounting Dimensions mm/in. Min.	Mounting Dimensions mm/in. Max.	Wt. kg/lbs.
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
4	4 0.1575	7 0.2756	7.0 0.276	K4X7X7TN	1.83 411	1.32 297	34000	52000	—	4.000 0.1575	3.995 0.1573	7.005 0.2758	7.014 0.2761	0.00 0.002
5	5 0.1969	8 0.3150	8.0 0.315	K5X8X8TN	2.18 490	1.71 384	31000	47000	—	5.000 0.1969	4.995 0.1967	8.005 0.3152	8.014 0.3155	0.001 0.002
	5 0.1969	8 0.3150	10.0 0.394	K5X8X10TN	3.04 683	2.63 591	31000	47000	—	5.000 0.1969	4.995 0.1967	8.005 0.3152	8.014 0.3155	0.001 0.002
	5 0.1969	9 0.3543	13.0 0.512	K5X9X13TN	4.29 964	3.55 798	26000	40000	—	5.000 0.1969	4.995 0.1967	9.005 0.3545	9.014 0.3549	0.002 0.004
6	6 0.2362	9 0.3543	8.0 0.315	K6X9X8	3.19 717	2.90 652	29000	44000	0.0116	6.000 0.2362	5.995 0.2360	9.005 0.3545	9.014 0.3549	0.001 0.002
	6 0.2362	9 0.3543	8.0 0.315	K6X9X8TN	2.47 555	2.07 465	29000	44000	—	6.000 0.2362	5.995 0.2360	9.005 0.3545	9.014 0.3549	0.001 0.002
	6 0.2362	9 0.3543	10.0 0.394	K6X9X10TN	3.07 690	2.74 616	29000	44000	—	6.000 0.2362	5.995 0.2360	9.005 0.3545	9.014 0.3549	0.001 0.002
7	7 0.2756	10 0.3937	8.0 0.315	K7X10X8TN	2.74 616	2.44 549	28000	42000	—	7.000 0.2756	6.994 0.2754	10.005 0.3939	10.014 0.3943	0.001 0.002
	7 0.2756	10 0.3937	10.0 0.394	K7X10X10TN	3.40 764	3.22 724	28000	42000	—	7.000 0.2756	6.994 0.2754	10.005 0.3939	10.014 0.3943	0.001 0.002
	7 0.2756	11 0.4331	15.0 0.591	K7X11X15TN	6.44 1450	6.24 1400	23000	35000	—	7.000 0.2756	6.994 0.2754	11.006 0.4333	11.017 0.4337	0.000 0.000
8	8 0.3150	11 0.4331	8.0 0.315	K8X11X8FV	3.23 726	3.11 699	26000	41000	0.0132	8.000 0.3150	7.994 0.3147	11.006 0.4333	11.017 0.4337	0.002 0.004
	8 0.3150	11 0.4331	8.0 0.315	K8X11X8TN	2.34 526	2.05 461	26000	41000	—	8.000 0.3150	7.994 0.3147	11.006 0.4333	11.017 0.4337	0.002 0.003
	8 0.3150	11 0.4331	10.0 0.394	K8X11X10	4.57 1030	4.89 1100	26000	41000	0.0148	8.000 0.3150	7.994 0.3147	11.006 0.4333	11.017 0.4337	0.002 0.004
	8 0.3150	11 0.4331	10.0 0.394	K8X11X10FV	4.01 901	4.11 924	26000	41000	0.0142	8.000 0.3150	7.994 0.3147	11.006 0.4333	11.017 0.4337	0.002 0.004
	8 0.3150	11 0.4331	13.0 0.512	K8X11X13H	5.22 1170	5.78 1300	26000	41000	0.0154	8.000 0.3150	7.994 0.3147	11.006 0.4333	11.017 0.4337	0.003 0.007
	8 0.3150	12 0.4724	10.0 0.394	K8X12X10F	5.05 1140	4.69 1050	22000	33000	0.0143	8.000 0.3150	7.994 0.3147	12.006 0.4727	12.017 0.4731	0.002 0.004
9	9 0.3543	12 0.4724	10.0 0.394	K9X12X10FH	4.27 960	4.60 1030	26000	40000	0.0153	9.000 0.3543	8.994 0.3541	12.006 0.4727	12.017 0.4731	0.003 0.007
	9 0.3543	12 0.4724	10.0 0.394	K9X12X10FV	4.27 960	4.60 1030	26000	40000	0.0153	9.000 0.3543	8.994 0.3541	12.006 0.4727	12.017 0.4731	0.002 0.004
	9 0.3543	12 0.4724	13.0 0.512	K9X12X13F	5.57 1250	6.47 1450	26000	40000	0.0167	9.000 0.3543	8.994 0.3541	12.006 0.4727	12.017 0.4731	0.003 0.007
	9 0.3543	12 0.4724	13.0 0.512	K9X12X13FH	5.57 1250	6.47 1450	26000	40000	0.0167	9.000 0.3543	8.994 0.3541	12.006 0.4727	12.017 0.4731	0.003 0.007
	9 0.3543	12 0.4724	13.0 0.512	K9X12X13FV	5.57 1250	6.47 1450	26000	40000	0.0167	9.000 0.3543	8.994 0.3541	12.006 0.4727	12.017 0.4731	0.003 0.007
	9 0.3543	13 0.5118	8.0 0.315	K9X13X8H	3.96 890	3.50 787	21000	32000	0.0139	9.000 0.3543	8.994 0.3541	13.006 0.5120	13.017 0.5125	0.003 0.007
10	10 0.3937	13 0.5118	10.0 0.394	K10X13X10	5.40 1210	6.43 1450	25000	39000	0.0174	10.000 0.3937	9.994 0.3935	13.006 0.5120	13.017 0.5125	0.002 0.004

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	10 0.3937	13 0.5118	10.0 0.394	K10X13X10H	5.40 1210	6.43 1450	25000	39000	0.0174	10.000 0.3937	9.994 0.3935	13.006 0.5120	13.017 0.5125	0.002 0.004
	10 0.3937	13 0.5118	10.0 0.394	K10X13X10TN	4.29 964	4.77 1070	25000	39000	—	10.000 0.3937	9.994 0.3935	13.006 0.5120	13.017 0.5125	0.002 0.004
	10 0.3937	13 0.5118	13.0 0.512	K10X13X13	5.90 1330	7.16 1610	25000	39000	0.0178	10.000 0.3937	9.994 0.3935	13.006 0.5120	13.017 0.5125	0.003 0.007
	10 0.3937	13 0.5118	16.0 0.630	K10X13X16	7.43 1670	9.64 2170	25000	39000	0.0192	10.000 0.3937	9.994 0.3935	13.006 0.5120	13.017 0.5125	0.004 0.009
	10 0.3937	14 0.5512	10.0 0.394	K10X14X10H	6.12 1380	6.29 1410	20000	31000	0.0167	10.000 0.3937	9.994 0.3935	14.006 0.5514	14.017 0.5519	0.003 0.007
	10 0.3937	14 0.5512	13.0 0.512	K10X14X13H	7.88 1770	8.71 1960	20000	31000	0.0181	10.000 0.3937	9.994 0.3935	14.006 0.5514	14.017 0.5519	0.004 0.009
	10 0.3937	16 0.6299	12.0 0.472	K10X16X12F	8.39 1890	7.47 1680	15000	24000	0.0168	10.000 0.3937	9.994 0.3935	16.006 0.6302	16.017 0.6306	0.006 0.013
	10 0.3937	16 0.6299	12.0 0.472	K10X16X12TN	7.50 1690	6.40 1440	15000	24000	—	10.000 0.3937	9.994 0.3935	16.006 0.6302	16.017 0.6306	0.005 0.011
12	12 0.4724	15 0.5906	10.0 0.394	K12X15X10H	5.85 1320	7.51 1690	24000	37000	0.0195	12.000 0.4724	11.992 0.4721	15.006 0.5908	15.017 0.5912	0.003 0.007
	12 0.4724	15 0.5906	13.0 0.512	K12X15X13H	6.78 1520	9.03 2030	24000	37000	0.0204	12.000 0.4724	11.992 0.4721	15.006 0.5908	15.017 0.5912	0.004 0.009
	12 0.4724	16 0.6299	13.0 0.512	K12X16X13	7.49 1680	8.51 1910	19000	30000	0.0194	12.000 0.4724	11.992 0.4721	16.006 0.6302	16.017 0.6306	0.000 0.013
	12 0.4724	17 0.6693	13.0 0.512	K12X17X13	8.93 2010	9.29 2090	16000	25000	0.0194	12.000 0.4724	11.992 0.4721	17.006 0.6695	17.017 0.6700	0.008 0.018
	12 0.4724	18 0.7087	12.0 0.472	K12X18X12H	9.76 2190	9.40 2110	14000	22000	0.0191	12.000 0.4724	11.992 0.4721	18.006 0.7089	18.017 0.7093	0.009 0.020
13	13 0.5118	17 0.6693	10.0 0.394	K13X17X10	7.22 1620	8.33 1870	19000	29000	0.0199	13.000 0.5118	12.992 0.5115	17.006 0.6695	17.017 0.6700	0.004 0.009
	13 0.5118	18 0.7087	15.0 0.591	K13X18X15F	10.8 2430	12.1 2720	16000	25000	0.0213	13.000 0.5118	12.992 0.5115	18.006 0.7089	18.017 0.7093	0.008 0.01
14	14 0.5512	18 0.7087	8.0 0.315	K14X18X8	5.39 1210	5.82 1310	19000	29000	0.0188	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.004 0.009
	14 0.5512	18 0.7087	10.0 0.394	K14X18X10	7.17 1 610	8.41 1890	19000	29000	0.0206	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.005 0.011
	14 0.5512	18 0.7087	13.0 0.512	K14X18X13	9.73 2190	12.5 2810	19000	29000	0.0227	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.006 0.013
	14 0.5512	18 0.7087	15.0 0.591	K14X18X15	10.5 2360	13.8 3100	19000	29000	0.0233	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.007 0.015
	14 0.5512	18 0.7087	17.0 0.669	K14X18X17H	12.4 2790	17.1 3840	19000	29000	0.0246	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.008 0.018
	14 0.5512	19 0.7480	13.0 0.512	K14X19X13H	10.2 2290	11.4 2560	16000	24000	0.0217	14.000 0.5512	13.992 0.5509	19.007 0.7483	19.020 0.7488	0.008 0.018
	14 0.5512	19 0.7480	18.0 0.709	K14X19X18F	13.2 2970	16.0 3600	16000	24000	0.0236	14.000 0.5512	13.992 0.5509	19.007 0.7483	19.020 0.7488	0.011 0.024
	14 0.5512	20 0.7874	12.0 0.472	K14X20X12	10.5 2360	10.6 2380	14000	21000	0.0209	14.000 0.5512	13.992 0.5509	20.007 0.7877	20.020 0.7882	0.009 0.020
15	15 0.5906	18 0.7087	14.0 0.551	K15X18X14TN	7.92 1780	11.9 2680	13000	23000	—	15.000 0.5906	14.992 0.5902	18.006 0.7089	18.017 0.7093	0.003 0.007
	15 0.5906	18 0.7087	16.0 0.630	K15X18X16F	8.36 1880	12.6 2830	13000	23000	0.0244	15.000 0.5906	14.992 0.5902	18.006 0.7089	18.017 0.7093	0.005 0.011
	15 0.5906	18 0.7087	17.0 0.669	K15X18X17	8.08 1820	12.1 2720	23000	36000	0.0241	15.000 0.5906	14.992 0.5902	18.006 0.7089	18.017 0.7093	0.005 0.011
	15 0.5906	19 0.7480	10.0 0.394	K15X19X10	7.87 1770	9.69 2180	18000	28000	0.0220	15.000 0.5906	14.992 0.5902	19.007 0.7483	19.020 0.7488	0.005 0.011
	15 0.5906	19 0.7480	13.0 0.512	K15X19X13	9.66 2170	12.6 2830	18000	28000	0.0235	15.000 0.5906	14.992 0.5902	19.007 0.7483	19.020 0.7488	0.007 0.015
	15 0.5906	19 0.7480	17.0 0.669	K15X19X17	12.3 2770	17.2 3870	18000	28000	0.0254	15.000 0.5906	14.992 0.5902	19.007 0.7483	19.020 0.7488	0.009 0.020

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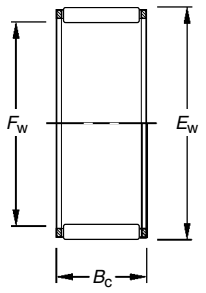
SINGLE-ROW, DOUBLE-ROW ASSEMBLIES — *continued*

METRIC SERIES



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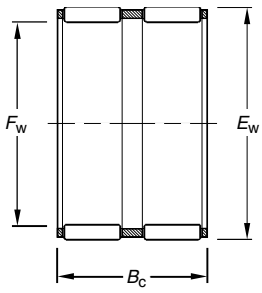

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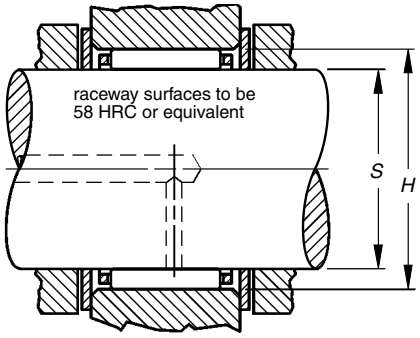


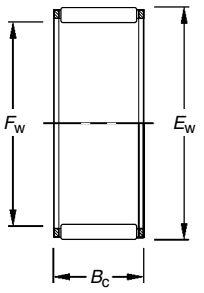
Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	15 0.5906	19 0.7480	17.0 0.669	K15X19X17H	12.3 2770	17.2 3870	18000	28000	0.0254	15.000 0.5906	14.992 0.5902	19.007 0.7483	19.020 0.7488	0.009 0.020
	15 0.5906	19 0.7480	22.0 0.866	K15X19X22ZW	12.2 2740	17.0 3820	18000	28000	0.0253	15.000 0.5906	14.992 0.5902	19.007 0.7483	19.020 0.7488	0.010 0.022
	15 0.5906	20 0.7874	13.0 0.512	K15X20X13H	9.93 2230	11.3 2540	16000	24000	0.0222	15.000 0.5906	14.992 0.5902	20.007 0.7877	20.020 0.7882	0.008 0.018
	15 0.5906	21 0.8268	15.0 0.591	K15X21X15	13.4 3010	14.8 3330	14000	21000	0.0233	15.000 0.5906	14.992 0.5902	21.007 0.8270	21.020 0.8276	0.013 0.029
	15 0.5906	21 0.8268	21.0 0.827	K15X21X21H	18.0 4050	21.7 4880	14000	21000	0.0256	15.000 0.5906	14.992 0.5902	21.007 0.8270	21.020 0.8276	0.018 0.040
16	16 0.6299	20 0.7874	8.0 0.315	K16X20X8F	6.37 1430	7.51 1690	18000	28000	0.0212	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.005 0.011
	16 0.6299	20 0.7874	10.0 0.394	K16X20X10	7.82 1760	9.76 2190	18000	28000	0.0226	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.006 0.013
	16 0.6299	20 0.7874	10.0 0.394	K16X20X10H	7.82 1760	9.76 2190	18000	28000	0.0226	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.006 0.013
	16 0.6299	20 0.7874	10.6 0.417	K16X20X10,6TN1	6.06 1360	7.01 1580	18000	28000	—	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.003 0.007
	16 0.6299	20 0.7874	13.0 0.512	K16X20X13	10.1 2270	13.5 3030	18000	28000	0.0245	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.007 0.015
	16 0.6299	20 0.7874	14.0 0.551	K16X20X14	10.8 2430	14.8 3330	18000	28000	0.0251	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.007 0.015
	16 0.6299	20 0.7874	17.0 0.669	K16X20X17F	11.9 2680	16.8 3780	18000	28000	0.0259	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.009 0.020
	16 0.6299	20 0.7874	17.0 0.669	K16X20X17H	12.9 2900	18.5 4160	18000	28000	0.0265	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.008 0.018
	16 0.6299	20 0.7874	20.0 0.787	K16X20X20	13.4 3010	19.5 4380	18000	28000	0.0269	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.011 0.024
	16 0.6299	21 0.8268	10.0 0.394	K16X21X10HD	7.69 1730	8.22 1850	18000	28000	0.0211	16.000 0.6299	15.992 0.6296	21.007 0.8270	21.020 0.8276	0.007 0.015
	16 0.6299	22 0.8661	12.0 0.472	K16X22X12	11.2 2520	11.9 2680	19000	29000	0.0227	16.000 0.6299	15.992 0.6296	22.007 0.8664	22.020 0.8669	0.010 0.022
	16 0.6299	22 0.8661	16.0 0.630	K16X22X16	14.9 3350	17.2 3870	19000	29000	0.0248	16.000 0.6299	15.992 0.6296	22.007 0.8664	22.020 0.8669	0.014 0.031
	16 0.6299	22 0.8661	16.0 0.630	K16X22X16H.ZB2	14.9 3350	17.2 3870	19000	29000	0.0248	16.000 0.6299	15.992 0.6296	22.007 0.8664	22.020 0.8669	0.014 0.031
	16 0.6299	22 0.8661	20.0 0.787	K16X22X20	18.6 4180	22.9 5150	19000	29000	0.0267	16.000 0.6299	15.992 0.6296	22.007 0.8664	22.020 0.8669	0.017 0.037
	16 0.6299	24 0.9449	20.0 0.787	K16X24X20	20.2 4540	21.4 4810	20000	30000	0.0255	16.000 0.6299	15.992 0.6296	24.007 0.9452	24.020 0.9457	0.025 0.055
17	17 0.6693	20 0.7874	10.0 0.394	K17X20X10	5.96 1340	8.53 1920	16000	25000	0.0234	17.000 0.6693	16.992 0.6690	20.007 0.7877	20.020 0.7882	0.004 0.009
	17 0.6693	21 0.8268	10.0 0.394	K17X21X10	8.12 1830	10.4 2340	17000	26000	0.0236	17.000 0.6693	16.992 0.6690	21.007 0.8270	21.020 0.8276	0.006 0.013
	17 0.6693	21 0.8268	12.8 0.504	K17X21X13H	10.5 2360	14.5 3260	17000	26000	0.0256	17.000 0.6693	16.992 0.6690	21.007 0.8270	21.020 0.8276	0.008 0.018

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	17 0.6693	21 0.8268	13.0 0.512	K17X21X13	10.5 2360	14.5 3260	17000	26000	0.0256	17.000 0.6693	16.992 0.6690	21.007 0.8270	21.020 0.8276	0.008 0.018
	17 0.6693	21 0.8268	15.0 0.591	K17X21X15	11.4 2560	16.1 3620	17000	26000	0.0263	17.000 0.6693	16.992 0.6690	21.007 0.8270	21.020 0.8276	0.008 0.018
	17 0.6693	21 0.8268	17.0 0.669	K17X21X17H	13.4 3010	19.8 4450	17000	26000	0.0277	17.000 0.6693	16.992 0.6690	21.007 0.8270	21.020 0.8276	0.011 0.024
	17 0.6693	22 0.8661	20.0 0.787	K17X22X20FH	17.0 3820	23.3 5240	17000	27000	0.0280	17.000 0.6693	16.992 0.6690	22.007 0.8664	22.020 0.8669	0.015 0.033
	17 0.6693	23 0.9055	15.0 0.591	K17X23X15F	14.1 3170	16.3 3660	18000	27000	0.0251	17.000 0.6693	16.992 0.6690	23.007 0.9058	23.020 0.9063	0.010 0.022
18	18 0.7087	22 0.8661	8.0 0.315	K18X22X8F	6.32 1420	7.70 1730	16000	24000	0.0224	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.005 0.011
	18 0.7087	22 0.8661	10.0 0.394	K18X22X10	8.41 1890	11.1 2500	16000	24000	0.0246	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.006 0.013
	18 0.7087	22 0.8661	10.0 0.394	K18X22X10H	8.41 1890	11.1 2500	16000	24000	0.0246	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.006 0.013
	18 0.7087	22 0.8661	13.0 0.512	K18X22X13H	10.8 2430	15.4 3460	16000	24000	0.0266	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.008 0.018
	18 0.7087	22 0.8661	14.0 0.551	K18X22X14	11.6 2610	16.8 3780	16000	24000	0.0272	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.009 0.020
	18 0.7087	22 0.8661	14.0 0.551	K18X22X14FV	11.3 2540	16.3 3660	16000	24000	0.0270	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.009 0.020
	18 0.7087	22 0.8661	17.0 0.669	K18X22X17H	13.3 2990	19.9 4470	16000	24000	0.0284	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.009 0.020
	18 0.7087	22 0.8661	20.0 0.787	K18X22X20F	15.0 3370	23.4 5260	16000	24000	0.0296	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.011 0.024
	18 0.7087	24 0.9449	12.0 0.472	K18X24X12	11.8 2650	13.1 2940	17000	25000	0.0243	18.000 0.7087	17.992 0.7083	24.007 0.9452	24.020 0.9457	0.011 0.024
	18 0.7087	24 0.9449	20.0 0.787	K18X24X20H	19.4 4360	24.9 5600	16000	25000	0.0285	18.000 0.7087	17.992 0.7083	24.007 0.9452	24.020 0.9457	0.019 0.042
	18 0.7087	25 0.9843	22.0 0.866	K18X25X22H	23.3 5240	28.6 6430	17000	26000	0.0291	18.000 0.7087	17.992 0.7083	25.007 0.9845	25.020 0.9850	0.025 0.055
	18 0.7087	26 1.0236	12.0 0.472	K18X26X12FV	13.8 3100	13.5 3030	11000	17000	0.0238	18.000 0.7087	17.992 0.7083	26.007 1.0239	26.020 1.0244	0.020 0.044
	18 0.7087	26 1.0236	20.0 0.787	K18X26X20F.ZB2	21.7 4880	24.1 5420	17000	26000	0.0275	18.000 0.7087	17.992 0.7083	26.007 1.0239	26.020 1.0244	0.027 0.060
19	19 0.7480	23 0.9055	13.0 0.512	K19X23X13	10.8 2430	15.5 3480	15000	23000	0.0273	19.000 0.7480	18.991 0.7477	23.007 0.9058	23.020 0.9063	0.008 0.018
	19 0.7480	23 0.9055	17.0 0.669	K19X23X17	13.4 3010	20.6 4630	15000	23000	0.0293	19.000 0.7480	18.991 0.7477	23.007 0.9058	23.020 0.9063	0.011 0.024
20	20 0.7874	24 0.9449	8.0 0.315	K20X24X8F	7.31 1640	9.60 2160	14000	22000	0.0248	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.005 0.011
	20 0.7874	24 0.9449	10.0 0.394	K20X24X10	8.97 2020	12.5 2810	14000	22000	0.0265	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.006 0.013
	20 0.7874	24 0.9449	10.0 0.394	K20X24X10H	8.97 2020	12.5 2810	14000	22000	0.0265	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.006 0.013
	20 0.7874	24 0.9449	12.0 0.472	K20X24X12	10.7 2410	15.7 3530	14000	22000	0.0280	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.008 0.018
	20 0.7874	24 0.9449	13.0 0.512	K20X24X13	11.5 2590	17.3 3890	14000	22000	0.0287	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.008 0.018
	20 0.7874	24 0.9449	13.0 0.512	K20X24X13H	11.5 2590	17.3 3890	14000	22000	0.0287	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.009 0.020
	20 0.7874	24 0.9449	14.0 0.551	K20X24X14	12.4 2790	18.9 4250	14000	22000	0.0293	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.009 0.020
	20 0.7874	24 0.9449	17.0 0.669	K20X24X17H	14.8 3330	23.7 5330	14000	22000	0.0310	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.011 0.024
	20 0.7874	26 1.0236	12.0 0.472	K20X26X12	13.0 2920	15.3 3440	15000	23000	0.0264	20.000 0.7874	19.991 0.7870	26.007 1.0239	26.020 1.0244	0.012 0.026

Continued on next page.

SINGLE-ROW, DOUBLE-ROW ASSEMBLIES — *continued*

METRIC SERIES



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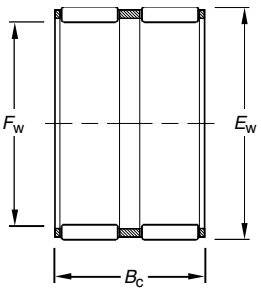

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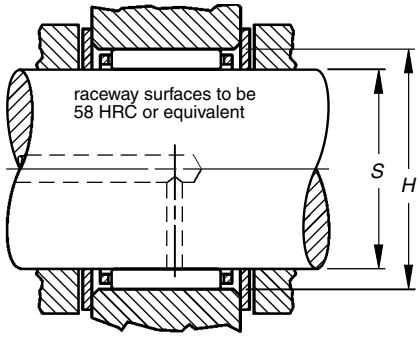

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	20 0.7874	26 1.0236	13.0 0.512	K20X26X13H	13.4 3010	15.9 3570	15000	23000	0.0267	20.000 0.7874	19.991 0.7870	26.007 1.0239	26.020 1.0244	0.014 0.031
	20 0.7874	26 1.0236	17.0 0.669	K20X26X17H	19.3 4340	25.5 5730	15000	23000	0.0300	20.000 0.7874	19.991 0.7870	26.007 1.0239	26.020 1.0244	0.017 0.037
	20 0.7874	26 1.0236	20.0 0.787	K20X26X20	20.3 4560	27.2 6110	15000	23000	0.0305	20.000 0.7874	19.991 0.7870	26.007 1.0239	26.020 1.0244	0.020 0.044
	20 0.7874	28 1.1024	20.0 0.787	K20X28X20H	24.6 5530	29.0 6520	15000	23000	0.0300	20.000 0.7874	19.991 0.7870	28.007 1.1026	28.020 1.1031	0.028 0.062
	20 0.7874	28 1.1024	25.0 0.984	K20X28X25H	29.7 6680	37.0 8320	15000	23000	0.0319	20.000 0.7874	19.991 0.7870	28.007 1.1026	28.020 1.1031	0.036 0.079
	20 0.7874	30 1.1811	30.0 1.181	K20X30X30H	38.9 8750	45.8 10300	16000	24000	0.0329	20.000 0.7874	19.991 0.7870	30.007 1.1814	30.020 1.1819	0.055 0.121
	20 0.7874	32 1.2598	36.0 1.417	K20X32X36H	49.9 11220	57.0 12810	16000	25000	0.0344	20.000 0.7874	19.991 0.7870	32.009 1.2602	32.025 1.2608	0.082 0.181
21	21 0.8268	25 0.9843	17.0 0.669	K21X25X17F	14.3 3210	23.1 5190	14000	21000	0.0315	21.000 0.8268	20.991 0.8264	25.007 0.9845	25.020 0.9850	0.012 0.026
	21 0.8268	25 0.9843	17.0 0.669	K21X25X17H	14.3 3210	23.1 5190	14000	21000	0.0315	21.000 0.8268	20.991 0.8264	25.007 0.9845	25.020 0.9850	0.013 0.029
22	22 0.8661	26 1.0236	10.0 0.394	K22X26X10H	9.81 2210	14.5 3 260	13000	20000	0.0291	22.000 0.8661	21.991 0.8658	26.007 1.0239	26.020 1.0244	0.007 0.015
	22 0.8661	26 1.0236	13.0 0.512	K22X26X13H	11.8 2650	18.3 4110	13000	20000	0.0303	22.000 0.8661	21.991 0.8658	26.007 1.0239	26.020 1.0244	0.012 0.026
	22 0.8661	26 1.0236	17.0 0.669	K22X26X17	15.6 3510	26.3 5910	13000	20000	0.0332	22.000 0.8661	21.991 0.8658	26.007 1.0239	26.020 1.0244	0.015 0.033
	22 0.8661	26 1.0236	17.0 0.669	K22X26X17H	15.6 3510	26.3 5910	13000	20000	0.0332	22.000 0.8661	21.991 0.8658	26.007 1.0239	26.020 1.0244	0.012 0.026
	22 0.8661	26 1.0236	18.0 0.709	K22X26X18H	15.3 3440	25.5 5730	13000	20000	0.0329	22.000 0.8661	21.991 0.8658	26.007 1.0239	26.020 1.0244	0.017 0.037
	22 0.8661	28 1.1024	13.0 0.512	K22X28X13	13.9 3120	17.1 3840	13000	20000	0.0283	22.000 0.8661	21.991 0.8658	28.007 1.1026	28.020 1.1031	0.015 0.033
	22 0.8661	28 1.1024	17.0 0.669	K22X28X17H	18.2 4090	24.2 5440	13000	20000	0.0308	22.000 0.8661	21.991 0.8658	28.007 1.1026	28.020 1.1031	0.020 0.044
	22 0.8661	30 1.1811	15.0 0.591	K22X30X15H	19.7 4430	22.3 5010	14000	21000	0.0292	22.000 0.8661	21.991 0.8658	30.007 1.1814	30.020 1.1819	0.023 0.051
	22 0.8661	30 1.1811	20.0 0.787	K22X30X20FV	24.4 5490	29.4 6610	14000	21000	0.0313	22.000 0.8661	21.991 0.8658	30.007 1.1814	30.020 1.1819	0.031 0.068
	22 0.8661	32 1.2598	24.0 0.945	K22X32X24F	33.1 7440	37.9 8520	14000	22000	0.0326	22.000 0.8661	21.991 0.8658	32.009 1.2602	32.025 1.2608	0.046 0.101
	22 0.8661	32 1.2598	30.0 1.181	K22X32X30H	41.8 9400	51.3 11530	14000	22000	0.0351	22.000 0.8661	21.991 0.8658	32.009 1.2602	32.025 1.2608	0.057 0.126
23	23 0.9055	28 1.1024	24.0 0.945	K23X28X24F	22.4 5040	36.2 8140	12000	19000	0.0355	23.000 0.9055	22.991 0.9052	28.007 1.1026	28.020 1.1031	0.023 0.051
	23 0.9055	35 1.3780	16.0 0.630	K23X35X16H.ZB2	25.9 5820	25.1 5640	14000	21000	0.0294	23.000 0.9055	22.991 0.9052	35.009 1.3783	35.025 1.3789	0.040 0.088
	23 0.9055	35 1.3780	16.2 0.638	K23X35X16,2H	29.1 6540	29.3 6590	14000	21000	0.0306	23.000 0.9055	22.991 0.9052	35.009 1.3783	35.025 1.3789	0.040 0.088

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
24	24 0.9449	28 1.1024	10.0 0.394	K24X28X10H	9.67 2170	14.6 3280	12000	18000	0.0298	24.000 0.9449	23.991 0.9445	28.007 1.1026	28.020 1.1031	0.027 0.060
	24 0.9449	28 1.1024	13.0 0.512	K24X28X13H	12.5 2810	20.2 4540	12000	18000	0.0323	24.000 0.9449	23.991 0.9445	28.007 1.1026	28.020 1.1031	0.010 0.022
	24 0.9449	28 1.1024	16.0 0.630	K24X28X16F						24.000 0.9449	23.991 0.9445	28.007 1.1026	28.020 1.1031	
	24 0.9449	28 1.1024	17.0 0.669	K24X28X17H	15.4 3460	26.4 5930	12000	18000	0.0345	24.000 0.9449	23.991 0.9445	28.007 1.1026	28.020 1.1031	0.013 0.029
	24 0.9449	30 1.1811	10.0 0.394	K24X30X10TN	11.3 2540	13.5 3030	12000	19000	—	24.000 0.9449	23.991 0.9445	30.007 1.1814	30.020 1.1819	0.008 0.018
	24 0.9449	30 1.1811	17.0 0.669	K24X30X17H	19.8 4450	27.7 6230	12000	19000	0.0331	24.000 0.9449	23.991 0.9445	30.007 1.1814	30.020 1.1819	0.020 0.044
	24 0.9449	30 1.1811	22.0 0.866	K24X30X22	25.0 5620	37.3 8390	12000	19000	0.0356	24.000 0.9449	23.991 0.9445	30.007 1.1814	30.020 1.1819	0.024 0.053
	24 0.9449	36 1.4173	23.0 0.906	K24X36X23H	37.1 8340	40.1 9010	13000	20000	0.0336	24.000 0.9449	23.991 0.9445	36.009 1.4177	36.025 1.4183	0.070 0.154
25	25 0.9843	29 1.1417	10.0 0.394	K25X29X10H	9.61 2160	14.6 3280	11000	17000	0.0303	25.000 0.9843	24.991 0.9839	29.007 1.1420	29.020 1.1425	0.008 0.018
	25 0.9843	29 1.1417	13.0 0.512	K25X29X13H	12.8 2880	21.1 4740	11000	17000	0.0332	25.000 0.9843	24.991 0.9839	29.007 1.1420	29.020 1.1425	0.010 0.022
	25 0.9843	29 1.1417	17.0 0.669	K25X29X17H	15.1 3390	26.2 5890	11000	17000	0.0351	25.000 0.9843	24.991 0.9839	29.007 1.1420	29.020 1.1425	0.016 0.035
	25 0.9843	30 1.1811	13.0 0.512	K25X30X13	14.6 3280	21.4 4810	11000	17000	0.0323	25.000 0.9843	24.991 0.9839	30.007 1.1814	30.020 1.1819	0.012 0.026
	25 0.9843	30 1.1811	17.0 0.669	K25X30X17H	18.8 4230	29.8 6700	11000	17000	0.0351	25.000 0.9843	24.991 0.9839	30.007 1.1814	30.020 1.1819	0.016 0.035
	25 0.9843	30 1.1811	18.0 0.709	K25X30X18	20.6 4630	33.4 7510	11000	17000	0.0361	25.000 0.9843	24.991 0.9839	30.007 1.1814	30.020 1.1819	0.017 0.037
	25 0.9843	30 1.1811	20.0 0.787	K25X30X20H	21.9 4920	36.1 8120	11000	17000	0.0368	25.000 0.9843	24.991 0.9839	30.007 1.1814	30.020 1.1819	0.019 0.042
	25 0.9843	30 1.1811	24.0 0.945	K25X30X24H	24.8 5580	42.4 9530	11000	17000	0.0383	25.000 0.9843	24.991 0.9839	30.007 1.1814	30.020 1.1819	0.024 0.053
	25 0.9843	30 1.1811	26.0 1.024	K25X30X26ZW	23.0 5170	38.6 8680	11000	17000	0.0374	25.000 0.9843	24.991 0.9839	30.007 1.1814	30.020 1.1819	0.027 0.060
	25 0.9843	31 1.2205	14.0 0.551	K25X31X14H	16.8 3780	22.7 5100	12000	18000	0.0320	25.000 0.9843	24.991 0.9839	31.009 1.2208	31.025 1.2215	0.017 0.037
	25 0.9843	31 1.2205	17.0 0.669	K25X31X17H	19.7 4430	27.8 6250	12000	18000	0.0337	25.000 0.9843	24.991 0.9839	31.009 1.2208	31.025 1.2215	0.020 0.044
	25 0.9843	31 1.2205	21.0 0.827	K25X31X21	25.1 5640	38.0 8540	12000	18000	0.0364	25.000 0.9843	24.991 0.9839	31.009 1.2208	31.025 1.2215	0.026 0.057
	25 0.9843	31 1.2205	21.0 0.827	K25X31X21F	25.1 5640	38.0 8540	12000	18000	0.0364	25.000 0.9843	24.991 0.9839	31.009 1.2208	31.025 1.2215	0.026 0.057
	25 0.9843	31 1.2205	21.0 0.827	K25X31X21H	25.1 5640	38.0 8540	12000	18000	0.0364	25.000 0.9843	24.991 0.9839	31.009 1.2208	31.025 1.2215	0.026 0.057
	25 0.9843	31 1.2205	24.0 0.945	K25X31X24F	25.3 5690	38.5 8660	12000	18000	0.0365	25.000 0.9843	24.991 0.9839	31.009 1.2208	31.025 1.2215	0.031 0.068
	25 0.9843	31 1.2205	24.0 0.945	K25X31X24FH	25.3 5690	38.5 8660	12000	18000	0.0365	25.000 0.9843	24.991 0.9839	31.009 1.2208	31.025 1.2215	0.031 0.068
	25 0.9843	32 1.2598	16.0 0.630	K25X32X16	19.8 4450	25.3 5690	12000	18000	0.0323	25.000 0.9843	24.991 0.9839	32.009 1.2602	32.025 1.2608	0.027 0.060
	25 0.9843	33 1.2992	20.0 0.787	K25X33X20FH.ZB2	25.6 5760	32.3 7260	12000	18000	0.0337	25.000 0.9843	24.991 0.9839	33.009 1.2996	33.025 1.3002	0.035 0.077
	25 0.9843	33 1.2992	20.0 0.787	K25X33X20H	28.8 6470	37.6 8450	12000	18000	0.0350	25.000 0.9843	24.991 0.9839	33.009 1.2996	33.025 1.3002	0.035 0.077
	25 0.9843	33 1.2992	24.0 0.945	K25X33X24H	32.3 7260	43.5 9780	12000	18000	0.0363	25.000 0.9843	24.991 0.9839	33.009 1.2996	33.025 1.3002	0.038 0.084
	25 0.9843	33 1.2992	25.0 0.984	K25X33X25H	33.0 7420	44.6 10030	12000	18000	0.0365	25.000 0.9843	24.991 0.9839	33.009 1.2996	33.025 1.3002	0.041 0.090

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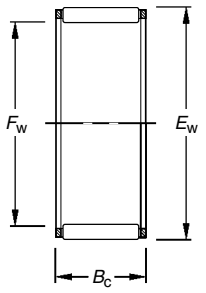
SINGLE-ROW, DOUBLE-ROW ASSEMBLIES — *continued*

METRIC SERIES



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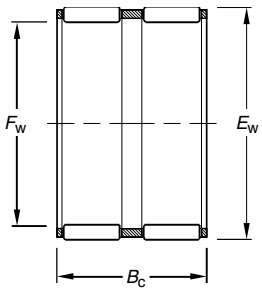

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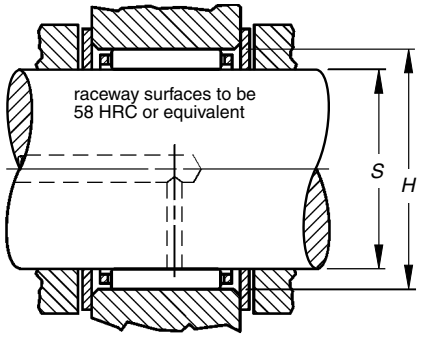

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	25 0.9843	35 1.3780	23.7 0.933	K25X35X23,7H	35.9 8070	42.3 9510	12000	19000	0.0354	25.000 0.9843	24.991 0.9839	35.009 1.3783	35.025 1.3789	0.050 0.110
	25 0.9843	35 1.3780	25.0 0.984	K25X35X25H	37.8 8500	46.2 10390	12000	19000	0.0360	25.000 0.9843	24.991 0.9839	35.009 1.3783	35.025 1.3789	0.054 0.119
	25 0.9843	35 1.3780	30.0 1.181	K25X35X30H	44.6 10030	57.2 12860	12000	19000	0.0379	25.000 0.9843	24.991 0.9839	35.009 1.3783	35.025 1.3789	0.060 0.132
	25 0.9843	35 1.3780	30.0 1.181	K25X35X30H.ZB2	44.6 10030	57.2 12860	12000	19000	0.0379	25.000 0.9843	24.991 0.9839	35.009 1.3783	35.025 1.3789	0.060 0.132
	25 0.9843	35 1.3780	36.0 1.417	K25X35X36H	52.4 11780	70.4 15830	12000	19000	0.0399	25.000 0.9843	24.991 0.9839	35.009 1.3783	35.025 1.3789	0.074 0.163
	25 0.9843	37 1.4567	20.0 0.787	K25X37X20H	32.5 7310	34.1 7670	12000	19000	0.0328	25.000 0.9843	24.991 0.9839	37.009 1.4570	37.025 1.4577	0.055 0.121
26	26 1.0236	30 1.1811	10.0 0.394	K26X30X10F	9.46 2130	14.5 3260	11000	16000	0.0308	26.000 1.0236	25.991 1.0233	30.007 1.1814	30.020 1.1819	0.007 0.015
	26 1.0236	30 1.1811	13.0 0.512	K26X30X13	12.3 2770	20.4 4590	10000	16000	0.0335	26.000 1.0236	25.991 1.0233	30.007 1.1814	30.020 1.1819	0.011 0.024
	26 1.0236	30 1.1811	17.0 0.669	K26X30X17	15.0 3370	26.3 5910	10000	16000	0.0357	26.000 1.0236	25.991 1.0233	30.007 1.1814	30.020 1.1819	0.014 0.031
	26 1.0236	30 1.1811	22.0 0.866	K26X30X22ZW	16.7 3750	30.2 6790	10000	16000	0.0370	26.000 1.0236	25.991 1.0233	30.007 1.1814	30.020 1.1819	0.018 0.040
28	28 1.1024	32 1.2598	21.0 0.827	K28X32X21F	18.7 4200	35.7 8030	9900	15000	0.0398	28.000 1.1024	27.991 1.1020	32.009 1.2602	32.025 1.2608	0.018 0.040
	28 1.1024	33 1.2992	13.0 0.512	K28X33X13F	14.1 3170	21.4 4810	10000	15000	0.0339	28.000 1.1024	27.991 1.1020	33.009 1.2996	33.025 1.3002	0.015 0.033
	28 1.1024	33 1.2992	13.0 0.512	K28X33X13FV	14.1 3170	21.4 4810	10000	15000	0.0339	28.000 1.1024	27.991 1.1020	33.009 1.2996	33.025 1.3002	0.015 0.033
	28 1.1024	33 1.2992	17.0 0.669	K28X33X17H	19.8 4450	33.0 7420	10000	15000	0.0378	28.000 1.1024	27.991 1.1020	33.009 1.2996	33.025 1.3002	0.018 0.040
	28 1.1024	33 1.2992	27.0 1.063	K28X33X27	29.0 6520	53.8 12090	10000	15000	0.0427	28.000 1.1024	27.991 1.1020	33.009 1.2996	33.025 1.3002	0.027 0.060
	28 1.1024	34 1.3386	17.0 0.669	K28X34X17	21.1 4740	31.5 7080	10000	16000	0.0364	28.000 1.1024	27.991 1.1020	34.009 1.3389	34.025 1.3396	0.022 0.049
	28 1.1024	34 1.3386	20.0 0.787	K28X34X20H	24.4 5490	37.8 8500	10000	16000	0.0381	28.000 1.1024	27.991 1.1020	34.009 1.3389	34.025 1.3396	0.025 0.055
	28 1.1024	35 1.3780	15.0 0.591	K28X35X15H	19.5 4380	25.6 5760	10000	16000	0.0339	28.000 1.1024	27.991 1.1020	35.009 1.3783	35.025 1.3789	0.025 0.055
	28 1.1024	35 1.3780	16.0 0.630	K28X35X16FH	21.5 4830	29.1 6540	10000	16000	0.0350	28.000 1.1024	27.991 1.1020	35.009 1.3783	35.025 1.3789	0.026 0.057
	28 1.1024	35 1.3780	16.0 0.630	K28X35X16H	21.5 4830	29.1 6540	10000	16000	0.0350	28.000 1.1024	27.991 1.1020	35.009 1.3783	35.025 1.3789	0.026 0.057
	28 1.1024	35 1.3780	27.0 1.063	K28X35X27H	35.2 7910	54.7 12300	10000	16000	0.0409	28.000 1.1024	27.991 1.1020	35.009 1.3783	35.025 1.3789	0.042 0.093
	28 1.1024	36 1.4173	20.0 0.787	K28X36X20FV	27.8 6250	37.0 8320	10000	16000	0.0365	28.000 1.1024	27.991 1.1020	36.009 1.4177	36.025 1.4183	0.039 0.086
	28 1.1024	38 1.4961	25.5 1.004	K28X38X25,5	40.9 9190	52.7 11850	11000	16000	0.0389	28.000 1.1024	27.991 1.1020	38.009 1.4964	38.025 1.4970	0.059 0.130

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	28 1.1024	40 1.5748	18.0 0.709	K28X40X18H	33.6 7550	36.5 8210	11000	17000	0.0349	28.000 1.1024	27.991 1.1020	40.009 1.5752	40.025 1.5758	0.060 0.132
	28 1.1024	40 1.5748	25.0 0.984	K28X40X25H	45.5 10230	54.0 12140	11000	17000	0.0384	28.000 1.1024	27.991 1.1020	40.009 1.5752	40.025 1.5758	0.072 0.159
	28 1.1024	40 1.5748	30.0 1.181	K28X40X30H	54.3 12210	67.8 15240	11000	17000	0.0406	28.000 1.1024	27.991 1.1020	40.009 1.5752	40.025 1.5758	0.100 0.220
	28 1.1024	41 1.6142	25.0 0.984	K28X41X25H	49.2 11060	57.1 12840	11000	17000	0.0386	28.000 1.1024	27.991 1.1020	41.009 1.6145	41.025 1.6152	0.082 0.181
29	29 1.1417	34 1.3386	27.0 1.063	K29X34X27F	28.9 6500	54.0 12140	9700	15000	0.0434	29.000 1.1417	28.991 1.1414	34.009 1.3389	34.025 1.3396	0.033 0.073
30	30 1.1811	34 1.3386	13.0 0.512	K30X34X13	13.5 3030	24.1 5420	9200	14000	0.0372	30.000 1.1811	29.991 1.1807	34.009 1.3389	34.025 1.3396	0.011 0.024
	30 1.1811	35 1.3780	13.0 0.512	K30X35X13H	15.6 3510	24.9 5600	9300	14000	0.0363	30.000 1.1811	29.991 1.1807	35.009 1.3783	35.025 1.3789	0.017 0.037
	30 1.1811	35 1.3780	17.0 0.669	K30X35X17H	20.2 4540	34.6 7780	9300	14000	0.0394	30.000 1.1811	29.991 1.1807	35.009 1.3783	35.025 1.3789	0.022 0.049
	30 1.1811	35 1.3780	20.0 0.787	K30X35X20H	23.5 5280	41.9 9420	9300	14000	0.0413	30.000 1.1811	29.991 1.1807	35.009 1.3783	35.025 1.3789	0.023 0.051
	30 1.1811	35 1.3780	22.8 0.898	K30X35X23F	25.6 5760	46.8 10520	9300	14000	0.0425	30.000 1.1811	29.991 1.1807	35.009 1.3783	35.025 1.3789	0.028 0.062
	30 1.1811	35 1.3780	27.0 1.063	K30X35X27H	30.6 6880	59.0 13260	9300	14000	0.0450	30.000 1.1811	29.991 1.1807	35.009 1.3783	35.025 1.3789	0.032 0.071
	30 1.1811	35 1.3780	27.0 1.063	K30X35X27HZW	19.9 4470	33.6 7550	9300	14000	0.0391	30.000 1.1811	29.991 1.1807	35.009 1.3783	35.025 1.3789	0.033 0.073
	30 1.1811	36 1.4173	14.0 0.551	K30X36X14	18.0 4050	26.2 5890	9500	15000	0.0358	30.000 1.1811	29.991 1.1807	36.009 1.4177	36.025 1.4183	0.020 0.044
	30 1.1811	37 1.4567	17.8 0.701	K30X37X18	24.3 5460	34.8 7820	9600	15000	0.0377	30.000 1.1811	29.991 1.1807	37.009 1.4570	37.025 1.4577	0.033 0.073
	30 1.1811	37 1.4567	18.0 0.709	K30X37X18FV	24.3 5460	34.8 7820	9600	15000	0.0377	30.000 1.1811	29.991 1.1807	37.009 1.4570	37.025 1.4577	0.033 0.073
	30 1.1811	40 1.5748	30.0 1.181	K30X40X30H	49.2 11060	67.8 15240	9900	15000	0.0426	30.000 1.1811	29.991 1.1807	40.009 1.5752	40.025 1.5758	0.077 0.170
	30 1.1811	42 1.6535	30.0 1.181	K30X42X30H	54.2 12180	68.6 15420	10000	16000	0.0419	30.000 1.1811	29.991 1.1807	42.009 1.6539	42.025 1.6545	0.096 0.212
	30 1.1811	44 1.7323	26.0 1.024	K30X44X26H	52.4 11780	59.9 13470	10000	16000	0.0399	30.000 1.1811	29.991 1.1807	44.009 1.7326	44.025 1.7333	0.095 0.209
31	31 1.2047	37 1.4409	24.0 0.945	K30,6X36,6X24FV	27.8 6250	46.2 10390	9300	14000	0.0416	30.600 1.2047	30.591 1.2044	36.609 1.4413	36.625 1.4419	0.038 0.084
32	32 1.2598	36 1.4173	15.0 0.591	K32X36X15F	11.6 2610	20.2 4540	8600	13000	0.0367	32.000 1.2598	31.989 1.2594	36.009 1.4177	36.025 1.4183	0.015 0.033
	32 1.2598	37 1.4567	13.0 0.512	K32X37X13	15.2 3420	24.4 5490	8700	13000	0.0372	32.000 1.2598	31.989 1.2594	37.009 1.4570	37.025 1.4577	0.018 0.040
	32 1.2598	37 1.4567	17.0 0.669	K32X37X17H	20.0 4500	34.8 7820	8700	13000	0.0406	32.000 1.2598	31.989 1.2594	37.009 1.4570	37.025 1.4577	0.020 0.044
	32 1.2598	37 1.4567	27.0 1.063	K32X37X27	29.3 6590	56.8 12770	8700	13000	0.0459	32.000 1.2598	31.989 1.2594	37.009 1.4570	37.025 1.4577	0.035 0.077
	32 1.2598	38 1.4961	20.0 0.787	K32X38X20H	27.3 6140	45.7 10270	8800	14000	0.0423	32.000 1.2598	31.989 1.2594	38.009 1.4964	38.025 1.4970	0.030 0.066
	32 1.2598	38 1.4961	26.0 1.024	K32X38X26H	33.2 7460	58.8 13220	8800	14000	0.0451	32.000 1.2598	31.989 1.2594	38.009 1.4964	38.025 1.4970	0.037 0.082
	32 1.2598	39 1.5354	16.0 0.630	K32X39X16H	23.0 5170	33.0 7420	8900	14000	0.0382	32.000 1.2598	31.989 1.2594	39.009 1.5358	39.025 1.5364	0.030 0.066
	32 1.2598	39 1.5354	18.0 0.709	K32X39X18H	25.8 5800	38.2 8590	8900	14000	0.0397	32.000 1.2598	31.989 1.2594	39.009 1.5358	39.025 1.5364	0.033 0.073
	32 1.2598	40 1.5748	25.0 0.984	K32X40X25H	37.9 8520	57.2 12860	9000	14000	0.0431	32.000 1.2598	31.989 1.2594	40.009 1.5752	40.025 1.5758	0.052 0.115
	32 1.2598	40 1.5748	36.0 1.417	K32X40X36H	52.3 11760	86.4 19420	9000	14000	0.0477	32.000 1.2598	31.989 1.2594	40.009 1.5752	40.025 1.5758	0.080 0.176

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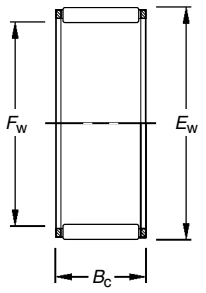
SINGLE-ROW, DOUBLE-ROW ASSEMBLIES — *continued*

METRIC SERIES



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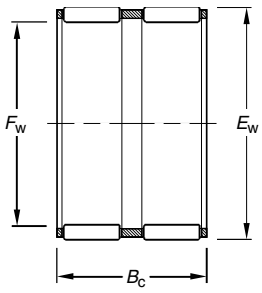

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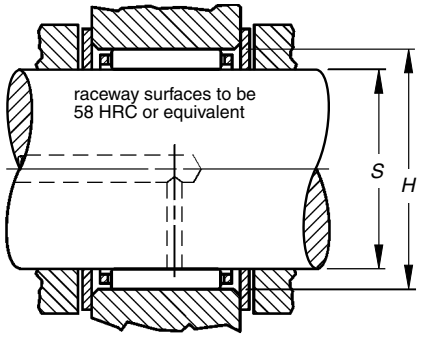


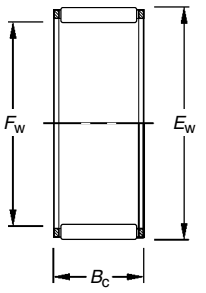
Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	32 1.2598	42 1.6535	42.0 1.654	K32X42X42H	69.2 15560	108 24280	9200	14000	0.0491	32.000 1.2598	31.989 1.2594	42.009 1.6539	42.025 1.6545	0.110 0.243
	32 1.2598	46 1.8110	18.0 0.709	K32X46X18H	39.2 8810	41.9 9420	9600	15000	0.0374	32.000 1.2598	31.989 1.2594	46.009 1.8114	46.025 1.8120	0.075 0.165
	32 1.2598	46 1.8110	32.0 1.260	K32X46X32H	67.0 15060	83.4 18750	9600	15000	0.0444	32.000 1.2598	31.989 1.2594	46.009 1.8114	46.025 1.8120	0.140 0.309
	32 1.2598	46 1.8110	40.0 1.575	K32X46X40H	81.7 18370	108 24280	9600	15000	0.0473	32.000 1.2598	31.989 1.2594	46.009 1.8114	46.025 1.8120	0.158 0.348
33	33 1.2992	51 2.0079	23.0 0.906	K33X51X23H.ZB2	55.9 12570	57.6 12950	9600	15000	0.0401	33.000 1.2992	32.989 1.2988	51.010 2.0083	51.029 2.0090	0.140 0.309
34	34 1.3386	38 1.4961	11.0 0.433	K34X38X11	12.2 2740	21.9 4920	8100	12000	0.0385	34.000 1.3386	33.989 1.3381	38.009 1.4964	38.025 1.4970	0.011 0.024
	34 1.3386	44 1.7323	26.0 1.024	K34X44X26FH	42.9 9640	58.9 13240	8600	13000	0.0433	34.000 1.3386	33.989 1.3381	44.009 1.7326	44.025 1.7333	0.080 0.176
	34 1.3386	44 1.7323	26.0 1.024	K34X44X26FV	42.9 9640	58.9 13240	8600	13000	0.0433	34.000 1.3386	33.989 1.3381	44.009 1.7326	44.025 1.7333	0.075 0.165
35	35 1.3780	40 1.5748	13.0 0.512	K35X40X13H	16.2 3640	27.2 6110	7900	12000	0.0398	35.000 1.3780	34.989 1.3775	40.009 1.5752	40.025 1.5758	0.018 0.040
	35 1.3780	40 1.5748	17.0 0.669	K35X40X17H	22.1 4970	40.8 9170	7900	12000	0.0440	35.000 1.3780	34.989 1.3775	40.009 1.5752	40.025 1.5758	0.025 0.055
	35 1.3780	40 1.5748	19.0 0.748	K35X40X19F.ZB2	23.2 5220	43.2 9710	7900	12000	0.0446	35.000 1.3780	34.989 1.3775	40.009 1.5752	40.025 1.5758	0.025 0.055
	35 1.3780	40 1.5748	19.0 0.748	K35X40X19H.ZB2	23.2 5220	43.2 9710	7900	12000	0.0446	35.000 1.3780	34.989 1.3775	40.009 1.5752	40.025 1.5758	0.025 0.055
	35 1.3780	40 1.5748	25.0 0.984	K35X40X25H	28.4 6380	56.2 12630	7900	12000	0.0476	35.000 1.3780	34.989 1.3775	40.009 1.5752	40.025 1.5758	0.035 0.077
	35 1.3780	40 1.5748	27.0 1.063	K35X40X27H	29.8 6700	59.6 13400	7900	12000	0.0483	35.000 1.3780	34.989 1.3775	40.009 1.5752	40.025 1.5758	0.037 0.082
	35 1.3780	42 1.6535	16.0 0.630	K35X42X16	24.5 5510	36.8 8270	8100	12000	0.0408	35.000 1.3780	34.989 1.3775	42.009 1.6539	42.025 1.6545	0.032 0.071
	35 1.3780	42 1.6535	16.0 0.630	K35X42X16AH	24.5 5510	36.8 8270	8100	12000	0.0408	35.000 1.3780	34.989 1.3775	42.009 1.6539	42.025 1.6545	0.031 0.068
	35 1.3780	42 1.6535	18.0 0.709	K35X42X18	27.5 6180	42.6 9580	8100	12000	0.0423	35.000 1.3780	34.989 1.3775	42.009 1.6539	42.025 1.6545	0.035 0.077
	35 1.3780	42 1.6535	20.0 0.787	K35X42X20H	30.4 6830	48.5 10900	8100	12000	0.0437	35.000 1.3780	34.989 1.3775	42.009 1.6539	42.025 1.6545	0.037 0.082
	35 1.3780	42 1.6535	30.0 1.181	K35X42X30FH	40.5 9100	70.0 15740	8100	12000	0.0479	35.000 1.3780	34.989 1.3775	42.009 1.6539	42.025 1.6545	0.061 0.134
	35 1.3780	45 1.7717	20.0 0.787	K35X45X20FH	36.5 8210	49.9 11220	8400	13000	0.0421	35.000 1.3780	34.989 1.3775	45.009 1.7720	45.025 1.7726	0.059 0.130
	35 1.3780	45 1.7717	30.0 1.181	K35X45X30F	51.2 11510	74.5 16750	8400	13000	0.0465	35.000 1.3780	34.989 1.3775	45.009 1.7720	45.025 1.7726	0.100 0.220
	35 1.3780	45 1.7717	35.0 1.378	K35X45X35H	62.1 13960	95.5 21470	8400	13000	0.0494	35.000 1.3780	34.989 1.3775	45.009 1.7720	45.025 1.7726	0.085 0.187
	35 1.3780	45 1.7717	41.0 1.614	K35X45X41	70.8 15920	113 25400	8400	13000	0.0515	35.000 1.3780	34.989 1.3775	45.009 1.7720	45.025 1.7726	0.120 0.265

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	35 1.3780	45 1.7717	49.0 1.929	K35X45X49H	82.5 18550	138 31020	8400	13000	0.0541	35.000 1.3780	34.989 1.3775	45.009 1.7720	45.025 1.7726	0.143 0.315
	35 1.3780	45 1.7717	49.0 1.929	K35X45X49HZW	71.8 16140	115 25850	8400	13000	0.0518	35.000 1.3780	34.989 1.3775	45.009 1.7720	45.025 1.7726	0.143 0.315
	35 1.3780	48 1.8898	22.8 0.898	K35X48X22,8H.ZB2	47.6 10700	57.4 12900	8600	13000	0.0423	35.000 1.3780	34.989 1.3775	48.009 1.8901	48.025 1.8907	0.100 0.220
	35 1.3780	50 1.9685	40.0 1.575	K35X50X40F	79.7 17920	102 22930	8700	13000	0.0480	35.000 1.3780	34.989 1.3775	50.009 1.9689	50.025 1.9695	0.200 0.441
36	36 1.4173	40 1.5748	29.0 1.142	K36X40X29TN	21.2 4770	45.2 10160	7600	12000	—	36.000 1.4173	35.989 1.4169	40.009 1.5752	40.025 1.5758	0.029 0.064
	36 1.4173	42 1.6535	16.0 0.630	K36X42X16	22.8 5130	37.7 8480	7800	12000	0.0425	36.000 1.4173	35.989 1.4169	42.009 1.6539	42.025 1.6545	0.027 0.060
	36 1.4173	44 1.7323	27.5 1.083	K36X44X27,5H	42.8 9620	69.2 15560	7900	12000	0.0475	36.000 1.4173	35.989 1.4169	44.009 1.7326	44.025 1.7333	0.064 0.14
37	37 1.4567	42 1.6535	13.0 0.512	K37X42X13H	16.9 3800	29.4 6610	7500	11000	0.0416	37.000 1.4567	36.989 1.4563	42.009 1.6539	42.025 1.6545	0.017 0.037
	37 1.4567	42 1.6535	17.0 0.669	K37X42X17H	21.9 4920	41.0 9220	7500	11000	0.0451	37.000 1.4567	36.989 1.4563	42.009 1.6539	42.025 1.6545	0.025 0.055
	37 1.4567	42 1.6535	27.0 1.063	K37X42X27F	32.1 7220	66.9 15040	7500	11000	0.0510	37.000 1.4567	36.989 1.4563	42.009 1.6539	42.025 1.6545	0.039 0.086
	37 1.4567	44 1.7323	19.0 0.748	K37X44X19H	29.7 6680	48.0 10790	7600	12000	0.0447	37.000 1.4567	36.989 1.4563	44.009 1.7326	44.025 1.7333	0.039 0.086
38	38 1.4961	41 1.6142	9.0 0.354	K38X41X9TN	5.93 1330	11.0 2470	7100	11000	—	38.000 1.4961	37.989 1.4956	41.009 1.6145	41.025 1.6152	0.004 0.009
	38 1.4961	43 1.6929	17.0 0.669	K38X43X17F	21.8 4900	41.0 9220	7300	11000	0.0457	38.000 1.4961	37.989 1.4956	43.009 1.6933	43.025 1.6939	0.032 0.071
	38 1.4961	43 1.6929	17.0 0.669	K38X43X17H	21.8 4900	41.0 9220	7300	11000	0.0457	38.000 1.4961	37.989 1.4956	43.009 1.6933	43.025 1.6939	0.032 0.071
	38 1.4961	43 1.6929	27.0 1.063	K38X43X27	31.9 7170	67.0 15060	7300	11000	0.0516	38.000 1.4961	37.989 1.4956	43.009 1.6933	43.025 1.6939	0.041 0.090
	38 1.4961	46 1.8110	19.8 0.780	K38X46X20	33.3 7490	51.0 11470	7500	12000	0.0450	38.000 1.4961	37.989 1.4956	46.009 1.8114	46.025 1.8120	0.055 0.121
	38 1.4961	46 1.8110	19.8 0.780	K38X46X20H	33.3 7490	51.0 11470	7500	12000	0.0450	38.000 1.4961	37.989 1.4956	46.009 1.8114	46.025 1.8120	0.055 0.121
	38 1.4961	46 1.8110	32.0 1.260	K38X46X32FV1	53.7 12070	94.6 21270	7500	12000	0.0525	38.000 1.4961	37.989 1.4956	46.009 1.8114	46.025 1.8120	0.080 0.176
	38 1.4961	46 1.8110	32.0 1.260	K38X46X32H	55.2 12410	98.1 22050	7500	12000	0.0530	38.000 1.4961	37.989 1.4956	46.009 1.8114	46.025 1.8120	0.090 0.198
	38 1.4961	50 1.9685	25.0 0.984	K38X50X25	53.0 11910	70.8 15920	7800	12000	0.0464	38.000 1.4961	37.989 1.4956	50.009 1.9689	50.025 1.9695	0.100 0.220
	38 1.4961	50 1.9685	33.0 1.299	K38X50X33H	68.3 15350	98.2 22080	7800	12000	0.0504	38.000 1.4961	37.989 1.4956	50.009 1.9689	50.025 1.9695	0.126 0.278
	38 1.4961	50 1.9685	40.0 1.575	K38X50X40FCH1	76.2 17130	113 25400	7800	12000	0.0521	38.000 1.4961	37.989 1.4956	50.009 1.9689	50.025 1.9695	0.170 0.375
40	40 1.5748	45 1.7717	13.0 0.512	K40X45X13H	17.6 3960	31.7 7130	6900	11000	0.0438	40.000 1.5748	39.989 1.5744	45.009 1.7720	45.025 1.7726	0.022 0.049
	40 1.5748	45 1.7717	17.0 0.669	K40X45X17CH	19.2 4320	35.3 7940	6900	11000	0.0450	40.000 1.5748	39.989 1.5744	45.009 1.7720	45.025 1.7726	0.027 0.060
	40 1.5748	45 1.7717	17.0 0.669	K40X45X17H	23.8 5350	47.0 10570	6900	11000	0.0484	40.000 1.5748	39.989 1.5744	45.009 1.7720	45.025 1.7726	0.030 0.066
	40 1.5748	45 1.7717	18.0 0.709	K40X45X18H	25.1 5640	50.4 11330	6900	11000	0.0492	40.000 1.5748	39.989 1.5744	45.009 1.7720	45.025 1.7726	0.031 0.068
	40 1.5748	45 1.7717	21.0 0.827	K40X45X21CH	23.3 5240	45.2 10160	6900	11000	0.0479	40.000 1.5748	39.989 1.5744	45.009 1.7720	45.025 1.7726	0.033 0.073
	40 1.5748	45 1.7717	27.0 1.063	K40X45X27H	32.7 7350	70.2 15780	6900	11000	0.0534	40.000 1.5748	39.989 1.5744	45.009 1.7720	45.025 1.7726	0.040 0.088
	40 1.5748	45 1.7717	27.0 1.063	K40X45X27TN	33.3 7490	72.1 16210	6900	11000	0.0538	40.000 1.5748	39.989 1.5744	45.009 1.7720	45.025 1.7726	0.030 0.066

Continued on next page.

SINGLE-ROW, DOUBLE-ROW ASSEMBLIES — *continued*

METRIC SERIES



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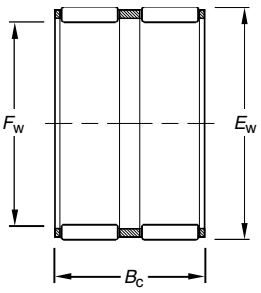

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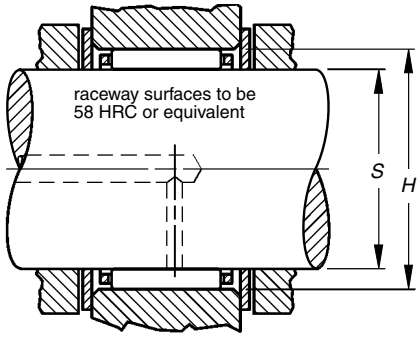

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	40 1.5748	45 1.7717	29.0 1.142	K40X45X29H	34.7 7800	75.9 17060	6900	11000	0.0545	40.000 1.5748	39.989 1.5744	45.009 1.7720	45.025 1.7726	0.050 0.110
	40 1.5748	46 1.8110	17.0 0.669	K40X46X17	25.2 5670	44.0 9890	7000	11000	0.0464	40.000 1.5748	39.989 1.5744	46.009 1.8114	46.025 1.8120	0.033 0.073
	40 1.5748	47 1.8504	18.0 0.709	K40X47X18	28.0 6290	45.6 10250	7000	11000	0.0456	40.000 1.5748	39.989 1.5744	47.009 1.8507	47.025 1.8514	0.041 0.090
	40 1.5748	47 1.8504	20.0 0.787	K40X47X20	31.1 6990	52.1 11710	7000	11000	0.0472	40.000 1.5748	39.989 1.5744	47.009 1.8507	47.025 1.8514	0.042 0.093
	40 1.5748	48 1.8898	20.0 0.787	K40X48X20FV1	35.5 7980	56.3 12660	7100	11000	0.0472	40.000 1.5748	39.989 1.5744	48.009 1.8901	48.025 1.8907	0.052 0.115
	40 1.5748	48 1.8898	20.0 0.787	K40X48X20H	35.5 7980	56.3 12660	7100	11000	0.0472	40.000 1.5748	39.989 1.5744	48.009 1.8901	48.025 1.8907	0.050 0.110
	40 1.5748	48 1.8898	35.0 1.378	K40X48X35H.ZB2	57.3 12880	104 23380	7100	11000	0.0550	40.000 1.5748	39.989 1.5744	48.009 1.8901	48.025 1.8907	0.098 0.216
	40 1.5748	50 1.9685	27.0 1.063	K40X50X27H	53.0 11910	81.0 18210	7200	11000	0.0502	40.000 1.5748	39.989 1.5744	50.009 1.9689	50.025 1.9695	0.084 0.185
	40 1.5748	55 2.1654	45.0 1.772	K40X55X45H	103 23160	146 32820	7500	12000	0.0554	40.000 1.5748	39.989 1.5744	55.010 2.1657	55.029 2.1665	0.221 0.487
	40 1.5748	56 2.2047	26.0 1.024	K40X56X26H	63.7 14320	75.7 17020	7600	12000	0.0467	40.000 1.5748	39.989 1.5744	56.010 2.2051	56.029 2.2059	0.138 0.304
41	41 1.6142	48 1.8898	31.0 1.220	K41X48X31HZW	38.0 8540	68.1 15310	6800	11000	0.0510	41.000 1.6142	40.989 1.6137	48.009 1.8901	48.025 1.8907	0.067 0.148
42	42 1.6535	47 1.8504	13.0 0.512	K42X47X13H	18.7 4200	34.9 7850	6500	10000	0.0459	42.000 1.6535	41.989 1.6531	47.009 1.8507	47.025 1.8514	0.027 0.060
	42 1.6535	47 1.8504	17.0 0.669	K42X47X17H	22.8 5130	45.2 10160	6500	10000	0.0490	42.000 1.6535	41.989 1.6531	47.009 1.8507	47.025 1.8514	0.028 0.062
	42 1.6535	47 1.8504	27.0 1.063	K42X47X27FH	33.8 7600	74.7 16790	6500	10000	0.0555	42.000 1.6535	41.989 1.6531	47.009 1.8507	47.025 1.8514	0.041 0.09
	42 1.6535	47 1.8504	27.0 1.063	K42X47X27H	33.8 7600	74.7 16790	6500	10000	0.0555	42.000 1.6535	41.989 1.6531	47.009 1.8507	47.025 1.8514	0.041 0.090
	42 1.6535	48 1.8898	24.0 0.945	K42X48X24F	33.1 7440	63.9 14370	6600	10000	0.0519	42.000 1.6535	41.989 1.6531	48.009 1.8901	48.025 1.8907	0.046 0.101
	42 1.6535	50 1.9685	13.0 0.512	K42X50X13H	20.9 4700	28.9 6500	6700	10000	0.0409	42.000 1.6535	41.989 1.6531	50.009 1.9689	50.025 1.9695	0.035 0.077
	42 1.6535	50 1.9685	20.0 0.787	K42X50X20H	35.2 7910	56.6 12720	6700	10000	0.0483	42.000 1.6535	41.989 1.6531	50.009 1.9689	50.025 1.9695	0.054 0.119
	42 1.6535	50 1.9685	30.0 1.181	K42X50X30H.ZB2	51.3 11530	91.9 20660	6700	10000	0.0545	42.000 1.6535	41.989 1.6531	50.009 1.9689	50.025 1.9695	0.080 0.176
	42 1.6535	54 2.1260	30.7 1.209	K42X54X30,7H	62.7 14100	90.1 20260	7000	11000	0.0514	42.000 1.6535	41.989 1.6531	54.010 2.1264	54.029 2.1271	0.140 0.309
43	43 1.6929	48 1.8898	17.0 0.669	K43X48X17FH	23.0 5170	45.8 10300	6400	9800	0.0496	43.000 1.6929	42.989 1.6925	48.009 1.8901	48.025 1.8907	0.036 0.079
	43 1.6929	48 1.8898	27.0 1.063	K43X48X27H	34.8 7820	78.0 17540	6400	9800	0.0567	43.000 1.6929	42.989 1.6925	48.009 1.8901	48.025 1.8907	0.050 0.110
44	44 1.7323	50 1.9685	22.0 0.866	K44X50X22	31.6 7100	60.6 13620	6400	9900	0.0523	44.000 1.7323	43.989 1.7319	50.009 1.9689	50.025 1.9695	0.046 0.101

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	44 1.7323	50 1.9685	22.0 0.866	K44X50X22H	31.6 7100	60.6 13620	6400	9900	0.0523	44.000 1.7323	43.989 1.7319	50.009 1.9689	50.025 1.9695	0.046 0.101
	44 1.7323	50 1.9685	30.5 1.201	K44X50X30,5HZW	35.5 7980	70.5 15850	6400	9900	0.0543	44.000 1.7323	43.989 1.7319	50.009 1.9689	50.025 1.9695	0.068 0.150
45	45 1.7717	50 1.9685	13.0 0.512	K45X50X13H	18.4 4140	35.1 7890	6100	9400	0.0474	45.000 1.7717	44.989 1.7712	50.009 1.9689	50.025 1.9695	0.022 0.049
	45 1.7717	50 1.9685	15.0 0.591	K45X50X15FVB	19.4 4360	37.3 8390	6100	9400	0.0482	45.000 1.7717	44.989 1.7712	50.009 1.9689	50.025 1.9695	0.028 0.062
	45 1.7717	50 1.9685	17.0 0.669	K45X50X17H	24.9 5600	51.8 11650	6100	9400	0.0523	45.000 1.7717	44.989 1.7712	50.009 1.9689	50.025 1.9695	0.030 0.066
	45 1.7717	50 1.9685	20.0 0.787	K45X50X20F	27.0 6070	57.4 12900	6100	9400	0.0536	45.000 1.7717	44.989 1.7712	50.009 1.9689	50.025 1.9695	0.040 0.088
	45 1.7717	50 1.9685	21.0 0.827	K45X50X21CH	24.6 5530	50.4 11330	6100	9400	0.0519	45.000 1.7717	44.989 1.7712	50.009 1.9689	50.025 1.9695	0.036 0.079
	45 1.7717	50 1.9685	27.0 1.063	K45X50X27FH.ZB2	34.2 7690	77.4 17400	6100	9400	0.0577	45.000 1.7717	44.989 1.7712	50.009 1.9689	50.025 1.9695	0.043 0.095
	45 1.7717	50 1.9685	27.0 1.063	K45X50X27TN	31.8 7150	70.7 15890	6100	9400	—	45.000 1.7717	44.989 1.7712	50.009 1.9689	50.025 1.9695	0.048 0.106
	45 1.7717	52 2.0472	18.0 0.709	K45X52X18H	30.1 6770	52.0 11690	6200	9500	0.0497	45.000 1.7717	44.989 1.7712	52.010 2.0476	52.029 2.0484	0.045 0.099
	45 1.7717	52 2.0472	21.0 0.827	K45X52X21F	35.0 7870	63.2 14210	6200	9500	0.0521	45.000 1.7717	44.989 1.7712	52.010 2.0476	52.029 2.0484	0.055 0.121
	45 1.7717	53 2.0866	19.8 0.780	K45X53X20FH.ZB2	36.0 8090	59.5 13380	6200	9600	0.0504	45.000 1.7717	44.989 1.7712	53.010 2.0870	53.029 2.0878	0.060 0.132
	45 1.7717	53 2.0866	20.0 0.787	K45X53X20H	36.0 8090	59.5 13380	6200	9600	0.0504	45.000 1.7717	44.989 1.7712	53.010 2.0870	53.029 2.0878	0.054 0.119
	45 1.7717	53 2.0866	24.8 0.976	K45X53X25H	45.9 10320	81.5 18320	6200	9600	0.0545	45.000 1.7717	44.989 1.7712	53.010 2.0870	53.029 2.0878	0.072 0.159
	45 1.7717	53 2.0866	25.0 0.984	K45X53X25F	42.5 9550	73.7 16570	6200	9600	0.0531	45.000 1.7717	44.989 1.7712	53.010 2.0870	53.029 2.0878	0.075 0.165
	45 1.7717	53 2.0866	28.0 1.102	K45X53X28H	49.3 11080	89.2 20050	6200	9600	0.0557	45.000 1.7717	44.989 1.7712	53.010 2.0870	53.029 2.0878	0.078 0.172
	45 1.7717	55 2.1654	20.0 0.787	K45X55X20H	42.0 9440	62.2 13980	6400	9800	0.0494	45.000 1.7717	44.989 1.7712	55.010 2.1657	55.029 2.1665	0.074 0.163
	45 1.7717	59 2.3228	18.0 0.709	K45X59X18H	47.8 10750	58.9 13240	6600	10000	0.0467	45.000 1.7717	44.989 1.7712	59.010 2.3232	59.029 2.3240	0.107 0.236
	45 1.7717	59 2.3228	18.0 0.709	K45X59X18TN	45.7 10270	55.4 12450	6600	10000	—	45.000 1.7717	44.989 1.7712	59.010 2.3232	59.029 2.3240	0.097 0.214
	45 1.7717	59 2.3228	36.0 1.417	K45X59X36H	82.4 18520	118 26530	6600	10000	0.0555	45.000 1.7717	44.989 1.7712	59.010 2.3232	59.029 2.3240	0.181 0.399
	45 1.7717	60 2.3622	30.0 1.181	K45X60X30H	75.5 16970	101 22710	6600	10000	0.0530	45.000 1.7717	44.989 1.7712	60.010 2.3626	60.029 2.3633	0.171 0.377
	45 1.7717	60 2.3622	45.0 1.772	K45X60X45H	108 24280	160 35970	6600	10000	0.0594	45.000 1.7717	44.989 1.7712	60.010 2.3626	60.029 2.3633	0.280 0.617
46	46 1.8110	53 2.0866	36.0 1.417	K46X53X36HZW	48.6 10930	96.7 21740	6100	9300	0.0585	46.000 1.8110	45.989 1.8106	53.010 2.0870	53.029 2.0878	0.100 0.220
47	47 1.8504	52 2.0472	15.0 0.591	K47X52X15FH	20.1 4520	39.8 8950	5800	8900	0.0499	47.000 1.8504	46.989 1.8500	52.010 2.0476	52.029 2.0484	0.030 0.066
	47 1.8504	52 2.0472	17.0 0.669	K47X52X17H	24.2 5440	50.4 11330	5800	8900	0.0529	47.000 1.8504	46.989 1.8500	52.010 2.0476	52.029 2.0484	0.032 0.071
	47 1.8504	52 2.0472	26.8 1.055	K47X52X27FH	35.4 7960	82.4 18520	5800	8900	0.0598	47.000 1.8504	46.989 1.8500	52.010 2.0476	52.029 2.0484	0.045 0.099
	47 1.8504	52 2.0472	27.0 1.063	K47X52X27H	36.6 8230	85.9 19310	5800	8900	0.0604	47.000 1.8504	46.989 1.8500	52.010 2.0476	52.029 2.0484	0.045 0.099
	47 1.8504	55 2.1654	28.0 1.102	K47X55X28FV1	48.9 10990	89.5 20120	6000	9200	0.0568	47.000 1.8504	46.989 1.8500	55.010 2.1657	55.029 2.1665	0.092 0.203
48	48 1.8898	53 2.0866	17.0 0.669	K48X53X17H	25.7 5780	54.9 12340	5700	8700	0.0546	48.000 1.8898	47.989 1.8893	53.010 2.0870	53.029 2.0878	0.032 0.071

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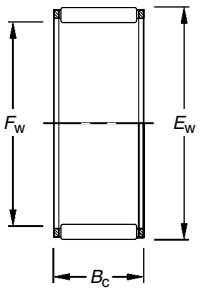
SINGLE-ROW, DOUBLE-ROW ASSEMBLIES — *continued*

METRIC SERIES



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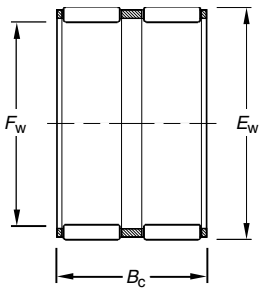

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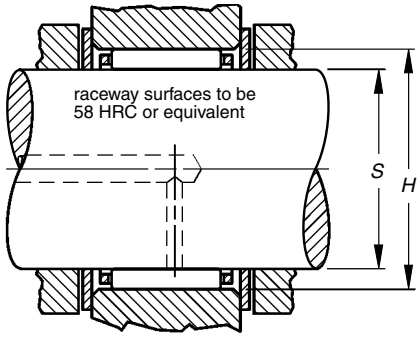

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	48 1.8898	54 2.1260	19.0 0.748	K48X54X19H.ZB2	30.9 6950	61.2 13760	5700	8800	0.0545	48.000 1.8898	47.989 1.8893	54.010 2.1264	54.029 2.1271	0.042 0.093
49	49 1.9291	55 2.1654	32.0 1.260	K49X55X32HZW	40.2 9040	86.4 19420	5600	8600	0.0599	49.000 1.9291	48.989 1.9287	55.010 2.1657	55.029 2.1665	0.080 0.176
	49 1.9291	65 2.5591	38.0 1.496	K49X65X38H	100 22480	142 31920	6100	9300	0.0593	49.000 1.9291	48.989 1.9287	65.010 2.5594	65.029 2.5602	0.244 0.538
50	50 1.9685	55 2.1654	17.0 0.669	K50X55X17H	25.5 5730	55.0 12360	5400	8400	0.0557	50.000 1.9685	49.989 1.9681	55.010 2.1657	55.029 2.1665	0.032 0.071
	50 1.9685	55 2.1654	20.0 0.787	K50X55X20H	30.2 6790	68.5 15400	5400	8400	0.0588	50.000 1.9685	49.989 1.9681	55.010 2.1657	55.029 2.1665	0.038 0.084
	50 1.9685	55 2.1654	30.0 1.181	K50X55X30	38.2 8590	92.4 20770	5400	8400	0.0633	50.000 1.9685	49.989 1.9681	55.010 2.1657	55.029 2.1665	0.057 0.12
	50 1.9685	55 2.1654	30.0 1.181	K50X55X30FV1	38.2 8590	92.4 20770	5400	8400	0.0633	50.000 1.9685	49.989 1.9681	55.010 2.1657	55.029 2.1665	0.057 0.126
	50 1.9685	56 2.2047	23.0 0.906	K50X56X23	35.5 7980	74.1 16660	5500	8500	0.0582	50.000 1.9685	49.989 1.9681	56.010 2.2051	56.029 2.2059	0.051 0.112
	50 1.9685	57 2.2441	18.0 0.709	K50X57X18FH	31.3 7040	56.4 12680	5500	8500	0.0531	50.000 1.9685	49.989 1.9681	57.010 2.2445	57.029 2.2452	0.050 0.110
	50 1.9685	58 2.2835	20.0 0.787	K50X58X20H	38.8 8720	67.8 15240	5600	8600	0.0545	50.000 1.9685	49.989 1.9681	58.010 2.2839	58.029 2.2846	0.065 0.143
	50 1.9685	58 2.2835	25.0 0.984	K50X58X25H	46.5 10450	85.6 19240	5600	8600	0.0577	50.000 1.9685	49.989 1.9681	58.010 2.2839	58.029 2.2846	0.081 0.179
	50 1.9685	58 2.2835	35.0 1.378	K50X58X35H	64.9 14590	131 29450	5600	8600	0.0642	50.000 1.9685	49.989 1.9681	58.010 2.2839	58.029 2.2846	0.105 0.231
	50 1.9685	62 2.4409	30.0 1.181	K50X62X30H.ZB2	64.6 14520	98.1 22050	5800	8900	0.0565	50.000 1.9685	49.989 1.9681	62.010 2.4413	62.029 2.4421	0.136 0.300
	50 1.9685	66 2.5984	30.0 1.181	K50X66X30H	80.9 18190	109 24500	5900	9100	0.0559	50.000 1.9685	49.989 1.9681	66.010 2.5988	66.029 2.5996	0.192 0.423
	50 1.9685	70 2.7559	32.0 1.260	K50X70X32H	103 23160	129 29000	6100	9300	0.0569	50.000 1.9685	49.989 1.9681	70.010 2.7563	70.029 2.7570	0.224 0.494
52	52 2.0472	57 2.2441	12.0 0.472	K52X57X12	18.4 4140	36.7 8250	5200	8000	0.0512	52.000 2.0472	51.987 2.0467	57.010 2.2445	57.029 2.2452	0.022 0.049
	52 2.0472	57 2.2441	17.0 0.669	K52X57X17FCH	21.4 4810	44.3 9960	5200	8000	0.0537	52.000 2.0472	51.987 2.0467	57.010 2.2445	57.029 2.2452	0.035 0.077
	52 2.0472	57 2.2441	17.0 0.669	K52X57X17H	21.4 4810	44.3 9960	5200	8000	0.0537	52.000 2.0472	51.987 2.0467	57.010 2.2445	57.029 2.2452	0.035 0.077
	52 2.0472	60 2.3622	24.0 0.945	K52X60X24	47.1 10600	88.3 19900	5400	8200	0.0592	52.000 2.0472	51.987 2.0467	60.010 2.3626	60.029 2.3633	0.078 0.172
55	55 2.1654	60 2.3622	17.0 0.669	K55X60X17	26.0 5850	58.3 13100	4900	7600	0.0590	55.000 2.1654	54.987 2.1648	60.010 2.3626	60.029 2.3633	0.037 0.082
	55 2.1654	60 2.3622	20.0 0.787	K55X60X20H	30.7 6900	72.4 16300	4900	7600	0.0622	55.000 2.1654	54.987 2.1648	60.010 2.3626	60.029 2.3633	0.042 0.093
	55 2.1654	60 2.3622	27.0 1.063	K55X60X27H	40.1 9010	102 22900	4900	7600	0.0677	55.000 2.1654	54.987 2.1648	60.010 2.3626	60.029 2.3633	0.055 0.121
	55 2.1654	60 2.3622	30.0 1.181	K55X60X30	40.6 9130	103 23200	4900	7600	0.0680	55.000 2.1654	54.987 2.1648	60.010 2.3626	60.029 2.3633	0.066 0.146

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	55 2.1654	60 2.3622	30.0 1.181	K55X60X30FH	40.6 9130	103 23200	4900	7600	0.0680	55.000 2.1654	54.987 2.1648	60.010 2.3626	60.029 2.3633	0.068 0.150
	55 2.1654	61 2.4016	26.0 1.024	K55X61X26H	44.3 9960	102 22900	5000	7600	0.0657	55.000 2.1654	54.987 2.1648	61.010 2.4020	61.029 2.4027	0.063 0.139
	55 2.1654	62 2.4409	18.0 0.709	K55X62X18H	33.2 7460	62.8 14100	5000	7700	0.0569	55.000 2.1654	54.987 2.1648	62.010 2.4413	62.029 2.4421	0.055 0.121
	55 2.1654	63 2.4803	15.0 0.591	K55X63X15F	30.5 6860	51.5 11600	5000	7800	0.0531	55.000 2.1654	54.987 2.1648	63.010 2.4807	63.029 2.4815	0.054 0.119
	55 2.1654	63 2.4803	20.0 0.787	K55X63X20	40.3 9060	73.5 16500	5000	7800	0.0580	55.000 2.1654	54.987 2.1648	63.010 2.4807	63.029 2.4815	0.072 0.159
	55 2.1654	63 2.4803	25.0 0.984	K55X63X25	49.8 11200	96.5 21700	5000	7800	0.0621	55.000 2.1654	54.987 2.1648	63.010 2.4807	63.029 2.4815	0.080 0.176
	55 2.1654	63 2.4803	32.0 1.260	K55X63X32	62.3 14000	129 29000	5000	7800	0.0667	55.000 2.1654	54.987 2.1648	63.010 2.4807	63.029 2.4815	0.108 0.238
58	58 2.2835	63 2.4803	17.0 0.669	K58X63X17F	27.0 6070	62.6 14100	4700	7200	0.0615	58.000 2.2835	57.987 2.2830	63.010 2.4807	63.029 2.4815	0.037 0.082
	58 2.2835	64 2.5197	19.0 0.748	K58X64X19H	32.9 7400	70.6 15900	4700	7200	0.0615	58.000 2.2835	57.987 2.2830	64.010 2.5201	64.029 2.5208	0.037 0.082
	58 2.2835	65 2.5591	18.0 0.709	K58X65X18H	34.3 7710	67.1 15100	4700	7300	0.0593	58.000 2.2835	57.987 2.2830	65.010 2.5594	65.029 2.5602	0.058 0.128
60	60 2.3622	65 2.5591	20.0 0.787	K60X65X20H	31.9 7170	78.1 17600	4500	6900	0.0660	60.000 2.3622	59.987 2.3617	65.010 2.5594	65.029 2.5602	0.046 0.101
	60 2.3622	65 2.5591	26.8 1.055	K60X65X27FH	39.5 8880	103 23200	4500	6900	0.0707	60.000 2.3622	59.987 2.3617	65.010 2.5594	65.029 2.5602	0.059 0.130
	60 2.3622	65 2.5591	29.8 1.173	K60X65X30FH	42.9 9640	114 25600	4500	6900	0.0726	60.000 2.3622	59.987 2.3617	65.010 2.5594	65.029 2.5602	0.085 0.187
	60 2.3622	65 2.5591	30.0 1.181	K60X65X30	42.9 9640	114 25600	4500	6900	0.0726	60.000 2.3622	59.987 2.3617	65.010 2.5594	65.029 2.5602	0.070 0.154
	60 2.3622	68 2.6772	17.0 0.669	K60X68X17F	34.2 7690	61.4 13800	4600	7100	0.0577	60.000 2.3622	59.987 2.3617	68.010 2.6776	68.029 2.6783	0.066 0.146
	60 2.3622	68 2.6772	20.0 0.787	K60X68X20H	41.8 9400	79.2 17800	4600	7100	0.0614	60.000 2.3622	59.987 2.3617	68.010 2.6776	68.029 2.6783	0.066 0.146
	60 2.3622	68 2.6772	23.0 0.906	K60X68X23F	49.0 11000	97.2 21900	4600	7100	0.0646	60.000 2.3622	59.987 2.3617	68.010 2.6776	68.029 2.6783	0.089 0.196
	60 2.3622	68 2.6772	23.0 0.906	K60X68X23FH	49.0 11000	97.2 21900	4600	7100	0.0646	60.000 2.3622	59.987 2.3617	68.010 2.6776	68.029 2.6783	0.089 0.196
	60 2.3622	68 2.6772	23.0 0.906	K60X68X23H	49.0 11000	97.2 21900	4600	7100	0.0646	60.000 2.3622	59.987 2.3617	68.010 2.6776	68.029 2.6783	0.089 0.196
	60 2.3622	68 2.6772	25.0 0.984	K60X68X25	51.6 11600	104 23400	4600	7100	0.0657	60.000 2.3622	59.987 2.3617	68.010 2.6776	68.029 2.6783	0.091 0.201
	60 2.3622	68 2.6772	30.0 1.181	K60X68X30ZW	46.4 10400	90.1 20300	4600	7100	0.0634	60.000 2.3622	59.987 2.3617	68.010 2.6776	68.029 2.6783	0.119 0.262
63	63 2.4803	71 2.7953	20.0 0.787	K63X71X20	41.4 9310	79.4 17800	4400	6700	0.0628	63.000 2.4803	62.987 2.4798	71.010 2.7957	71.029 2.7964	0.070 0.154
64	64 2.5197	70 2.7559	16.0 0.630	K64X70X16	26.4 5930	55.1 12400	4200	6500	0.0605	64.000 2.5197	63.987 2.5192	70.010 2.7563	70.029 2.7570	0.049 0.108
65	65 2.5591	70 2.7559	20.0 0.787	K65X70X20CH	28.6 6430	69.2 15600	4100	6400	0.0665	65.000 2.5591	64.987 2.5585	70.010 2.7563	70.029 2.7570	0.050 0.110
	65 2.5591	70 2.7559	20.0 0.787	K65X70X20F	31.5 7080	78.9 17700	4100	6400	0.0687	65.000 2.5591	64.987 2.5585	70.010 2.7563	70.029 2.7570	0.050 0.110
	65 2.5591	70 2.7559	20.0 0.787	K65X70X20H	31.5 7080	78.9 17700	4100	6400	0.0687	65.000 2.5591	64.987 2.5585	70.010 2.7563	70.029 2.7570	0.050 0.110
	65 2.5591	70 2.7559	30.0 1.181	K65X70X30	44.4 9980	123 27700	4100	6400	0.0766	65.000 2.5591	64.987 2.5585	70.010 2.7563	70.029 2.7570	0.075 0.165
	65 2.5591	73 2.8740	23.0 0.906	K65X73X23H	48.2 10800	97.7 22000	4200	6500	0.0671	65.000 2.5591	64.987 2.5585	73.010 2.8744	73.029 2.8752	0.091 0.201
	65 2.5591	73 2.8740	30.0 1.181	K65X73X30H	60.1 13500	129 29100	4200	6500	0.0719	65.000 2.5591	64.987 2.5585	73.010 2.8744	73.029 2.8752	0.116 0.256

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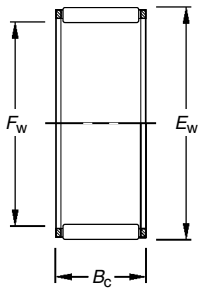
SINGLE-ROW, DOUBLE-ROW ASSEMBLIES — *continued*

METRIC SERIES



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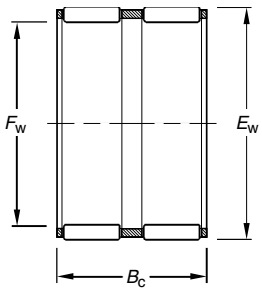

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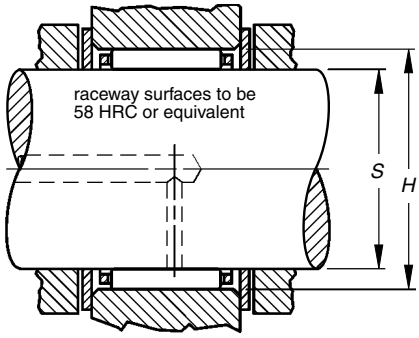


Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Grease	Limiting Speed Oil		Mounting Dimensions mm/in. Max.	Mounting Dimensions mm/in. Min.	Mounting Dimensions mm/in. Min.	Mounting Dimensions mm/in. Max.	Wt. kg/lbs.
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
68	68 2.6772	74 2.9134	20.0 0.787	K68X74X20FH	37.5 8430	88.1 19800	4000	6100	0.0699	68.000 2.6772	67.987 2.6767	74.010 2.9138	74.029 2.9145	0.062 0.137
	68 2.6772	74 2.9134	28.0 1.102	K68X74X28CH	44.8 10100	110 24700	4000	6100	0.0739	68.000 2.6772	67.987 2.6767	74.010 2.9138	74.029 2.9145	0.082 0.181
	68 2.6772	74 2.9134	30.0 1.181	K68X74X30H	47.6 10700	119 26800	4000	6100	0.0754	68.000 2.6772	67.987 2.6767	74.010 2.9138	74.029 2.9145	0.098 0.216
	68 2.6772	74 2.9134	35.0 1.378	K68X74X35HZW	45.1 10100	111 25000	4000	6100	0.0740	68.000 2.6772	67.987 2.6767	74.010 2.9138	74.029 2.9145	0.120 0.265
	68 2.6772	76 2.9921	20.0 0.787	K68X76X20	43.8 9850	87.8 19700	4000	6200	0.0667	68.000 2.6772	67.987 2.6767	76.010 2.9925	76.029 2.9933	0.086 0.190
	68 2.6772	82 3.2283	38.5 1.516	K68X82X38,5H	117 26300	209 47000	4200	6400	0.0761	68.000 2.6772	67.987 2.6767	82.012 3.2288	82.034 3.2297	0.320 0.705
70	70 2.7559	76 2.9921	20.0 0.787	K70X76X20	36.1 8120	84.7 19000	3900	5900	0.0702	70.000 2.7559	69.987 2.7554	76.010 2.9925	76.029 2.9933	0.065 0.143
	70 2.7559	76 2.9921	30.0 1.181	K70X76X30	51.6 11600	134.0 30100	3900	5900	0.0786	70.000 2.7559	69.987 2.7554	76.010 2.9925	76.029 2.9933	0.097 0.214
	70 2.7559	78 3.0709	20.0 0.787	K70X78X20H	43.6 9800	87.9 19800	3900	6000	0.0676	70.000 2.7559	69.987 2.7554	78.010 3.0713	78.029 3.0720	0.090 0.198
	70 2.7559	78 3.0709	23.0 0.906	K70X78X23F	49.8 11200	104.0 23400	3900	6000	0.0705	70.000 2.7559	69.987 2.7554	78.010 3.0713	78.029 3.0720	0.115 0.254
	70 2.7559	78 3.0709	24.8 0.976	K70X78X25F	49.8 11200	104.0 23400	3900	6000	0.0705	70.000 2.7559	69.987 2.7554	78.010 3.0713	78.029 3.0720	0.115 0.254
	70 2.7559	78 3.0709	30.0 1.181	K70X78X30H	62.2 14000	139.0 31200	3900	6000	0.0757	70.000 2.7559	69.987 2.7554	78.010 3.0713	78.029 3.0720	0.140 0.309
	70 2.7559	78 3.0709	46.0 1.811	K70X78X46ZW	78.4 17600	187.0 42000	3900	6000	0.0815	70.000 2.7559	69.987 2.7554	78.010 3.0713	78.029 3.0720	0.188 0.414
	70 2.7559	85 3.3465	40.0 1.575	K70X85X40F	118 26500	203 45600	4100	6300	0.0758	70.000 2.7559	69.987 2.7554	85.012 3.3469	85.034 3.3478	0.338 0.745
	70 2.7559	88 3.4646	30.0 1.181	K70X88X30H.ZB2	115 25900	175 39300	4100	6400	0.0714	70.000 2.7559	69.987 2.7554	88.012 3.4650	88.034 3.4659	0.205 0.452
72	72 2.8346	80 3.1496	20.0 0.787	K72X80X20	44.4 9980	90.7 20400	3800	5800	0.0690	72.000 2.8346	71.987 2.8341	80.010 3.1500	80.029 3.1507	0.084 0.185
73	73 2.8740	79 3.1102	20.0 0.787	K73X79X20	37.0 8320	88.7 19900	3700	5700	0.0723	73.000 2.8740	72.987 2.8735	79.010 3.1106	79.029 3.1114	0.068 0.150
75	75 2.9528	81 3.1890	20.0 0.787	K75X81X20F	37.4 8410	90.7 20400	3600	5500	0.0737	75.000 2.9528	74.987 2.9522	81.012 3.1894	81.034 3.1903	0.075 0.165
	75 2.9528	83 3.2677	23.0 0.906	K75X83X23	52.5 11800	114.0 25600	3600	5600	0.0744	75.000 2.9528	74.987 2.9522	83.012 3.2682	83.034 3.2691	0.104 0.229
	75 2.9528	83 3.2677	30.0 1.181	K75X83X30	60.9 13700	138 31000	3600	5600	0.0780	75.000 2.9528	74.987 2.9522	83.012 3.2682	83.034 3.2691	0.141 0.311
	75 2.9528	83 3.2677	30.0 1.181	K75X83X30FH	60.9 13700	138 31000	3600	5600	0.0780	75.000 2.9528	74.987 2.9522	83.012 3.2682	83.034 3.2691	0.141 0.311
80	80 3.1496	86 3.3858	20.0 0.787	K80X86X20H	38.6 8680	96.7 21700	3400	5200	0.0771	80.000 3.1496	79.987 3.1491	86.012 3.3863	86.034 3.3872	0.072 0.159
	80 3.1496	88 3.4646	25.0 0.984	K80X88X25FV1	54.0 12100	121 27200	3400	5200	0.0778	80.000 3.1496	79.987 3.1491	88.012 3.4650	88.034 3.4659	0.134 0.295

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed			Mounting Dimensions mm/in.				Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
mm	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	80 3.1496	**88** 3.4646	**30.0** 1.181	**K80X88X30**	**67.5** 15200	**161** 36200	**3400**	**5200**	**0.0835**	**80.000** 3.1496	**79.987** 3.1491	**88.012** 3.4650	**88.034** 3.4659	**0.153** 0.337
85	**85** 3.3465	**92** 3.6220	**20.0** 0.787	**K85X92X20H**	**39.9** 8970	**91.7** 20600	**3200**	**4900**	**0.0763**	**84.988** 3.3460	**84.973** 3.3454	**92.012** 3.6225	**92.034** 3.6234	**0.085** 0.187
	85 3.3465	**93** 3.6614	**25.0** 0.984	**K85X93X25F**						**84.988** 3.3460	**84.973** 3.3454	**93.012** 3.6619	**93.034** 3.6628	**0.000** 0.000
	85 3.3465	**93** 3.6614	**30.0** 1.181	**K85X93X30H**	**69.4** 15600	**170** 38200	**3200**	**4900**	**0.0870**	**84.988** 3.3460	**84.973** 3.3454	**93.012** 3.6619	**93.034** 3.6628	**0.166** 0.366
90	**90** 3.5433	**97** 3.8189	**20.0** 0.787	**K90X97X20**	**46.3** 10400	**114** 25600	**3000**	**4600**	**0.0827**	**89.988** 3.5428	**89.973** 3.5422	**97.012** 3.8194	**97.034** 3.8202	**0.095** 0.209
	90 3.5433	**98** 3.8583	**25.0** 0.984	**K90X98X25F**	**54.8** 12300	**128** 28800	**3000**	**4600**	**0.0832**	**89.988** 3.5428	**89.973** 3.5422	**98.012** 3.8587	**98.034** 3.8596	**0.134** 0.295
	90 3.5433	**98** 3.8583	**30.0** 1.181	**K90X98X30**	**63.6** 14300	**155** 34800	**3000**	**4600**	**0.0873**	**89.988** 3.5428	**89.973** 3.5422	**98.012** 3.8587	**98.034** 3.8596	**0.168** 0.370
95	**95** 3.7402	**103** 4.0551	**20.0** 0.787	**K95X103X20**	**49.3** 11100	**114** 25600	**2800**	**4400**	**0.0829**	**94.988** 3.7397	**94.973** 3.7391	**103.012** 4.0556	**103.034** 4.0565	**0.130** 0.287
	95 3.7402	**103** 4.0551	**30.0** 1.181	**K95X103X30F**	**71.0** 16000	**183** 41100	**2800**	**4400**	**0.0932**	**94.988** 3.7397	**94.973** 3.7391	**103.012** 4.0556	**103.034** 4.0565	**0.180** 0.39
100	**100** 3.9370	**108** 4.2520	**30.0** 1.181	**K100X108X30**	**72.4** 16300	**191** 42900	**2700**	**4200**	**0.0965**	**99.988** 3.9365	**99.973** 3.9359	**108.012** 4.2524	**108.034** 4.2533	**0.210** 0.463
110	**110** 4.3307	**118** 4.6457	**24.0** 0.945	**K110X118X24**	**64.0** 14400	**168** 37800	**2400**	**3800**	**0.0977**	**109.988** 4.3302	**109.973** 4.3296	**118.012** 4.6461	**118.034** 4.6470	**0.165** 0.364
	110 4.3307	**118** 4.6457	**30.0** 1.181	**K110X118X30H**	**75.3** 16900	**207** 46500	**2400**	**3800**	**0.1029**	**109.988** 4.3302	**109.973** 4.3296	**118.012** 4.6461	**118.034** 4.6470	**0.200** 0.441

NEEDLE ROLLER AND CAGE RADIAL ASSEMBLIES FOR CONNECTING ROD APPLICATIONS – METRIC SERIES

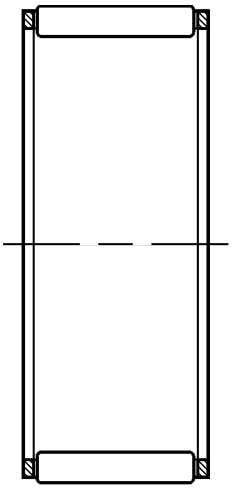
Connecting rods have two bearing positions: the crank pin or big end and the wrist pin or small end.

In the crank pin position there may be severe operating conditions due to centrifugal forces, internal forces, accelerations and high rotational speeds, requiring the use of special needle roller and cage radial assemblies.

Similarly, in the wrist pin position the reciprocating inertia loads and high oscillating speeds dictate the use of special cage designs.

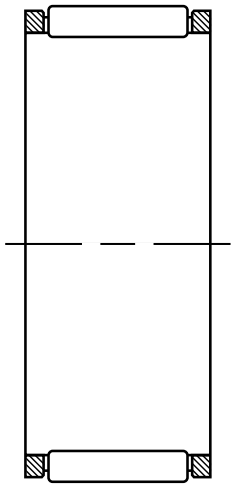
Types Of Metric Series Needle Roller and Cage Radial Assemblies.

Needle roller and cage assembly for crank pin applications.



K.BE

Needle roller and cage assembly for wrist pin applications.



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Suffixes

BE	steel cage, heat treated, for crank pin position
SE	steel cage, heat treated, for wrist pin position

CONSTRUCTION

METRIC SERIES NEEDLE ROLLER AND CAGE RADIAL ASSEMBLIES FOR CRANK PIN POSITIONS

Needle roller and cage assemblies for use in crank pin positions have cages with a large outside cylindrical surface to ensure optimum radial guidance in the connecting rod bore. Due to the inherent low weight and strength of the heat-treated cages, the needle roller and cage assemblies are well-suited for high engine speed applications. When necessary, silver plating and copper plating can be applied for optimum performance during operation at high speeds.

METRIC SERIES NEEDLE ROLLER AND CAGE RADIAL ASSEMBLIES FOR WRIST PIN POSITIONS

Reciprocating inertia loads and oscillating speeds require the cages used in the wrist pin positions to be heat treated and to guide on the wrist pin.

These cages are available in a variety of widths to allow the selection of a needle roller and cage assembly with the length of needle rollers to match the connecting rod width.

SIZE SELECTION

In most instances selection of a suitable size of a needle roller and cage assembly for typical connecting rod positions may be based on the cylinder displacement of the engine which in turn, dictates the crank pin and wrist pin diameters.

Suggestions based on engine displacements are listed in the following table.

C

TABLE 1 –
CRANK PIN AND WRIST PIN DIAMETERS, DETERMINED BY THE CYLINDER DISPLACEMENT OF THE ENGINE.

CYLINDER DISPLACEMENT IN CM^3								
Cylinder	>		40	60	100	150	200	300
Displacement	≤	40	60	100	150	200	300	

DIAMETER IN MM							
Crank pin	12/14	15/16/18	18/20	18/20/22	24/25/28	28/30	35/40
Wrist pin	10/11	12/13	14/15	15/16	18	20	20

CONNECTING ROD GUIDANCE ARRANGEMENTS

End guidance of a connecting rod can be provided either at the crank pin or at the wrist pin end. Connecting rod guidance is achieved at the crank pin end using a small clearance between the crank webs. Guidance at the wrist pin end is controlled by a small clearance between the piston bosses.

CRANK PIN END GUIDANCE

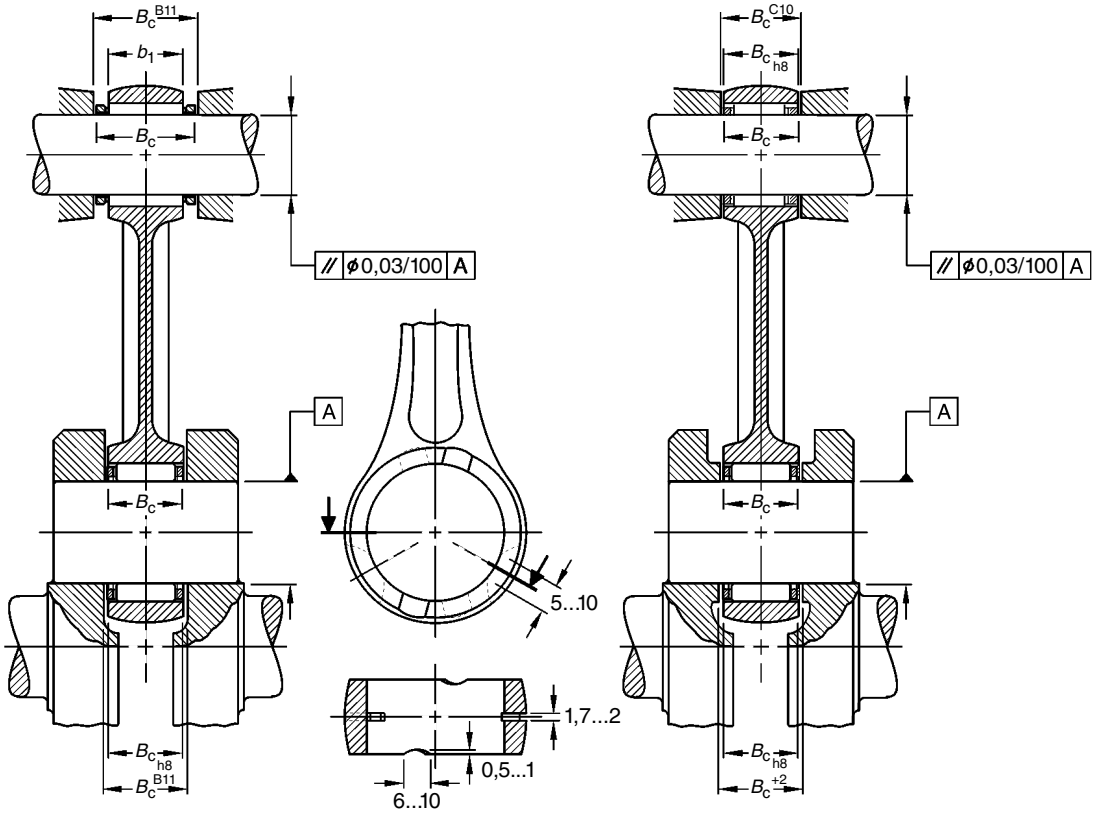
With crank pin end guidance care must be taken that an adequate amount of lubricant is supplied to the crank pin bearing and the surfaces which guide the connecting rod. For this purpose, grooves in the connecting rod end faces or slots in the connecting rod bore aligned with the incoming lubrication path should be provided. Occasionally, bronze or hardened steel washers may be used for end guidance of the connecting rod.

At the wrist pin end, the needle roller and cage assembly is located axially between the piston bosses. It may be both economical and effective to machine the connecting rod at the wrist pin end and at the crank pin end to the same width. It is suggested that at the wrist pin end the needle roller length does not overhang the connecting rod width. Otherwise, the load rating of the needle roller and cage assembly will be reduced.

WRIST PIN END GUIDANCE

Wrist pin end will get the most effective axial guidance between the piston bosses. Grooves in the bottom of the piston bosses and a chamfer of small angle on each side of the upper portion of the connecting rod small end, can improve the oil flow to the needle roller and cage assembly and its guiding surfaces.

The length of the needle roller and cage assembly and the connecting rod width at the crank pin end should be identical to ensure best possible radial piloting of cage in the bore of the connecting rod. The crank webs are recessed to allow proper axial alignment of the connecting rod. As a rule, it is not necessary to have additional supply of lubricant. Only in engines with sparse lubrication should consideration be given to provide lubricating slots in the connecting rod bores as with crank pin end guidance.



Crank Pin End Guidance

Wrist Pin End Guidance

Suitable Materials and Heat Treatment

Connecting rod crank pin end and wrist pin end bores serve as raceways:

a case hardening steel such as 15 CrNi 6, 17 MnCr 5 or AISI 8620.

Crank pins:

e.g., case hardening steel 15 Cr 3, AISI 8620, AISI 1018 or through-hardening steel 100 Cr 6, AISI 52100.

Wrist pins:

e.g., case hardening steel Ck 15, 15 Cr 3 or through-hardening steel 100 Cr 6, AISI 52100.

The effective case depth (50 HRC) of the raceways should be 0.5 mm minimum, the surface hardness should be 60 HRC or 700 HV minimum.

After hardening, the connecting rods must be stress relieved.

The connecting rod raceway bores as well as the crank pins and the wrist pins must be precision ground or preferably honed to a surface finish R_a not exceeding 0.16 µm.

FORM TOLERANCES

The form tolerances for crank pins, wrist pins and connecting rod bores are listed in Table 2.

TABLE 2 – FORM TOLERANCES

		Dimension in mm				
Nominal pin diameter	>	10	14	18	25	30
	≤	14	18	25	30	40
		Tolerances in µm				
Parallelism*	**wrist pin & crank pin**	1	1	2	2	3
	rod bore	2	3	3	4	4
Circularity (DIN ISO 1101)	**wrist pin & crank pin**	1	1	1.5	1.5	2
	rod bore	1.5	2	2	2.5	2.5

* The parallelism values are valid for the needle roller length L_w.

It is suggested that the parallelism of the wrist pin axis and the crank pin axis be within a tolerance zone of 0.03 mm diameter over a distance of 100 mm.

RADIAL CLEARANCE

METRIC SERIES CRANK PIN BEARINGS

The high speeds of modern production engines dictate the need for crank pin bearings with a relatively large radial clearance. As an approximation, the minimum clearance can be taken as the crank pin diameter/1000. The maximum radial clearance would be a result of the sorting plan shown in Table 3.

As shown in the example of the matching scheme, the suggested mounting diameters for the crank pin position are G6 for the connecting rod bore diameters and h5 for the crank pin diameters. Axial location of the cage is shown on the crank pin end guidance arrangement.

Racing and sport engines operate at yet even higher speeds than production engines, requiring 50 percent larger radial clearances in the crank pin bearings. The larger radial clearances should also be used in bores of split connecting rods to avoid the danger of distortion resulting from the unavoidable connecting rod deformation occurring in operation. Consult your Timken representative for advice on such applications.

METRIC SERIES WRIST PIN BEARINGS

The radial clearance in wrist pin bearings should be held as small as possible. The minimum clearance should be aimed at 2 mm with the maximum clearance resulting from the proposed sorting plan in Table 3. The maximum clearance should be held as close as possible to 12 mm for all wrist pin bearings based on sorting wrist pins made to a tolerance h5, small end bore diameter tolerance of K6 and needle roller grades as shown in Table 3.

TIMKEN® TORRINGTON® METRIC SERIES NEEDLE ROLLER AND CAGE RADIAL ASSEMBLIES FOR CONNECTING ROD APPLICATIONS

TABLE 3 – RADIAL CLEARANCE

Matching Scheme For A Crank Pin Bearing Arrangement

(three diameter ranges are specified for the connecting rod and crank pin)

Example:	Crank pin diameter	20 mm, tolerance h5
	Connecting rod bore diameter	26 mm, tolerance G6
	Needle roller and cage assembly	K20x26x12BE
	Radial clearance	20 . . . 29 µm

		Connecting Rod Crank Pin End Bore Diameter 26 $^{+20}_{+7}$ Tolerances and Radial Clearances In µm					
		+12 +7 Needle Roller Tolerance	Radial Clearance	+16 +12 Needle Roller Tolerance	Radial Clearance	+20 +16 Needle Roller Tolerance	Radial Clearance
	0	-7	21...29	-4 -5	20...29	-2 -3	20...29
	-3	-9		-6 -7		-4 -5	
Crank Pin Diameter	-3	-5	20...28	-3	21...28	-1	21...28
	-6	-7		-5		-3	
20 $^{0}_{-9}$	-6	-4	21...29	-1 -2	20...29	0	22...29
	-9	-6		-3 -4		-2	

Matching Scheme For A Wrist Pin Bearing Arrangement

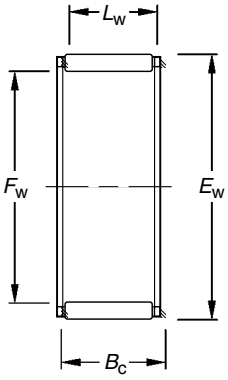
(three diameter ranges are specified for the connecting rod and wrist pin)

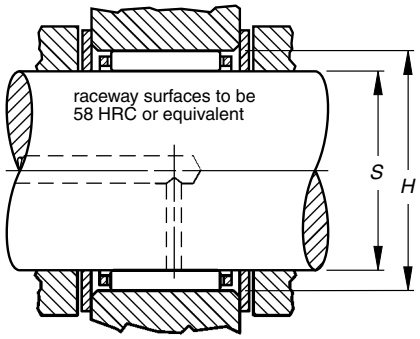
Example:	Wrist pin diameter	16 mm, tolerance h5
	Connecting rod bore diameter	20 mm, tolerance K6
	Needle roller and cage assembly	K16x20x20SE
	Radial clearance	2 . . . 12 µm

		Wrist Pin End Bore Diameter 20 $^{+2}_{-11}$ Tolerances and Radial Clearances In µm					
		-6 -11 Needle roller Tolerance	Radial Clearance	-2 -6 Needle Roller Tolerance	Radial Clearance	+2 -2 Needle Roller Tolerance	Radial Clearance
	0			-4 -5	2...11	-2 -3	2...11
	-3			-6 -7		-4 -5	
Wrist Pin Diameter	-3	-5	2...10	-3 -4	3...12	-1 -2	3...12
	-6	-7		-5 -6		-3 -4	
16 $^{0}_{-8}$	-6	-4 -5	3...12	-1 -2	2...10	0	4...10
	-8	-6 -7		-3 -4		-2	

ASSEMBLIES FOR CRANK PIN END APPLICATIONS

METRIC SERIES





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Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022				Assembly Designation	Load Ratings kN/lbf.			Mounting Dimensions mm/in. (non-high performance engines)				Wt. kg/lbs.
									Max.	Min.	Min.	Max.	
mm	F_w	E_w	B_c	L_w		C	C_0	C_g	S		H		
12	12 0.4724	16 0.6299	10 0.394	7.8 0.307	K12X16X10BE	6.21 1400	6.70 1510	n/a	12.000 0.4724	11.992 0.4721	16.006 0.6302	16.017 0.6306	0.004 0.009
	12 0.4724	17 0.6693	10 0.394	7.8 0.307	K12X17X10BE	7.32 1650	7.21 1620	n/a	12.000 0.4724	11.992 0.4721	17.006 0.6695	17.017 0.6700	0.005 0.011
14	14 0.5512	18 0.7087	10 0.394	7.8 0.307	K14X18X10BE	6.89 1550	7.98 1790	n/a	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.005 0.011
	14 0.5512	18 0.7087	10 0.394	7.8 0.307	WK14X18X10BE	6.89 1550	7.98 1790	0.0204	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.005 0.011
	14 0.5512	20 0.7874	10 0.394	7.8 0.307	K14X20X10BE	8.90 2000	8.61 1940	0.0198	14.000 0.5512	13.992 0.5509	20.007 0.7877	20.020 0.7882	0.007 0.015
	14 0.5512	20 0.7874	12 0.472	9.5 0.374	K14X20X12BE	10.50 2360	10.60 2380	0.0209	14.000 0.5512	13.992 0.5509	20.007 0.7877	20.020 0.7882	0.009 0.020
	14 0.5512	20 0.7874	12 0.472	9.5 0.374	WK14X20X12BE	10.50 2360	10.60 2380	0.0209	14.000 0.5512	13.992 0.5509	20.007 0.7877	20.020 0.7882	0.009 0.020
15	15 0.5984	22 0.8740	12 0.472	9.0 0.354	K15,2X22,2X12BE	10.80 2430	10.30 2320	0.0211	15.200 0.5984	15.192 0.5981	22.207 0.8743	22.220 0.8748	0.012 0.026
16	16 0.6299	21 0.8268	10 0.394	7.8 0.307	K16X21X10BE	8.17 1840	8.90 2000	0.0215	16.000 0.6299	15.992 0.6296	21.007 0.8270	21.020 0.8276	0.007 0.015
	16 0.6299	21 0.8268	10 0.394	7.8 0.307	WK16X21X10BE	8.17 1840	8.90 2000	0.0215	16.000 0.6299	15.992 0.6296	21.007 0.8270	21.020 0.8276	0.007 0.015
	16 0.6299	22 0.8661	12 0.472	9.5 0.374	K16X22X12BE	11.20 2520	11.90 2680	0.0227	16.000 0.6299	15.992 0.6296	22.007 0.8664	22.020 0.8669	0.011 0.024
18	18 0.7087	24 0.9449	12 0.472	9.5 0.374	K18X24X12BE	11.80 2650	13.10 2940	0.0243	18.000 0.7087	17.992 0.7083	24.007 0.9452	24.020 0.9457	0.011 0.024
	18 0.7087	24 0.9449	13 0.512	9.8 0.386	K18X24X13BE	12.10 2720	13.50 3030	0.0245	18.000 0.7087	17.992 0.7083	24.007 0.9452	24.020 0.9457	0.013 0.029
	18 0.7087	24 0.9449	13 0.512	10.5 0.413	WK18X24X13BE	12.80 2880	14.60 3280	0.0250	18.000 0.7087	17.992 0.7083	24.007 0.9452	24.020 0.9457	0.011 0.024
	18 0.7087	24 0.9449	15 0.591	11.8 0.465	K18X24X15BE	13.30 2990	15.20 3420	0.0253	18.000 0.7087	17.992 0.7083	24.007 0.9452	24.020 0.9457	0.014 0.031
19	19 0.7480	25 0.9843	15 0.591	12.5 0.492	K19X25X15BE	14.70 3300	17.60 3960	0.0268	19.000 0.7480	18.991 0.7477	25.007 0.9845	25.020 0.9850	0.014 0.031
20	20 0.7874	26 1.0236	12 0.472	9.8 0.386	K20X26X12BE	13.30 2990	15.80 3550	0.0267	20.000 0.7874	19.991 0.7870	26.007 1.0239	26.020 1.0244	0.013 0.029
	20 0.7874	26 1.0236	17 0.669	13.8 0.543	K20X26X17BE	14.90 3350	18.20 4090	0.0276	20.000 0.7874	19.991 0.7870	26.007 1.0239	26.020 1.0244	0.017 0.037
21	21 0.8307	27 1.0669	13 0.512	10.5 0.413	K21,1X27,1X13BE	14.10 3170	17.20 3870	0.0278	21.100 0.8307	21.091 0.8304	27.107 1.0672	27.120 1.0677	0.016 0.035
22	22 0.8661	28 1.1024	13 0.512	9.8 0.386	K22X28X13BE	13.90 3120	17.10 3840	0.0283	22.000 0.8661	21.991 0.8658	28.007 1.1026	28.020 1.1031	0.015 0.033
	22 0.8661	29 1.1417	15.6 0.614	12.8 0.504	WK22X29X15,6BE	18.50 4160	22.30 5010	0.0296	22.000 0.8661	21.991 0.8658	29.007 1.1420	29.020 1.1425	0.021 0.046
	22 0.8661	29 1.1417	16 0.630	12.8 0.504	K22X29X16BE	18.50 4160	22.30 5010	0.0296	22.000 0.8661	21.991 0.8658	29.007 1.1420	29.020 1.1425	0.021 0.046

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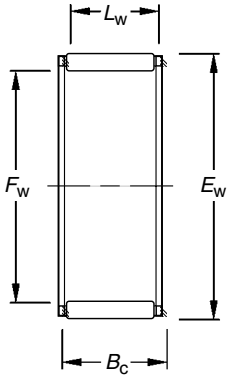
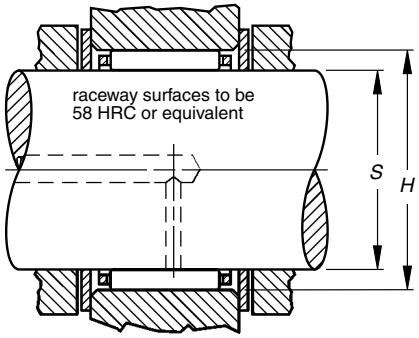
ASSEMBLIES FOR CRANK PIN END APPLICATIONS

continued

METRIC SERIES



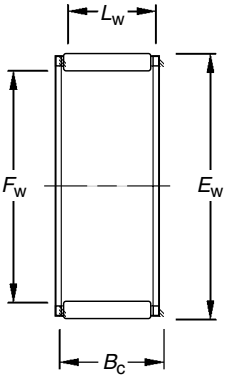


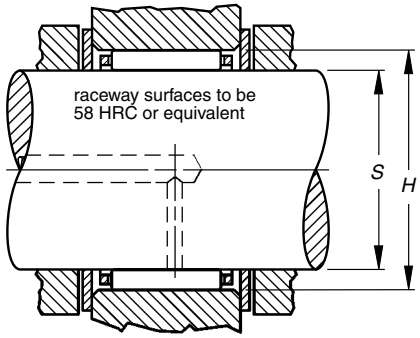
K.BE

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022				Assembly Designation	Load Ratings kN/lbf.			Mounting Dimensions mm/in. (non-high performance engines)				Wt. kg/lbs.
									Max.	Min.	Min.	Max.	
mm	F_w	E_w	B_c	L_w		C	C_0	C_g	S		H		
24	24 0.9449	30 1.1811	13 0.512	9.8 0.386	K24X30X13BE	14.40 3240	18.40 4140	0.0298	24.000 0.9449	23.991 0.9445	30.007 1.1814	30.020 1.1819	0.016 0.035
	24 0.9449	30 1.1811	15 0.591	11.8 0.465	K24X30X15BE	15.30 3440	19.70 4430	0.0304	24.000 0.9449	23.991 0.9445	30.007 1.1814	30.020 1.1819	0.018 0.040
	24 0.9449	30 1.1811	17 0.669	13.8 0.543	K24X30X17BE	19.00 4270	26.30 5910	0.0326	24.000 0.9449	23.991 0.9445	30.007 1.1814	30.020 1.1819	0.021 0.04
25	25 0.9843	31 1.2205	19.8 0.780	17.8 0.701	WK25X31X20BE	23.30 5240	34.50 7760	0.0355	25.000 0.9843	24.991 0.9839	31.009 1.2208	31.025 1.2215	0.024 0.053
	25 0.9843	32 1.2598	16 0.630	12.8 0.504	K25X32X16BE	19.20 4320	24.30 5460	0.0319	25.000 0.9843	24.991 0.9839	32.009 1.2602	32.025 1.2608	0.022 0.049
	25 0.9843	32 1.2598	24 0.945	19.8 0.780	K25X32X24BE	27.50 6180	38.50 8660	0.0358	25.000 0.9843	24.991 0.9839	32.009 1.2602	32.025 1.2608	0.035 0.077
30	30 1.1811	37 1.4567	16 0.630	12.8 0.504	K30X37X16BE	21.60 4860	29.80 6700	0.0363	30.000 1.1811	29.991 1.1807	37.009 1.4570	37.025 1.4577	0.029 0.064
35	35 1.3780	42 1.6535	20 0.787	16.8 0.661	K35X42X20BE	29.70 6680	47.00 10600	0.0434	35.000 1.3780	34.989 1.3775	42.009 1.6539	42.025 1.6545	0.039 0.086

ASSEMBLIES FOR WRIST PIN END APPLICATIONS

METRIC SERIES





K.SE

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022				Assembly Designation	Load Ratings kN/lbf.			Mounting Dimensions mm/in. (non-high performance engines)				Wt. kg/lbs.
									Max.	Min.	Min.	Max.	
mm	F_w	E_w	B_c	L_w		C	C_0	C_g	S		H		
9	9 0.3543	12 0.4724	11.5 0.453	8.4 0.331	K9X12X11,5SE	4.23 951	4.53 1020	0.0296	9.000 0.3543	8.994 0.3541	12.006 0.4727	12.017 0.4731	0.003 0.007
	9 0.3543	13 0.5118	12.5 0.492	9.8 0.386	K9X13X12,5SE	5.58 1250	5.41 1220	0.0306	9.000 0.3543	8.994 0.3541	13.006 0.5120	13.017 0.5125	0.005 0.011
10	10 0.3937	13 0.5118	14.5 0.571	11.8 0.465	K10X13X14,5SE	5.93 1330	7.20 1620	0.0152	10.000 0.3937	9.994 0.3935	13.006 0.5120	13.017 0.5125	0.004 0.009
	10 0.3937	14 0.5512	10.0 0.394	7.0 0.276	K10X14X10SE	4.62 1040	4.36 980	0.0155	10.000 0.3937	9.994 0.3935	14.006 0.5514	14.017 0.5519	0.004 0.009
12	12 0.4724	15 0.5906	13.0 0.512	9.8 0.386	K12X15X13SE	6.00 1350	7.72 1740	0.0179	12.000 0.4724	11.992 0.4721	15.006 0.5908	15.017 0.5912	0.004 0.009
	12 0.4724	15 0.5906	15.0 0.591	11.8 0.465	K12X15X15SE	6.97 1570	9.36 2100	0.0153	12.000 0.4724	11.992 0.4721	15.006 0.5908	15.017 0.5912	0.005 0.011
	12 0.4724	15 0.5906	17.5 0.689	12.8 0.504	K12X15X17,5SE	7.45 1670	10.2 2290	0.0196	12.000 0.4724	11.992 0.4721	15.006 0.5908	15.017 0.5912	0.006 0.013
	12 0.4724	16 0.6299	13.0 0.512	9.8 0.386	K12X16X13SE	6.03 1360	6.38 1430	0.0206	12.000 0.4724	11.992 0.4721	16.006 0.6302	16.017 0.6306	0.006 0.013
	12 0.4724	17 0.6693	13.0 0.512	9.8 0.386	K12X17X13SE	7.61 1710	7.54 1700	0.0210	12.000 0.4724	11.992 0.4721	17.006 0.6695	17.017 0.6700	0.007 0.015
	12 0.4724	17 0.6693	15.0 0.591	12.5 0.492	K12X17X15SE	9.30 2090	9.75 2190	0.0181	12.000 0.4724	11.992 0.4721	17.006 0.6695	17.017 0.6700	0.007 0.015
13	13 0.5118	16 0.6299	14.0 0.551	9.8 0.386	K13X16X14SE	5.62 1260	7.23 1630	0.0184	13.000 0.5118	12.992 0.5115	16.006 0.6302	16.017 0.6306	0.005 0.011
	13 0.5118	17 0.6693	17.7 0.697	13.8 0.543	K13X17X17,7SE	9.80 2200	12.3 2770	0.0196	13.000 0.5118	12.992 0.5115	17.006 0.6695	17.017 0.6700	0.008 0.018
	13 0.5118	18 0.7087	15.0 0.591	12.5 0.492	K13X18X15SE	9.28 2090	9.88 2220	0.0200	13.000 0.5118	12.992 0.5115	18.006 0.7089	18.017 0.7093	0.008 0.018
14	14 0.5512	18 0.7087	13.0 0.512	9.8 0.386	K14X18X13SE	7.39 1660	8.69 1950	0.0220	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.007 0.015
	14 0.5512	18 0.7087	17.0 0.669	11.8 0.465	K14X18X17SE	8.59 1930	10.5 2360	0.0203	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.00 0.020
	14 0.5512	18 0.7087	21.0 0.827	14.8 0.583	K14X18X21SE	10.3 2320	13.3 2990	0.0208	14.000 0.5512	13.992 0.5509	18.006 0.7089	18.017 0.7093	0.011 0.024
15	15 0.5906	19 0.7480	17.0 0.669	11.8 0.465	K15X19X17SE	9.05 2030	11.5 2590	0.0218	15.000 0.5906	14.992 0.5902	19.007 0.7483	19.020 0.7488	0.009 0.020
	15 0.5906	19 0.7480	19.5 0.768	15.8 0.622	K15X19X19,5SE	10.8 2430	14.3 3210	0.0231	15.000 0.5906	14.992 0.5902	19.007 0.7483	19.020 0.7488	0.010 0.022
	15 0.5906	19 0.7480	20.0 0.787	15.8 0.622	K15X19X20SE	10.8 2430	14.3 3210	0.0229	15.000 0.5906	14.992 0.5902	19.007 0.7483	19.020 0.7488	0.010 0.022
16	16 0.6299	20 0.7874	20.0 0.787	15.8 0.622	K16X20X20SE	12.0 2700	16.9 3800	0.0242	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.011 0.024
	16 0.6299	20 0.7874	22.0 0.866	15.8 0.622	K16X20X22SE	12.0 2700	16.9 3800	0.0242	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.013 0.029
	16 0.6299	20 0.7874	23.0 0.906	15.8 0.622	K16X20X23SE	10.7 2410	14.5 3260	0.0259	16.000 0.6299	15.992 0.6296	20.007 0.7877	20.020 0.7882	0.013 0.029

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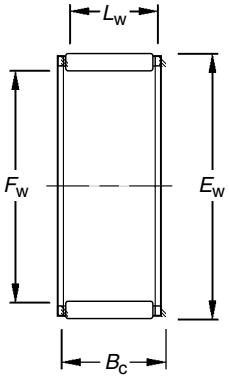
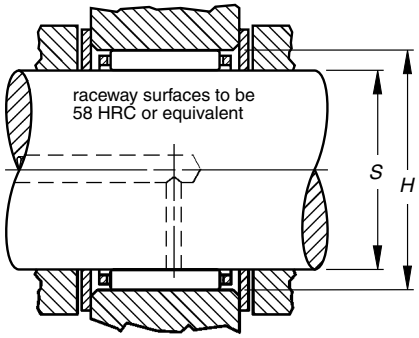
ASSEMBLIES FOR WRIST PIN END APPLICATIONS – *continued*

METRIC SERIES





K.SE

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022				Assembly Designation	Load Ratings kN/lbf.			Mounting Dimensions mm/in. (non-high performance engines)				Wt. kg/lbs.
									Max.	Min.	Min.	Max.	
mm	F_w	E_w	B_c	L_w		C	C_0	C_g	S		H		
18	18 0.7087	22 0.8661	22.0 0.866	17.8 0.701	K18X22X22SE	14.4 3240	22.0 4950	0.0259	18.000 0.7087	17.992 0.7083	22.007 0.8664	22.020 0.8669	0.016 0.035
	18 0.7087	23 0.9055	20.0 0.787	15.8 0.622	K18X23X20SE	13.6 3060	17.6 3960	0.0249	18.000 0.7087	17.992 0.7083	23.007 0.9058	23.020 0.9063	0.015 0.033
	18 0.7087	23 0.9055	23.0 0.906	17.8 0.701	K18X23X23SE	15.9 3570	21.6 4860	0.0291	18.000 0.7087	17.992 0.7083	23.007 0.9058	23.020 0.9063	0.018 0.040
19	19 0.7480	24 0.9449	25.5 1.004	17.8 0.701	K19X24X25,5SE	16.7 3750	23.4 5260	0.0268	19.000 0.7480	18.991 0.7477	24.007 0.9452	24.020 0.9457	0.022 0.049
20	20 0.7874	24 0.9449	23.0 0.906	17.8 0.701	K20X24X23SE	14.8 3330	23.7 5330	0.0282	20.000 0.7874	19.991 0.7870	24.007 0.9452	24.020 0.9457	0.017 0.037
	20 0.7874	25 0.9843	22.0 0.866	16.8 0.661	K20X25X22SE	15.9 3570	22.2 4990	0.0294	20.000 0.7874	19.991 0.7870	25.007 0.9845	25.020 0.9850	0.020 0.044
	20 0.7874	25 0.9843	23.0 0.906	17.8 0.701	K20X25X23SE	17.5 3930	25.2 5670	0.0310	20.000 0.7874	19.991 0.7870	25.007 0.9845	25.020 0.9850	0.025 0.055

NEEDLE ROLLER AND CAGE RADIAL ASSEMBLIES

INCH SERIES

Timken® Torrington® inch series needle roller and cage radial assemblies are available in a variety of sizes and designs. This catalog includes the most popular standard designs.

REFERENCE STANDARDS:

- **ANSI/ABMA 18.2** – Needle roller bearings – Radial, inch design.

Before selecting specific inch series, needle roller and cage radial assemblies, the engineering section of this catalog should be reviewed.

Types Of Inch Series Needle Roller And Cage Radial Assemblies

WJ

WJC

There are two primary constructions of inch series needle roller and cage assemblies. The WJ assemblies generally employ larger diameter needle rollers whereas the WJC assemblies normally employ smaller diameter needle rollers.

CONSTRUCTION

Needle roller and cage radial assemblies have a steel cage which provides both inward and outward retention for the needle rollers. The designs provide maximum cage strength consistent with the inherent high load ratings of needle roller bearings.

Accurate guidance of the needle rollers by the cage bars allows for operation at high speeds. Needle roller and cage assemblies have either one or two rows of needle rollers.

Also available (on request) are needle roller and cage assemblies using molded, one piece glass reinforced engineered polymer cages. These operate well at temperatures up to 250° F (120° C) over extended periods. However, care should be exercised when bearings are lubricated with oils containing additives as service life may be reduced if the operating temperature exceeds 212° F (100° C). At such high temperatures oil can deteriorate with time and it is suggested that oil change intervals are observed.

Needle rollers with relieved ends used in these assemblies are made of high carbon chrome steel, through-hardened, ground and lapped to close tolerances for diameter and roundness. See the engineering section of this catalog for further discussion of relieved end rollers.

DIMENSIONAL ACCURACY

The nominal inch assemblies, WJ and WJC, contain needle rollers manufactured to only one diameter grade. Within any one assembly, the needle rollers have a total diameter tolerance of .0001 inch.

The limit to precision of the radial clearance of mounted needle roller and cage assemblies is the capability of the user to hold close tolerances on the inner and outer raceways.

The tolerance of the overall width of these assemblies is given on the tabular pages of this section.

MOUNTING DIMENSIONS

The cage and needle roller assembly normally uses the shaft and housing as the inner and outer raceways. In order to realize full bearing load rating and life, the shaft and housing must have the correct geometric and metallurgical characteristics.

The tables of dimensions for these assemblies list the suggested diameters for the shaft when used as the inner raceway. These are consistent with ISO h5 shaft raceway tolerances. Additional design details for shafts used as inner raceways can be found in the engineering section of this catalog.

Since the housing normally serves as the outer raceway, it should be of sufficient cross section to maintain adequate roundness and running clearance under load. The tables of dimensions also list the suggested diameters for the housings when used as outer raceways. These are consistent with ISO G6

housing bore tolerances. Additional design details for housings used as outer raceways can be found in the engineering section of this catalog.

The suggested mounting diameter tolerances for these needle roller and cage assemblies will provide correct running clearance for most applications.

The needle roller and cage assembly must be axially located by shoulders or other suitable means. End locating surfaces should be hardened to minimize wear. For satisfactory operation, minimum axial clearance should be 0.008 inch. When using type WJ assembly, fillets adjacent to the assembly must not exceed 0.03 inch radius. When it is necessary to use fillets adjacent to WJC assembly, please consult your Timken representative for suggestions.

LUBRICATION

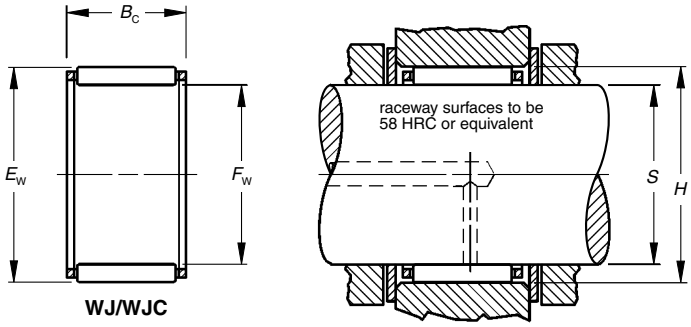
Oil is the preferred lubricant for most applications. In critical applications involving high speeds, ample oil flow must be provided. Where assemblies are subjected to high centrifugal forces, such as in epicyclic gearing, or inertia forces, as in the small end of a connecting rod, the contact pressure between the cage and the raceway guiding surface becomes critical. The allowable contact pressure depends on a combination of the induced force and the rubbing velocity between the cage and the raceway and the rate of lubricant flow. Consult your Timken representative when cages will be subjected to high induced forces.

SPECIAL DESIGNS

Needle roller and cage assemblies made to special dimensions or configurations, such as those that are split to assemble around a one-piece crankshaft, can be made available on special order where quantities permit. Special plated cages to enhance life under conditions of high induced forces can also be made available.

SINGLE-ROW ASSEMBLIES

INCH SERIES



WJ/WJC

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed							Wt. kg/lbs.
							Grease	Oil		Max.	Min.	Min.	Max.	
in.	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
3/8	9.525 0.3750	12.700 0.5000	9.53 0.375	WJC-060806	3.87 870	4.00 900	24000	37000	0.0170	9.525 0.3750	9.520 0.3748	12.705 0.5002	12.715 0.5006	0.003 0.006
1/2	12.700 0.5000	15.875 0.6250	12.70 0.500	WJC-081008	6.23 1 400	8.01 1 800	23000	35000	0.0227	12.700 0.5000	12.692 0.4997	15.880 0.6252	15.890 0.6256	0.005 0.010
9/16	14.288 0.5625	17.463 0.6875	12.70 0.500	WJC-091108	6.81 1 530	9.25 2 080	22000	34000	0.0247	14.288 0.5625	14.280 0.5622	17.468 0.6877	17.478 0.6881	0.006 0.013
5/8	15.875 0.6250	19.050 0.7500	12.70 0.500	WJC-101208	7.03 1 580	9.96 2 240	18000	27000	0.0264	15.875 0.6250	15.867 0.6247	19.058 0.7503	19.070 0.7508	0.006 0.013
	15.875 0.6250	22.225 0.8750	15.88 0.625	WJ-101410	15.6 3 510	17.8 3 990	19000	29000	0.0280	15.875 0.6250	15.867 0.6247	22.233 0.8753	22.245 0.8758	0.012 0.027
	15.875 0.6250	22.225 0.8750	22.23 0.875	WJ-101414	21.3 4 780	26.4 5 940	19000	29000	0.0309	15.875 0.6250	15.867 0.6247	22.233 0.8753	22.245 0.8758	0.017 0.038
3/4	19.050 0.7500	25.400 1.0000	25.40 1.000	WJ-121616	26.8 6 020	37.2 8 370	16000	24000	0.0362	19.050 0.7500	19.040 0.7496	25.408 1.0003	25.420 1.0008	0.023 0.051
13/16	20.638 0.8125	26.988 1.0625	22.23 0.875	WJ-131714	25.1 5 650	35.0 7 880	14000	22000	0.0368	20.638 0.8125	20.627 0.8121	26.995 1.0628	27.008 1.0633	0.021 0.046
7/8	22.225 0.8750	28.575 1.1250	25.40 1.000	WJ-141816	29.2 6 570	43.5 9 770	13000	20000	0.0401	22.225 0.8750	22.215 0.8746	28.583 1.1253	28.595 1.1258	0.026 0.058
1	25.400 1.0000	33.338 1.3125	19.05 0.750	WJ-162112	28.1 6 320	37.1 8 340	12000	18000	0.0397	25.400 1.0000	25.390 0.9996	33.348 1.3129	33.363 1.3135	0.029 0.063
	25.400 1.0000	33.338 1.3125	25.40 1.000	WJ-162116	36.8 8 270	52.5 11 800	12000	18000	0.0432	25.400 1.0000	25.390 0.9996	33.348 1.3129	33.363 1.3135	0.038 0.084
	25.400 1.0000	33.338 1.3125	31.75 1.250	WJ-162120	44.5 10 000	67.2 15 100	12000	18000	0.0460	25.400 1.0000	25.390 0.9996	33.348 1.3129	33.363 1.3135	0.048 0.105
1 1/8	28.575 1.1250	38.100 1.5000	25.40 1.000	WJ-182416	42.4 9 520	57.8 13 000	10000	16000	0.0455	28.575 1.1250	28.565 1.1246	38.110 1.5004	38.125 1.5010	0.041 0.090
	28.575 1.1250	38.100 1.5000	31.75 1.250	WJ-182420	52 11 700	74.7 16 800	10000	16000	0.0485	28.575 1.1250	28.565 1.1246	38.110 1.5004	38.125 1.5010	0.065 0.143
1 1/4	31.750 1.2500	41.275 1.6250	19.05 0.750	WJ-202612	33.4 7 520	43.7 9 830	9300	14000	0.0443	31.750 1.2500	31.740 1.2496	41.285 1.6254	41.300 1.6260	0.043 0.094
	31.750 1.2500	41.275 1.6250	25.40 1.000	WJ-202616	44.1 9 910	62.3 14 000	9300	14000	0.0484	31.750 1.2500	31.740 1.2496	41.285 1.6254	41.300 1.6260	0.061 0.134
	31.750 1.2500	41.275 1.6250	31.75 1.250	WJ-202620	53.8 12 100	81.0 18 200	9300	14000	0.0517	31.750 1.2500	31.740 1.2496	41.285 1.6254	41.300 1.6260	0.071 0.156
	31.750 1.2500	41.275 1.6250	38.10 1.500	WJ-202624	63.6 14 300	99.6 22 400	9300	14000	0.0544	31.750 1.2500	31.740 1.2496	41.285 1.6254	41.300 1.6260	0.085 0.188
1 3/8	34.925 1.3750	44.450 1.7500	25.40 1.000	WJ-222816	45.8 10 300	67.2 15 100	8300	13000	0.0513	34.925 1.3750	34.915 1.3746	44.460 1.7504	44.475 1.7510	0.067 0.147
	34.925 1.3750	44.450 1.7500	31.75 1.250	WJ-222820	56.0 12 600	87.2 19 600	8300	13000	0.0547	34.925 1.3750	34.915 1.3746	44.460 1.7504	44.475 1.7510	0.077 0.170
1 1/2	38.100 1.5000	47.625 1.8750	25.40 1.000	WJ-243016	47.2 10 600	71.6 16 100	7600	12000	0.0541	38.100 1.5000	38.090 1.4996	47.635 1.8754	47.650 1.8760	0.078 0.172
	38.100 1.5000	47.625 1.8750	31.75 1.250	WJ-243020	57.8 13 000	93.0 20 900	7600	12000	0.0577	38.100 1.5000	38.090 1.4996	47.635 1.8754	47.650 1.8760	0.083 0.184
	38.100 1.5000	47.625 1.8750	38.10 1.500	WJ-243024	68.1 15 300	114.8 25 800	7600	12000	0.0608	38.100 1.5000	38.090 1.4996	47.635 1.8754	47.650 1.8760	0.100 0.220

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Minimum axial clearance should be **.02 mm**, .008 in.

Continued on next page.

NEEDLE ROLLER BEARINGS

Shaft Dia.	Dimensions mm/in. -0.2 -.008 -0.55 -.022			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Grease	Limiting Speed Oil						Wt. kg/lbs.
										Max.	Min.	Min.	Max.	
in.	Fw	Ew	B_c		C	C_0	RPM		C_g	S		H		
	38.100 1.5000	47.625 1.8750	44.45 1.750	WJ-243028	77.4 17 400	135.7 30 500	7600	12000	0.0634	38.100 1.5000	38.090 1.4996	47.635 1.8754	47.650 1.8760	0.13 0.295
1 3/4	44.450 1.7500	53.975 2.1250	19.05 0.750	WJ-283412	39.5 8 870	59.6 13 400	6400	9900	0.0552	44.450 1.7500	44.440 1.7496	53.985 2.1254	54.003 2.1261	0.058 0.127
	44.450 1.7500	53.975 2.1250	25.40 1.000	WJ-283416	52.0 11 700	85.0 19 100	6400	9900	0.0603	44.450 1.7500	44.440 1.7496	53.985 2.1254	54.003 2.1261	0.084 0.185
	44.450 1.7500	53.975 2.1250	38.10 1.500	WJ-283424	74.7 16 800	136 30 600	6400	9900	0.0677	44.450 1.7500	44.440 1.7496	53.985 2.1254	54.003 2.1261	0.115 0.253
2	50.800 2.0000	60.325 2.3750	19.05 0.750	WJ-323812	42.8 9 610	69 15 500	5600	8600	0.0606	50.800 2.0000	50.787 1.9995	60.335 2.3754	60.353 2.3761	0.065 0.143
	50.800 2.0000	60.325 2.3750	25.40 1.000	WJ-323816	56.5 12 700	98 22 100	5600	8600	0.0662	50.800 2.0000	50.787 1.9995	60.335 2.3754	60.353 2.3761	0.105 0.231
	50.800 2.0000	60.325 2.3750	31.75 1.250	WJ-323820	69.0 15 500	127 28 700	5600	8600	0.0707	50.800 2.0000	50.787 1.9995	60.335 2.3754	60.353 2.3761	0.10 0.238
	50.800 2.0000	60.325 2.3750	38.10 1.500	WJ-323824	81.0 18 200	157 35 300	5600	8600	0.0744	50.800 2.0000	50.787 1.9995	60.335 2.3754	60.353 2.3761	0.130 0.286
2 1/16	52.388 2.0625	61.913 2.4375	25.40 1.000	WJ-333916	57.8 13 000	102 23 100	5400	8300	0.0678	52.388 2.0625	52.375 2.0620	61.923 2.4379	61.940 2.4386	0.099 0.218
2 1/8	53.975 2.1250	63.500 2.5000	25.40 1.000	WJ-344016	52.5 11 800	92.08 20 700	5200	8000	0.0668	53.975 2.1250	53.962 2.1245	63.510 2.5004	63.528 2.5011	0.089 0.196
	53.975 2.1250	63.500 2.5000	38.10 1.500	WJ-344024	78.3 17 600	153 34 500	5200	8000	0.0759	53.975 2.1250	53.962 2.1245	63.510 2.5004	63.528 2.5011	0.137 0.302
2 3/16	55.563 2.1875	65.088 2.5625	19.05 .750	WJ-354112	44.5 10 000	75.17 16 900	5000	7800	0.0644	55.563 2.1875	55.550 2.1870	65.098 2.5629	65.115 2.5636	0.070 0.155
	55.563 2.1875	65.088 2.5625	25.40 1.000	WJ-354116	57.8 13 000	107 24 100	5000	7800	0.0704	55.563 2.1875	55.550 2.1870	65.098 2.5629	65.115 2.5636	0.094 0.207
2 1/4	57.150 2.2500	66.675 2.6250	25.40 1.000	WJ-364216	53.8 12 100	96.08 21 600	4900	7500	0.0693	57.150 2.2500	57.137 2.2495	66.685 2.6254	66.703 2.6261	0.096 0.212
	57.150 2.2500	66.675 2.6250	31.75 1.250	WJ-364220	67.6 15 200	128 28 900	4900	7500	0.0745	57.150 2.2500	57.137 2.2495	66.685 2.6254	66.703 2.6261	0.120 0.265
2 3/8	60.325 2.3750	69.850 2.7500	38.10 1.500	WJ-384424	81.4 18 300	167 37 600	4600	7100	0.0815	60.325 2.3750	60.312 2.3745	69.860 2.7504	69.878 2.7511	0.151 0.334
2 1/2	63.500 2.5000	73.025 2.8750	25.40 1.000	WJ-404616	55.6 12 500	104 23 400	4400	6700	0.0741	63.500 2.5000	63.487 2.4995	73.035 2.8754	73.053 2.8761	0.106\ 0.234
	63.500 2.5000	73.025 2.8750	31.75 1.250	WJ-404620	69.8 15 700	139 31 400	4400	6700	0.0797	63.500 2.5000	63.487 2.4995	73.035 2.8754	73.053 2.8761	0.132 0.292
	63.500 2.5000	73.025 2.8750	38.10 1.500	WJ-404624	83.2 18 700	173 39 100	4400	6700	0.0842	63.500 2.5000	63.487 2.4995	73.035 2.8754	73.053 2.8761	0.179 0.395
2 3/4	69.850 2.7500	79.375 3.1250	25.40 1.000	WJ-445016	57.8 13 000	112.54 25 300	4000	6100	0.0788	69.850 2.7500	69.837 2.7495	79.385 3.1254	79.403 3.1261	0.116 0.256
3	76.200 3.0000	85.725 3.3750	25.40 1.000	WJ-485416	59.6 13 400	120.55 27 100	3600	5600	0.0833	76.200 3.0000	76.187 2.9995	85.738 3.3755	85.761 3.3764	0.126 0.278
	76.200 3.0000	85.725 3.3750	38.10 1.500	WJ-485424	85.4 19 200	191.72 43 100	3600	5600	0.0935	76.200 3.0000	76.187 2.9995	85.738 3.3755	85.761 3.3764	0.189 0.416
3 1/4	82.550 3.2500	92.075 3.6250	25.40 1.000	WJ-525816	61.4 13 800	128.55 28 900	3300	5100	0.0878	82.550 3.2500	82.535 3.2494	92.088 3.6255	92.111 3.6264	0.136 0.299
	82.550 3.2500	92.075 3.6250	38.10 1.500	WJ-525824	88.1 19 800	204.62 46 000	3300	5100	0.0985	82.550 3.2500	82.535 3.2494	92.088 3.6255	92.111 3.6264	0.220 0.486
3 1/2	88.900 3.5000	98.425 3.8750	25.40 1.000	WJ-566216	63.2 14 200	136.56 30 700	3100	4700	0.0922	88.900 3.5000	88.885 3.4994	98.438 3.8755	98.461 3.8764	0.146 0.321
	88.900 3.5000	101.600 4.0000	25.40 1.000	WJ-566416	79.6 17 900	150.35 33 800	3100	4800	0.0903	88.900 3.5000	88.885 3.4994	101.613 4.0005	101.636 4.0014	0.197 0.435
	88.900 3.5000	101.600 4.0000	38.10 1.500	WJ-566424	113 25 600	237.53 53 400	3100	4800	0.1011	88.900 3.5000	88.885 3.4994	101.613 4.0005	101.636 4.0014	0.296 0.653
4	101.600 4.0000	114.300 4.5000	25.40 1.000	WJ-647216	83.6 18 800	166.59 37 450	2700	4200	0.0983	101.600 4.0000	101.585 3.9994	114.313 4.5005	114.336 4.5014	0.224 0.493
	101.600 4.0000	114.300 4.5000	38.10 1.500	WJ-647224	119 26 800	263.33 59 200	2700	4200	0.1102	101.600 4.0000	101.585 3.9994	114.313 4.5005	114.336 4.5014	0.335 0.739
5	127.000 5.0000	152.400 6.0000	38.10 1.500	WJ-809624	211 47 600	365.20 82 100	2200	3400	0.1196	127.000 5.0000	126.982 4.9993	152.415 6.0006	152.438 6.0015	1.018 2.244

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.

Minimum axial clearance should be **.02 mm**, .008 in.

DRAWN CUP NEEDLE ROLLER BEARINGS

Overview: Drawn cup needle roller bearings support radial loads and reduce friction between rotating components, with a drawn outer shell serving as a raceway for the rollers. The low cross section of the drawn cup bearing provides high load-carrying capability with minimum required space. Drawn cup bearings are easily installed with a press fit in the housing.

- **Sizes:**3 mm - 60 mm bore ($^1/_8$ in. - 5 $^1/_2$ in. bore).
- **Markets:** Transmissions, transfer cases, engines, valve trains, steering and braking systems, axle supports, outboard engines, power tools, copiers, fax machines, paper-moving equipment and appliances.
- **Features:** Available in two basic designs: full complement and caged.
- **Benefits:** Full complement handles high radial load-carrying capability at a low cost. Caged provides high speed and maximum lubricant retention capability.

Drawn Cup Needle Roller Bearings – Metric Nominal Dimensions

Prefix
- **HK** drawn cup bearing, caged, open ends
- **BK** drawn cup bearing, caged, closed end
- **DL** drawn cup bearing, full complement, open ends
- **DLF** drawn cup bearing, full complement, closed end
- **DLH** drawn cup bearing, full complement, oil hole option

Width
- **12** = 12 mm
- **20** = 20 mm

HK **10** **12** **AS1**

Bore diameter
- **10** = 10 mm
- **25** = 25 mm

Suffix*
- **RS** lip contact seal on one side of the bearing
- **.2RS** lip contact seal on each side of the bearing
- **AS1** lubricating hole

** These suffixes only apply to the HK and BK Series bearings*

C

Inner Rings – Metric Nominal Dimensions

Prefix
- **JR** inner ring
- **JRZ** inner ring without mounting chambers
- **IM** inner ring for full compliment bearings
- **IMC** inner ring with oil hole for full compliment bearings

Outside diameter
- **14** = 14 mm
- **25** = 25 mm

Suffix
- **JS1** lubricating hole
- **R6** crowned raceway (IM types)

JR **10** x **14** x **12** **JS1**

Bore diameter
- **10** = 10 mm
- **20** = 20 mm

Width
- **12** = 12 mm
- **30** = 30 mm

Drawn Cup Needle Roller Bearings – Inch Nominal Dimensions

Prefixes
- **B** full complement of mechanically retained needle rollers
- **G** extraprecision
- **H** heavy series
- **J** caged complement of needle rollers
- **M** closed end
- **T** one seal
- **TT** two seals

with M prefix
signifies closed end inch nominal dimensions

Suffixes: limited availability
- **F** plastic cage
- **GF** grease fitting, closed end
- **OH** oil hole
- **OHE** oil hole in closed end

MJH - **18** **16** **1** - **OH**

Bore
- **16** = $^{16}/_{16}$ = 1 in.
- **18** = $^{18}/_{16}$ = 1 in.

Width
- **12** = $^{12}/_{16}$ = $^{3}/_{4}$ in.
- **16** = $^{16}/_{16}$ = 1 in.

Inner Rings (with 4-digit number) Inch Nominal Dimensions

Prefixes
- **IR** regular width (for use with drawn cup bearings only)
- **IRA** extended width (for use with drawn cup bearings only)

Suffixes: limited availability
- **L** .005 in. width tolerance
- **OH** oil hole and lube groove

I R - **14** **16** - **OH**

Bore
- **5** = $^{5}/_{16}$ in.
- **14** = $^{14}/_{16}$ = $^{7}/_{8}$ in.

Width (IR series only)
- **12** = $^{12}/_{16}$ = $^{3}/_{4}$ in.
- **16** = $^{16}/_{16}$ = 1 in.

Drawn Cup Bearings

C

DRAWN CUP NEEDLE ROLLER BEARINGS

METRIC SERIES

When a rolling bearing is needed for a compact and economic design and where it is not practical to harden and grind the housing bore, or where the housing materials are of low rigidity such as cast iron, aluminum or even plastics, drawn cup needle roller bearings should be considered.

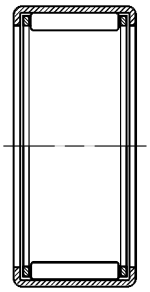
REFERENCE STANDARDS ARE:

- **ISO 3245** – Rolling bearings – Needle roller bearings, drawn cup, without inner ring, boundary dimensions and tolerances.
- **ANSI/ABMA 18.1** – Needle roller bearings – Radial, metric design.
- **DIN 618** – Needle roller bearings with cage – Drawn cups with open end, drawn cup with closed end.

Before selecting specific drawn cup needle roller bearings, the engineering section of this catalog should be reviewed.

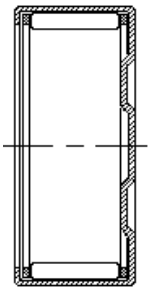
Types Of Metric Series Drawn Cup Needle Roller Bearings

Drawn cup needle roller bearing, open ends



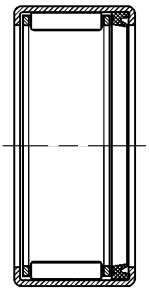
HK

Drawn cup needle roller bearing, closed end

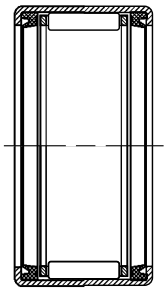


BK

Drawn cup needle roller bearings, open ends, sealed



HKRS



HK.2RS

Suffixes	
AS1	lubricating hole
RS	one seal
.2RS	two seals

CONSTRUCTION

The prefix letters in metric series drawn cup bearing designations denote whether the bearings are made with a full complement of needle rollers or caged needle rollers. The use of a full complement of needle rollers is indicated by the prefix code letters DL or DLF and for use of caged needle rollers by the prefix code letters HK or BK.

The outer ring, in the form of a cup, is accurately drawn and no subsequent machining is performed. Drawn cup needle roller bearings of series HK and DL have open ends. The HK Series are also available with one seal, HKRS, and with two seals, HK.2RS. The stamped lip of a drawn cup needle roller bearing of series HKRS with one seal is at the seal end.

Drawn cup needle roller bearings of series BK and DLF are closed at one end. They are used for shaft end mounting. The open end is not sealed.

The one-piece steel cage used in HK Series drawn cup bearings is designed to provide rigidity and minimize wear. This cage design separates the needle roller guiding and retention functions.

Drawn cup needle roller bearings are manufactured with two needle roller and cage assemblies. They have a lubricating hole in the outer ring. Metric series drawn cup bearings with one needle roller and cage assembly may be made available on request with a lubricating hole, indicated by suffix AS1.

SEALED BEARINGS

The HK Series drawn cup bearings are offered with integral seals. The tables of dimensions on page C50 indicates those sizes available with lip contact seals. The seal lip design achieves a light and constant contact with the inner raceway throughout the range

of mounted bearing clearances thereby ensuring positive sealing and low frictional drag.

Sealed drawn cup bearings are intended to retain grease or non-pressurized oil within a bearing while also preventing contaminants entering the raceway area.

Details of shaft design for sealed bearings are given in the engineering section of this catalog.

The standard lip contact seals are compatible with common lubricating oils and petroleum based fuels, but they are adversely affected by certain fire-resistant hydraulic fluids and most common solvents. Sealed drawn cup bearings are normally filled with a high quality lithium soap base general purpose grease. The seal material and grease properties limit the bearing operating temperature between -30° C and +100° C.

If the operating temperature must be outside of the range for the seals mentioned here, or if the seals are exposed to unusual fluids please consult your Timken automotive representative.

BEARING MOUNTING FITS AND INTERNAL CLEARANCE

Drawn cup bearings are manufactured to a degree of precision that will satisfy the radial clearance requirements of most applications. The total radial clearance for an installed drawn cup bearing results from the build up of manufacturing tolerances of the housing bore, the inner raceway diameter and the bearing, as well as the minimum radial clearance required for the application.

For metric series drawn cup bearings requiring close control of radial internal clearance, the suggested housing bore tolerance is N6 and h5 tolerance for the inner raceway diameter. When such exacting close control of radial internal clearance is not required, the user may select N7 housing bore and h6 inner raceway diameter tolerances.

TOLERANCES FOR HOUSING MATERIALS OF LOW RIGIDITY

Metric series drawn cup bearings used in housings made from materials of low rigidity or steel housings of small section, the suggested housing bore tolerance is R6 (R7). To maintain normal radial internal clearance the inner raceway diameter tolerance should be h5 (h6).

OUTER RING ROTATION

For metric series drawn cup bearing applications where the outer ring rotates with respect to the load, it is suggested that both the housing bore and the inner raceway diameter be reduced using R6 (R7) and f5 (f6) tolerance practice respectively.

OSCILLATING MOTION

Metric series drawn cup bearing applications involving oscillating motion may require reduced radial internal clearances. This reduction may be accomplished by increasing the inner raceway diameter using j6 tolerance.

INNER RINGS

When it becomes impractical to meet the shaft raceway design requirements (hardness, case depth, surface finish etc.) outlined in the engineering section, standard inner rings may be used with metric series drawn cup bearings. It is suggested that when metric series inner rings are used with metric series drawn cup bearings, they should be mounted with a loose transition fit on the shaft using g6 (g5) shaft diameter tolerance. The inner ring should be end-clamped against a shoulder. If a tight transition fit must be used, [shaft diameter tolerance h6 (h5)], to keep the inner ring from rotating relative to the shaft, the inner ring outside diameter, as mounted, must not exceed the raceway diameter required by the drawn cup bearing for the particular application. In case the outside diameter of the inner ring, when mounted on the shaft, exceeds the required raceway diameter for the matching drawn cup bearing, it should be ground to proper diameter while mounted on the shaft.

LOAD RATING FACTORS

DYNAMIC LOADS

Drawn cup needle roller bearings can accommodate only radial loads.

$P = F_r$

P = The maximum dynamic radial load that may be applied to a drawn cup bearing based on the dynamic load rating, C given in the tabular pages. This load should be $\leq C/3$.

STATIC LOADS

$$f_0 = \frac{C_0}{P_0}$$

f_0 – static load safety factor

C_0 – basic static load rating (kN)

P_0 – maximum applied static load (kN)

To ensure satisfactory operation of drawn cup needle roller bearings under all types of conditions the static load safety factor f_0 should be ≥ 3.

ADJUSTED RATING LIFE

When application data includes details of operating temperature, oil viscosity, operating speed and the applied load meets the $\leq C/3$ condition adjusted rating life may be evaluated using the information given in the engineering section of this catalog.

INSPECTION OF DRAWN CUP NEEDLE ROLLER BEARINGS

Although the bearing cup is accurately drawn from strip steel, because of its fairly thin section it may go out of round during heat treatment. When the bearing is pressed into a true round housing or ring gage, of correct size and wall thickness, it becomes round and is sized properly. For this reason, it is incorrect to inspect an unmounted drawn cup bearing by measuring the outside diameter. The correct method for inspecting the bearing size is to:

1. press the bearing into a ring gage of proper size
2. plug the bearing bore with the appropriate "go" and "no go" gages or measure it with a tapered arbor (lathe mandrel)

The "go" gage size is the minimum needle roller complement bore diameter. The "no go" gage size is larger than the maximum needle roller complement bore diameter by 0.002 mm.

TABLE 1 – HK SERIES BEARINGS

Nominal Bore Diameter mm	Ring Gage *	Dimensions – mm Needle Roller Complement Bore Diameter	
		Min.	Max.
		$F_{ws\ min}$	
3	6.484	3.006	3.024
4	7.984	4.010	4.028
5	8.984	5.010	5.028
6	9.984	6.010	6.028
7	10.980	7.013	7.031
8	11.980	8.013	8.031
9	12.980	9.013	9.031
10	13.980	10.013	10.031
12	15.980	12.016	12.034
12	17.980	12.016	12.034
13	18.976	13.016	13.034
14	19.976	14.016	14.034
15	20.976	15.016	15.034
16	21.976	16.016	16.034
17	22.976	17.016	17.034
18	23.976	18.016	18.034
20	25.976	20.020	20.041
22	27.976	22.020	22.041
25	31.972	25.020	25.041
28	34.972	28.020	28.041
30	36.972	30.020	30.041
35	41.972	35.025	35.050
40	46.972	40.025	40.050
45	51.967	45.025	45.050
50	57.967	50.025	50.050
60	67.967	60.030	60.060

*The ring gage sizes are in accordance with ISO N6 lower limit.

INSTALLATION PROCEDURES

GENERAL INSTALLATION REQUIREMENTS

- A drawn cup bearing must be pressed into its housing.
- An installation tool, similar to the one illustrated, must be used in conjunction with a standard press.
- The bearing must not be hammered into its housing even in conjunction with the proper assembly mandrel.
- The bearing must not be pressed tightly against a shoulder in the housing.
- If it is necessary to use a shouldered housing, the depth of the housing bore must be sufficient to ensure that the housing shoulder fillet, as well as the shoulder face, clears the bearing.
- The installation tool must be coaxial with the housing bore.

INSTALLATION OF OPEN END BEARINGS

It is advisable to utilize a positive stop on the press tool to locate the bearing properly in the housing. The assembly tool should have a leader or a pilot, as shown, to aid in starting the bearing true in the housing. The "O" ring shown on the drawing may be used to assist in holding the bearing on the installation tool. The bearing should be installed with the marked end (the end with the identification markings) against the angled shoulder of the pressing tool.

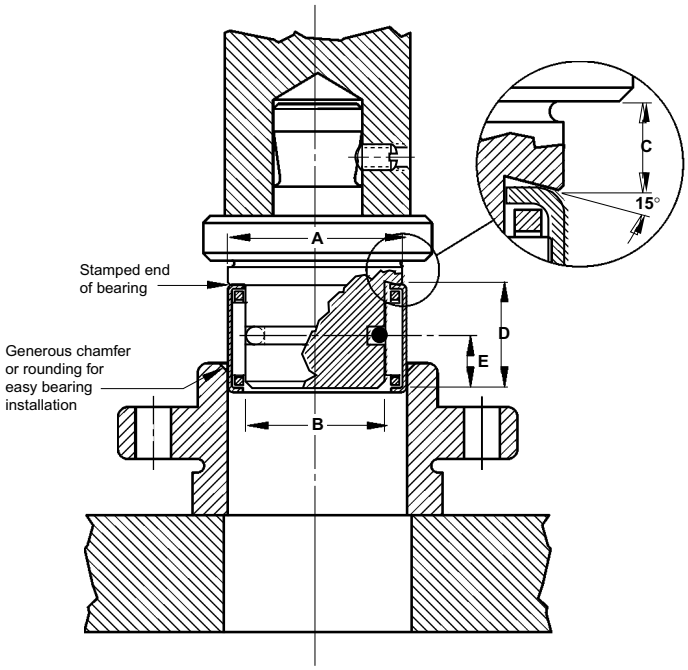
A — 0.4 mm less than housing bore

B — 0.08 mm less than shaft diameter

C — distance bearing will be inset into housing, minimum of 0.2 mm

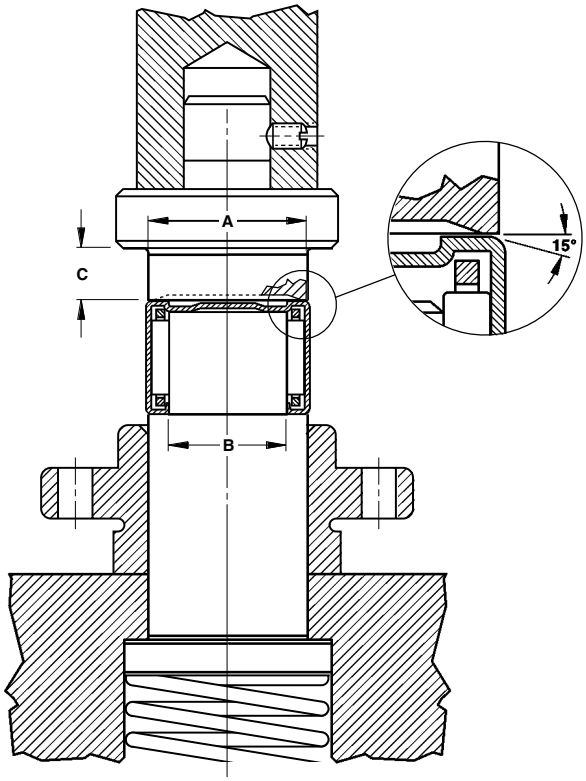
D — pilot length should be length of bearing less 0.8 mm

E — approximately $^1/_2$ D



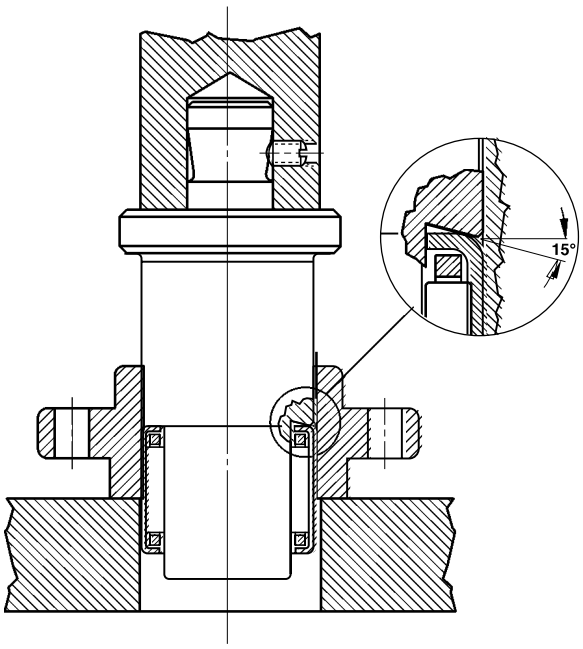
INSTALLATION OF CLOSED END BEARINGS

Bearing can be piloted from below for installation.



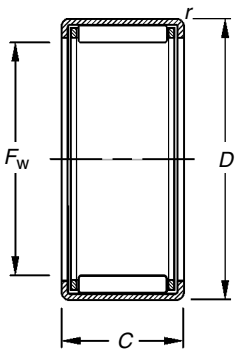
EXTRACTION FROM A STRAIGHT HOUSING

Bearing can be extracted by pushing it through the housing. After extraction, the drawn cup bearing should not be reused.

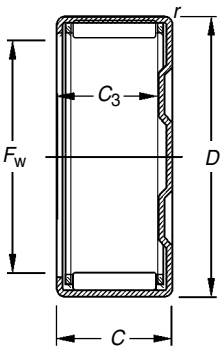


OPEN ENDS, CLOSED ONE END

METRIC SERIES



HK



BK

Shaft Dia.	Dimensions mm/in. -0.3, -.012					Bearing Desig-nation	Load Ratings kN/lbf. Dynamic		Limiting Speed Approx. Grease	Oil	
mm	F_w	D	C	$C_{3\,min}$	$r_{s\,min}$		C	C_0	RPM		C_g
3	3 0.1181	7 0.2559	6 0.236	—	0.3 0.012	HK0306	1.6 360	1.14 256	30000	46000	0.0065
4	4 0.1575	8 0.315	8 0.315	—	0.4 0.016	HK0408	1.88 423	1.32 297	25000	39000	0.0083
5	5 0.1969	9 0.3543	9 0.354	7.4 0.291	0.4 0.016	BK0509	2.52 567	2.07 465	23000	36000	0.01
	5 0.1969	9 0.3543	9 0.354	—	0.4 0.016	HK0509	2.52 567	2.07 465	23000	36000	0.01
6	6 0.2362	10 0.3937	8 0.315	—	0.4 0.016	HK0608	2.34 526	1.95 438	22000	33000	0.0105
	6 0.2362	10 0.3937	9 0.354	7.4 0.291	0.4 0.016	BK0609	3.14 706	2.85 641	22000	33000	0.0116
	6 0.2362	10 0.3937	9 0.354	—	0.4 0.016	HK0609	3.15 708	2.94 661	22000	33000	0.0116
7	7 0.2756	11 0.4331	9 0.354	7.4 0.291	0.4 0.016	BK0709	3.23 726	3.05 686	21000	32000	0.0125
	7 0.2756	11 0.4331	9 0.354	—	0.4 0.016	HK0709	3.22 724	3.12 701	21000	32000	0.0125
8	8 0.315	12 0.4724	8 0.315	6.4 0.252	0.4 0.016	BK0808	2.9 652	2.73 614	20000	31000	0.0128
	8 0.315	12 0.4724	8 0.315	—	0.4 0.016	HK0808	2.9 652	2.73 614	20000	31000	0.0128
	8 0.315	12 0.4724	10 0.394	8.4 0.331	0.4 0.016	BK0810	3.93 883	4.14 931	20000	31000	0.0184
	8 0.315	12 0.4724	10 0.394	—	0.4 0.016	HK0810	3.95 888	4.07 915	20000	31000	0.0186
9	9 0.3543	13 0.5118	10 0.394	8.4 0.331	0.4 0.016	BK0910	4.57 1030	5.07 1140	19000	30000	0.0206
	9 0.3543	13 0.5118	10 0.394	—	0.4 0.016	HK0910	4.57 1030	5.07 1140	19000	30000	0.0206
	9 0.3543	13 0.5118	12 0.472	10.4 0.409	0.4 0.016	BK0912	5.65 1270	6.65 1490	19000	30000	0.022
	9 0.3543	13 0.5118	12 0.472	—	0.4 0.016	HK0912	5.65 1270	6.65 1490	19000	30000	0.022
10	10 0.3937	14 0.5512	10 0.394	8.4 0.331	0.4 0.016	BK1010	4.78 1070	5.51 1240	19000	29000	0.0219
	10 0.3937	14 0.5512	10 0.394	—	0.4 0.016	HK1010	4.78 1070	5.51 1240	19000	29000	0.0219
	10 0.3937	14 0.5512	12 0.472	10.4 0.409	0.4 0.016	BK1012	5.9 1330	7.23 1630	19000	29000	0.0239
	10 0.3937	14 0.5512	12 0.472	—	0.4 0.016	HK1012	5.9 1330	7.23 1630	19000	29000	0.0235
	10 0.3937	14 0.5512	15 0.591	—	0.4 0.016	HK1015	7.49 1680	9.81 2210	19000	29000	0.0253
12	12 0.4724	16 0.6299	10 0.394	8.4 0.331	0.4 0.016	BK1210	4.96 1120	6.08 1370	18000	28000	0.0243
	12 0.4724	16 0.6299	10 0.394	—	0.4 0.016	HK1210	4.96 1120	6.08 1370	18000	28000	0.0243
	12 0.4724	18 0.7087	12 0.472	9.3 0.366	1 0.039	BK1212	6.61 1490	7.29 1640	14000	22000	0.0245
	12 0.4724	18 0.7087	12 0.472	—	1 0.039	HK1212	6.61 1490	7.29 1640	14000	22000	0.0245
13	13 0.5118	19 0.748	12 0.472	9.3 0.366	1 0.039	BK1312	6.92 1560	7.89 1770	14000	22000	0.0258
	13 0.5118	19 0.748	12 0.472	—	1 0.039	HK1312	6.92 1560	7.89 1770	14000	22000	0.0258
14	14 0.5512	20 0.7874	12 0.472	9.3 0.366	1 0.039	BK1412	7.21 1620	8.5 1910	14000	21000	0.0271

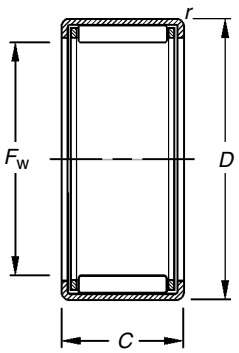
Wt. kg/lbs.	Mounting Dimensions mm/in.									Shaft Dia.
	S		H			Plug Gage				
	Max.	Min.	Min.	Max.	Ring Gage	Go	No-Go	C_g	Matching Inner Ring	mm
0.001 0.002	**3** 0.1181	**2.996** 0.118	**6.487** 0.2554	**6.495** 0.2557	**6.484** 0.2553	**3.006** 0.1183	**3.026** 0.1191			**3**
0.002 0.004	**4** 0.1575	**3.995** 0.1573	**7.984** 0.3143	**7.993** 0.3147	**7.984** 0.3143	**4.01** 0.1579	**4.03** 0.1587			**4**
0.002 0.004	**5** 0.1969	**4.995** 0.1967	**8.984** 0.3537	**8.993** 0.3541	**8.984** 0.3537	**5.01** 0.1972	**5.03** 0.198			**5**
0.002 0.004	**5** 0.1969	**4.995** 0.1967	**8.984** 0.3537	**8.993** 0.3541	**8.984** 0.3537	**5.01** 0.1972	**5.03** 0.198			
0.002 0.004	**6** 0.2362	**5.995** 0.236	**9.984** 0.3931	**9.993** 0.3934	**9.984** 0.3931	**6.01** 0.2366	**6.03** 0.2374			**6**
0.003 0.007	**6** 0.2362	**5.995** 0.236	**9.984** 0.3931	**9.993** 0.3934	**9.984** 0.3931	**6.01** 0.2366	**6.03** 0.2374			
0.002 0.004	**6** 0.2362	**5.995** 0.236	**9.984** 0.3931	**9.993** 0.3934	**9.984** 0.3931	**6.01** 0.2366	**6.03** 0.2374			
0.003 0.007	**7** 0.2756	**6.994** 0.2754	**10.98** 0.4323	**10.991** 0.4327	**10.98** 0.4323	**7.013** 0.2761	**7.033** 0.2769			**7**
0.003 0.007	**7** 0.2756	**6.994** 0.2754	**10.98** 0.4323	**10.991** 0.4327	**10.98** 0.4323	**7.013** 0.2761	**7.033** 0.2769			
0.003 0.007	**8** 0.315	**7.994** 0.3147	**11.98** 0.4717	**11.991** 0.4721	**11.98** 0.4717	**8.013** 0.3155	**8.033** 0.3163			**8**
0.003 0.007	**8** 0.315	**7.994** 0.3147	**11.98** 0.4717	**11.991** 0.4721	**11.98** 0.4717	**8.013** 0.3155	**8.033** 0.3163			
0.004 0.009	**8** 0.315	**7.994** 0.3147	**11.98** 0.4717	**11.991** 0.4721	**11.98** 0.4717	**8.013** 0.3155	**8.033** 0.3163	**0.0241**	**JR5x8x12**	
0.004 0.009	**8** 0.315	**7.994** 0.3147	**11.98** 0.4717	**11.991** 0.4721	**11.98** 0.4717	**8.013** 0.3155	**8.033** 0.3163	**0.0244**	**JR5x8x12**	
0.004 0.009	**9** 0.3543	**8.994** 0.3541	**12.98** 0.511	**12.991** 0.5115	**12.98** 0.511	**9.013** 0.3548	**9.033** 0.3556	**0.027**	**JR6x9x12**	**9**
0.004 0.009	**9** 0.3543	**8.994** 0.3541	**12.98** 0.511	**12.991** 0.5115	**12.98** 0.511	**9.013** 0.3548	**9.033** 0.3556	**0.027**	**JR6x9x12**	
0.005 0.011	**9** 0.3543	**8.994** 0.3541	**12.98** 0.511	**12.991** 0.5115	**12.98** 0.511	**9.013** 0.3548	**9.033** 0.3556	**0.0289**	**JR6x9x12**	
0.005 0.011	**9** 0.3543	**8.994** 0.3541	**12.98** 0.511	**12.991** 0.5115	**12.98** 0.511	**9.013** 0.3548	**9.033** 0.3556	**0.0289**	**JR6x9x12**	
0.004 0.009	**10** 0.3937	**9.994** 0.3935	**13.98** 0.5504	**13.991** 0.5508	**13.98** 0.5504	**10.013** 0.3942	**10.033** 0.395	**0.0287**	**JR7x10x10.5**	**10**
0.004 0.009	**10** 0.3937	**9.994** 0.3935	**13.98** 0.5504	**13.991** 0.5508	**13.98** 0.5504	**10.013** 0.3942	**10.033** 0.395	**0.0287**	**JR7x10x10.5**	
0.005 0.011	**10** 0.3937	**9.994** 0.3935	**13.98** 0.5504	**13.991** 0.5508	**13.98** 0.5504	**10.013** 0.3942	**10.033** 0.395	**0.0314**	**JR7x10x12**	
0.005 0.011	**10** 0.3937	**9.994** 0.3935	**13.98** 0.5504	**13.991** 0.5508	**13.98** 0.5504	**10.013** 0.3942	**10.033** 0.395	**0.0308**	**JR7x10x12**	
0.007 0.015	**10** 0.3937	**9.994** 0.3935	**13.98** 0.5504	**13.991** 0.5508	**13.98** 0.5504	**10.013** 0.3942	**10.033** 0.395	**0.0332**	**JR7x10x16**	
0.006 0.013	**12** 0.4724	**11.992** 0.4721	**15.98** 0.6291	**15.991** 0.6296	**17.98** 0.7079	**12.016** 0.4731	**12.036** 0.4739	**0.0319**	**JR8x12x10.5**	**12**
0.006 0.013	**12** 0.4724	**11.992** 0.4721	**15.98** 0.6291	**15.991** 0.6296	**17.98** 0.7079	**12.016** 0.4731	**12.036** 0.4739	**0.0319**	**JR8x12x10.5**	
0.012 0.026	**12** 0.4724	**11.992** 0.4721	**17.98** 0.7079	**17.991** 0.7083	**17.98** 0.7079	**12.016** 0.4731	**12.036** 0.4739	**0.0321**	**JR8x12x12.5**	
0.01 0.022	**12** 0.4724	**11.992** 0.4721	**17.98** 0.7079	**17.991** 0.7083	**17.98** 0.7079	**12.016** 0.4731	**12.036** 0.4739	**0.0321**	**JR8x12x12.5**	
0.012 0.026	**13** 0.5118	**12.992** 0.5115	**18.976** 0.7471	**18.989** 0.7476	**18.976** 0.7471	**13.016** 0.5124	**13.036** 0.5132	**0.0338**	**JR10x13x12.5**	**13**
0.01 0.022	**13** 0.5118	**12.992** 0.5115	**18.976** 0.7471	**18.989** 0.7476	**18.976** 0.7471	**13.016** 0.5124	**13.036** 0.5132	**0.0338**	**JR10x13x12.5**	
0.014 0.031	**14** 0.5512	**13.992** 0.5509	**19.976** 0.7865	**19.989** 0.787	**19.976** 0.7865	**14.016** 0.5518	**14.036** 0.5526	**0.0356**	**JR10x14x12**	**14**

Continued on next page.

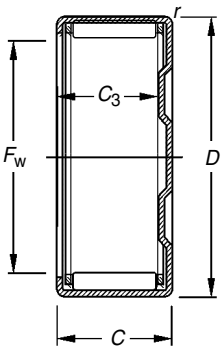
OPEN ENDS, CLOSED ONE END

METRIC SERIES

continued



HK



BK

Shaft Dia.	Dimensions mm/in. -0.3, -.012					Bearing Desig-nation	Load Ratings kN/lbf. Dynamic		Limiting Speed Approx. Grease	Oil	
mm	F_w	D	C	$C_{3\,min}$	$r_{s\,min}$		C	C_0	RPM		C_g
	14 0.5512	20 0.7874	12 0.472	—	1 0.039	HK1412	7.21 1620	8.5 1910	14000	21000	0.0271
15	15 0.5906	21 0.8268	12 0.472	9.3 0.366	1 0.039	BK1512	7.16 1610	8.57 1930	14000	21000	0.0284
	15 0.5906	21 0.8268	12 0.472	— 	1 0.039	HK1512	7.49 1680	9.11 2050	14000	21000	0.0284
	15 0.5906	21 0.8268	16 0.63	13.3 0.524	1 0.039	BK1516	10.7 2410	14.4 3240	14000	21000	0.0318
	15 0.5906	21 0.8268	16 0.63	— 	1 0.039	HK1516	10.7 2410	14.4 3240	14000	21000	0.0318
	15 0.5906	21 0.8268	22 0.866	19.3 0.76	1 0.039	BK1522	13.5 3030	19.4 4360	14000	21000	0.0288
	15 0.5906	21 0.8268	22 0.866	— 	1 0.039	HK1522	13.5 3030	19.4 4360	14000	21000	0.0288
16	16 0.6299	22 0.8661	12 0.472	9.3 0.366	1 0.039	BK1612	7.76 1740	9.72 2190	14000	21000	0.0297
	16 0.6299	22 0.8661	12 0.472	— 	1 0.039	HK1612	7.76 1740	7.72 1740	14000	21000	0.0297
	16 0.6299	22 0.8661	16 0.63	13.3 0.524	1 0.039	BK1616	11.1 2500	15.3 3440	14000	21000	0.0332
	16 0.6299	22 0.8661	16 0.63	— 	1 0.039	HK1616	11.1 2500	15.3 3440	14000	21000	0.0332
	16 0.6299	22 0.8661	22 0.866	19.3 0.76	1 0.039	BK1622	13.4 3010	19.5 4380	14000	21000	0.0297
	16 0.6299	22 0.8661	22 0.866	— 	1 0.039	HK1622	13.4 3010	19.5 4380	14000	21000	0.0297
17	17 0.6693	23 0.9055	12 0.472	9.3 0.366	1 0.039	BK1712	8.12 1830	10.4 2340	13000	20000	0.0236
	17 0.6693	23 0.9055	12 0.472	— 	1 0.039	HK1712	8.12 1830	10.4 2340	13000	20000	0.0236
18	18 0.7087	24 0.9449	12 0.472	— 	1 0.039	HK1812	8.41 1890	11.11 2500	12000	18000	0.0246
	18 0.7087	24 0.9449	16 0.63	13.3 0.524	1 0.039	BK1816	11.6 2610	16.8 3780	12000	18000	0.0357
	18 0.7087	24 0.9449	16 0.63	— 	1 0.039	HK1816	11.6 2610	16.8 3780	12000	18000	0.0357
20	20 0.7874	26 1.0236	12 0.472	9.3 0.366	1 0.039	BK2012	8.97 2020	12.5 2810	11000	16000	0.0347
	20 0.7874	26 1.0236	12 0.472	— 	1 0.039	HK2012	8.97 2020	12.5 2810	11000	16000	0.0347
	20 0.7874	26 1.0236	16 0.63	13.3 0.524	1 0.039	BK2016	12.4 2790	18.9 4250	11000	16000	0.0385
	20 0.7874	26 1.0236	16 0.63	— 	1 0.039	HK2016	12.4 2790	18.9 4250	11000	16000	0.0385
	20 0.7874	26 1.0236	20 0.787	17.3 0.681	1 0.039	BK2020	15.5 3480	25.3 5690	11000	16000	0.0414
	20 0.7874	26 1.0236	20 0.787	— 	1 0.039	HK2020	15.9 3570	26.2 5890	11000	16000	0.0414
	20 0.7874	26 1.0236	30 1.181	27.3 1.075	1 0.039	BK2030	21.2 4770	37.8 8500	11000	16000	0.0385
	20 0.7874	26 1.0236	30 1.181	— 	1 0.039	HK2030	21.2 4770	37.8 8500	11000	16000	0.0385
22	22 0.8661	28 1.1024	12 0.472	9.3 0.366	1 0.039	BK2212	9.81 2210	14.5 3260	9600	15000	0.0375
	22 0.8661	28 1.1024	12 0.472	— 	1 0.039	HK2212	9.81 2210	14.5 3260	9600	15000	0.0382
	22 0.8661	28 1.1024	16 0.63	13.3 0.524	1 0.039	BK2216	13.1 2940	20.9 4700	9600	15000	0.0412

Wt. kg/lbs	Mounting Dimensions mm/in.								Matching Inner Ring	Shaft Dia.
						Plug Gage				
	Max.	Min.	Min.	Max.	Ring Gage	Go	No-Go			
	S		H					C_g		mm
0.011 0.024	**14** 0.5512	**13.992** 0.5509	**19.976** 0.7865	**19.989** 0.787	**19.976** 0.7865	**14.016** 0.5518	**14.036** 0.5526	**0.0356**	**JR10x14x12**	
0.015 0.033	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0373**	**JR12x15x12.5**	**15**
0.011 0.024	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0373**	**JR12x15x12.5**	
0.019 0.042	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0417**	**JR12x15x16.5**	
0.016 0.035	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0417**	**JR12x15x16.5**	
0.025 0.055	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0378**	**JR12x15x22.5**	
0.024 0.053	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0378**	**JR12x15x22.5**	
0.016 0.035	**16** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**21.976** 0.8652	**16.016** 0.6306	**16.036** 0.6313	**0.039**	**JR12x16x12**	**16**
0.012 0.026	**16** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**21.976** 0.8652	**16.016** 0.6306	**16.036** 0.6313	**0.039**	**JR12x16x12**	
0.02 0.044	**16** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**21.976** 0.8652	**16.016** 0.6306	**16.036** 0.6313	**0.0436**	**JR12x16x16**	
0.018 0.04	**16** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**21.976** 0.8652	**16.016** 0.6306	**16.036** 0.6313	**0.0436**	**JR12x16x16**	
0.028 0.062	**16** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**21.976** 0.8652	**16.016** 0.6306	**16.036** 0.6313	**0.039**	**JR12x16x22**	
0.022 0.049	**16** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**21.976** 0.8652	**16.016** 0.6306	**16.036** 0.6313	**0.039**	**JR12x16x22**	
0.018 0.04	**17** 0.6693	**16.992** 0.669	**22.976** 0.9046	**22.989** 0.9051	**22.976** 0.9046	**17.016** 0.6699	**17.036** 0.6707			**17**
0.013 0.029	**17** 0.6693	**16.992** 0.669	**22.976** 0.9046	**22.989** 0.9051	**22.976** 0.9046	**17.016** 0.6699	**17.036** 0.6707			
0.015 0.033	**18** 0.7087	**17.992** 0.7083	**23.976** 0.9439	**23.989** 0.9444	**23.976** 0.9439	**18.016** 0.7093	**18.036** 0.7101			**18**
0.022 0.049	**18** 0.7087	**17.992** 0.7083	**23.976** 0.9439	**23.989** 0.9444	**23.976** 0.9439	**18.016** 0.7093	**18.036** 0.7101	**0.0468**	**JR15x18x16.5**	
0.018 0.04	**18** 0.7087	**17.992** 0.7083	**23.976** 0.9439	**23.989** 0.9444	**23.976** 0.9439	**18.016** 0.7093	**18.036** 0.7101	**0.0468**	**JR15x18x16.5**	
0.017 0.037	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0455**	**JR15x20x12**	**20**
0.016 0.035	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0455**	**JR15x20x12**	
0.022 0.049	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0505**	**JR17x20x16.5**	
0.022 0.049	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0505**	**JR17x20x16.5**	
0.027 0.06	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0543**	**JR17x20x20.5**	
0.025 0.055	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0543**	**JR17x20x20.5**	
0.043 0.095	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0505**	**JR17x20x30.5**	
0.041 0.09	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0505**	**JR17x20x30.5**	
0.02 0.044	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678	**0.0492**	**JR17x22x13**	**22**
0.015 0.033	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678	**0.0501**	**JR17x22x13**	
0.027 0.06	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678	**0.0541**	**JR17x22x16**	

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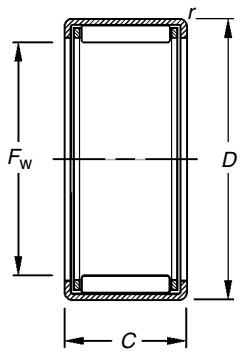
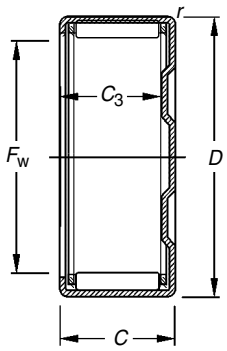
OPEN ENDS, CLOSED ONE END

METRIC SERIES

continued



HK



BK

Shaft Dia.	Dimensions mm/in. -0.3, -.012					Bearing Desig-nation	Load Ratings kN/lbf. Dynamic		Limiting Speed Approx. Grease	Oil	
mm	F_w	D	C	$C_{3\,min}$	$r_{s\,min}$		C	C_0	RPM		C_g
	22 0.8661	28 1.1024	16 0.63	—	1 0.039	HK2216	13.1 2940	20.9 4700	9600	15000	0.0412
	22 0.8661	28 1.1024	20 0.787	17.3 0.681	1 0.039	BK2220	15.3 3440	25.5 5730	9600	15000	0.0432
	22 0.8661	28 1.1024	20 0.787	—	1 0.039	HK2220	15.3 3440	25.5 5730	9600	15000	0.0432
25	25 0.9843	32 1.2598	12 0.472	—	1 0.039	HK2512	10.9 2450	14.7 3300	8500	13000	0.0295
	25 0.9843	32 1.2598	16 0.63	13.3 0.524	1 0.039	BK2516	15.6 3510	23.5 5280	8500	13000	0.0434
	25 0.9843	32 1.2598	16 0.63	—	1 0.039	HK2516	15.6 3510	23.5 5280	8500	13000	0.0434
	25 0.9843	32 1.2598	20 0.787	17.3 0.681	1 0.039	BK2520	20.6 4630	33.4 7510	8500	13000	0.0474
	25 0.9843	32 1.2598	20 0.787	—	1 0.039	HK2520	20.6 4630	33.4 7510	8500	13000	0.0474
	25 0.9843	32 1.2598	26 1.024	23.3 0.917	1 0.039	BK2526	25.7 5780	44.4 9980	8500	13000	0.0508
	25 0.9843	32 1.2598	26 1.024	—	1 0.039	HK2526	25.7 5780	44.4 9980	8500	13000	0.0508
	25 0.9843	32 1.2598	38 1.496	35.3 1.39	1 0.039	BK2538	35.3 7940	66.9 15000	8500	13000	0.0474
	25 0.9843	32 1.2598	38 1.496	—	1 0.039	HK2538	35.3 7940	66.9 15000	8500	13000	0.0474
28	28 1.1024	35 1.378	16 0.63	—	1 0.039	HK2816	15.9 3570	24.9 5600	7500	12000	0.0462
	28 1.1024	35 1.378	20 0.787	17.3 0.681	1 0.039	BK2820	20.9 4700	35.3 7940	7500	12000	0.0504
	28 1.1024	35 1.378	20 0.787	—	1 0.039	HK2820	20.9 4700	35.3 7940	7500	12000	0.0504
30	30 1.1811	37 1.4567	12 0.472	9.3 0.366	1 0.039	BK3012	11.6 2610	16.8 3780	7000	11000	0.033
	30 1.1811	37 1.4567	12 0.472	—	1 0.039	HK3012	12 2700	17.7 3980	7000	11000	0.033
	30 1.1811	37 1.4567	16 0.63	—	1 0.039	HK3016	16.8 3780	27.3 6140	7000	11000	0.0488
	30 1.1811	37 1.4567	20 0.787	17.3 0.681	1 0.039	BK3020	22.4 5040	39.6 8900	7000	11000	0.0537
	30 1.1811	37 1.4567	20 0.787	—	1 0.039	HK3020	22.4 5040	39.6 8900	7000	11000	0.0537
	30 1.1811	37 1.4567	26 1.024	23.3 0.917	1 0.039	BK3026	27.4 6160	51.2 11500	7000	11000	0.057
	30 1.1811	37 1.4567	26 1.024	—	1 0.039	HK3026	27.4 6160	51.2 11500	7000	11000	0.0571
	30 1.1811	37 1.4567	38 1.496	35.3 1.39	1 0.039	BK3038	38.4 8630	79.2 17800	7000	11000	0.0535
	30 1.1811	37 1.4567	38 1.496	—	1 0.039	HK3038	38.4 8630	79.2 17800	7000	11000	0.0535
35	35 1.378	42 1.6535	12 0.472	—	1 0.039	HK3512	13 2920	20.6 4630	5900	9100	0.0365
	35 1.378	42 1.6535	16 0.63	—	1 0.039	HK3516	17.4 3910	29.9 6720	5900	9100	0.0534
	35 1.378	42 1.6535	20 0.787	17.3 0.681	1 0.039	BK3520	24.5 5510	46.8 10520	5900	9100	0.0597
	35 1.378	42 1.6535	20 0.787	—	1 0.039	HK3520	24.5 5510	46.8 10500	5900	9100	0.0597
40	40 1.5748	47 1.8504	12 0.472	—	1 0.039	HK4012	14.7 3300	25.3 5690	5200	7900	0.0402

Wt. kg/lbs	Mounting Dimensions mm/in.					Plug Gage			Matching Inner Ring	Shaft Dia.
	Max.	Min.	Min.	Max.	Ring Gage	Go	No-Go			
	S		H					C_g		mm
0.022 0.049	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678	**0.0541**	**JR17x22x16**	
0.028 0.062	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678	**0.0567**	**JR17x22x23**	
0.026 0.057	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678	**0.0567**	**JR17x22x23**	
0.021 0.046	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859			**25**
0.031 0.068	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0569**	**JR20x25x17**	
0.028 0.062	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0569**	**JR20x25x17**	
0.043 0.095	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0622**	**JR20x25x20.5**	
0.04 0.088	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0622**	**JR20x25x20.5**	
0.048 0.106	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0666**	**JR20x25x26.5**	
0.046 0.101	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0666**	**JR20x25x26.5**	
0.077 0.17	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0622**	**JR20x25x38.5**	
0.073 0.161	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0622**	**JR20x25x38.5**	
0.032 0.071	**28** 1.1024	**27.991** 1.102	**34.972** 1.3769	**34.988** 1.3775	**34.972** 1.3769	**28.02** 1.1031	**28.043** 1.1041	**0.0606**	**JR22x28x17**	**28**
0.047 0.104	**28** 1.1024	**27.991** 1.102	**34.972** 1.3769	**34.988** 1.3775	**34.972** 1.3769	**28.02** 1.1031	**28.043** 1.1041	**0.0661**	**JR22x28x20.5**	
0.04 0.088	**28** 1.1024	**27.991** 1.102	**34.972** 1.3769	**34.988** 1.3775	**34.972** 1.3769	**28.02** 1.1031	**28.043** 1.1041	**0.0661**	**JR22x28x20.5**	
0.031 0.068	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828			**30**
0.042 0.093	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828			
0.032 0.071	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.064**	**JR25x30x17**	
0.053 0.117	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0705**	**JR25x30x20.5**	
0.047 0.104	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0705**	**JR25x30x20.5**	
0.067 0.148	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0748**	**JR25x30x26.5**	
0.052 0.115	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0749**	**JR25x30x26.5**	
0.093 0.205	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0702**	**JR25x30x38.5**	
0.087 0.192	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0702**	**JR25x30x38.5**	
0.028 0.062	**35** 1.378	**34.989** 1.3775	**41.972** 1.6524	**41.988** 1.6531	**41.972** 1.6524	**35.025** 1.3789	**35.052** 1.38			**35**
0.037 0.082	**35** 1.378	**34.989** 1.3775	**41.972** 1.6524	**41.988** 1.6531	**41.972** 1.6524	**35.025** 1.3789	**35.052** 1.38	**0.0701**	**JR30x35x17**	
0.065 0.143	**35** 1.378	**34.989** 1.3775	**41.972** 1.6524	**41.988** 1.6531	**41.972** 1.6524	**35.025** 1.3789	**35.052** 1.38	**0.0783**	**JR30x35x20.5**	
0.049 0.108	**35** 1.378	**34.989** 1.3775	**41.972** 1.6524	**41.988** 1.6531	**41.972** 1.6524	**35.025** 1.3789	**35.052** 1.38	**0.0783**	**JR30x35x20.5**	
0.036 0.079	**40** 1.5748	**39.989** 1.5744	**46.972** 1.8493	**46.988** 1.8499	**46.972** 1.8493	**40.025** 1.5758	**40.052** 1.5769			**40**

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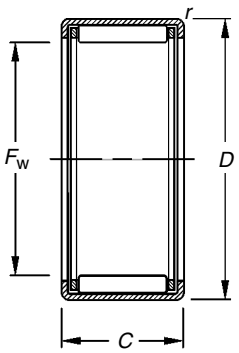
OPEN ENDS, CLOSED ONE END

METRIC SERIES

continued



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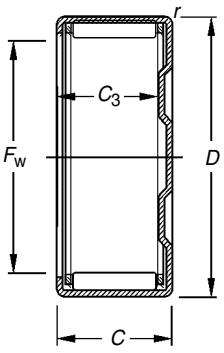


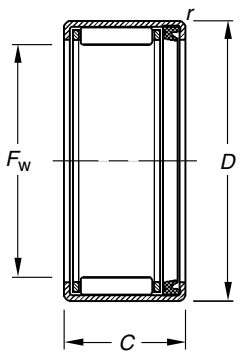
BK

Shaft Dia.	Dimensions mm/in. -0.3, -.012					Bearing Desig-nation	Load Ratings kN/lbf. Dynamic		Limiting Speed Approx. Grease	Oil	
mm	F_w	D	C	$C_{3\,min}$	$r_{s\,min}$		C	C_0	RPM		C_g
	40 1.5748	47 1.8504	16 0.63	—	1 0.039	HK4016	18.9 4250	34.8 7820	5200	7900	0.0589
	40 1.5748	47 1.8504	20 0.787	17.3 0.681	1 0.039	BK4020	25.1 5640	50.4 11300	5200	7900	0.0646
	40 1.5748	47 1.8504	20 0.787	—	1 0.039	HK4020	25.1 5640	50.4 11300	5200	7900	0.0646
45	45 1.7717	52 2.0472	12 0.472	—	1 0.039	HK4512	14.1 3170	24.8 5580	4600	7000	N/A
	45 1.7717	52 2.0472	16 0.63	—	1 0.039	HK4516	19.8 4450	38.5 8660	4600	7000	0.0637
	45 1.7717	52 2.0472	20 0.787	17.3 0.681	1 0.039	BK4520	26.3 5910	55.4 12500	4600	7000	0.0697
	45 1.7717	52 2.0472	20 0.787	—	1 0.039	HK4520	27.2 6110	58.2 13100	4600	7000	0.0697
50	50 1.9685	58 2.2835	20 0.787	—	1 0.039	HK5020	30.9 6950	62.2 14000	4100	6300	0.0714
50	50 1.9685	58 2.2835	25 0.984	—	1 0.039	HK5025	35.5 7980	74.1 16700	4100	6300	0.0764
	60 2.3622	68 2.6772	12 0.472	—	1 0.039	HK6012	17.2 3870	31.2 7010	3400	5200	0.0523

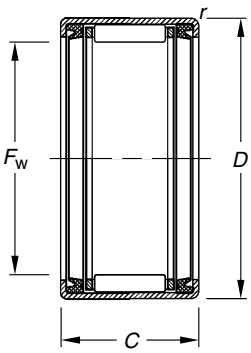
Wt. kg/lbs	Mounting Dimensions mm/in.					Plug Gage			Matching Inner Ring	Shaft Dia.
	Max.	Min.	Min.	Max.	Ring Gage	Go	No-Go			
	S		H					C_g		mm
0.048 0.106	**40** 1.5748	**39.989** 1.5744	**46.972** 1.8493	**46.988** 1.8499	**46.972** 1.8493	**40.025** 1.5758	**40.052** 1.5769	**0.0773**	**JR35x40x17**	
0.07 0.154	**40** 1.5748	**39.989** 1.5744	**46.972** 1.8493	**46.988** 1.8499	**46.972** 1.8493	**40.025** 1.5758	**40.052** 1.5769	**0.0848**	**JR35x40x20.5**	
0.06 0.132	**40** 1.5748	**39.989** 1.5744	**46.972** 1.8493	**46.988** 1.8499	**46.972** 1.8493	**40.025** 1.5758	**40.052** 1.5769	**0.0848**	**JR35x40x20.5**	
0.036 0.079	**45** 1.7717	**44.989** 1.7712	**51.967** 2.0459	**51.986** 2.0467	**51.967** 2.0459	**45.025** 1.7726	**45.052** 1.7737	**N/A**		**45**
0.048 0.106	**45** 1.7717	**44.989** 1.7712	**51.967** 2.0459	**51.986** 2.0467	**51.967** 2.0459	**45.025** 1.7726	**45.052** 1.7737	**0.0836**	**JR40x45x17**	
0.079 0.174	**45** 1.7717	**44.989** 1.7712	**51.967** 2.0459	**51.986** 2.0467	**51.967** 2.0459	**45.025** 1.7726	**45.052** 1.7737	**0.0914**	**JR40x45x20.5**	
0.057 0.126	**45** 1.7717	**44.989** 1.7712	**51.967** 2.0459	**51.986** 2.0467	**51.967** 2.0459	**45.025** 1.7726	**45.052** 1.7737	**0.0914**	**JR40x45x20.5**	
0.072 0.159	**50** 1.9685	**49.989** 1.9681	**57.967** 2.2822	**57.986** 2.2829	**57.967** 2.2822	**50.025** 1.9695	**50.052** 1.9706	**0.0937**	**JR45x50x20**	
0.092 0.203	**50** 1.9685	**49.989** 1.9681	**57.967** 2.2822	**57.986** 2.2829	**57.967** 2.2822	**50.025** 1.9695	**50.052** 1.9706	**0.1002**	**JR45x50x25.5**	**50**
0.06 0.132	**60** 2.3622	**59.987** 2.3617	**67.967** 2.6759	**67.986** 2.6766	**67.967** 2.6759	**60.03** 2.3634	**60.062** 2.3646			

SEALED BEARINGS

METRIC SERIES



HK RS



HK .2RS

Shaft Dia.	Dimensions mm/in. -0.3 -.012					Bearing Designation	Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Approx. Grease	
mm	F_w	D	C	$C_{3\,min}$	$r_{s\,min}$		C	C_0	RPM	C_g
8	8 0.315	12 0.4724	10 0.394	—	0.4 0.016	HK0810RS	2.9 650	2.73 610	20000	N/A
10	10 0.3937	14 0.5512	12 0.472	—	0.4 0.016	HK1012RS	4.78 1070	5.51 1240	19000	N/A
12	12 0.4724	18 0.7087	14 0.551	—	1 0.039	HK1214RS	6.61 1490	7.29 1640	14000	0.0189
	12 0.4724	18 0.7087	16 0.63	—	1	HK1216.2RS	6.87	7.65	14000	0.0189
14	14 0.5512	20 0.7874	14 0.551	11.3 0.445	1 0.039	BK1414RS	7.17 1610	8.41 1890	14000	N/A
	14 0.5512	20 0.7874	14 0.551	—	1 0.039	HK1414RS	7.17 1610	8.41 1890	14000	0.0271
	14 0.5512	20 0.7874	16 0.63	—	1 0.039	HK1416.2RS	7.17 1610	8.41 1890	14000	0.0271
15	15 0.5906	21 0.8268	14 0.551	11.3 0.445	1 0.039	BK1514RS	7.87 1770	9.69 2180	13000	N/A
	15 0.5906	21 0.8268	14 0.551	—	1 0.039	HK1514RS	7.87 1770	9.69 2180	13000	0.0288
	15 0.5906	21 0.8268	16 0.63	—	1 0.039	HK1516.2RS	7.87 1770	9.69 2180	13000	0.0288
16	16 0.6299	22 0.8661	16 0.63	—	1 0.039	HK1614RS	7.82 1760	9.76 2190	12000	0.0297
	16 0.6299	22 0.8661	16 0.63	—	1 0.039	HK1616.2RS	7.82 1760	9.76 2190	12000	0.0297
18	18 0.7087	24 0.9449	14 0.551	—	1 0.039	HK1814RS	8.41 1890	11.1 2500	11000	0.0246
	18 0.7087	24 0.9449	16 0.63	—	1 0.039	HK1816.2RS	8.41 1890	11.1 2500	11000	0.0322
20	20 0.7874	26 1.0236	16 0.63	—	1 0.039	HK2016.2RS	8.97 2020	12.5 2810	9700	0.0347
	20 0.7874	26 1.0236	18 0.709	—	1 0.039	HK2018RS	12.4 2790	18.9 4250	9700	0.0385
	20 0.7874	26 1.0236	20 0.787	—	1 0.039	HK2020.2RS	12.4 2790	18.9 4250	9700	0.0385
22	22 0.8661	28 1.1024	16 0.63	—	1 0.039	HK2216.2RS	9.81 2210	14.5 3260	8800	0.0286
22	22 0.8661	28 1.1024	18 0.709	—	1 0.039	HK2218RS	13.1 2950	20.9 4700	8800	0.0412
	22 0.8661	28 1.1024	20 0.787	—	1 0.039	HK2220.2RS	13.1 2950	20.9 4700	8800	0.0412
25	25 0.9843	32 1.2598	16 0.63	—	1 0.039	HK2516.2RS	11.1 2500	15.1 3390	7800	0.0389
	25 0.9843	32 1.2598	18 0.709	—	1 0.039	HK2518RS	16.2 3640	24.6 5530	7800	0.0439
	25 0.9843	32 1.2598	20 0.787	—	1 0.039	HK2520.2RS	16.2 3640	24.6 5530	7800	0.0439
	25 0.9843	32 1.2598	22 0.866	—	1 0.039	HK2522RS	20.6 4630	33.4 7510	7800	0.0474
	25 0.9843	32 1.2598	24 0.945	—	1 0.039	HK2524.2RS	20.6 4630	33.4 7510	7800	0.0474
28	28 1.1024	35 1.378	20 0.787	—	1 0.039	HK2820.2RS	15.9 3570	24.9 5600	6900	0.0462
30	30 1.1811	37 1.4567	16 0.63	—	1 0.039	HK3016.2RS	11.6 2610	16.8 3780	6500	0.0432
	30 1.1811	37 1.4567	18 0.709	—	1 0.039	HK3018RS	16.8 3780	27.3 6140	6500	0.0488
	30 1.1811	37 1.4567	20 0.787	—	1 0.039	HK3020.2RS	16.8 3780	27.3 6140	6500	0.0488

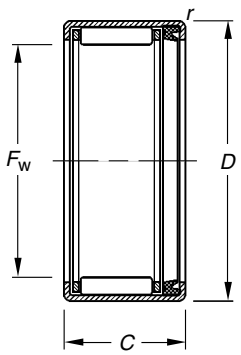
Wt. kg/lbs	Mounting Dimensions mm/in.					Plug Gage			Matching Inner Ring	Shaft Dia.
	Max.	Min.	Min.	Max.	Ring Gage	Go	No-Go			
	S		H					C_g		mm
0.004 0.009	**8** 0.315	**7.994** 0.3147	**11.98** 0.4717	**11.991** 0.4721	**11.98** 0.4717	**8.013** 0.3155	**8.033** 0.3163			**8**
0.005 0.011	**10** 0.3937	**9.994** 0.3935	**13.98** 0.5504	**13.991** 0.5508	**13.98** 0.5504	**10.013** 0.3942	**10.033** 0.395			**10**
0.013 0.029	**12** 0.4724	**11.992** 0.4721	**17.98** 0.7079	**17.991** 0.7083	**17.98** 0.7079	**12.016** 0.4731	**12.036** 0.4739			**12**
0.016 0.035	**12** 0.4724	**11.992** 0.4721	**17.98** 0.7079	**17.991** 0.7083	**17.98** 0.7079	**12.016** 0.4731	**12.036** 0.4739			
0.014 0.031	**14** 0.5512	**13.992** 0.5509	**19.976** 0.7865	**19.989** 0.787	**19.976** 0.7865	**14.016** 0.5518	**14.036** 0.5526			**14**
0.015 0.033	**14** 0.5512	**13.992** 0.5509	**19.976** 0.7865	**19.989** 0.787	**19.976** 0.7865	**14.016** 0.5518	**14.036** 0.5526	**0.0356**	**JR10x14x16**	
0.014 0.031	**14** 0.5512	**13.992** 0.5509	**19.976** 0.7865	**19.989** 0.787	**19.976** 0.7865	**14.016** 0.5518	**14.036** 0.5526	**0.0356**	**JR10x14x20**	
0.017 0.037	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0378**	**JR12x15x16.5**	**15**
0.016 0.035	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0378**	**JR12x15x16.5**	
0.019 0.042	**15** 0.5906	**14.992** 0.5902	**20.976** 0.8258	**20.989** 0.8263	**20.976** 0.8258	**15.016** 0.5912	**15.036** 0.592	**0.0378**	**JR12x15x16.5**	
0.014 0.031	**16** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**21.976** 0.8652	**16.016** 0.6306	**16.036** 0.6313	**0.039**	**JR12x16x16**	**16**
0.015 0.033	**16** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**21.976** 0.8652	**16.016** 0.6306	**16.036** 0.6313	**0.039**	**JR12x16x20**	
0.018 0.04	**18** 0.7087	**17.992** 0.7083	**23.976** 0.9439	**23.989** 0.9444	**23.976** 0.9439	**18.016** 0.7093	**18.036** 0.7101			**18**
0.017 0.037	**18** 0.7087	**17.992** 0.7083	**23.976** 0.9439	**23.989** 0.9444	**23.976** 0.9439	**18.016** 0.7093	**18.036** 0.7101	**0.0422**	**JR15x18x16.5**	
0.023 0.051	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0455**	**JR17x20x16.5**	**20**
0.025 0.055	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0505**	**JR17x20x20.5**	
0.028 0.062	**20** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**25.976** 1.0227	**20.02** 0.7882	**20.043** 0.7891	**0.0505**	**JR17x20x20.5**	
0.025 0.055	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678			**22**
0.027 0.06	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678	**0.0541**	**JR17x22x23**	**22**
0.026 0.057	**22** 0.8661	**21.991** 0.8658	**27.976** 1.1014	**27.989** 1.1019	**27.976** 1.1014	**22.02** 0.8669	**22.043** 0.8678	**0.0541**	**JR17x22x23**	
0.03 0.066	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.051**	**JR20x25x17**	**25**
0.034 0.075	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0576**	**JR20x25x20.5**	
0.038 0.084	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0576**	**JR20x25x20.5**	
0.042 0.093	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0622**	**JR20x25x26**	
0.047 0.104	**25** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**31.972** 1.2587	**25.02** 0.985	**25.043** 0.9859	**0.0622**	**JR20x25x26**	
0.042 0.093	**28** 1.1024	**27.991** 1.102	**34.972** 1.3769	**34.988** 1.3775	**34.972** 1.3769	**28.02** 1.1031	**28.043** 1.1041	**0.0606**	**JR22x28x20.5**	**28**
0.03 0.066	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0567**	**JR25x30x17**	**30**
0.042 0.093	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.064**	**JR25x30x20.5**	
0.04 0.088	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.064**	**JR25x30x20.5**	

Continued on next page.

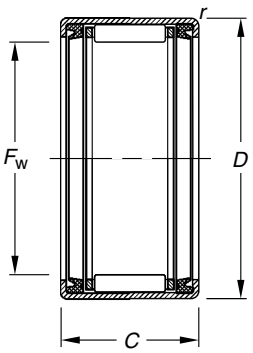
SEALED BEARINGS

METRIC SERIES

continued



HK RS



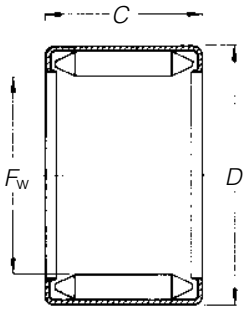
HK .2RS

Shaft Dia.	Dimensions mm/in. -0.3 -.012					Bearing Designation	Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speed Approx. Grease	
mm	F_w	D	C	$C_{3\,min}$	$r_{s\,min}$		C	C_0	RPM	C_g
	30 1.1811	37 1.4567	22 0.866	—	1 0.039	HK3022RS	22.4 5040	39.6 8900	6500	0.0535
	30 1.1811	37 1.4567	24 0.945	—	1 0.039	HK3024.2RS	22.4 5040	39.6 8900	6500	0.0535
35	35 1.378	42 1.6535	16 0.63	—	1 0.039	HK3516.2RS	14.2 3190	23.2 5220	5500	0.0492
	35 1.378	42 1.6535	18 0.709	—	1 0.039	HK3518RS	17.4 3910	29.9 6720	5500	0.0534
	35 1.378	42 1.6535	20 0.787	—	1 0.039	HK3520.2RS	17.4 3910	29.9 6720	5500	0.0534
40	40 1.5748	47 1.8504	16 0.63	—	1 0.039	HK4016.2RS	13.4 3010	22.4 5040	4900	0.0528
	40 1.5748	47 1.8504	18 0.709	—	1 0.039	HK4018RS	18.9 4250	34.8 7820	4900	0.0589
	40 1.5748	47 1.8504	20 0.787	—	1 0.039	HK4020.2RS	18.9 4250	34.8 7820	4900	0.0589
45	45 1.7717	52 2.0472	18 0.709	—	1 0.039	HK4518RS	19.8 4450	38.5 8660	4300	0.0637
	45 1.7717	52 2.0472	20 0.787	—	1 0.039	HK4520.2RS	19.8 4450	38.5 8660	4300	0.0637
50	50 1.9685	58 2.2835	22 0.866	—	1 0.039	HK5022RS	28.8 6470	56.6 12700	3900	0.0714
	50 1.9685	58 2.2835	24 0.945	—	1 0.039	HK5024.2RS	28.8 6470	56.6 12700	3900	0.0714

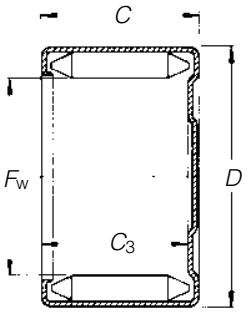
Wt. kg/lbs.	Mounting Dimensions mm/in.					Plug Gage			Matching Inner Ring	Shaft Dia.
	Max.	Min.	Min.	Max.	Ring Gage	Go	No-Go			
	S		H					C_g		mm
0.051 0.112	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0702**	**JR25x30x26**	
0.057 0.126	**30** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**36.972** 1.4556	**30.02** 1.1819	**30.043** 1.1828	**0.0702**	**JR25x30x26**	
0.047 0.104	**35** 1.378	**34.989** 1.3775	**41.972** 1.6524	**41.988** 1.6531	**41.972** 1.6524	**35.025** 1.3789	**35.052** 1.38	**0.0646**	**JR30x35x17**	**35**
0.54 1.19	**35** 1.378	**34.989** 1.3775	**41.972** 1.6524	**41.988** 1.6531	**41.972** 1.6524	**35.025** 1.3789	**35.052** 1.38	**0.0701**	**JR30x35x20.5**	
0.044 0.097	**35** 1.378	**34.989** 1.3775	**41.972** 1.6524	**41.988** 1.6531	**41.972** 1.6524	**35.025** 1.3789	**35.052** 1.38	**0.0701**	**JR30x35x20.5**	
0.037 0.082	**40** 1.5748	**39.989** 1.5744	**46.972** 1.8493	**46.988** 1.8499	**46.972** 1.8493	**40.025** 1.5758	**40.052** 1.5769	**0.0693**	**JR35x40x20**	**40**
0.057 0.126	**40** 1.5748	**39.989** 1.5744	**46.972** 1.8493	**46.988** 1.8499	**46.972** 1.8493	**40.025** 1.5758	**40.052** 1.5769	**0.0773**	**JR35x40x20.5**	
0.053 0.117	**40** 1.5748	**39.989** 1.5744	**46.972** 1.8493	**46.988** 1.8499	**46.972** 1.8493	**40.025** 1.5758	**40.052** 1.5769	**0.0773**	**JR35x40x20.5**	
0.064 0.141	**45** 1.7717	**44.989** 1.7712	**51.967** 2.0459	**51.986** 2.0467	**51.967** 2.0459	**45.025** 1.7726	**45.052** 1.7737	**0.0836**	**JR40x45x20.5**	**45**
0.075 0.165	**45** 1.7717	**44.989** 1.7712	**51.967** 2.0459	**51.986** 2.0467	**51.967** 2.0459	**45.025** 1.7726	**45.052** 1.7737	**0.0836**	**JR40x45x20.5**	
0.097 0.214	**50** 1.9685	**49.989** 1.9681	**57.967** 2.2822	**57.986** 2.2829	**57.967** 2.2822	**50.025** 1.9695	**50.052** 1.9706	**0.0937**	**JR45x50x25.5**	**50**
0.083 0.183	**50** 1.9685	**49.989** 1.9681	**57.967** 2.2822	**57.986** 2.2829	**57.967** 2.2822	**50.025** 1.9695	**50.052** 1.9706	**0.0937**	**JR45x50x25.5**	

FULL COMPLEMENT OPEN ENDS, CLOSED ONE END

METRIC SERIES



DL



DLF

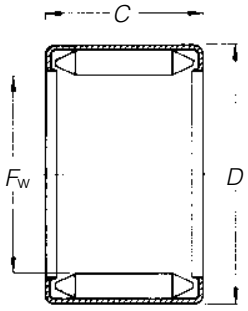
Shaft Dia.	Dimensions mm/in. -0,3, -.012				Bearing Designation	Load Ratings kN/lbf. Dynamic		Limiting Speed Approx. Grease	Oil	
mm	F_w	D	C	$C_{3\ min}$		C	C_0	RPM		C_g
6	6 0.2362	12 0.4724	10 0.394	-	DL 6 10	2.90 650	3.80 850	33000	50000	0.0120
	6 0.2362	12 0.4724	10 0.394	7.7 0.303	DLF 6 10	2.90 650	3.80 850	33000	50000	0.0120
8	8 0.3150	14 0.5512	10 0.394	-	DL 8 10	4.50 1010	6.50 1460	24000	37500	0.0145
	8 0.3150	14 0.5512	10 0.394	7.7 0.303	DLF 8 10	4.50 1010	6.50 1460	24000	37500	0.0145
10	10 0.3937	16 0.6299	12 0.472	-	DL 10 12	7.00 1570	10.9 2450	20000	30000	0.0180
	10 0.3937	16 0.6299	12 0.472	9.7 0.382	DLF 10 12	7.00 1570	10.9 2450	20000	30000	0.0180
12	12 0.4724	18 0.7087	10 0.394	-	DL 12 10	6.00 1350	9.7 2180	16000	25000	0.0195
	12 0.4724	20 0.7874	12 0.472	-	DL 12 12	7.00 1570	11.5 2590	16000	25000	0.0206
	12 0.4724	20 0.7874	12 0.472	9.7 0.382	DLF 12 12	7.00 1570	11.5 2590	16000	25000	0.0206
13	13 0.5118	19 0.7480	12 0.472	-	DL 13 12	8.50 1910	14.2 3190	15000	23000	0.0217
	13 0.5118	19 0.7480	12 0.472	9.7 0.382	DLF 13 12	8.50 1910	14.2 3190	15000	23000	0.0217
14	14 0.5512	20 0.7874	12 0.472	-	DL 14 12	7.90 1780	13.5 3030	14000	21500	0.0229
	14 0.5512	20 0.7874	12 0.472	9.7 0.382	DLF 14 12	7.90 1780	13.5 3030	14000	21500	0.0229
15	15 0.5906	21 0.8268	12 0.472	-	DL 15 12	9.40 2110	16.4 3690	13000	20000	0.0238
	15 0.5906	21 0.8268	12 0.472	9.7 0.382	DLF 15 12	9.40 2110	16.4 3690	13000	20000	0.0238
16	16 0.6299	22 0.8661	12 0.472	-	DL 16 12	8.70 1960	15.5 3480	12000	18500	0.0251
	16 0.6299	22 0.8661	12 0.472	9.7 0.382	DLF 16 12	8.70 1960	15.5 3480	12000	18500	0.0251
17	17 0.6693	23 0.9055	12 0.472	-	DL 17 12	9.00 2020	16.2 3640	11000	17500	0.0260
	17 0.6693	23 0.9055	12 0.472	9.7 0.382	DLF 17 12	9.00 2020	16.2 3640	11000	17500	0.0260
18	18 0.7087	24 0.9449	12 0.472	-	DL 18 12	10.7 2410	19.5 4380	11000	16500	0.0272
	18 0.7087	24 0.9449	12 0.472	9.7 0.382	DLF 18 12	10.7 2410	19.5 4380	11000	16500	0.0272
	18 0.7087	24 0.9449	16 0.630	-	DL 18 16	16.0 3600	29.5 6630	11000	16500	0.0304
	18 0.7087	24 0.9449	16 0.630	13.7 0.539	DLF 18 16	16.0 3600	29.5 6630	11000	16500	0.0304
20	20 0.7874	26 1.0236	12 0.472	-	DL 20 12	10.2 2290	19.5 4380	10000	15000	0.0292
	20 0.7874	26 1.0236	12 0.472	9.7 0.382	DLF 20 12	10.2 2290	19.5 4380	10000	15000	0.0292
	20 0.7874	26 1.0236	16 0.630	-	DL 20 16	16.0 3600	30.5 6860	10000	15000	0.0327
	20 0.7874	26 1.0236	16 0.630	13.7 0.539	DLF 20 16	16.0 3600	30.5 6860	10000	15000	0.0327
22	22 0.8661	28 1.1024	16 0.630	-	DL 22 16	17.0 3820	33.0 7420	8800	13500	0.0349
	22 0.8661	28 1.1024	16 0.630	13.7 0.539	DLF 22 16	17.0 3820	33.0 7420	8800	13500	0.0349

Wt. kg/lbs.	Mounting Dimensions mm/in.					Plug Gage			Matching Inner Ring	Shaft Dia.
	Max.	Min.	Min.	Max.	Ring Gage	Go	No-Go			
	S		H					C_g		mm
0.004 0.009	**6.000** 0.2362	**5.995** 0.2360	**12.000** 0.4724	**12.011** 0.4729	**12.000** 0.4724	**6.009** 0.2366	**6.036** 0.2376			**6**
0.004 0.010	**6.000** 0.2362	**5.995** 0.2360	**12.000** 0.4724	**12.011** 0.4729	**12.000** 0.4724	**6.009** 0.2366	**6.036** 0.2376			
0.005 0.012	**8.000** 0.3150	**7.994** 0.3147	**14.000** 0.5512	**14.011** 0.5516	**14.000** 0.5512	**8.009** 0.3153	**8.036** 0.3164			**8**
0.005 0.012	**8.000** 0.3150	**7.994** 0.3147	**14.000** 0.5512	**14.011** 0.5516	**14.000** 0.5512	**8.009** 0.3153	**8.036** 0.3164			
0.008 0.018	**10.000** 0.3937	**9.994** 0.3935	**16.000** 0.6299	**16.011** 0.6304	**16.000** 0.6299	**10.009** 0.3941	**10.036** 0.3951			**10**
0.008 0.018	**10.000** 0.3937	**9.994** 0.3935	**16.000** 0.6299	**16.011** 0.6304	**16.000** 0.6299	**10.009** 0.3941	**10.036** 0.3951			
0.008 0.017	**12.000** 0.4724	**11.992** 0.4721	**18.000** 0.7087	**18.011** 0.7091	**18.000** 0.7087	**12.009** 0.4728	**12.035** 0.4738			**12**
0.009 0.021	**12.000** 0.4724	**11.992** 0.4721	**20.000** 0.7874	**20.013** 0.7879	**20.000** 0.7874	**12.009** 0.4728	**12.035** 0.4738	**0.0270**	**IM 8 12 12.4**	
0.009 0.021	**12.000** 0.4724	**11.992** 0.4721	**20.000** 0.7874	**20.013** 0.7879	**20.000** 0.7874	**12.009** 0.4728	**12.035** 0.4738	**0.0270**	**IM 8 12 12.4**	
0.010 0.022	**13.000** 0.5118	**12.992** 0.5115	**19.000** 0.7480	**19.013** 0.7485	**19.000** 0.7480	**13.009** 0.5122	**13.035** 0.5132	**0.0285**	**IM 9 13 12.4**	**13**
0.010 0.022	**13.000** 0.5118	**12.992** 0.5115	**19.000** 0.7480	**19.013** 0.7485	**19.000** 0.7480	**13.009** 0.5122	**13.035** 0.5132	**0.0285**	**IM 9 13 12.4**	
0.011 0.023	**14.000** 0.5512	**13.992** 0.5509	**20.000** 0.7874	**20.013** 0.7879	**20.000** 0.7874	**14.009** 0.5515	**14.035** 0.5526	**0.0300**	**IM 10 14 12.4**	**14**
0.011 0.023	**14.000** 0.5512	**13.992** 0.5509	**20.000** 0.7874	**20.013** 0.7879	**20.000** 0.7874	**14.009** 0.5515	**14.035** 0.5526	**0.0300**	**IM 10 14 12.4**	
0.011 0.024	**15.000** 0.5906	**14.992** 0.5902	**21.000** 0.8268	**21.013** 0.8273	**21.000** 0.8268	**15.009** 0.5909	**15.035** 0.5919	**0.0312**	**IM 12 15 12.4**	**15**
0.011 0.024	**15.000** 0.5906	**14.992** 0.5902	**21.000** 0.8268	**21.013** 0.8273	**21.000** 0.8268	**15.009** 0.5909	**15.035** 0.5919	**0.0312**	**IM 12 15 12.4**	
0.012 0.026	**16.000** 0.6299	**15.992** 0.6296	**22.000** 0.8661	**22.013** 0.8667	**22.000** 0.8661	**16.009** 0.6303	**16.035** 0.6313			**16**
0.012 0.026	**16.000** 0.6299	**15.992** 0.6296	**22.000** 0.8661	**22.013** 0.8667	**22.000** 0.8661	**16.009** 0.6303	**16.035** 0.6313			
0.013 0.029	**17.000** 0.6693	**16.992** 0.6690	**23.000** 0.9055	**23.013** 0.9060	**23.000** 0.9055	**17.009** 0.6696	**17.035** 0.6707	**0.0341**	**IM 13 17 12.4**	**17**
0.013 0.029	**17.000** 0.6693	**16.992** 0.6690	**23.000** 0.9055	**23.013** 0.9060	**23.000** 0.9055	**17.009** 0.6696	**17.035** 0.6707	**0.0341**	**IM 13 17 12.4**	
0.014 0.031	**18.000** 0.7087	**17.992** 0.7083	**24.000** 0.9449	**24.013** 0.9454	**24.000** 0.9449	**18.009** 0.7090	**18.035** 0.7100	**0.0357**	**IM 13 18 12.4**	**18**
0.014 0.031	**18.000** 0.7087	**17.992** 0.7083	**24.000** 0.9449	**24.013** 0.9454	**24.000** 0.9449	**18.009** 0.7090	**18.035** 0.7100	**0.0357**	**IM 13 18 12.4**	
0.019 0.042	**18.000** 0.7087	**17.992** 0.7083	**24.000** 0.9449	**24.013** 0.9454	**24.000** 0.9449	**18.009** 0.7090	**18.035** 0.7100	**0.0399**	**IM 13 18 16.4**	
0.019 0.042	**18.000** 0.7087	**17.992** 0.7083	**24.000** 0.9449	**24.013** 0.9454	**24.000** 0.9449	**18.009** 0.7090	**18.035** 0.7100	**0.0399**	**IM 13 18 16.4**	
0.015 0.033	**20.000** 0.7874	**19.991** 0.7870	**26.000** 1.0236	**26.013** 1.0241	**26.000** 1.0236	**20.009** 0.7878	**20.035** 0.7888	**0.0383**	**IM 15 20 12.4**	**20**
0.015 0.033	**20.000** 0.7874	**19.991** 0.7870	**26.000** 1.0236	**26.013** 1.0241	**26.000** 1.0236	**20.009** 0.7878	**20.035** 0.7888	**0.0383**	**IM 15 20 12.4**	
0.020 0.044	**20.000** 0.7874	**19.991** 0.7870	**26.000** 1.0236	**26.013** 1.0241	**26.000** 1.0236	**20.009** 0.7878	**20.035** 0.7888	**0.0429**	**IM 15 20 16.4**	
0.020 0.044	**20.000** 0.7874	**19.991** 0.7870	**26.000** 1.0236	**26.013** 1.0241	**26.000** 1.0236	**20.009** 0.7878	**20.035** 0.7888	**0.0429**	**IM 15 20 16.4**	
0.022 0.049	**22.000** 0.8661	**21.991** 0.8658	**28.000** 1.1024	**28.013** 1.1029	**28.000** 1.1024	**20.009** 0.7878	**20.035** 0.7888	**0.0458**	**IM 17 22 16.4**	**22**
0.022 0.049	**22.000** 0.8661	**21.991** 0.8658	**28.000** 1.1024	**28.013** 1.1029	**28.000** 1.1024	**20.009** 0.7878	**20.035** 0.7888	**0.0458**	**IM 17 22 16.4**	

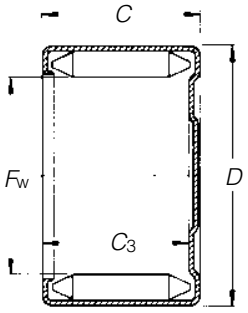
Continued on next page.

FULL COMPLEMENT OPEN ENDS, CLOSED ONE END

METRIC SERIES



DL



DLF

Shaft Dia.	Dimensions mm/in. -0,3, -.012				Bearing Designation	Load Ratings kN/lbf. Dynamic		Limiting Speed Approx. Grease	Oil	
mm	F_w	D	C	$C_{3\,min}$		C	C_0	RPM		C_g
25	25 0.9843	33 1.2992	16 0.630	-	DL 25 16	16.0 3600	32.5 7310	7800	12000	0.0348
	25 0.9843	33 1.2992	16 0.630	13.7 0.539	DLF 25 16	16.0 3600	32.5 7310	7800	12000	0.0348
	25 0.9843	33 1.2992	20 0.787	-	DL 25 20	22.8 5130	46.0 10300	7800	12000	0.0379
	25 0.9843	33 1.2992	20 0.787	17.7 0.697	DLF 25 20	22.8 5130	46.0 10300	7800	12000	0.0379
28	28 1.1024	36 1.4173	20 0.787	-	DL 28 20	24.5 5510	52.0 11700	7200	11000	0.0417
30	30 1.1811	38 1.4961	16 0.630	-	DL 30 16	21.7 4880	46.5 10500	6500	10000	0.0403
	30 1.1811	38 1.4961	20 0.787	-	DL 30 20	26.0 5850	56.0 12600	6500	10000	0.0437
	30 1.1811	38 1.4961	20 0.787	17.7 0.697	DLF 30 20	26.0 5850	56.0 12600	6500	10000	0.0437
	30 1.1811	38 1.4961	25 0.984	-	DL 30 25	35.5 7980	76.0 17100	6500	10000	0.0470
35	35 1.3780	 0.0000	16 0.630	-	DL 35 16	24.0 5400	54.0 12100	5500	8500	0.0437
	35 1.3780	43 1.6929	20 0.787	-	DL 35 20	29.0 6520	65.0 14600	5500	8500	0.0477
	35 1.3780	43 1.6929	20 0.787	17.7 0.697	DLF 35 20	29.0 6520	65.0 14600	5500	8500	0.0477
40	40 1.5748	48 1.8898	16 0.630	-	DL 40 16	26.5 5960	62.0 13900	4900	7500	0.0479
	40 1.5748	48 1.8898	20 0.787	-	DL 40 20	36.0 8090	84.0 18900	4900	7500	0.0523
	40 1.5748	48 1.8898	20 0.787	17.7 0.697	DLF 40 20	36.0 8090	84.0 18900	4900	7500	0.0523
44	44 1.7323	52 2.0472	16 0.630	-	DL 44 16	23.8 5350	57.0 12800	4400	6800	0.0512
47	47 1.8504	55 2.1654	16 0.630	-	DL 47 16	25.0 5620	61.0 13700	4200	6400	0.0536
50	50 1.9685	58 2.2835	12 0.472	-	DL 50 12	20.0 4500	50.0 11200	3900	6000	0.0508
	50 1.9685	58 2.2835	18 0.709	-	DL 50 18	36.5 8210	92.0 20700	3900	6000	0.0587
	50 1.9685	58 2.2835	20 0.787	-	DL 50 20	37.0 8320	93.0 20900	3900	6000	0.0611
	50 1.9685	58 2.2835	20 0.787	17.7 0.697	DLF 50 20	37.0 8320	93.0 20900	3900	6000	0.0611
55	55 2.1654	63 2.4803	20 0.787	-	DL 55 20	39.5 8880	102.0 22900	3600	5500	0.0653

Wt. kg/lbs.	Mounting Dimensions mm/in.					Plug Gage			Matching Inner Ring	Shaft Dia.
	Max.	Min.	Min.	Max.	Ring Gage	Go	No-Go			
	S		H					C_g		mm
0.035 0.077	**25.000** 0.9843	**24.991** 0.9839	**33.000** 1.2992	**33.016** 1.2998	**33.000** 1.2992	**22.009** 0.8665	**22.035** 0.8675	**0.0457**	**IM 20 25 16.4**	**25**
0.035 0.077	**25.000** 0.9843	**24.991** 0.9839	**33.000** 1.2992	**33.016** 1.2998	**33.000** 1.2992	**22.009** 0.8665	**22.035** 0.8675	**0.0457**	**IM 20 25 16.4**	
0.043 0.095	**25.000** 0.9843	**24.991** 0.9839	**33.000** 1.2992	**33.016** 1.2998	**33.000** 1.2992	**25.015** 0.9848	**25.041** 0.9859	**0.0497**	**IM 20 25 20.4**	
0.043 0.095	**25.000** 0.9843	**24.991** 0.9839	**33.000** 1.2992	**33.016** 1.2998	**33.000** 1.2992	**25.015** 0.9848	**25.041** 0.9859	**0.0497**	**IM 20 25 20.4**	
0.047 0.104	**28.000** 1.1024	**27.991** 1.1020	**36.000** 1.4173	**36.016** 1.4180	**36.000** 1.4173	**28.015** 1.1030	**28.041** 1.1040	**0.0547**	**IM 23 28 20.4**	**28**
0.040 0.088	**30.000** 1.1811	**29.991** 1.1807	**38.000** 1.4961	**38.016** 1.4967	**38.000** 1.4961	**30.015** 1.1817	**30.041** 1.1827	**0.0529**	**IM 25 30 16.4**	**30**
0.050 0.110	**30.000** 1.1811	**29.991** 1.1807	**38.000** 1.4961	**38.016** 1.4967	**38.000** 1.4961	**30.015** 1.1817	**30.041** 1.1827	**0.0573**	**IM 25 30 20.4**	
0.050 0.110	**30.000** 1.1811	**29.991** 1.1807	**38.000** 1.4961	**38.016** 1.4967	**38.000** 1.4961	**30.015** 1.1817	**30.041** 1.1827	**0.0573**	**IM 25 30 20.4**	
0.063 0.139	**30.000** 1.1811	**29.991** 1.1807	**38.000** 1.4961	**38.016** 1.4967	**38.000** 1.4961	**30.015** 1.1817	**30.041** 1.1827	**0.0617**	**IM 25 30 25**	
0.046 0.101	**35.000** 1.3780	**34.989** 1.3775	**0.000** 0.0000	**#N/A** #N/A	**43.000** 1.6929	**35.015** 1.3785	**35.041** 1.3796	**0.0573**	**IM 30 35 16.4**	**35**
0.057 0.126	**35.000** 1.3780	**34.989** 1.3775	**43.000** 1.6929	**43.016** 1.6935	**43.000** 1.6929	**35.015** 1.3785	**35.041** 1.3796	**0.0626**	**IM 30 35 20.4**	
0.057 0.126	**35.000** 1.3780	**34.989** 1.3775	**43.000** 1.6929	**43.016** 1.6935	**43.000** 1.6929	**35.015** 1.3785	**35.041** 1.3796	**0.0626**	**IM 30 35 20.4**	
0.051 0.112	**40.000** 1.5748	**39.989** 1.5744	**48.000** 1.8898	**48.016** 1.8904	**48.000** 1.8898	**40.015** 1.5754	**40.041** 1.5764	**0.0628**	**IM 35 40 16.4**	**40**
0.064 0.141	**40.000** 1.5748	**39.989** 1.5744	**48.000** 1.8898	**48.016** 1.8904	**48.000** 1.8898	**40.015** 1.5754	**40.041** 1.5764	**0.0686**	**IM 35 40 20.4**	
0.064 0.141	**40.000** 1.5748	**39.989** 1.5744	**48.000** 1.8898	**48.016** 1.8904	**48.000** 1.8898	**40.015** 1.5754	**40.041** 1.5764	**0.0686**	**IM 35 40 20.4**	
0.056 0.123	**44.000** 1.7323	**43.989** 1.7319	**52.000** 2.0472	**52.019** 2.0480	**52.000** 2.0472	**44.015** 1.7329	**44.041** 1.7339	**0.0672**	**IM 40 44 16.4**	**44**
0.060 0.132	**47.000** 1.8504	**46.989** 1.8500	**55.000** 2.1654	**55.019** 2.1661	**55.000** 2.1654	**47.015** 1.8510	**47.041** 1.8520	**0.0703**	**IM 40 44 16.4**	**47**
0.047 0.104	**50.000** 1.9685	**49.989** 1.9681	**58.000** 2.2835	**58.019** 2.2842	**58.000** 2.2835	**50.015** 1.9691	**50.041** 1.9701			**50**
0.071 0.157	**50.000** 1.9685	**49.989** 1.9681	**58.000** 2.2835	**58.019** 2.2842	**58.000** 2.2835	**50.015** 1.9691	**50.041** 1.9701			
0.077 0.170	**50.000** 1.9685	**49.989** 1.9681	**58.000** 2.2835	**58.019** 2.2842	**58.000** 2.2835	**50.015** 1.9691	**50.041** 1.9701	**0.0802**	**IM 45 50 20.4**	
0.077 0.170	**50.000** 1.9685	**49.989** 1.9681	**58.000** 2.2835	**58.019** 2.2842	**58.000** 2.2835	**50.015** 1.9691	**50.041** 1.9701	**0.0802**	**IM 45 50 20.4**	
0.086 0.190	**55.000** 2.1654	**54.987** 2.1648	**63.000** 2.4803	**63.019** 2.4811	**63.000** 2.4803	**55.015** 2.1659	**55.041** 2.1670	**0.0857**	**IM 50 55 20.4**	**55**

DRAWN CUP NEEDLE ROLLER BEARINGS –

INCH SERIES

When a rolling bearing is needed for a compact and economical design where it is not practical to harden and grind the housing bore, or where the housing materials are of low rigidity such as cast iron, aluminum or even plastics, drawn cup needle roller bearings should be considered.

REFERENCE STANDARDS

- **ANSI/ABMA 18.2** - Needle roller bearings - Radial, inch design.

Before selecting specific inch series drawn cup needle roller bearings, the engineering section of this catalog should be reviewed.

TYPES OF INCH SERIES DRAWN CUP NEEDLE ROLLER BEARINGS

B

M

Full complement bearings

J

JTT

Caged bearings

IDENTIFICATION

The prefix letter or letters in inch series drawn cup bearing designation denote whether the bearings are made with a full complement of needle rollers or caged needle rollers. The use of full complement of needle rollers is indicated by the prefix code letter B and for use of caged needle rollers by the prefix code letter J.

Inch bearings are available in either of two radial cross-sections. The larger cross-section is indicated by the prefix code letter H. Absence of the letter H indicates the smaller radial cross section.

These major features of dimension and construction are summarized in Table 1.

In addition, there can be other identifying letters which cover special modification. Please consult your Timken representative when special modifications are required.

Since the entire identification code in the bearing designation may not appear on the bearing itself, the manufacturer's parts list or another reliable source should always be consulted when ordering bearings for service or field replacement to make certain that the correct bearing with the correct lubricant is used.

TABLE 1 –
IDENTIFYING LETTERS – INCH SERIES

	Prefix letters in Bearing Designation	
	Smaller Roller	Larger Roller
Full complement (mechanically retained)	B	BH
Caged	J	JH

Other prefix letters denoting major construction features are:

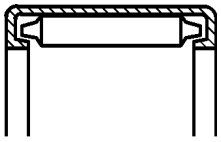
- M – closed end style
- P – open end (finger)cage
- T – single seal
- TT – double seal
- G – extra-precision

CONSTRUCTION

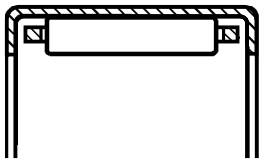
FULL COMPLEMENT BEARINGS

The original drawn cup needle roller bearing employs a full complement of needle rollers. The full complement drawn cup bearing combines maximum load carrying capability and low cost with the advantages of the drawn outer ring.

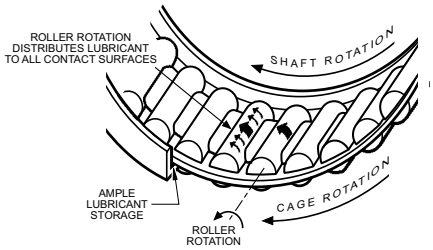
The inward turned lips of the cup are used to mechanically retain the full complement of needle rollers, providing their positive radial retention even though it may be necessary to remove the shaft repeatedly during servicing of the mechanism employing the bearing.



Full Complement Bearing



Caged Bearing



CAGED BEARINGS

The one-piece steel cage, used in most Timken® Torrington® caged drawn cup bearings, is designed to provide rigidity and minimize wear. This cage design separates the roller guiding and roller retainment functions. The portions of the cage that retain the rollers cannot contact the rollers while the bearing is operating. Thus, there is no wear which might affect roller retention.

The cage contacts the rollers only near their ends at the roller pitch line, so accurate guidance is achieved with least effort. Pitch line guidance at the ends of the rollers prevents skewing and assures roller stability, with little stress on the cage itself. The design minimizes the contact area and force required for roller guidance, and thus minimizes drag between cage and rollers.

The same design feature which assures no contact between roller retention bars and rollers while the bearing is operating also provides ample clearance along the length of the roller to enhance the circulation of lubricant.

Timken also has available bearings with other cage designs. Bearings with engineered polymer cages are for use where operating conditions permit. Before applying bearings with engineered polymer cages, please consult your Timken representative.

SEALED BEARINGS

Drawn cup caged needle roller bearings are offered with integral seals. The tables of dimensions on pages C90-C91 indicate those sizes available with lip contact seals which limit the bearing operating temperature between -25° F and 225° F. The seal lip design achieves a light and constant contact with the shaft throughout the range of mounting bearing clearances thereby ensuring positive sealing and low frictional drag.

Sealed drawn cup bearings are intended to retain grease or non-pressurized oil within a bearing while also preventing contaminants from entering the raceway area.

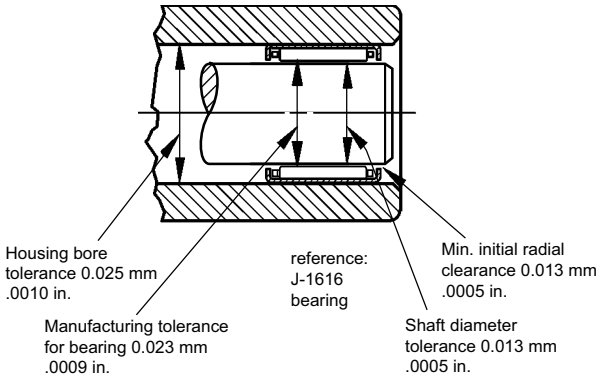
Details of shaft design for sealed bearings are given in the engineering section.

The standard lip contact seals are compatible with common lubricating oils and petroleum based fuels, but they are adversely affected by certain fire-resistant hydraulic fluids and most common solvents.

If the operating temperature must be outside of the specified range, or if the seals are exposed to unusual fluids, please consult your Timken representative.

DIMENSIONAL ACCURACY AND MOUNTING DIMENSIONS

MANUFACTURING TOLERANCES AND RESULTING CLEARANCES



BEARING MOUNTING FITS AND RADIAL INTERNAL CLEARANCE

Drawn cup bearings are manufactured to a degree of precision that will satisfy the radial clearance requirements of most applications. The total radial clearance of an installed drawn cup bearing results from the build up of manufacturing tolerances of the housing bore, inner raceway O.D. and the bearing, as well as the minimum radial clearance required for the application.

For bearings of nominal inch dimensions, the suggested mounting dimensions will provide correct running clearance for most applications. Closer control of radial clearance would be governed by the user's capability of holding housing and shaft raceway dimensional tolerances tighter than the limits shown on the tabular pages.

The drawing illustrates the manufacturing tolerances and resulting clearances applying to medium size drawn cup bearings in rotating applications when using the suggested tabulated mounting dimensions.

Radial clearance in a mounted bearing may be more closely controlled by reducing the manufacturing tolerances of the housing bore and inner raceway diameter. Where extremely close control of radial clearance is required for bearings of nominal inch dimensions, extra-precision full complement bearings are available (see page C80).

TOLERANCES FOR HOUSING MATERIALS OF LOW RIGIDITY

For housing materials of low rigidity, or steel housings of small section, it is suggested that for initial trial the housing bore diameters given in the tabular pages be reduced by the amounts shown in Table 3. To maintain normal radial internal clearance, the inner raceway diameter tolerance given in the tabular pages should be used.

TABLE 3 –
LOW RIGIDITY HOUSING BORE

Nom. Housing Bore inch				Subtract inch	
mm		inch		mm	inch
over	incl.	over	incl.		
0	9.5	0	.38	.010	.0004
9.5	25.4	.38	1.00	.015	.0006
25.4	50.8	1.00	2.00	.025	.0010
50.8	76.2	2.00	3.00	.030	.0012
76.2	152.4	3.00	6.00	.036	.0014

OUTER RING ROTATION

For applications where the outer ring rotates with respect to the load, it is suggested that both the housing bore and inner raceway diameter be reduced. Bearings of nominal inch dimensions should have the housing bore and inner raceway diameters reduced by .0005 in.

OSCILLATING MOTION

Applications involving oscillating motion often require reduced radial clearances. This reduction is accomplished by increasing the shaft raceway diameters as shown in Table 4.

TABLE 4 –
NOMINAL INCH BEARING OSCILLATING SHAFT SIZE

Shaft Size		Add	
mm	inch	mm	inch
2.38 to 4.76	.094 to .188	.008	.0003
6.35 to 47.62	.25 to 1.875	.013	.0005
50.8 to 139.7	2 to 5.5	.015	.0006

INNER RINGS

Where it becomes impractical to meet the shaft raceway design requirements (hardness, case depth, surface finish, etc.) outlined in the general engineering section, standard inner rings for drawn cup bearings are available. These are tabulated on pages C92 of the drawn cup section.

Inner rings for drawn cup bearings are designed to be a loose transition fit on the shaft and should be clamped against a shoulder. If a tight transition fit must be used to keep the inner ring from rotating relative to the shaft, the inner ring O.D., as mounted, must not exceed the raceway diameters required by the drawn cup bearing for the particular application. See the previous discussion on internal clearances and fits for further details on inner raceway diameter choice.

LUBRICATION

Inch series drawn cup bearings can be furnished with an oil hole (centered in the drawn cup) to facilitate relubrication. If desired, specify on order by adding an -OH suffix to the bearing designation.

LOAD RATING FACTORS
DYNAMIC LOADS

Drawn cup needle roller bearings can accommodate only radial loads.

$P = F_r$

P = The maximum dynamic radial load that may be applied to a drawn cup bearing based on the dynamic load rating, C given in the tabular pages. This load should be $\leq$ C/3.

STATIC LOADS

$$f_0 = \frac{C_0}{P_0}$$

f_0 – static load safety factor
C_0 – basic static load rating
P_0 – maximum applied static load

To ensure satisfactory operation of drawn cup needle roller bearings under all types of conditions the static load safety factor f_0 should be ≥ 3.

ADJUSTED RATING LIFE

When application data includes details of operating temperature, oil viscosity, operating speed and the applied load meets the $\leq$ C/3 condition adjusted rating life may be evaluated using the information given in the engineering section.

INSPECTION PROCEDURES

Although the bearing cup (outer ring) is accurately drawn from strip steel it may go out of round during heat treatment. When the bearing is pressed into a true, round housing or ring gage of correct size and wall thickness, it becomes round and is sized properly. For this reason, it is incorrect to inspect an unmounted drawn cup bearing by measuring the O.D. The correct method for inspecting the bearing size is to:

1. press the bearing into a ring gage of proper size.
2. plug the bearing bore with the appropriate "go" and "no go" gages.

Table 2 provides the correct ring and plug gage diameters for inspecting Torrington drawn cup needle roller bearings. When the letter H appears in the columns headed "Bearing Bore Designation" and "Nominal Shaft Diameter", the gage sizes listed are for the larger cross section bearings which include H in their bearing designation prefix.

EXAMPLE

Find the ring gage and plug gage dimensions for a BH-68 bearing.

The nominal bore diameter (F_w) for this bearing, as shown in the table of dimensions on this page, is .3750". Since the letter H appears in the bearing designation, the following information will be found opposite H6 .3750" in Table 2.

	inch
ring gage	.6255
diameter under needle rollers, min.	.3765
diameter under needle rollers, max.	.3774

The "go" plug gage is the same size as the minimum needle roller complement bore diameter and the "no go" plug gage size is .0001" larger than the maximum bore diameter. Therefore the correct ring and plug gage dimensions are:

	inch
ring gage	.6255
plug gage, "go"	.3765
plug gage, "no go"	.3775

These same gage dimensions also apply to JH-68.

TABLE 2 –
INCH SERIES BEARINGS

Bearing Bore Designation	Nominal Shaft Diameter	Nominal Bore Diameter	Dimensions - inch		
			Ring Gage	Needle Roller Complement Bore Diameter	
inch				min.	max.
2	1/8	.1250	.2505	.1258	.1267
2 1/2	5/32	.1562	.2817	.1571	.1580
3	3/16	.1875	.3437	.1883	.1892
4	1/4	.2500	.4380	.2515	.2524
5	5/16	.3125	.5005	.3140	.3149
H 5	H 5/16	.3125	.5630	.3140	.3149
6	3/8	.3750	.5630	.3765	.3774
H 6	H 3/8	.3750	.6255	.3765	.3774
7	7/16	.4375	.6255	.4390	.4399
H 7	H 7/16	.4375	.6880	.4390	.4399
8	1/2	.5000	.6880	.5015	.5024
H 8	H 1/2	.5000	.7505	.5015	.5024
9	9/16	.5625	.7505	.5640	.5649
H 9	H 9/16	.5625	.8130	.5640	.5649
10	5/8	.6250	.8130	.6265	.6274
H10	H 5/8	.6250	.8755	.6265	.6274
11	11/16	.6875	.8755	.6890	.6899
H11	H 11/16	.6875	.9380	.6890	.6899
12	3/4	.7500	.9995	.7505	.7514
H12	H 3/4	.7500	1.0620	.7505	.7514
13	13/16	.8125	1.0620	.8130	.8139
H13	H 13/16	.8125	1.1245	.8130	.8139
14	7/8	.8750	1.1245	.8755	.8764
H14	H 7/8	.8750	1.1870	.8755	.8764
15	15/16	.9375	1.1870	.9380	.9389
16	1	1.0000	1.2495	1.0005	1.0014
H16	H 1	1.0000	1.3120	1.0005	1.0014
17	1 1/16	1.0625	1.3120	1.0630	1.0639
18	1 1/8	1.1250	1.3745	1.1255	1.1264
H18	H 1 1/8	1.1250	1.4995	1.1255	1.1264
19	1 3/16	1.1875	1.4995	1.1880	1.1889
20	1 1/4	1.2500	1.4995	1.2505	1.2514
H20	H 1 1/4	1.2500	1.6245	1.2505	1.2514
21	1 5/16	1.3125	1.6245	1.3130	1.3140
22	1 3/8	1.3750	1.6245	1.3755	1.3765
H22	H 1 3/8	1.3750	1.7495	1.3755	1.3765
24	1 1/2	1.5000	1.8745	1.5005	1.5016
26	1 5/8	1.6250	1.9995	1.6255	1.6266
28	1 3/4	1.7500	2.1245	1.7505	1.7517
30	1 7/8	1.8750	2.2495	1.8755	1.8767
32	2	2.0000	2.3745	2.0006	2.0018
H33	H 2 1/16	2.0625	2.5307	2.0630	2.0644
34	2 1/8	2.1250	2.4995	2.1256	2.1270
36	2 1/4	2.2500	2.6245	2.2506	2.2520
42	2 5/8	2.6250	2.9995	2.6260	2.6274
44	2 3/4	2.7500	3.1245	2.7510	2.7524
56	3 1/2	3.5000	3.9995	3.5010	3.5024
88	5 1/2	5.5000	5.9990	5.5010	5.5029

Bearing bore should be checked with "go" and "no go" plug gages. The "go" gage size is the minimum needle roller complement bore diameter. The "no go" gage size is larger than the maximum needle roller complement bore diameter by 0.0001".

INSTALLATION OF DRAWN CUP BEARINGS

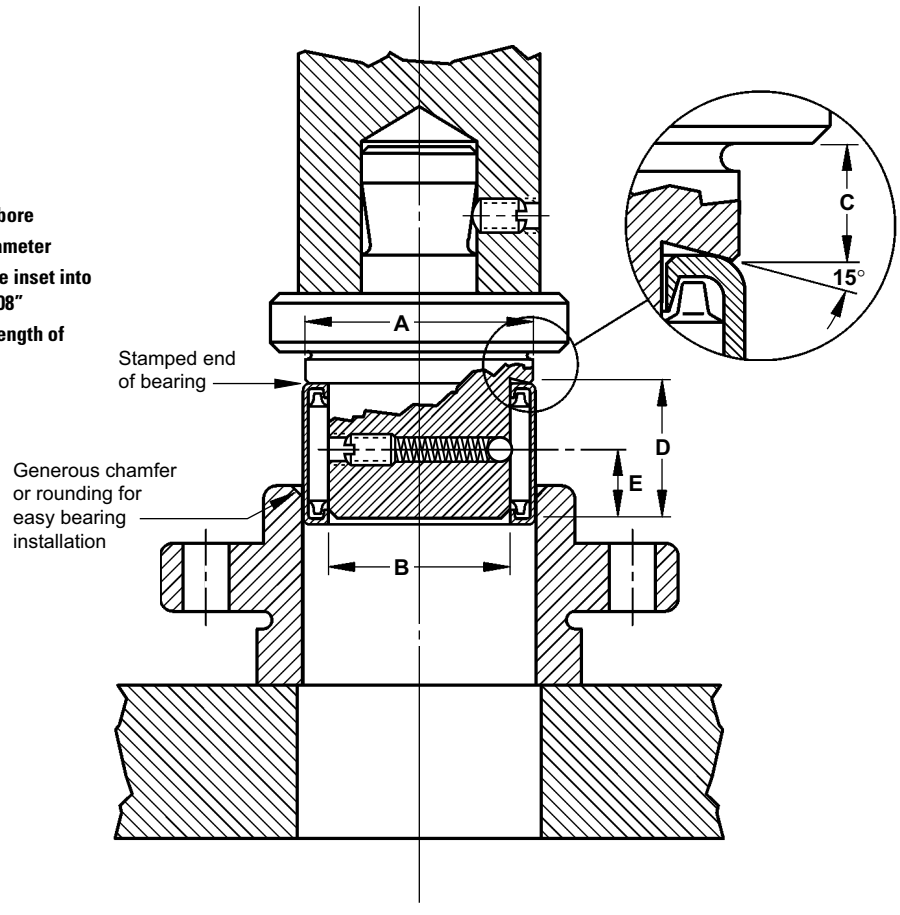
GENERAL INSTALLATION REQUIREMENTS

- A drawn cup bearing must be pressed into its housing.
- An installation tool, similar to the ones shown, must be used in conjunction with a standard press.
- The bearing must not be hammered into its housing, even in conjunction with the proper assembly mandrel.
- The bearing must not be pressed tightly against a shoulder in the housing.
- If it is necessary to use a shouldered housing, the depth of the housing bore must be sufficient to ensure the housing shoulder fillet, as well as the shoulder face, clears the bearing.
- The installation tool must be coaxial with the housing bore.

INSTALLATION OF OPEN END BEARINGS

It is advisable to utilize a positive stop on the press tool to locate the bearing properly in the housing. The assembly tool should have a leader or a pilot, as shown, to aid in starting the bearing true in the housing. The ball detent shown on the drawing is used to assist in aligning the rollers of a full complement bearing during installation and to hold the bearing on the installation tool. A caged type drawn cup bearing does not require a ball detent to align its rollers. The ball detent may still be used to hold the bearing on the installation tool or an "O" ring may be used as shown in the drawing on page C41. The bearing should be installed with the marked end (the end with identification markings) against the angled shoulder of the pressing tool.

A – $^{1}/_{64}$**" less than housing bore**
B – **.003" less than shaft diameter**
C – **distance bearing will be inset into housing, minimum of .008"**
D – **pilot length should be length of bearing less** $^{1}/_{32}$**"**
E – **approximately** $^{1}/_{2}$ **D**

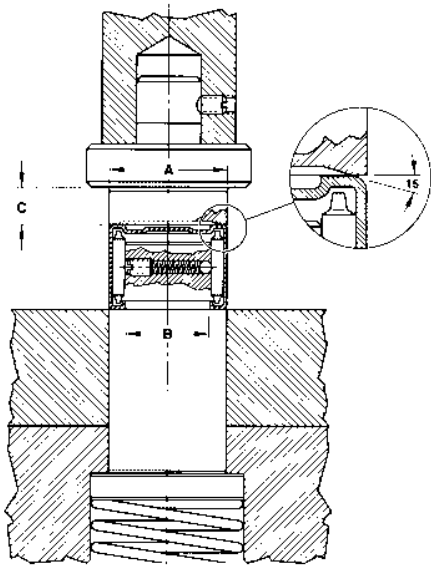


INSTALLATION OF CLOSED END BEARINGS

The installation tool combines all the features of the tool used to install open end bearings, but the pilot is spring loaded and is part of the press bed.

The angled shoulder of the pressing tool should bear against the closed end with the bearing held on the pilot to aid in starting the bearing true in the housing.

A – $^{1}/_{64}$" less than housing bore
B – .003" less than shaft diameter
C – distance bearing will be inset into housing, minimum of .008"

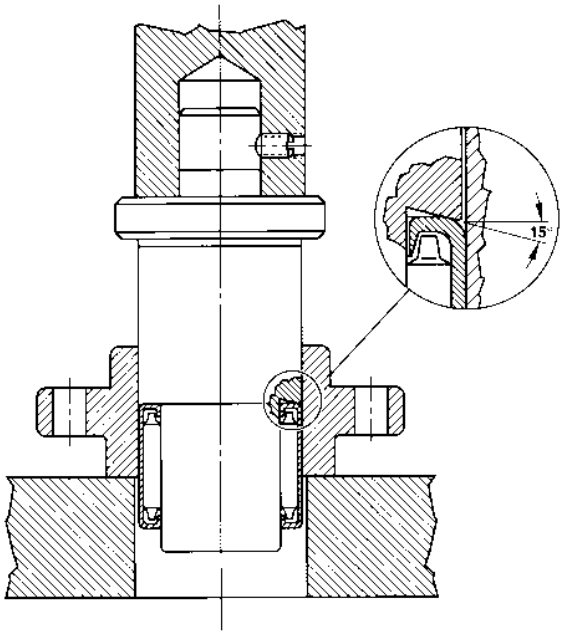


EXTRACTION OF DRAWN CUP BEARINGS

The need to extract a drawn cup bearing does not arise often. Standard extractor tools may be purchased from a reputable manufacturer. Customers may produce the special extraction tools at their own facilities. In certain cases, The Timken Company may assist, particularly when a drawn cup bearing appears to be damaged and a full analysis is required. After extraction, the drawn cup bearing should not be reused.

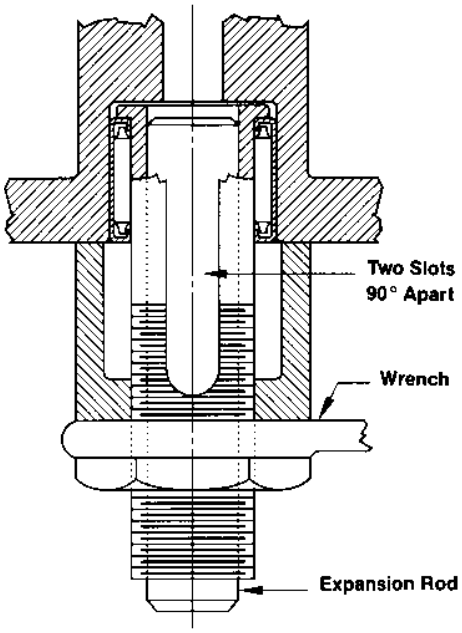
EXTRACTION FROM A STRAIGHT HOUSING

When it is necessary to extract a drawn cup bearing from a straight housing, a similar tool to the installation tool, but without the stop, may be used. To avoid damage to the bearing, pressure should be applied against the marked end of the bearing, just as it is done at installation.



EXTRACTION FROM A SHOULDERED OR DEAD END HOUSING (with space between the bearing and the housing shoulder)

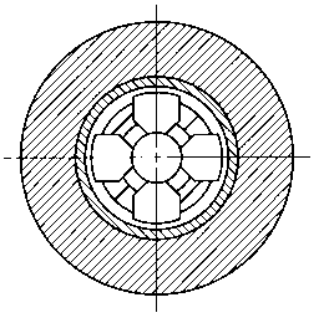
Bearings may be extracted from shouldered or dead end housings with a common bearing puller tool as shown. This type of tool is slotted in two places at right angles to form four prongs. The four puller prongs are pressed together and inserted into the space between the end of the bearing and the shoulder. The prongs are forced outward by inserting the expansion rod, and then the bearing is extracted. Do not reuse the bearing after extraction.



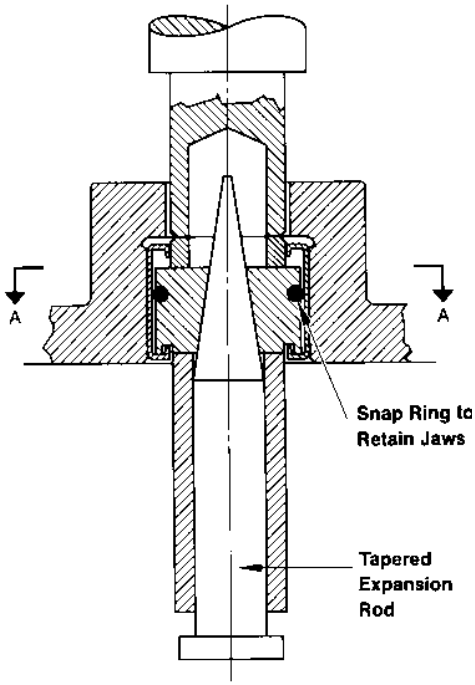
EXTRACTION FROM A SHOULDERED HOUSING (with bearing pressed up close to the shoulder)

The tool to be used, as shown, is of a similar type described for a shouldered or dead end housing, but the rollers must first be removed from the bearing.

The four segment puller jaws are collapsed and slipped into the empty cup. The jaws are then forced outward into the cup bore by means of the tapered expansion rod. The jaws should bear on the lip as near as possible to the cup bore. The cup is then pressed out from the top.

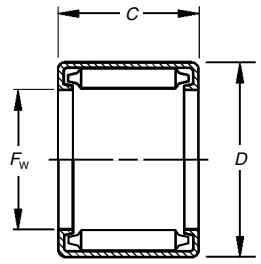


Section A-A
of Four Jaws

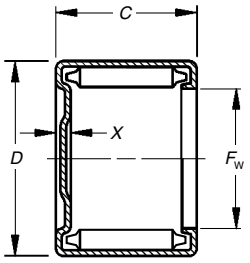


FULL COMPLEMENT BEARINGS, OPEN ENDS, CLOSED ONE END

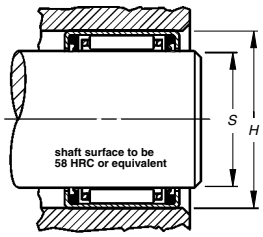
INCH SERIES



B,BH



M-1, MH-1



Full Complement Bearing

Drawn cup bearings of nominal inch dimensions, with one closed end, that are not tabulated, may be made available upon request.

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design.

Shaft Dia.	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
1/8	3.175 0.1250	6.350 0.2500	6.35 0.250	—	B-24	—	1.73 390	1.65 370	8100	13000	0.0081
5/32	3.970 0.1563	7.142 0.2812	6.35 0.250	—	B-2-1/2-4	—	2.00 450	2.00 450	7000	11000	0.0093
	3.970 0.1563	7.142 0.2812	7.92 0.312	—	B-2-1/2-5	—	2.58 580	2.80 630	7000	11000	0.0101
3/16	4.763 0.1875	8.733 0.3438	6.35 0.250	1.78 0.07	B-34	M-341	2.22 500	2.14 480	7000	11000	0.0099
	4.763 0.1875	8.733 0.3438	9.53 0.375	1.78 0.07	B-36	M-361	3.78 850	4.23 950	7000	11000	0.0118
1/4	6.350 0.2500	11.113 0.4375	6.35 0.250	2.03 0.08	B-44	M-441	2.76 620	2.62 590	6500	10000	0.0115
	6.350 0.2500	11.113 0.4375	7.92 0.312	2.03 0.08	B-45	M-451	3.56 800	3.69 830	6500	10000	0.0125
	6.350 0.2500	11.113 0.4375	9.53 0.375	—	B-46	—	4.54 1020	5.03 1130	6500	10000	N/A
	6.350 0.2500	11.113 0.4375	11.13 0.438	2.03 0.08	B-47	M-471	5.52 1240	6.45 1450	6500	10000	0.0143
5/16	7.938 0.3125	12.700 0.5000	7.92 0.312	2.03 0.08	B-55	M-551	4.09 920	4.58 1030	5400	8300	0.0144
	7.938 0.3125	12.700 0.5000	9.53 0.375	—	B-56	—	5.25 1180	6.32 1420	5400	8300	0.0156
	7.938 0.3125	12.700 0.5000	11.13 0.438	2.03 0.08	B-57	M-571	6.32 1420	8.1 1820	5400	8300	0.0165
	7.938 0.3125	12.700 0.5000	14.27 0.562	—	B-59	—	8.36 1880	11.60 2600	5400	8300	0.0181
	7.938 0.3125	14.288 0.5625	11.13 0.438	2.29 0.09	BH-57	MH-571	7.03 1580	7.34 1650	7500	12000	0.0156
	7.938 0.3125	14.288 0.5625	14.27 0.562	—	BH-59	—	9.47 2130	10.80 2420	7500	12000	0.0171
3/8	9.525 0.3750	14.288 0.5625	7.92 0.312	2.03 0.08	B-65	M-651	4.54 1020	5.52 1240	4600	7100	0.0162
	9.525 0.3750	14.288 0.5625	9.53 0.375	2.03 0.08	B-66	M-661	5.83 1310	7.61 1710	4600	7100	0.0175
	9.525 0.3750	14.288 0.5625	11.13 0.438	—	B-67	—	7.07 1590	9.7 2180	4600	7100	0.0186
	9.525 0.3750	14.288 0.5625	12.70 0.500	2.03 0.08	B-68	M-681	8.18 1840	11.80 2650	4600	7100	0.0195
	9.525 0.3750	14.288 0.5625	14.27 0.562	—	B-69	—	9.34 2100	13.92 3130	4600	7100	0.0203
	9.525 0.3750	14.288 0.5625	15.88 0.625	2.03 0.08	B-610	M-6101	10.4 2340	16.00 3590	4600	7100	0.0211
	9.525 0.3750	15.875 0.6250	12.70 0.500	—	BH-68	—	9.34 2100	10.90 2460	6500	10000	0.0184
7/16	11.113 0.4375	15.875 0.6250	9.53 0.375	—	B-76	—	6.36 1430	8.90 2000	4100	6300	0.0194
	11.113 0.4375	15.875 0.6250	11.13 0.438	—	B-77	—	7.70 1730	11.3 2550	4100	6300	0.0206
	11.113 0.4375	15.875 0.6250	12.70 0.500	2.03 0.08	B-78	M-781	8.99 2020	13.80 3100	4100	6300	0.0216
	11.113 0.4375	15.875 0.6250	15.88 0.625	—	B-710	—	11.3 2550	18.7 4200	4100	6300	0.0233

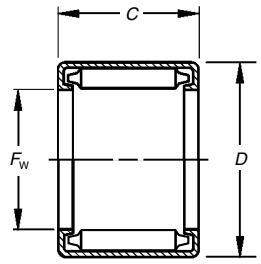
Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring*	Shaft Dia.
		S		H						in.
0.001 0.002	—	3.175 0.1250	3.167 0.1247	6.350 0.2500	6.363 0.2505	6.363 0.2505	3.195 0.1258	3.221 0.1268		1/8
0.001 0.002	—	3.970 0.1563	3.962 0.1560	7.142 0.2812	7.155 0.2817	7.155 0.2817	3.990 0.1571	4.016 0.1581		5/32
0.001 0.003	—	3.970 0.1563	3.962 0.1560	7.142 0.2812	7.155 0.2817	7.155 0.2817	3.990 0.1571	4.016 0.1581		
0.001 0.003	0.002 0.004	4.763 0.1875	4.755 0.1872	8.717 0.3432	8.730 0.3437	8.730 0.3437	4.783 0.1883	4.808 0.1893		3/16
0.002 0.005	0.003 0.006	4.763 0.1875	4.755 0.1872	8.717 0.3432	8.730 0.3437	8.730 0.3437	4.783 0.1883	4.808 0.1893		
0.002 0.005	0.003 0.006	6.350 0.2500	6.337 0.2495	11.100 0.4370	11.125 0.4380	11.125 0.4380	6.388 0.2515	6.414 0.2525		1/4
0.003 0.007	0.004 0.008	6.350 0.2500	6.337 0.2495	11.100 0.4370	11.125 0.4380	11.125 0.4380	6.388 0.2515	6.414 0.2525		
0.004 0.008	—	6.350 0.2500	6.337 0.2495	11.100 0.4370	11.125 0.4380	11.125 0.4380	6.388 0.2515	6.414 0.2525		
0.004 0.009	0.005 0.011	6.350 0.2500	6.337 0.2495	11.100 0.4370	11.125 0.4380	11.125 0.4380	6.388 0.2515	6.414 0.2525		
0.004 0.008	0.004 0.009	7.938 0.3125	7.925 0.3120	12.687 0.4995	12.713 0.5005	12.713 0.5005	7.976 0.3140	8.001 0.3150		5/16
0.005 0.010	—	7.938 0.3125	7.925 0.3120	12.687 0.4995	12.713 0.5005	12.713 0.5005	7.976 0.3140	8.001 0.3150		
0.005 0.011	0.006 0.013	7.938 0.3125	7.925 0.3120	12.687 0.4995	12.713 0.5005	12.713 0.5005	7.976 0.3140	8.001 0.3150		
0.006 0.014	—	7.938 0.3125	7.925 0.3120	12.687 0.4995	12.713 0.5005	12.713 0.5005	7.976 0.3140	8.001 0.3150		
0.007 0.016	0.008 0.018	7.938 0.3125	7.925 0.3120	14.275 0.5620	14.300 0.5630	14.300 0.5630	7.976 0.3140	8.001 0.3150		
0.009 0.020	—	7.938 0.3125	7.925 0.3120	14.275 0.5620	14.300 0.5630	14.300 0.5630	7.976 0.3140	8.001 0.3150		
0.004 0.009	0.005 0.010	9.525 0.3750	9.512 0.3745	14.275 0.5620	14.300 0.5630	14.300 0.5630	9.563 0.3765	9.589 0.3775		3/8
0.005 0.011	0.005 0.012	9.525 0.3750	9.512 0.3745	14.275 0.5620	14.300 0.5630	14.300 0.5630	9.563 0.3765	9.589 0.3775		
0.006 0.013	—	9.525 0.3750	9.512 0.3745	14.275 0.5620	14.300 0.5630	14.300 0.5630	9.563 0.3765	9.589 0.3775		
0.007 0.015	0.008 0.017	9.525 0.3750	9.512 0.3745	14.275 0.5620	14.300 0.5630	14.300 0.5630	9.563 0.3765	9.589 0.3775	IRA-3	
0.007 0.016	—	9.525 0.3750	9.512 0.3745	14.275 0.5620	14.300 0.5630	14.300 0.5630	9.563 0.3765	9.589 0.3775		
0.008 0.018	0.01 0.021	9.525 0.3750	9.512 0.3745	14.275 0.5620	14.300 0.5630	14.300 0.5630	9.563 0.3765	9.589 0.3775		
0.010 0.021	0.000	9.525 0.3750	9.512 0.3745	15.862 0.6245	15.888 0.6255	15.888 0.6255	9.563 0.3765	9.589 0.3775	IRA-3	
0.005 0.012	—	11.113 0.4375	11.100 0.4370	15.862 0.6245	15.888 0.6255	15.888 0.6255	11.151 0.4390	11.176 0.4400	IRA-4	7/16
0.007 0.015	—	11.113 0.4375	11.100 0.4370	15.862 0.6245	15.888 0.6255	15.888 0.6255	11.151 0.4390	11.176 0.4400	IRA-4	
0.008 0.017	0.009 0.019	11.113 0.4375	11.100 0.4370	15.862 0.6245	15.888 0.6255	15.888 0.6255	11.151 0.4390	11.176 0.4400	IRA-4	
0.010 0.021	—	11.113 0.4375	11.100 0.4370	15.862 0.6245	15.888 0.6255	15.888 0.6255	11.151 0.4390	11.176 0.4400		

* Further reduces shaft diameter.

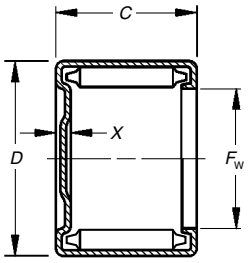
Continued on next page.

FULL COMPLEMENT BEARINGS, OPEN ENDS, CLOSED ONE END – *continued*

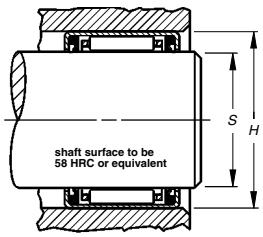
INCH SERIES



B,BH



M-1, MH-1



Full Complement Bearing

Drawn cup bearings of nominal inch dimensions, with one closed end, that are not tabulated, may be made available upon request.

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design.

Shaft Dia.	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
	11.113 0.4375	17.463 0.6875	12.70 0.500	— —	BH-78	—	10.3 2320	12.8 2870	5700	8800	0.0203
1/2	12.700 0.5000	17.463 0.6875	7.92 0.312	2.03 0.08	B-85	M-851	5.34 1200	7.38 1660	3600	5600	0.0196
	12.700 0.5000	17.463 0.6875	9.53 0.375	2.03 0.08	B-86	M-861	6.85 1540	10.1 2280	3600	5600	0.0212
	12.700 0.5000	17.463 0.6875	11.13 0.438	2.03 0.08	B-87	M-871	8.32 1870	13.0 2920	3600	5600	0.0225
	12.700 0.5000	17.463 0.6875	12.70 0.500	2.03 0.08	B-88	M-881	9.61 2160	15.7 3530	3600	5600	0.0236
	12.700 0.5000	17.463 0.6875	15.88 0.625	2.03 0.08	B-810	M-8101	12.2 2750	21.34 4800	3600	5600	0.0255
	12.700 0.5000	17.463 0.6875	19.05 0.750	2.03 0.08	B-812	M-8121	14.7 3300	27.0 6060	3600	5600	0.0270
	12.700 0.5000	19.050 0.7500	11.13 0.438	— —	BH-87	—	9.47 2130	11.8 2650	5100	7900	0.0210
	12.700 0.5000	19.050 0.7500	12.70 0.500	— —	BH-88	—	11.2 2510	14.6 3280	5100	7900	0.0221
	12.700 0.5000	19.050 0.7500	15.88 0.625	— —	BH-810	—	14.4 3230	20.2 4540	5100	7900	0.0240
	12.700 0.5000	19.050 0.7500	19.05 0.750	2.29 0.09	BH-812	MH-8121	17.4 3910	25.8 5790	5100	7900	0.0255
9/16	14.288 0.5625	19.050 0.7500	7.92 0.312	2.03 0.08	B-95	M-951	5.74 1290	8.32 1870	3300	5000	0.0212
	14.288 0.5625	19.050 0.7500	9.53 0.375	2.03 0.08	B-96	M-961	7.34 1650	11.4 2570	3300	5000	0.0229
	14.288 0.5625	19.050 0.7500	11.13 0.438	2.03 0.08	B-97	M-971	8.85 1990	14.6 3280	3300	5000	0.0244
	14.288 0.5625	19.050 0.7500	12.70 0.500	2.03 0.08	B-98	M-981	10.3 2320	17.7 3990	3300	5000	0.0256
	14.288 0.5625	19.050 0.7500	15.88 0.625	2.03 0.08	B-910	M-9101	13.1 2940	24.0 5400	3300	5000	0.0276
	14.288 0.5625	19.050 0.7500	19.05 0.750	2.03 0.08	B-912	M-9121	15.7 3520	30.3 6820	3300	5000	0.0292
	14.288 0.5625	20.638 0.8125	12.70 0.500	— —	BH-98	—	12.0 2690	16.5 3700	4600	7100	0.0239
	14.288 0.5625	20.638 0.8125	15.88 0.625	— —	BH-910	—	15.4 3460	22.7 5110	4600	7100	0.0259
	14.288 0.5625	20.638 0.8125	19.05 0.750	— —	BH-912	—	18.6 4190	29.0 6520	4600	7100	0.0275
5/8	15.875 0.6250	20.638 0.8125	7.92 0.312	2.03 0.08	B-105	M-1051	6.1 1360	9.25 2080	3000	4500	0.0227
	15.875 0.6250	20.638 0.8125	11.13 0.438	2.03 0.08	B-107	M-1071	9.39 2110	16.2 3650	3000	4500	0.0262
	15.875 0.6250	20.638 0.8125	12.70 0.500	2.03 0.08	B-108	M-1081	10.9 2450	19.7 4430	3000	4500	0.0275
	15.875 0.6250	20.638 0.8125	15.88 0.625	2.03 0.08	B-1010	M-10101	13.80 3110	26.7 6000	3000	4500	0.0296
	15.875 0.6250	20.638 0.8125	19.05 0.750	2.03 0.08	B-1012	M-10121	16.6 3720	33.7 7580	3000	4500	0.0314
5/8	15.875 0.6250	22.212 0.8745	12.70 0.500	2.29 0.09	BH-108	MH-1081	12.7 2860	18.3 4110	4200	6500	0.0256

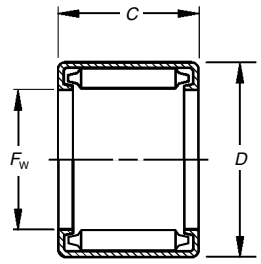
Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring*	Shaft Dia.
		S		H						in.
0.010 0.023	—	**11.113** 0.4375	**11.100** 0.4370	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**11.151** 0.4390	**11.176** 0.4400	**IRA-4**	
0.005 0.012	**0.006** 0.014	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025	**IRA-5**	1/2
0.006 0.014	**0.007** 0.016	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025	**IRA-5**	
0.007 0.016	**0.008** 0.018	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025	**IRA-5**	
0.009 0.019	**0.010** 0.021	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025		
0.010 0.023	**0.012** 0.026	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025		
0.013 0.028	**0.014** 0.031	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025		
0.010 0.023	—	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**12.738** 0.5015	**12.764** 0.5025	**IRA-5**	
0.012 0.026	—	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**12.738** 0.5015	**12.764** 0.5025	**IRA-5**	
0.015 0.033	—	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**12.738** 0.5015	**12.764** 0.5025		
0.018 0.039	**0.020** 0.044	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**12.738** 0.5015	**12.764** 0.5025		
0.006 0.013	**0.006** 0.014	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**14.326** 0.5640	**14.351** 0.5650	**IR-68**	9/16
0.007 0.015	**0.008** 0.018	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**14.326** 0.5640	**14.351** 0.5650	**IR-68**	
0.008 0.018	**0.010** 0.021	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**14.326** 0.5640	**14.351** 0.5650	**IR-68**	
0.009 0.020	**0.010** 0.023	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**14.326** 0.5640	**14.351** 0.5650	**IR-68**	
0.012 0.026	**0.013** 0.029	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**14.326** 0.5640	**14.351** 0.5650	**IR-612**	
0.014 0.031	**0.015** 0.034	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**14.326** 0.5640	**14.351** 0.5650	**IR-612**	
0.013 0.029	—	**14.288** 0.5625	**14.275** 0.5620	**20.625** 0.8120	**20.650** 0.8130	**20.650** 0.8130	**14.326** 0.5640	**14.351** 0.5650	**IR-68**	
0.016 0.036	—	**14.288** 0.5625	**14.275** 0.5620	**20.625** 0.8120	**20.650** 0.8130	**20.650** 0.8130	**14.326** 0.5640	**14.351** 0.5650	**IR-612**	
0.020 0.043	—	**14.288** 0.5625	**14.275** 0.5620	**20.625** 0.8120	**20.650** 0.8130	**20.650** 0.8130	**14.326** 0.5640	**14.351** 0.5650	**IRA-6**	
0.006 0.014	**0.007** 0.016	**15.875** 0.6250	**15.862** 0.6245	**20.625** 0.8120	**20.650** 0.8130	**20.650** 0.8130	**15.913** 0.6265	**15.939** 0.6275	**IR-68-1**	5/8
0.009 0.020	**0.010** 0.022	**15.875** 0.6250	**15.862** 0.6245	**20.625** 0.8120	**20.650** 0.8130	**20.650** 0.8130	**15.913** 0.6265	**15.939** 0.6275	**IR-68-1**	
0.010 0.022	**0.012** 0.026	**15.875** 0.6250	**15.862** 0.6245	**20.625** 0.8120	**20.650** 0.8130	**20.650** 0.8130	**15.913** 0.6265	**15.939** 0.6275	**IR-68-1**	
0.013 0.028	**0.015** 0.032	**15.875** 0.6250	**15.862** 0.6245	**20.625** 0.8120	**20.650** 0.8130	**20.650** 0.8130	**15.913** 0.6265	**15.939** 0.6275	**IR-612-1**	
0.015 0.034	**0.017** 0.038	**15.875** 0.6250	**15.862** 0.6245	**20.625** 0.8120	**20.650** 0.8130	**20.650** 0.8130	**15.913** 0.6265	**15.939** 0.6275	**IR-612-1**	
0.014 0.031	**0.016** 0.035	**15.875** 0.6250	**15.862** 0.6245	**22.212** 0.8745	**22.238** 0.8755	**22.238** 0.8755	**15.913** 0.6265	**15.939** 0.6275	**IR-68-1**	5/8

* Further reduces shaft diameter.

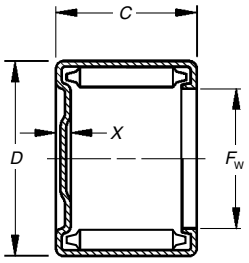
Continued on next page.

FULL COMPLEMENT BEARINGS, OPEN ENDS, CLOSED ONE END – *continued*

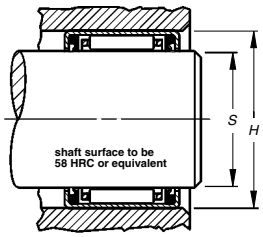
INCH SERIES



B,BH



M-1, MH-1



Full Complement Bearing

Drawn cup bearings of nominal inch dimensions, with one closed end, that are not tabulated, may be made available upon request.

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design.

Shaft Dia.	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
	15.875 0.6250	22.212 0.8745	15.88 0.625	— —	BH-1010	—	16.4 3680	25.3 5680	4200	6500	0.0278
5/8	15.875 0.6250	22.212 0.8745	19.05 0.750	— —	BH-1012	—	19.8 4450	32.3 7250	4200	6500	0.0295
	15.875 0.6250	22.212 0.8745	25.40 1.000	— —	BH-1016	—	26.2 5890	46.3 10400	4200	6500	0.0322
11/16	17.463 0.6875	22.212 0.8745	9.53 0.375	2.03 0.08	B-116	M-1161	8.18 1840	14.0 3140	2700	4200	0.0263
	17.463 0.6875	22.212 0.8745	12.70 0.500	2.03 0.08	B-118	M-1181	11.5 2580	21.7 4880	2700	4200	0.0293
	17.463 0.6875	22.212 0.8745	15.88 0.625	2.03 0.08	B-1110	M-11101	14.6 3270	29.4 6610	2700	4200	0.0316
	17.463 0.6875	22.212 0.8745	19.05 0.750	2.03 0.08	B-1112	M-11121	17.4 3920	37.1 8340	2700	4200	0.0335
	17.463 0.6875	23.813 0.9375	11.13 0.438	— —	BH-117	—	11.4 2560	16.2 3650	3900	6000	0.0259
	17.463 0.6875	23.813 0.9375	15.88 0.625	2.29 0.09	BH-1110	MH-11101	17.3 3890	27.8 6250	3900	6000	0.0296
	17.463 0.6875	23.813 0.9375	19.05 0.750	— —	BH-1112	—	20.9 4700	35.5 7980	3900	6000	0.0314
3/4	19.050 0.7500	25.400 1.0000	9.53 0.375	2.29 0.09	B-126	M-1261	9.7 2180	13.6 3050	3600	5600	0.0256
	19.050 0.7500	25.400 1.0000	12.70 0.500	2.29 0.09	B-128	M-1281	14.1 3170	22.0 4940	3600	5600	0.0289
	19.050 0.7500	25.400 1.0000	15.88 0.625	2.29 0.09	B-1210	M-12101	18.2 4080	30.3 6820	3600	5600	0.0313
	19.050 0.7500	25.400 1.0000	19.05 0.750	2.29 0.09	B-1212	M-12121	21.9 4930	38.7 8710	3600	5600	0.0333
13/16	20.638 0.8125	26.988 1.0625	9.53 0.375	— —	B-136	—	10.1 2280	14.68 3300	3400	5200	0.0271
	20.638 0.8125	26.988 1.0625	12.70 0.500	2.29 0.09	B-138	M-1381	14.8 3320	23.80 5350	3400	5200	0.0305
	20.638 0.8125	26.988 1.0625	22.23 0.875	2.29 0.09	B-1314	M-13141	26.7 6010	51.15 11500	3400	5200	0.0369
	20.638 0.8125	26.988 1.0625	25.40 1.000	2.29 0.09	B-1316	M-13161	30.3 6820	60.05 13500	3400	5200	0.0384
	20.638 0.8125	26.988 1.0625	31.75 1.250	— —	B-1320	—	37.3 8380	78.29 17600	3500	5200	N/A
	20.643 0.8127	28.575 1.1250	12.70 0.500	2.79 0.11	BH-138	MH-1381	14.9 3340	20.82 4680	4100	6300	0.0287
	20.638 0.8125	28.575 1.1250	15.88 0.625	2.79 0.11	BH-1310	MH-13101	19.70 4430	29.89 6720	4100	6300	0.0314
	20.638 0.8125	28.575 1.1250	19.05 0.750	2.79 0.11	BH-1312	MH-13121	24.2 5440	38.97 8760	4100	6300	0.0336
7/8	22.225 0.8750	28.575 1.1250	9.53 0.375	2.29 0.09	B-146	M-1461	10.5 2370	15.84 3560	3100	4800	0.0285
	22.225 0.8750	28.575 1.1250	12.70 0.500	2.29 0.09	B-148	M-1481	15.4 3450	25.62 5760	3100	4800	0.0321
	22.225 0.8750	28.575 1.1250	19.05 0.750	2.29 0.09	B-1412	M-14121	23.9 5370	45.37 10200	3100	4800	0.0369
	22.225 0.8750	28.575 1.1250	25.40 1.000	2.29 0.09	B-1416	M-14161	31.6 7100	64.94 14600	3100	4800	0.0404

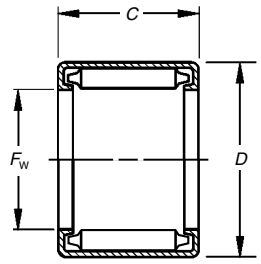
Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring*	Shaft Dia.
		S		H						in.
0.018 0.039	— —	15.875 0.6250	15.862 0.6245	22.212 0.8745	22.238 0.8755	22.238 0.8755	15.913 0.6265	15.939 0.6275	IR-612-1	
0.021 0.047	— —	15.875 0.6250	15.862 0.6245	22.212 0.8745	22.238 0.8755	22.238 0.8755	15.913 0.6265	15.939 0.6275	IR-612-1	5/8
0.028 0.062	— —	15.875 0.6250	15.862 0.6245	22.212 0.8745	22.238 0.8755	22.238 0.8755	15.913 0.6265	15.939 0.6275		
0.008 0.018	0.009 0.020	17.463 0.6875	17.450 0.6870	22.212 0.8745	22.238 0.8755	22.238 0.8755	17.501 0.6890	17.526 0.6900		11/16
0.011 0.024	0.012 0.027	17.463 0.6875	17.450 0.6870	22.212 0.8745	22.238 0.8755	22.238 0.8755	17.501 0.6890	17.526 0.6900		
0.014 0.030	0.015 0.034	17.463 0.6875	17.450 0.6870	22.212 0.8745	22.238 0.8755	22.238 0.8755	17.501 0.6890	17.526 0.6900		
0.016 0.036	0.019 0.041	17.463 0.6875	17.450 0.6870	22.212 0.8745	22.238 0.8755	22.238 0.8755	17.501 0.6890	17.526 0.6900		
0.014 0.030	— —	17.463 0.6875	17.450 0.6870	23.800 0.9370	23.825 0.9380	23.825 0.9380	17.501 0.6890	17.526 0.6900		
0.019 0.042	0.021 0.047	17.463 0.6875	17.450 0.6870	23.800 0.9370	23.825 0.9380	23.825 0.9380	17.501 0.6890	17.526 0.6900		
0.023 0.051	— —	17.463 0.6875	17.450 0.6870	23.800 0.9370	23.825 0.9380	23.825 0.9380	17.501 0.6890	17.526 0.6900		
0.012 0.027	0.014 0.031	19.050 0.7500	19.037 0.7495	25.387 0.9995	25.413 1.0005	25.387 0.9995	19.063 0.7505	19.088 0.7515	IR-88	3/4
0.016 0.036	0.019 0.041	19.050 0.7500	19.037 0.7495	25.387 0.9995	25.413 1.0005	25.387 0.9995	19.063 0.7505	19.088 0.7515	IR-88	
0.020 0.045	0.024 0.052	19.050 0.7500	19.037 0.7495	25.387 0.9995	25.413 1.0005	25.387 0.9995	19.063 0.7505	19.088 0.7515		
0.024 0.054	0.028 0.062	19.050 0.7500	19.037 0.7495	25.387 0.9995	25.413 1.0005	25.387 0.9995	19.063 0.7505	19.088 0.7515	IR-812	
0.013 0.029	— —	20.638 0.8125	20.625 0.8120	26.975 1.0620	27.000 1.0630	26.975 1.0620	20.650 0.8130	20.676 0.8140		13/16
0.018 0.039	0.020 0.044	20.638 0.8125	20.625 0.8120	26.975 1.0620	27.000 1.0630	26.975 1.0620	20.650 0.8130	20.676 0.8140		
0.031 0.068	0.035 0.077	20.638 0.8125	20.625 0.8120	26.975 1.0620	27.000 1.0630	26.975 1.0620	20.650 0.8130	20.676 0.8140		
0.035 0.078	0.040 0.088	20.638 0.8125	20.625 0.8120	26.975 1.0620	27.000 1.0630	26.975 1.0620	20.650 0.8130	20.676 0.8140		
0.044 0.098	— —	20.638 0.8125	29 625 0.8120	27.000 1.0630	26.975 1.0620	26.975 1.0620	20.650 0.8130	20.676 0.8140		
0.023 0.050	0.026 0.057	20.638 0.8125	20.625 0.8120	28.562 1.1245	28.588 1.1255	28.562 1.1245	20.650 0.8130	20.676 0.8140		
0.029 0.063	0.032 0.071	20.638 0.8125	20.625 0.8120	28.562 1.1245	28.588 1.1255	28.562 1.1245	20.650 0.8130	20.676 0.8140		
0.034 0.076	0.039 0.086	20.638 0.8125	20.625 0.8120	28.562 1.1245	28.588 1.1255	28.562 1.1245	20.650 0.8130	20.676 0.8140		
0.014 0.031	0.016 0.035	22.225 0.8750	22.212 0.8745	28.562 1.1245	28.588 1.1255	28.562 1.1245	22.238 0.8755	22.263 0.8765		7/8
0.019 0.042	0.022 0.048	22.225 0.8750	22.212 0.8745	28.562 1.1245	28.588 1.1255	28.562 1.1245	22.238 0.8755	22.263 0.8765	IR-1012	
0.028 0.062	0.032 0.070	22.225 0.8750	22.212 0.8745	28.562 1.1245	28.588 1.1255	28.562 1.1245	22.238 0.8755	22.263 0.8765	IRA-10	
0.038 0.083	0.043 0.094	22.225 0.8750	22.212 0.8745	28.562 1.1245	28.588 1.1255	28.562 1.1245	22.238 0.8755	22.263 0.8765	IR-1016	

* Further reduces shaft diameter.

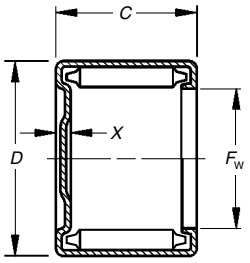
Continued on next page.

FULL COMPLEMENT BEARINGS, OPEN ENDS, CLOSED ONE END – *continued*

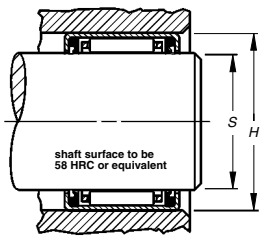
INCH SERIES



B,BH



M-1, MH-1



Full Complement Bearing

Drawn cup bearings of nominal inch dimensions, with one closed end, that are not tabulated, may be made available upon request.

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design.

Shaft Dia.	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
	22.225 0.8750	28.575 1.1250	28.58 1.125	——	B-1418	——	35.2 7920	74.73 16800	3100	4800	0.0418
	22.225 0.8750	30.163 1.1875	15.88 0.625	2.79 0.11	BH-1410	MH-14101	20.3 4570	32.21 7240	3800	5880	0.0331
	22.225 0.8750	30.163 1.1875	19.05 0.750	2.79 0.11	BH-1412	MH-14121	25.0 5620	41.99 9440	3800	5880	0.0354
	22.225 0.8750	30.163 1.1875	25.40 1.000	——	BH-1416	——	33.7 7570	61.39 13800	3800	5880	0.0389
15/16	23.813 0.9375	30.163 1.1875	12.70 0.500	——	B-158	——	15.9 3580	27.49 6180	3000	4500	0.0336
	23.813 0.9375	30.163 1.1875	25.40 1.000	2.29 0.09	B-1516	M-15161	32.8 7370	69.39 15600	3000	4500	0.0423
1/2	25.400 1.0000	31.750 1.2500	9.53 0.375	——	B-166	——	11.3 2550	18.10 4070	2800	4300	0.0312
	25.400 1.0000	31.750 1.2500	11.13 0.438	2.29 0.09	B-167	M-1671	14.0 3140	23.66 5320	2800	4300	0.0333
	25.400 1.0000	31.750 1.2500	15.88 0.625	2.29 0.09	B-1610	M-16101	21.2 4770	40.52 9110	2800	4300	0.0381
	25.400 1.0000	31.750 1.2500	19.05 0.750	2.29 0.09	B-1612	M-16121	25.7 5770	51.60 11600	2800	4300	0.0404
	25.400 1.0000	31.750 1.2500	25.40 1.000	2.29 0.09	B-1616	M-16161	33.9 7630	74.29 16700	2800	4300	0.0442
	25.400 1.0000	33.338 1.3125	12.70 0.500	2.79 0.11	BH-168	MH-1681	16.6 3740	25.6 5760	3400	5200	0.0330
	25.400 1.0000	33.338 1.3125	15.88 0.625	——	BH-1610	——	22.0 4950	36.8 8280	3400	5200	0.0361
	25.400 1.0000	33.338 1.3125	19.05 0.750	2.79 0.11	BH-1612	MH-16121	27.1 6090	48.0 10800	3400	5200	0.0386
	25.400 1.0000	33.338 1.3125	22.23 0.875	——	BH-1614	——	31.9 7170	59.2 13300	3400	5200	0.0407
	25.400 1.0000	33.338 1.3125	25.40 1.000	2.79 0.11	BH-1616	MH-16161	36.5 8200	70.3 15800	3400	5200	0.0425
	25.400 1.0000	33.338 1.3125	31.75 1.250	——	BH-1620	——	45.4 10200	93.0 20900	3400	5200	0.0455
	25.400 1.0000	33.338 1.3125	38.10 1.500	2.79 0.11	BH-1624	MH-16241	53.4 12000	115.2 25900	3400	5200	0.0480
1 1/16	26.988 1.0625	33.338 1.3125	15.88 0.625	2.29 0.09	B-1710	M-17101	21.9 4930	43.1 9680	2600	4000	0.0397
	26.988 1.0625	34.925 1.3750	19.05 0.750	——	BH-1712	——	29.49 6630	52.49 11800	2300	3400	N/A
1 1/8	28.575 1.1250	34.925 1.3750	9.53 0.375	2.29 0.09	B-186	M-1861	12.1 2720	20.37 4580	2500	3800	0.0338
	28.575 1.1250	34.925 1.3750	12.70 0.500	2.29 0.09	B-188	M-1881	17.6 3950	33.0 7420	2500	3800	0.0381
	28.575 1.1250	34.925 1.3750	15.88 0.625	——	B-1810	——	22.6 5080	45.8 10300	2500	3800	0.0413
	28.575 1.1250	34.925 1.3750	19.05 0.750	2.29 0.09	B-1812	M-18121	27.3 6140	58.3 13100	2500	3800	0.0438
	28.575 1.1250	34.925 1.3750	25.40 1.000	2.29 0.09	B-1816	M-18161	36.2 8130	83.6 18800	2500	3800	0.0479
	28.575 1.1250	38.100 1.5000	19.05 0.750	3.05 0.12	BH-1812	MH-18121	31.5 7090	52.9 11900	3600	5600	0.0405

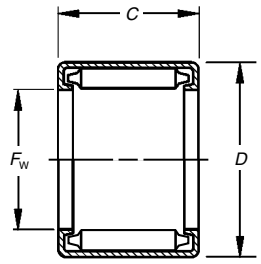
Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring*	Shaft Dia.
		S		H						in.
0.043 0.094	—	**22.225** 0.8750	**22.212** 0.8745	**28.562** 1.1245	**28.588** 1.1255	**28.562** 1.1245	**22.238** 0.8755	**22.263** 0.8765		
0.030 0.067	**0.035** 0.076	**22.225** 0.8750	**22.212** 0.8745	**30.150** 1.1870	**30.175** 1.1880	**30.150** 1.1870	**22.238** 0.8755	**22.263** 0.8765	**IR-1012**	
0.036 0.080	**0.041** 0.091	**22.225** 0.8750	**22.212** 0.8745	**30.150** 1.1870	**30.175** 1.1880	**30.150** 1.1870	**22.238** 0.8755	**22.263** 0.8765	**IRA-10**	
0.049 0.107	—	**22.225** 0.8750	**22.212** 0.8745	**30.150** 1.1870	**30.175** 1.1880	**30.150** 1.1870	**22.238** 0.8755	**22.263** 0.8765	**IR-1016**	
0.020 0.044	—	**23.813** 0.9375	**23.800** 0.9370	**30.150** 1.1870	**30.175** 1.1880	**30.150** 1.1870	**23.825** 0.9380	**23.851** 0.9390		$^{15}/_{16}$
0.040 0.088	**0.045** 0.100	**23.813** 0.9375	**23.800** 0.9370	**30.150** 1.1870	**30.175** 1.1880	**30.150** 1.1870	**23.825** 0.9380	**23.851** 0.9390		
0.016 0.035	—	**25.400** 1.0000	**25.387** 0.9995	**31.737** 1.2495	**31.763** 1.2505	**31.737** 1.2495	**25.413** 1.0005	**25.438** 1.0015	**IR-128**	$^{1}/_{2}$
0.019 0.041	**0.021** 0.046	**25.400** 1.0000	**25.387** 0.9995	**31.737** 1.2495	**31.763** 1.2505	**31.737** 1.2495	**25.413** 1.0005	**25.438** 1.0015	**IR-128**	
0.026 0.058	**0.030** 0.066	**25.400** 1.0000	**25.387** 0.9995	**31.737** 1.2495	**31.763** 1.2505	**31.737** 1.2495	**25.413** 1.0005	**25.438** 1.0015	**IR-1212**	
0.032 0.070	**0.036** 0.080	**25.400** 1.0000	**25.387** 0.9995	**31.737** 1.2495	**31.763** 1.2505	**31.737** 1.2495	**25.413** 1.0005	**25.438** 1.0015	**IR-1212**	
0.043 0.094	**0.048** 0.106	**25.400** 1.0000	**25.387** 0.9995	**31.737** 1.2495	**31.763** 1.2505	**31.737** 1.2495	**25.413** 1.0005	**25.438** 1.0015	**IR-1216**	
0.027 0.060	**0.031** 0.068	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-128**	
0.034 0.075	—	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-1212**	
0.041 0.090	**0.046** 0.102	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-1212**	
0.048 0.105	—	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-1216**	
0.054 0.120	**0.062** 0.136	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-1216**	
0.068 0.150	—	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-1220**	
0.082 0.180	**0.093** 0.204	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-1224**	
0.028 0.062	**0.032** 0.070	**26.988** 1.0625	**26.975** 1.0620	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**27.000** 1.0630	**27.026** 1.0640		$1\ ^{1}/_{16}$
0.035 0.078	—	**26.988** 1.0625	**26.975** 1.0620	**34.912** 1.3745	**34.938** 1.3755	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015		
0.018 0.039	**0.020** 0.044	**28.575** 1.1250	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**34.912** 1.3745	**28.588** 1.1255	**28.613** 1.1265		$1\ ^{1}/_{8}$
0.024 0.052	**0.027** 0.059	**28.575** 1.1250	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**34.912** 1.3745	**28.588** 1.1255	**28.613** 1.1265		
0.029 0.065	—	**28.575** 1.1250	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**34.912** 1.3745	**28.588** 1.1255	**28.613** 1.1265		
0.035 0.078	**0.040** 0.088	**28.575** 1.1250	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**34.912** 1.3745	**28.588** 1.1255	**28.613** 1.1265		
0.047 0.104	**0.054** 0.118	**28.575** 1.1250	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**34.912** 1.3745	**28.588** 1.1255	**28.613** 1.1265	**IR-1416**	
0.056 0.123	**0.063** 0.138	**28.575** 1.1250	**28.562** 1.1245	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**28.588** 1.1255	**28.613** 1.1265		

* Further reduces shaft diameter.

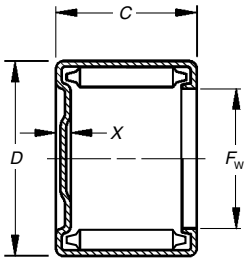
Continued on next page.

FULL COMPLEMENT BEARINGS, OPEN ENDS, CLOSED ONE END – *continued*

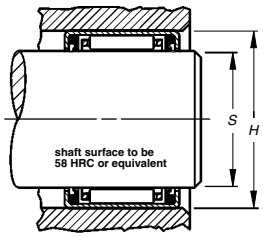
INCH SERIES



B,BH



M-1, MH-1



Full Complement Bearing

Drawn cup bearings of nominal inch dimensions, with one closed end, that are not tabulated, may be made available upon request.

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design.

Shaft Dia.	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
	28.575 1.1250	38.100 1.5000	25.40 1.000	3.05 0.12	BH-1816	MH-18161	42.5 9560	77.8 17500	3600	5600	0.0446
	28.575 1.1250	38.100 1.5000	31.75 1.250	3.05 0.12	BH-1820	MH-18201	52.9 11900	103.2 23200	3600	5600	0.0479
1 3/16	30.163 1.1875	38.100 1.5000	15.88 0.625	2.79 0.11	B-1910	M-19101	24.1 5420	43.8 9840	2900	4400	0.0406
	30.163 1.1875	38.100 1.5000	25.40 1.000	—	B-1916	—	40.0 8980	83.6 18800	2900	4400	0.0477
1 1/4	31.750 1.2500	38.100 1.5000	12.70 0.500	2.29 0.09	B-208	M-2081	18.6 4170	36.6 8240	2300	3500	0.0409
	31.750 1.2500	38.100 1.5000	15.88 0.625	2.29 0.09	B-2010	M-20101	23.9 5370	50.7 11400	2300	3500	0.0444
	31.750 1.2500	38.100 1.5000	19.05 0.750	2.29 0.09	B-2012	M-20121	28.9 6490	64.5 14500	2300	3500	0.0471
	31.750 1.2500	38.100 1.5000	25.40 1.000	2.29 0.09	B-2016	M-20161	38.2 8590	92.5 20800	2300	3500	0.0515
	31.750 1.2500	38.100 1.5000	31.75 1.250	2.29 0.09	B-2020	M-20201	47.2 10600	121 27200	2300	3500	0.0550
	31.750 1.2500	41.275 1.6250	12.70 0.500	3.05 0.12	BH-208	MH-2081	19.7 4420	30 6750	3300	5000	0.0369
	31.750 1.2500	41.275 1.6250	19.05 0.750	3.05 0.12	BH-2012	MH-20121	33.1 7440	58.7 13200	3300	5000	0.0435
	31.750 1.2500	41.275 1.6250	25.40 1.000	3.05 0.12	BH-2016	MH-20161	44.9 10100	86.7 19500	3300	5000	0.0480
	31.750 1.2500	41.275 1.6250	31.75 1.250	3.05 0.12	BH-2020	MH-20201	56.0 12600	115 25800	3300	5000	0.0515
1 5/16	33.338 1.3125	41.275 1.6250	12.70 0.500	2.79 0.11	B-218	M-2181	19.3 4330	33.7 7570	2600	4100	0.0397
	33.338 1.3125	41.275 1.6250	15.88 0.625	2.79 0.11	B-2110	M-21101	25.5 5740	48.5 10900	2600	4100	0.0435
	33.338 1.3125	41.275 1.6250	31.75 1.250	—	B-2120	—	52.5 11800	122 27500	2600	4100	0.0547
1 3/8	34.925 1.3750	41.275 1.6250	12.70 0.500	2.29 0.09	B-228	M-2281	19.5 4390	40.4 9070	2100	3200	0.0437
	34.925 1.3750	41.275 1.6250	19.05 0.750	2.29 0.09	B-2212	M-22121	30.4 6830	71.2 16000	2100	3200	0.0504
	34.925 1.3750	41.275 1.6250	25.40 1.000	2.29 0.09	B-2216	M-22161	40.2 9030	102 22900	2100	3200	0.0551
	34.925 1.3750	41.275 1.6250	31.75 1.250	2.29 0.09	B-2220	M-22201	49.4 11100	133 29900	2100	3200	0.0588
	34.925 1.3750	44.450 1.7500	12.70 0.500	—	BH-228	—	21.2 4770	33.5 7540	3000	4700	0.0394
	34.925 1.3750	44.450 1.7500	15.88 0.625	—	BH-2210	—	28.5 6410	48.9 11000	3000	4700	0.0432
	34.925 1.3750	44.450 1.7500	19.05 0.750	3.05 0.12	BH-2212	MH-22121	35.3 7930	64.5 14500	3000	4700	0.0463
	34.925 1.3750	44.450 1.7500	25.40 1.000	3.05 0.12	BH-2216	MH-22161	47.6 10700	94.8 21300	3000	4700	0.0509
	34.925 1.3750	44.450 1.7500	31.75 1.250	—	BH-2220	—	59.6 13400	126 28300	3000	4700	0.0547
1 1/2	38.100 1.5000	47.625 1.8750	12.70 0.500	3.05 0.12	B-248	M-2481	22.3 5020	37.1 8340	2800	4300	0.0420

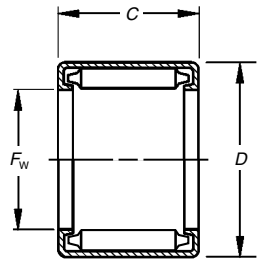
Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring*	Shaft Dia.
		S		H						in.
0.074 0.164	**0.084** 0.186	**28.575** 1.1250	**28.562** 1.1245	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**28.588** 1.1255	**28.613** 1.1265	**IR-1416**	
0.093 0.205	**0.105** 0.232	**28.575** 1.1250	**28.562** 1.1245	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**28.588** 1.1255	**28.613** 1.1265		
0.040 0.088	**0.045** 0.099	**30.163** 1.1875	**30.150** 1.1870	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**30.175** 1.1880	**30.201** 1.1890		**1 3/16**
0.064 0.140	— —	**30.163** 1.1875	**30.150** 1.1870	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**30.175** 1.1880	**30.201** 1.1890		
0.026 0.057	**0.029** 0.065	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**31.763** 1.2505	**31.788** 1.2515		**1 1/4**
0.032 0.071	**0.044** 0.097	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**31.763** 1.2505	**31.788** 1.2515		
0.039 0.086	**0.045** 0.099	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**31.763** 1.2505	**31.788** 1.2515	**IR-1612**	
0.052 0.114	**0.059** 0.130	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**31.763** 1.2505	**31.788** 1.2515	**IR-1616**	
0.065 0.143	**0.073** 0.162	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**31.763** 1.2505	**31.788** 1.2515		
0.041 0.090	**0.046** 0.102	**31.750** 1.2500	**31.737** 1.2495	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**31.763** 1.2505	**31.788** 1.2515		
0.061 0.135	**0.069** 0.153	**31.750** 1.2500	**31.737** 1.2495	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**31.763** 1.2505	**31.788** 1.2515	**IR-1612**	
0.081 0.179	**0.092** 0.203	**31.750** 1.2500	**31.737** 1.2495	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**31.763** 1.2505	**31.788** 1.2515	**IR-1616**	
0.102 0.224	**0.115** 0.254	**31.750** 1.2500	**31.737** 1.2495	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**31.763** 1.2505	**31.788** 1.2515		
0.034 0.076	**0.039** 0.086	**33.338** 1.3125	**33.325** 1.3120	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**33.350** 1.3130	**33.378** 1.3141		**1 5/16**
0.043 0.095	**0.049** 0.108	**33.338** 1.3125	**33.325** 1.3120	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**33.350** 1.3130	**33.378** 1.3141		
0.087 0.191	— —	**33.338** 1.3125	**33.325** 1.3120	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**33.350** 1.3130	**33.378** 1.3141		
0.028 0.062	**0.032** 0.070	**34.925** 1.3750	**34.912** 1.3745	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**34.938** 1.3755	**34.966** 1.3766		**1 3/8**
0.043 0.094	**0.049** 0.107	**34.925** 1.3750	**34.912** 1.3745	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**34.938** 1.3755	**34.966** 1.3766	**IR-1812**	
0.057 0.125	**0.064** 0.142	**34.925** 1.3750	**34.912** 1.3745	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**34.938** 1.3755	**34.966** 1.3766	**IR-1816**	
0.071 0.156	**0.080** 0.177	**34.925** 1.3750	**34.912** 1.3745	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**34.938** 1.3755	**34.966** 1.3766	**IR-1820**	
0.044 0.098	— —	**34.925** 1.3750	**34.912** 1.3745	**44.437** 1.7495	**44.463** 1.7505	**44.437** 1.7495	**34.938** 1.3755	**34.966** 1.3766		
0.055 0.122	— —	**34.925** 1.3750	**34.912** 1.3745	**44.437** 1.7495	**44.463** 1.7505	**44.437** 1.7495	**34.938** 1.3755	**34.966** 1.3766	**IR-1812**	
0.066 0.146	**0.075** 0.165	**34.925** 1.3750	**34.912** 1.3745	**44.437** 1.7495	**44.463** 1.7505	**44.437** 1.7495	**34.938** 1.3755	**34.966** 1.3766	**IR-1812**	
0.088 0.195	**0.100** 0.221	**34.925** 1.3750	**34.912** 1.3745	**44.437** 1.7495	**44.463** 1.7505	**44.437** 1.7495	**34.938** 1.3755	**34.966** 1.3766	**IR-1816**	
0.111 0.244	**0.125** 0.276	**34.925** 1.3750	**34.912** 1.3745	**44.437** 1.7495	**44.463** 1.7505	**44.437** 1.7495	**34.938** 1.3755	**34.966** 1.3766	**IR-1820**	
0.048 0.105	**0.054** 0.119	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017		**1 1/2**

* Further reduces shaft diameter.

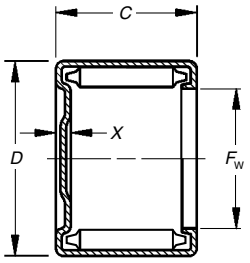
Continued on next page.

FULL COMPLEMENT BEARINGS, OPEN ENDS, CLOSED ONE END – *continued*

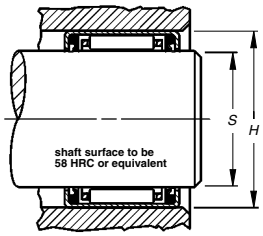
INCH SERIES



B,BH



M-1, MH-1



Full Complement Bearing

Shaft Dia.	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
	38.100 1.5000	47.625 1.8750	15.88 0.625	3.05 0.12	B-2410	M-24101	29.8 6710	53.8 12100	2800	4300	0.0460
	38.100 1.5000	47.625 1.8750	19.05 0.750	3.05 0.12	B-2412	M-24121	36.9 8290	70.7 15900	2800	4300	0.0493
	38.100 1.5000	47.625 1.8750	22.23 0.875	3.05 0.12	B-2414	M-24141	43.5 9780	87.6 19700	2800	4300	0.0519
	38.100 1.5000	47.625 1.8750	25.40 1.000	3.05 0.12	B-2416	M-24161	49.8 11200	103 23300	2800	4300	0.0542
	38.100 1.5000	47.625 1.8750	31.75 1.250	3.05 0.12	B-2420	M-24201	61.8 13900	138 31000	2800	4300	0.0581
1 5/8	41.275 1.6250	50.800 2.0000	12.70 0.500	—	B-268	—	22.8 5120	39.2 8820	2600	3900	0.0441
	41.275 1.6250	50.800 2.0000	15.88 0.625	3.05 0.12	B-2610	M-26101	30.6 6890	57.4 12900	2600	3900	0.0485
	41.275 1.6250	50.800 2.0000	25.40 1.000	—	B-2616	—	51.6 11600	112 25200	2600	3900	0.0573
	41.275 1.6250	50.800 2.0000	31.75 1.250	3.05 0.12	B-2620	M-26201	64.0 14400	149 33400	2600	3900	0.0614
1 3/4	44.450 1.7500	53.975 2.1250	19.05 0.750	3.05 0.12	B-2812	M-28121	39.3 8830	81.4 18300	2400	3700	0.0547
	44.450 1.7500	53.975 2.1250	25.40 1.000	3.05 0.12	B-2816	M-28161	53.4 12000	121 27100	2400	3700	0.0603
	44.450 1.7500	53.975 2.1250	31.75 1.250	—	B-2820	—	66.3 14900	160 36000	2400	3700	0.0647
	44.450 1.7500	53.975 2.1250	38.10 1.500	3.05 0.12	B-2824	M-26241	78.7 17700	199 44800	2400	3700	0.0683
1 7/8	47.625 1.8750	57.150 2.2500	12.70 0.500	3.05 0.12	B-308	M-3081	25.1 5650	46.3 10400	2300	3500	0.0489
	47.625 1.8750	57.150 2.2500	15.888 0.625	—	B-3010	—	33.6 7550	67.61 15200	2300	3500	N/A
	47.625 1.8750	57.150 2.2500	19.05 0.750	—	B-3012	—	41.5 9330	88.5 19900	2300	3500	0.0574
	47.625 1.8750	57.150 2.2500	25.40 1.000	3.05 0.12	B-3016	M-30161	56.0 12600	130 29200	2300	3500	0.0632
2	50.800 2.0000	60.325 2.3750	12.70 0.500	3.05 0.12	B-328	M-3281	25.4 5710	48.0 10800	2100	3300	0.0509
	50.800 2.0000	60.325 2.3750	15.88 0.625	—	B-3210	—	34.2 7680	70.7 15900	2200	3300	N/A
	50.800 2.0000	60.325 2.3750	22.23 0.875	—	B-3214	—	54.3 11300	115 26000	2200	3300	N/A
	50.800 2.0000	60.325 2.3750	25.40 1.000	3.05 0.12	B-3216	M-32161	57.4 12900	138 31000	2100	3300	0.0661
	50.800 2.0000	60.325 2.3750	31.75 1.250	3.05 0.12	B-3220	M-32201	71.6 16100	183 41100	2100	3300	0.0708
	50.800 2.0000	60.325 2.3750	38.10 1.500	3.05 0.12	B-3224	M-32241	85.0 19100	228 51200	2100	3300	0.0748
	50.800 2.0000	60.325 2.3750	44.45 1.750	3.05 0.12	B-3228	M-32281	97.4 21900	273 61300	2100	3300	0.0782
2 1/16	52.388 2.0625	64.292 2.5312	19.05 0.750	—	BH-3312	—	46.3 10400	86.7 19500	2600	4100	0.0574

Drawn cup bearings of nominal inch dimensions, with one closed end, that are not tabulated, may be made available upon request.

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design.

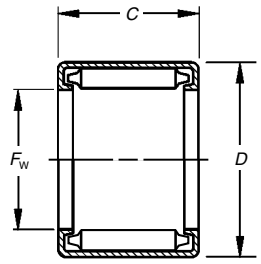
Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring*	Shaft Dia.
		S		H						in.
0.060 0.132	**0.068** 0.150	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017		
0.072 0.158	**0.081** 0.179	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017		
0.083 0.184	**0.095** 0.209	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017		
0.096 0.211	**0.108** 0.239	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017	**IR-1916**	
0.119 0.263	**0.135** 0.298	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017	**IR-1920**	
0.051 0.113	— 	**41.275** 1.6250	**41.262** 1.6245	**50.787** 1.9995	**50.813** 2.0005	**50.787** 1.9995	**41.288** 1.6255	**41.318** 1.6267		**1 5/8**
0.064 0.141	**0.073** 0.16	**41.275** 1.6250	**41.262** 1.6245	**50.787** 1.9995	**50.813** 2.0005	**50.787** 1.9995	**41.288** 1.6255	**41.318** 1.6267		
0.103 0.226	— 	**41.275** 1.6250	**41.262** 1.6245	**50.787** 1.9995	**50.813** 2.0005	**50.787** 1.9995	**41.288** 1.6255	**41.318** 1.6267		
0.128 0.282	**0.145** 0.32	**41.275** 1.6250	**41.262** 1.6245	**50.787** 1.9995	**50.813** 2.0005	**50.787** 1.9995	**41.288** 1.6255	**41.318** 1.6267	**IR-2220**	
0.082 0.181	**0.093** 0.205	**44.450** 1.7500	**44.437** 1.7495	**53.962** 2.1245	**53.988** 2.1255	**53.962** 2.1245	**44.463** 1.7505	**44.496** 1.7518		**1 3/4**
0.110 0.242	**0.124** 0.274	**44.450** 1.7500	**44.437** 1.7495	**53.962** 2.1245	**53.988** 2.1255	**53.962** 2.1245	**44.463** 1.7505	**44.496** 1.7518	**IR-2316**	
0.137 0.302	— 	**44.450** 1.7500	**44.437** 1.7495	**53.962** 2.1245	**53.988** 2.1255	**53.962** 2.1245	**44.463** 1.7505	**44.496** 1.7518		
0.165 0.363	**0.186** 0.411	**44.450** 1.7500	**44.437** 1.7495	**53.962** 2.1245	**53.988** 2.1255	**53.962** 2.1245	**44.463** 1.7505	**44.496** 1.7518	**IR-2324**	
0.059 0.129	**0.066** 0.146	**47.625** 1.8750	**47.612** 1.8745	**57.137** 2.2495	**57.163** 2.2505	**57.137** 2.2495	**47.638** 1.8755	**47.671** 1.8768		**1 7/8**
0.073 0.161	— 	**47.625** 1.8750	**47.612** 1.8745	**57.137** 2.2495	**57.163** 2.2505	**57.137** 2.2495	**47.638** 1.8755	**47.671** 1.8768		
0.088 0.193	— 	**47.625** 1.8750	**47.612** 1.8745	**57.137** 2.2495	**57.163** 2.2505	**57.137** 2.2495	**47.638** 1.8755	**47.671** 1.8768		
0.117 0.258	**0.132** 0.292	**47.625** 1.8750	**47.612** 1.8745	**57.137** 2.2495	**57.163** 2.2505	**57.137** 2.2495	**47.638** 1.8755	**47.671** 1.8768		
0.062 0.136	**0.070** 0.154	**50.800** 2.0000	**50.785** 1.9994	**60.312** 2.3745	**60.338** 2.3755	**60.312** 2.3745	**50.815** 2.0006	**50.848** 2.0019		**2**
0.078 0.171	— 	**50.800** 2.0000	**50.785** 1.9994	**60.312** 2.3745	**60.335** 2.3755	**60.312** 2.3745	**50.815** 2.0006	**50.848** 2.0019		
0.108 0.239	— 	**50.800** 2.0000	**50.785** 1.9994	**60.312** 2.3745	**60.338** 2.3755	**60.312** 2.3745	**50.815** 2.0006	**50.848** 2.0019		
0.124 0.273	**0.140** 0.309	**50.800** 2.0000	**50.785** 1.9994	**60.312** 2.3745	**60.338** 2.3755	**60.312** 2.3745	**50.815** 2.0006	**50.848** 2.0019		
0.155 0.341	**0.175** 0.386	**50.800** 2.0000	**50.785** 1.9994	**60.312** 2.3745	**60.338** 2.3755	**60.312** 2.3745	**50.815** 2.0006	**50.848** 2.0019		
0.186 0.410	**0.211** 0.465	**50.800** 2.0000	**50.785** 1.9994	**60.312** 2.3745	**60.338** 2.3755	**60.312** 2.3745	**50.815** 2.0006	**50.848** 2.0019		
0.217 0.478	**0.245** 0.541	**50.800** 2.0000	**50.785** 1.9994	**60.312** 2.3745	**60.338** 2.3755	**60.312** 2.3745	**50.815** 2.0006	**50.848** 2.0019		
0.122 0.269	— 	**52.388** 2.0625	**52.372** 2.0619	**64.280** 2.5307	**64.305** 2.5317	**64.280** 2.5307	**50.815** 2.0006	**50.848** 2.0019	**IR-2916**	**2 1/16**

* Further reduces shaft diameter.

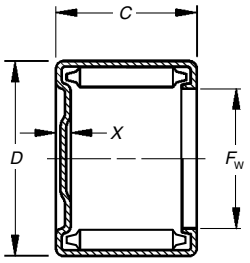
Continued on next page.

FULL COMPLEMENT BEARINGS, OPEN ENDS, CLOSED ONE END – *continued*

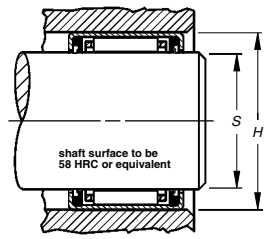
INCH SERIES



B,BH



M-1, MH-1



Full Complement Bearing

Shaft Dia.	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
	52.388 2.0625	64.292 2.5312	25.40 1.000	3.56 0.14	BH-3316	MH-33161	64.0 14400	133 29900	2600	4100	0.0639
	52.388 2.0625	64.292 2.5312	38.10 1.500	3.56 0.14	BH-3324	MH-33241	97.0 21800	226 50700	2600	4100	0.0728
2 1/8	53.975 2.1250	63.500 2.5000	12.70 0.500	—	B-348	—	26.1 5870	51.2 11500	2000	3100	0.0531
	53.975 2.1250	63.500 2.5000	19.05 0.750	—	B-3412	—	43.6 9790	99.2 22300	2100	3100	N/A
	53.975 2.1250	63.500 2.5000	25.40 1.000	3.05 0.12	B-3416	M-34161	59.2 13300	147 33000	2000	3100	0.069
	53.975 2.1250	63.500 2.5000	31.75 1.250	—	B-3420	—	73.4 16500	194 43700	2000	3100	0.074
	53.975 2.1250	63.500 2.5000	38.10 1.500	3.05 0.12	B-3424	M-34241	87.2 19600	242 54400	2000	3100	0.0781
2 1/4	57.150 2.2500	66.675 2.6250	19.05 0.750	3.30 0.13	B-3612	M-36121	45.8 10300	105 23700	2000	3000	0.0648
	57.150 2.2500	66.675 2.6250	31.75 1.250	—	B-3620	—	77.4 17400	206 46400	2000	3000	0.0766
	57.150 2.2500	66.675 2.6250	38.10 1.500	3.30 0.13	B-3624	M-36241	92.1 20700	257 57700	2000	3000	0.0809
2 5/8	66.675 2.6250	76.200 3.0000	25.40 1.000	3.30 0.13	B-4216	M-42161	66.7 15000	182 40900	1700	2500	0.0799
2 3/4	69.850 2.7500	79.375 3.1250	15.88 0.625	—	B-4410	—	41.0 9210	98 22000	1600	2500	0.0698
	69.850 2.7500	79.375 3.1250	25.40 1.000	—	B-4416	—	69.0 15500	190 42800	1600	2500	0.0824
	69.850 2.7500	79.375 3.1250	31.75 1.250	3.30 0.13	B-4420	M-44201	85.4 19200	252 56700	1600	2500	0.0883
3 1/2	88.900 3.5000	101.600 4.0000	19.05 0.750	—	B-5612	—	64.9 14600	150 33700	1800	2700	N/A
5 1/2	139.700 5.5000	152.400 6.0000	19.05 0.750	—	B-8812	—	77.00 17300	231 52000	1000	1600	0.114

Drawn cup bearings of nominal inch dimensions, with one closed end, that are not tabulated, may be made available upon request.

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design.

Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring*	Shaft Dia.
		S		H						in.
0.162 0.358	**0.184** 0.406	**52.388** 2.0625	**52.372** 2.0619	**64.280** 2.5307	**64.305** 2.5317	**64.280** 2.5307	**50.815** 2.0006	**50.848** 2.0019	**IR-2916**	
0.244 0.537	**0.276** 0.609	**52.388** 2.0625	**52.372** 2.0619	**64.280** 2.5307	**64.305** 2.5317	**64.280** 2.5307	**50.815** 2.0006	**50.848** 2.0019	**IR-2724**	
0.065 0.144	——	**53.975** 2.1250	**53.960** 2.1244	**63.487** 2.4995	**63.513** 2.5005	**63.487** 2.4995	**53.990** 2.1256	**54.028** 2.1271		**2 1/8**
0.098 0.216	——	**53.975** 2.1250	**53.960** 2.1244	**63.487** 2.4995	**63.513** 2.5005	**63.487** 2.4995	**53.990** 2.1256	**54.028** 2.1271		
0.131 0.289	**0.148** 0.327	**53.975** 2.1250	**53.960** 2.1244	**63.487** 2.4995	**63.513** 2.5005	**63.487** 2.4995	**53.990** 2.1256	**54.028** 2.1271		
0.164 0.361	——	**53.975** 2.1250	**53.960** 2.1244	**63.487** 2.4995	**63.513** 2.5005	**63.487** 2.4995	**53.990** 2.1256	**54.028** 2.1271		
0.196 0.433	**0.223** 0.491	**53.975** 2.1250	**53.960** 2.1244	**63.487** 2.4995	**63.513** 2.5005	**63.487** 2.4995	**53.990** 2.1256	**54.028** 2.1271	**IR-3024**	
0.103 0.228	**0.117** 0.258	**57.150** 2.2500	**57.135** 2.2494	**66.662** 2.6245	**66.688** 2.6255	**66.662** 2.6245	**57.165** 2.2506	**57.203** 2.2521		**2 1/4**
0.172 0.380	——	**57.150** 2.2500	**57.135** 2.2494	**66.662** 2.6245	**66.688** 2.6255	**66.662** 2.6245	**57.165** 2.2506	**57.203** 2.2521		
0.207 0.456	**0.235** 0.517	**57.150** 2.2500	**57.135** 2.2494	**66.662** 2.6245	**66.688** 2.6255	**66.662** 2.6245	**57.165** 2.2506	**57.203** 2.2521		
0.159 0.351	**0.181** 0.398	**66.675** 2.6250	**66.660** 2.6244	**76.187** 2.9995	**76.213** 3.0005	**76.187** 2.9995	**66.700** 2.6260	**66.739** 2.6275		**2 5/8**
0.104 0.229	——	**69.850** 2.7500	**69.835** 2.7494	**79.362** 3.1245	**79.388** 3.1255	**79.362** 3.1245	**69.875** 2.7510	**69.914** 2.7525		**2 3/4**
0.166 0.366	——	**69.850** 2.7500	**69.835** 2.7494	**79.362** 3.1245	**79.388** 3.1255	**79.362** 3.1245	**69.875** 2.7510	**69.914** 2.7525	**IR-4016**	
0.208 0.458	**0.235** 0.519	**69.850** 2.7500	**69.835** 2.7494	**79.362** 3.1245	**79.388** 3.1255	**79.362** 3.1245	**69.875** 2.7510	**69.914** 2.7525		
0.212 0.468	——	**88.900** 3.5000	**88.885** 3.4994	**101.587** 3.9995	**101.613** 4.0005	**101.587** 3.9995	**88.925** 3.5010	**88.964** 3.5025		**3 1/2**
0.325 0.717	——	**139.700** 5.5000	**139.682** 5.4993	**152.375** 5.9990	**152.425** 6.0010	**152.375** 5.9990	**139.725** 5.5010	**139.776** 5.5030		**5 1/2**

* Further reduces shaft diameter.

EXTRA-PRECISION BEARINGS –

INCH SERIES

Open end full complement mechanically retained drawn cup needle roller bearings, manufactured to inch standards, are offered with extra-precision specifications. The manufacturing tolerance of these bearings is one-third that of the precision bearings. In production operations using closer tolerances on shaft and housing, they will assemble with consistently lower radial internal clearances than can be expected with the precision series bearings.

Extra-precision bearings are suitable for those applications requiring close control of radial play and eccentricity. They are also preferred when two bearings are mounted adjacent to each other since the greater accuracy in manufacture will provide better load distribution between the bearings.

Nominal dimensions, load ratings, limiting speeds and other general specifications for extra-precision bearings are the same as for the corresponding "B" or "BH" sizes of drawn cup needle bearings. Consequently, the data on pages C66 to C79 can be used in bearing size selection.

When ordering an extra-precision bearing, add the prefix letter "G" to the bearing designation. For example, after following the size selection procedure outlined in the engineering section, bearing B-1212 is selected, but extra-precision tolerances are required. These are designated by ordering a GB-1212 bearing.

To realize the advantages of the expected closer radial internal clearance of the extra-precision bearing, the user must have the capability of producing housing bore and shaft raceway diameters to the close tolerances indicated by the tabular data on the facing page.

The resulting total radial internal clearance within the installed GB-1212 extra-precision drawn cup needle roller bearing will lie in the range from 0.0002 in. to 0.0012 in.

Inspection dimensions for the extra-precision bearings are given in the table at the right. Note that these bearings must be inspected while mounted in the specified ring gage. Bearing bores are checked with "GO" and "NO GO" plug gages. The "GO" gage size is the minimum diameter inside the needle rollers. The "NO GO" gage size is 0.0001 in. larger than the maximum diameter inside the needle rollers.

Procedures for selecting ring and plug gage dimensions are the same as for those involving precision needle bearings, except that the ring gage diameters and diameters inside the needle rollers must be drawn from the table on this page.

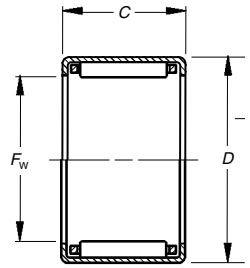
Nominal Inch Shaft Diameter	Gaging		
	Ring Gage	Diameter Inside Needle Rollers	
		Min.	Max.
1/8	0.2473	0.1256	0.1260
5/32	0.2785	0.1569	0.1573
3/16	0.3390	0.1881	0.1885
1/4	0.4328	0.2506	0.2510
5/16	0.4953	0.3131	0.3135
H 5/16	0.5578	0.3131	0.3135
3/8	0.5578	0.3756	0.3760
H 3/8	0.6203	0.3756	0.3760
7/16	0.6203	0.4381	0.4385
H 7/16	0.6828	0.4381	0.4385
1/2	0.6828	0.5006	0.5010
H 1/2	0.7453	0.5006	0.5010
9/16	0.7453	0.5631	0.5635
H 9/16	0.8078	0.5631	0.5635
5/8	0.8078	0.6256	0.6260
H 5/8	0.8703	0.6256	0.6260
11/16	0.8703	0.6881	0.6885
H 11/16	0.9328	0.6881	0.6885
3/4	0.9950	0.7503	0.7507
H 3/4	1.0575	0.7503	0.7507
13/16	1.0575	0.8128	0.8132
H 13/16	1.1200	0.8128	0.8132
7/8	1.1200	0.8753	0.8757
H 7/8	1.1825	0.8753	0.8757
15/16	1.1825	0.9378	0.9382
1	1.2450	1.0003	1.0007
H 1	1.3075	1.0003	1.0007
1 1/16	1.3075	1.0628	1.0632
1 1/8	1.3700	1.1253	1.1257
H 1 1/8	1.4950	1.1253	1.1257
1 3/16	1.4950	1.1878	1.1882
1 1/4	1.4950	1.2503	1.2507
H 1 1/4	1.6200	1.2503	1.2507
1 5/16	1.6200	1.3128	1.3132
1 3/8	1.6200	1.3753	1.3757
H 1 3/8	1.7450	1.3753	1.3757
1 1/2	1.8700	1.5003	1.5008
1 5/8	1.9950	1.6253	1.6258
1 3/4	2.1200	1.7503	1.7508
1 7/8	2.2450	1.8753	1.8758
2	2.3700	2.0003	2.0008
H 2 1/16	2.5262	2.0628	2.0633
2 1/8	2.4950	2.1253	2.1258
2 1/4	2.6200	2.2503	2.2508
2 5/8	2.9950	2.6254	2.6260
2 3/4	3.1200	2.7504	2.7510
3 1/2	3.9950	3.5004	3.5010

Bearing Bore Designation	Mounting					
			Shaft Raceway Diameter		Housing Bore	
	Nominal Bore Inch	Nominal O.D. Inch	Max.	Min.	Min.	Max.
GB-2	.1250	.2500	0.1251	0.1248	0.2470	0.2473
GB-2 1/2	.1562	.2812	0.1564	0.1561	0.2782	0.2785
GB-3	.1875	.3438	0.1876	0.1873	0.3387	0.3390
GB-4	.2500	.4375	0.2501	0.2498	0.4325	0.4328
GB-5	.3125	.5000	0.3126	0.3123	0.4950	0.4953
GBH-5	.3125	.5625	0.3126	0.3123	0.5575	0.5578
GB-6	.3750	.5625	0.3751	0.3748	0.5575	0.5578
GBH-6	.3750	.6250	0.3751	0.3748	0.6200	0.6203
GB-7	.4375	.6250	0.4376	0.4373	0.6200	0.6203
GBH-7	.4375	.6875	0.4376	0.4373	0.6825	0.6828
GB-8	.5000	.6875	0.5001	0.4998	0.6825	0.6828
GBH-8	.5000	.7500	0.5001	0.4998	0.7450	0.7453
GB-9	.5625	.7500	0.5626	0.5623	0.7450	0.7453
GBH-9	.5625	.8125	0.5626	0.5623	0.8075	0.8078
GB-10	.6250	.8125	0.6251	0.6248	0.8075	0.8078
GBH-10	.6250	.8750	0.6251	0.6248	0.8700	0.8703
GB-11	.6875	.8750	0.6876	0.6873	0.8700	0.8703
GBH-11	.6875	.9375	0.6876	0.6873	0.9325	0.9328
GB-12	.7500	1.0000	0.7501	0.7498	0.9950	0.9953
GBH-12	.7500	1.0625	0.7501	0.7498	1.0575	1.0578
GB-13	.8125	1.0625	0.8126	0.8123	1.0575	1.0578
GBH-13	.8125	1.1250	0.8126	0.8123	1.1200	1.1203
GB-14	.8750	1.1250	0.8751	0.8748	1.1200	1.1203
GBH-14	.8750	1.1875	0.8751	0.8748	1.1825	1.1829
GB-15	.9375	1.1875	0.9376	0.9373	1.1825	1.1829
GB-16	1.0000	1.2500	1.0001	0.9998	1.2450	1.2454
GBH-16	1.0000	1.3125	1.0001	0.9998	1.3075	1.3079
GB-17	1.0625	1.3125	1.0626	1.0623	1.3075	1.3079
GB-18	1.1250	1.3750	1.1251	1.1248	1.3700	1.3704
GBH-18	1.1250	1.5000	1.1251	1.1248	1.4950	1.4955
GB-19	1.1875	1.5000	1.1876	1.1873	1.4950	1.4955
GB-20	1.2500	1.5000	1.2501	1.2498	1.4950	1.4955
GBH-20	1.2500	1.6250	1.2501	1.2498	1.6200	1.6205
GB-21	1.3125	1.6250	1.3126	1.3123	1.6200	1.6205
GB-22	1.3750	1.6250	1.3750	1.3747	1.6200	1.6205
GBH-22	1.3750	1.7500	1.3750	1.3747	1.7450	1.7455
GB-24	1.5000	1.8750	1.5000	1.4997	1.8700	1.8705
GB-26	1.6250	2.0000	1.6250	1.6247	1.9950	1.9955
GB-28	1.7500	2.1250	1.7500	1.7497	2.1200	2.1205
GB-30	1.8750	2.2500	1.8750	1.8747	2.2450	2.2455
GB-32	2.0000	2.3750	2.0000	1.9997	2.3700	2.3705
GBH-33	2.0625	2.5312	2.0624	2.0621	2.5262	2.5267
GB-34	2.1250	2.5000	2.1249	2.1246	2.4950	2.4955
GB-36	2.2500	2.6250	2.2499	2.2496	2.6200	2.6205
GB-42	2.6250	3.0000	2.6248	2.6245	2.9950	2.9956
GB-44	2.7500	3.1250	2.7498	2.7495	3.1200	3.1206
GB-56	3.5000	4.0000	3.4998	3.4995	3.9950	3.9956

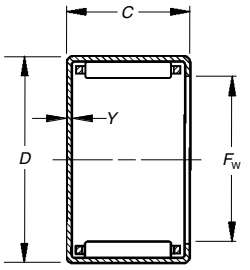
* Check for availability as not every size may be in production.

CAGED BEARINGS – OPEN ENDS, CLOSED ONE END

INCH SERIES



J,JH



MJ-1, MJH-1

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design. See page C62 for mounting procedure.

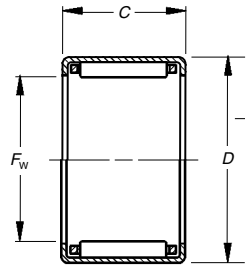
Shaft Diameter	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf.		Limiting Speed		
							Dynamic	Static	Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
1/8	3.175 0.1250	6.350 0.2500	4.780 0.188	— —	JP-23-F	—	0.89 200	0.62 140	33000	51000	0.0064
5/32	3.970 0.1563	7.142 0.2812	4.780 0.188	— —	JP-2-1/2-3F	—	0.93 210	0.62 140	31000	47000	0.007
3/16	4.763 0.1875	8.733 0.3438	9.530 0.375	1.02 0.04	J-36	MJ-361	2.27 510	1.91 430	25000	38000	0.0097
1/4	6.350 0.2500	11.113 0.4375	7.920 0.312	1.02 0.04	J-45	MJ-451	2.22 500	1.73 390	20000	30000	0.0103
	6.350 0.2500	11.113 0.4375	11.130 0.438	1.02 0.04	J-47	MJ-471	3.38 760	3.02 680	20000	30000	0.0119
5/16	7.938 0.3125	12.700 0.5000	7.920 0.312	— —	J-55	—	2.40 540	2.00 450	18000	28000	0.0117
	7.938 0.3125	12.700 0.5000	11.130 0.438	1.02 0.04	J-57	MJ-571	4.05 910	3.91 880	18000	28000	0.013
	7.938 0.3125	14.288 0.5625	11.130 0.438	1.02 0.04	JH-57	MJH-571	4.63 1040	3.78 850	14000	22000	0.0132
3/8	9.525 0.3750	14.288 0.5625	7.920 0.312	1.02 0.04	J-65	MJ-651	2.76 620	2.49 560	18000	27000	0.0133
	9.525 0.3750	14.288 0.5625	9.530 0.375	1.02 0.04	J-66	MJ-661	3.51 790	3.47 780	18000	27000	0.0144
	9.525 0.3750	14.288 0.5625	12.700 0.500	1.02 0.04	J-68	MJ-681	5.20 1170	5.74 1290	18000	27000	0.0163
	9.525 0.3750	15.875 0.6250	12.700 0.500	— —	JH-68	—	6.58 1480	6.09 1370	13000	20000	0.0159
7/16	11.113 0.4375	15.875 0.6250	12.700 0.500	1.02 0.04	J-78	MJ-781	6.36 1430	7.70 1730	17000	26000	0.0187
	11.113 0.4375	17.463 0.6875	12.700 0.500	— —	JH-78	—	7.12 1600	6.89 1550	13000	19000	0.0174
1/2	12.700 0.5000	17.463 0.6875	7.920 0.312	1.02 0.04	J-85	MJ-851	3.47 780	3.65 820	16000	25000	0.0164
	12.700 0.5000	17.463 0.6875	9.530 0.375	1.02 0.04	J-86	MJ-861	4.67 1050	5.38 1210	16000	25000	0.0181
	12.700 0.5000	17.463 0.6875	12.700 0.500	1.02 0.04	J-88	MJ-881	6.32 1420	7.92 1780	16000	25000	0.0199
	12.700 0.5000	17.463 0.6875	19.050 0.750	— —	J-812	—	10.23 2300	14.72 3310	16000	25000	0.0232
	12.700 0.5000	19.050 0.7500	11.130 0.438	1.02 0.04	JH-87	MJH-871	6.41 1440	6.18 1390	12000	19000	0.0179
	12.700 0.5000	19.050 0.7500	12.700 0.500	1.02 0.04	JH-88	MJH-881	7.56 1700	7.70 1730	12000	19000	0.0189
	12.700 0.5000	19.050 0.7500	19.050 0.750	— —	JH-812	—	12.32 2770	14.41 3240	12000	19000	0.0221
9/16	14.288 0.5625	19.050 0.750	11.130 0.438	1.02 0.04	J-97	MJ-971	5.47 1230	6.81 1530	16000	25000	
	14.288 0.5625	19.050 0.7500	12.700 0.500	1.02 0.04	J-98	MJ-981	6.23 1400	8.01 1800	16000	25000	0.021

Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring	Shaft Diameter
		S		H						in.
0.0005 0.001	—	**3.175** 0.1250	**3.167** 0.1247	**6.350** 0.2500	**6.363** 0.2505	**6.363** 0.2505	**3.195** 0.1258	**3.221** 0.1268		1/8
0.0005 0.001	—	**3.970** 0.1563	**3.962** 0.1560	**7.142** 0.2812	**7.155** 0.2817	**7.155** 0.2817	**3.990** 0.1571	**4.016** 0.1581		5/32
0.0018 0.004	**0.0023** 0.005	**4.763** 0.1875	**4.755** 0.1872	**8.717** 0.3432	**8.730** 0.3437	**8.730** 0.3437	**4.783** 0.1883	**4.808** 0.1893		3/16
0.0027 0.006	**0.0032** 0.007	**6.350** 0.2500	**6.337** 0.2495	**11.100** 0.4370	**11.125** 0.4380	**11.125** 0.4380	**6.388** 0.2515	**6.414** 0.2525		1/4
0.0036 0.008	**0.0041** 0.009	**6.350** 0.2500	**6.337** 0.2495	**11.100** 0.4370	**11.125** 0.4380	**11.125** 0.4380	**6.388** 0.2515	**6.414** 0.2525		
0.0032 0.007	—	**7.938** 0.3125	**7.925** 0.3120	**12.687** 0.4995	**12.713** 0.5005	**12.713** 0.5005	**7.976** 0.3140	**8.001** 0.3150		5/16
0.0041 0.009	**0.0050** 0.011	**7.938** 0.3125	**7.925** 0.3120	**12.687** 0.4995	**12.713** 0.5005	**12.713** 0.5005	**7.976** 0.3140	**8.001** 0.3150		
0.0059 0.013	**0.0073** 0.016	**7.938** 0.3125	**7.925** 0.3120	**14.275** 0.5620	**14.300** 0.5630	**14.300** 0.5630	**7.976** 0.3140	**8.001** 0.3150		
0.0036 0.008	**0.0041** 0.009	**9.525** 0.3750	**9.512** 0.3745	**14.275** 0.5620	**14.300** 0.5630	**14.300** 0.5630	**9.563** 0.3765	**9.589** 0.3775		3/8
0.0041 0.009	**0.0045** 0.01	**9.525** 0.3750	**9.512** 0.3745	**14.275** 0.5620	**14.300** 0.5630	**14.300** 0.5630	**9.563** 0.3765	**9.589** 0.3775		
0.0054 0.012	**0.0059** 0.013	**9.525** 0.3750	**9.512** 0.3745	**14.275** 0.5620	**14.300** 0.5630	**14.300** 0.5630	**9.563** 0.3765	**9.589** 0.3775	**IRA-3**	
0.0077 0.017	—	**9.525** 0.3750	**9.512** 0.3745	**15.862** 0.6245	**15.888** 0.6255	**15.888** 0.6255	**9.563** 0.3765	**9.589** 0.3775	**IRA-3**	
0.0064 0.014	**0.0073** 0.016	**11.113** 0.4375	**11.100** 0.4370	**15.862** 0.6245	**15.888** 0.6255	**15.888** 0.6255	**11.151** 0.4390	**11.176** 0.4400		7/16
0.0086 0.019	—	**11.113** 0.4375	**11.100** 0.4370	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**11.151** 0.4390	**11.176** 0.4400		
0.0045 0.01	**0.0054** 0.012	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025		1/2
0.0050 0.011	**0.0059** 0.013	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025		
0.0068 0.015	**0.0082** 0.018	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025	**IRA-5**	
0.0104 0.023	—	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	**17.475** 0.6880	**12.738** 0.5015	**12.764** 0.5025		
0.0086 0.019	**0.0104** 0.023	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**12.738** 0.5015	**12.764** 0.5025		
0.0100 0.022	**0.0118** 0.026	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**12.738** 0.5015	**12.764** 0.5025		
0.0145 0.032	—	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**12.738** 0.5015	**12.764** 0.5025		
0.0073 0.016	**0.0086** 0.019	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**14.326** 0.5640	**14.351** 0.5650		9/16
0.0077 0.017	**0.0091** 0.02	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	**19.063** 0.7505	**14.326** 0.5640	**14.351** 0.5650	**IR-68**	

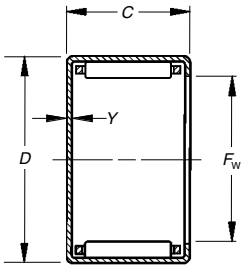
Continued on next page.

CAGED BEARINGS – OPEN ENDS, CLOSED ONE END – *continued*

INCH SERIES



J,JH



MJ-1, MJH-1

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design. See page C62 for mounting procedure.

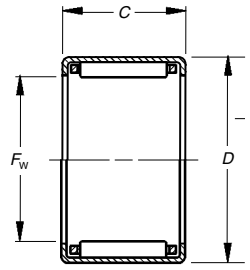
Shaft Diameter	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf.		Limiting Speed		
							Dynamic	Static	Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
	14.288 0.5625	19.050 0.7500	15.880 0.625	— —	J-910	—	5.83 1310	7.21 1620	16000	25000	0.0205
	14.288 0.5625	20.638 0.8125	12.700 0.500	1.02 0.04	JH-98	MJH-981	8.01 1800	8.50 1910	12000	18000	N/A
5/8	15.875 0.6250	20.638 0.8125	12.700 0.500	1.02 0.04	J-108	MJ-1081	6.72 1510	9.12 2050	13000	21000	0.0227
	15.875 0.6250	20.638 0.8125	15.880 0.625	1.02 0.04	J-1010	MJ-10101	8.81 1980	12.94 2910	13000	21000	0.0247
	15.875 0.6250	20.638 0.8125	19.050 0.750	1.02 0.04	J-1012	MJ-10121	11.74 2640	18.86 4240	13000	21000	0.0272
	15.875 0.6250	22.212 0.8745	15.880 0.625	1.02 0.04	JH-1010	MJH-10101	11.57 2600	14.10 3170	14000	21000	0.024
	15.875 0.6250	22.212 0.8745	25.400 1.000	1.02 0.04	JH-1016	MJH-10161	19.79 4450	28.11 6320	14000	21000	0.0285
11/16	17.463 0.6875	22.212 0.8745	19.050 0.750	1.02 0.04	J-1112	MJ-11121	11.43 2570	18.73 4210	12000	19000	0.029
	17.463 0.6875	23.813 0.9375	15.880 0.625	1.02 0.04	JH-1110	MJH-11101	12.05 2710	15.21 3420	13000	19000	0.0255
	17.463 0.6875	23.813 0.9375	19.050 0.750	— —	JH-1112	—	16.15 3630	22.20 4990	13000	19000	0.028
3/4	19.050 0.7500	25.400 1.0000	9.530 0.375	— —	J-126	—	6.49 1460	7.03 1580	11000	18000	0.0218
	19.050 0.7500	25.400 1.0000	12.700 0.500	— —	J-128	—	9.92 2230	12.19 2740	11000	18000	0.025
	19.050 0.7500	25.400 1.0000	15.880 0.625	1.02 0.04	J-1210	MJ-12101	12.50 2810	16.32 3670	11000	18000	0.0269
	19.050 0.7500	25.400 1.0000	19.050 0.750	1.02 0.04	J-1212	MJ-12121	15.52 3490	21.62 4860	11000	18000	0.0288
	19.050 0.7500	26.988 1.0625	19.050 0.750	1.02 0.04	JH-1212	MJH-12121	19.08 4290	23.58 5300	12000	18000	0.0285
13/16	20.638 0.8125	26.988 1.0625	22.230 0.875	— —	J-1314	—	19.31 4340	29.31 6590	10000	16000	0.0321
	20.638 0.8125	28.575 1.1250	19.050 0.750	1.27 0.05	JH-1312	MJH-13121	18.77 4220	24.55 5520	11000	16000	0.0299
7/8	22.225 0.8750	28.575 1.1250	9.530 0.375	— —	J-146	—	7.21 1620	8.41 1890	9700	15000	0.0243
	22.225 0.8750	28.575 1.1250	12.700 0.500	— —	J-148	—	10.94 2460	14.50 3260	9700	15000	0.027
	22.225 0.8750	28.575 1.1250	19.050 0.750	1.02 0.04	J-1412	MJ-14121	17.88 4020	27.18 6110	9700	15000	0.0325
	22.225 0.8750	28.575 1.1250	25.400 1.000	1.02 0.04	J-1416	MJ-14161	23.66 5320	38.97 8760	9700	15000	0.0356
	22.225 0.8750	30.163 1.1875	19.050 0.750	1.27 0.05	JH-1412	MJH-14121	18.33 4120	24.55 5520	9800	15000	0.0309
	22.225 0.8750	30.163 1.1875	25.400 1.000	1.27 0.05	JH-1416	MJH-14161	25.40 5710	37.37 8400	9800	15000	0.0343

Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring	Shaft Diameter
		S		H						in.
0.0095 0.021	——	14.288 0.5625	14.275 0.5620	19.037 0.7495	19.063 0.7505	19.063 0.7505	14.326 0.5640	14.351 0.5650	IR-612	
0.0113 0.025	0.0136 0.03	14.288 0.5625	14.275 0.5620	20.625 0.8120	20.650 0.8130	20.650 0.8130	14.326 0.5640	14.351 0.5650	IR-68	
0.0086 0.019	0.0104 0.023	15.875 0.6250	15.862 0.6245	20.625 0.8120	20.650 0.8130	20.650 0.8130	15.913 0.6265	15.939 0.6275	IR-68-1	5/8
0.0104 0.023	0.0127 0.028	15.875 0.6250	15.862 0.6245	20.625 0.8120	20.650 0.8130	20.650 0.8130	15.913 0.6265	15.939 0.6275		
0.0127 0.028	0.0150 0.033	15.875 0.6250	15.862 0.6245	20.625 0.8120	20.650 0.8130	20.650 0.8130	15.913 0.6265	15.939 0.6275	IR-612-1	
0.0145 0.032	0.0168 0.037	15.875 0.6250	15.862 0.6245	22.212 0.8745	22.238 0.8755	22.238 0.8755	15.913 0.6265	15.939 0.6275		
0.0236 0.052	0.0281 0.062	15.875 0.6250	15.862 0.6245	22.212 0.8745	22.238 0.8755	22.238 0.8755	15.913 0.6265	15.939 0.6275		
0.0136 0.03	0.0163 0.036	17.463 0.6875	17.450 0.6870	22.212 0.8745	22.238 0.8755	22.238 0.8755	17.501 0.6890	17.526 0.6900		11/16
0.0159 0.035	0.0191 0.042	17.463 0.6875	17.450 0.6870	23.800 0.9370	23.825 0.9380	23.825 0.9380	17.501 0.6890	17.526 0.6900		
0.0191 0.042	——	17.463 0.6875	17.450 0.6870	23.800 0.9370	23.825 0.9380	23.825 0.9380	17.501 0.6890	17.526 0.6900		
0.0100 0.022	——	19.050 0.7500	19.037 0.7495	25.387 0.9995	25.413 1.0005	25.387 0.9995	19.063 0.7505	19.088 0.7515		3/4
0.0136 0.03	——	19.050 0.7500	19.037 0.7495	25.387 0.9995	25.413 1.0005	25.387 0.9995	19.063 0.7505	19.088 0.7515	IR-88	
0.0172 0.038	0.0204 0.045	19.050 0.7500	19.037 0.7495	25.387 0.9995	25.413 1.0005	25.387 0.9995	19.063 0.7505	19.088 0.7515		
0.0204 0.045	0.0245 0.054	19.050 0.7500	19.037 0.7495	25.387 0.9995	25.413 1.0005	25.387 0.9995	19.063 0.7505	19.088 0.7515	IR-812	
0.0263 0.058	0.0313 0.069	19.050 0.7500	19.037 0.7495	26.975 1.0620	27.000 1.0630	26.975 1.0620	19.063 0.7505	19.088 0.7515	IR-812	
0.0254 0.056	——	20.638 0.8125	20.625 0.8120	26.975 1.0620	27.000 1.0630	26.975 1.0620	20.650 0.8130	20.676 0.8140		13/16
0.0281 0.062	0.0336 0.074	20.638 0.8125	20.625 0.8120	28.562 1.1245	28.588 1.1255	28.562 1.1245	20.650 0.8130	20.676 0.8140		
0.0118 0.026	——	22.225 0.8750	22.212 0.8745	28.562 1.1245	28.588 1.1255	28.562 1.1245	22.238 0.8755	22.263 0.8765		7/8
0.0154 0.034	——	22.225 0.8750	22.212 0.8745	28.562 1.1245	28.588 1.1255	28.562 1.1245	22.238 0.8755	22.263 0.8765		
0.0236 0.052	0.0281 0.062	22.225 0.8750	22.212 0.8745	28.562 1.1245	28.588 1.1255	28.562 1.1245	22.238 0.8755	22.263 0.8765	IR-1012	
0.0313 0.069	0.0585 0.129	22.225 0.8750	22.212 0.8745	28.562 1.1245	28.588 1.1255	28.562 1.1245	22.238 0.8755	22.263 0.8765	IR-1016	
0.0299 0.066	0.0358 0.079	22.225 0.8750	22.212 0.8745	30.150 1.1870	30.175 1.1880	30.150 1.1870	22.238 0.8755	22.263 0.8765	IR-1012	
0.0404 0.089	0.0481 0.106	22.225 0.8750	22.212 0.8745	30.150 1.1870	30.175 1.1880	30.150 1.1870	22.238 0.8755	22.263 0.8765	IR-1016	

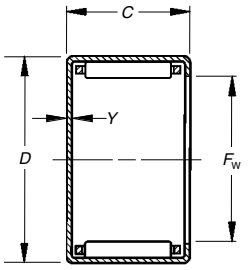
Continued on next page.

CAGED BEARINGS – OPEN ENDS, CLOSED ONE END – *continued*

INCH SERIES



J,JH



MJ-1, MJH-1

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design. See page C62 for mounting procedure.

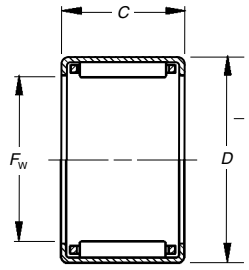
Shaft Diameter	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf.		Limiting Speed		
							Dynamic	Static	Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
1	25.400 1.0000	31.750 1.2500	19.050 0.750	— —	J-1612	—	18.15 4080	28.82 6480	8400	13000	0.035
	25.400 1.0000	31.750 1.2500	25.400 1.000	1.02 0.04	J-1616	MJ-16161	24.95 5610	43.41 9760	8400	13000	0.0387
	25.400 1.0000	33.338 1.3125	19.050 0.750	1.27 0.05	JH-1612	MJH-16121	20.68 4650	29.58 6650	8500	13000	0.0342
	25.400 1.0000	33.338 1.3125	25.400 1.000	1.27 0.05	JH-1616	MJH-16161	27.58 6200	42.88 9640	8500	13000	0.0375
1 1/8	28.575 1.1250	34.925 1.3750	12.700 0.500	1.02 0.04	J-188	MJ-1881	11.65 2620	16.95 3810	7400	11000	0.0323
	28.575 1.1250	34.925 1.3750	19.050 0.750	1.02 0.04	J-1812	MJ-18121	19.04 4280	31.76 7140	7400	11000	0.0377
	28.575 1.1250	34.925 1.3750	25.400 1.000	1.02 0.04	J-1816	MJ-18161	26.16 5880	48.04 10800	7400	11000	0.0418
	28.575 1.1250	38.100 1.5000	19.050 0.750	1.27 0.05	JH-1812	MJH-18121	23.35 5250	31.32 7040	7600	12000	0.0356
	28.575 1.1250	38.100 1.5000	25.400 1.000	1.27 0.05	JH-1816	MJH-18161	33.14 7450	49.38 11100	7600	12000	0.0398
	28.575 1.1250	38.100 1.5000	28.580 1.125	1.27 0.05	JH-1818	MJH-18181	36.30 8160	55.16 12400	7600	12000	0.041
1 1/4	31.750 1.2500	38.100 1.5000	19.050 0.750	1.02 0.04	J-2012	MJ-20121	19.84 4460	34.70 7800	6600	10000	0.0404
	31.750 1.2500	38.100 1.5000	25.400 1.000	1.02 0.04	J-2016	MJ-20161	28.82 6480	56.49 12700	6600	10000	0.0455
	31.750 1.2500	41.275 1.6250	19.050 0.750	— —	JH-2012	—	24.11 5420	33.94 7630	6800	10000	0.038
	31.750 1.2500	41.275 1.6250	25.400 1.000	— —	JH-2016	—	33.94 7630	52.93 11900	6800	10000	0.0424
	31.750 1.2500	41.275 1.6250	31.750 1.250	— —	JH-2020	—	43.37 9750	72.51 16300	6800	10000	0.0459
1 3/8	34.925 1.3750	41.275 1.6250	12.700 0.500	1.02 0.04	J-228	MJ-2281	13.97 3140	22.91 5150	6000	9200	0.038
	34.925 1.3750	41.275 1.6250	19.050 0.750	— —	J-2212	—	22.82 5130	42.97 9660	6000	9200	0.0444
	34.925 1.3750	44.450 1.7500	19.050 0.750	1.27 0.05	JH-2212	MJH-22121	26.24 5900	38.43 8640	6100	9400	0.0407
	34.925 1.3750	44.450 1.7500	25.400 1.000	1.27 0.05	JH-2216	MJH-22161	36.52 8210	58.72 13200	6100	9400	0.0452
1 1/2	38.100 1.5000	47.625 1.8750	19.050 0.750	1.27 0.05	J-2412	MJ-24121	29.89 6720	47.15 10600	5600	8600	0.0445
	38.100 1.5000	47.625 1.8750	25.400 1.000	1.27 0.05	J-2416	MJ-24161	39.32 8840	66.72 15000	5600	8600	0.0486
	38.100 1.5000	47.625 1.8750	31.750 1.250	— —	J-2420	—	49.38 11100	89.85 20200	5600	8600	0.0523
1 5/8	41.275 1.6250	50.800 2.0000	15.880 0.625	— —	J-2610	—	26.11 5870	40.97 9210	5100	7900	0.0446

Wt. kg/lbs. Approx. Open Ends	Wt. kg/lbs. Approx. Closed Ends	Bearing Mounting mm/in. Max.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Min.	Bearing Mounting mm/in. Max.	Inspection mm/in. Ring Gage	Inspection mm/in. Plug-GO	Inspection mm/in. Plug-NO-Go	Matching Inner Ring	Shaft Diameter
		S		H						in.
0.0263 0.058	——	**25.400** 1.0000	**25.387** 0.9995	**31.737** 1.2495	**31.763** 1.2505	**31.737** 1.2495	**25.413** 1.0005	**25.438** 1.0015	**IR-1212**	**1**
0.0349 0.077	**0.0417** 0.092	**25.400** 1.0000	**25.387** 0.9995	**31.737** 1.2495	**31.763** 1.2505	**31.737** 1.2495	**25.413** 1.0005	**25.438** 1.0015	**IR-1216**	
0.0336 0.074	**0.0399** 0.088	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-1212**	
0.0449 0.099	**0.0540** 0.119	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**33.325** 1.3120	**25.413** 1.0005	**25.438** 1.0015	**IR-1216**	
0.0195 0.043	**0.0227** 0.05	**28.575** 1.1250	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**34.912** 1.3745	**28.588** 1.1255	**28.613** 1.1265		**1 1/8**
0.0290 0.064	**0.0345** 0.076	**28.575** 1.1250	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**34.912** 1.3745	**28.588** 1.1255	**28.613** 1.1265		
0.0390 0.086	**0.0467** 0.103	**28.575** 1.1250	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**34.912** 1.3745	**28.588** 1.1255	**28.613** 1.1265	**IR-1416**	
0.0458 0.101	**0.0549** 0.121	**28.575** 1.1250	**28.562** 1.1245	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**28.588** 1.1255	**28.613** 1.1265		
0.0612 0.135	**0.0735** 0.162	**28.575** 1.1250	**28.562** 1.1245	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**28.588** 1.1255	**28.613** 1.1265	**IR-1416**	
0.0689 0.152	**0.0821** 0.181	**28.575** 1.1250	**28.562** 1.1245	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**28.588** 1.1255	**28.613** 1.1265		
0.0363 0.08	**0.0431** 0.095	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**31.763** 1.2505	**31.788** 1.2515	**IR-1612**	**1 1/4**
0.0426 0.094	**0.0513** 0.113	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	**38.087** 1.4995	**31.763** 1.2505	**31.788** 1.2515	**IR-1616**	
0.0503 0.111	——	**31.750** 1.2500	**31.737** 1.2495	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**31.763** 1.2505	**31.788** 1.2515	**IR-1612**	
0.0671 0.148	——	**31.750** 1.2500	**31.737** 1.2495	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**31.763** 1.2505	**31.788** 1.2515	**IR-1616**	
0.0839 0.185	——	**31.750** 1.2500	**31.737** 1.2495	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**31.763** 1.2505	**31.788** 1.2515		
0.0236 0.052	**0.0281** 0.062	**34.925** 1.3750	**34.912** 1.3745	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**34.938** 1.3755	**34.966** 1.3766		**1 3/8**
0.0349 0.077	——	**34.925** 1.3750	**34.912** 1.3745	**41.262** 1.6245	**41.288** 1.6255	**41.262** 1.6245	**34.938** 1.3755	**34.966** 1.3766	**IR-1812**	
0.0549 0.121	**0.0653** 0.144	**34.925** 1.3750	**34.912** 1.3745	**44.437** 1.7495	**44.463** 1.7505	**44.437** 1.7495	**34.938** 1.3755	**34.966** 1.3766	**IR-1812**	
0.0730 0.161	**0.0871** 0.192	**34.925** 1.3750	**34.912** 1.3745	**44.437** 1.7495	**44.463** 1.7505	**44.437** 1.7495	**34.938** 1.3755	**34.966** 1.3766	**IR-1816**	
0.0594 0.131	**0.0943** 0.208	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017		**1 1/2**
0.0789 0.174	**0.0943** 0.208	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017	**IR-1916**	
0.0989 0.218	——	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**47.612** 1.8745	**38.113** 1.5005	**38.143** 1.5017	**IR-1920**	
0.0531 0.117	——	**41.275** 1.6250	**41.262** 1.6245	**50.787** 1.9995	**50.813** 2.0005	**50.787** 1.9995	**41.288** 1.6255	**41.318** 1.6267		**1 5/8**

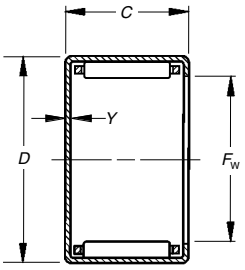
Continued on next page.

CAGED BEARINGS – OPEN ENDS, CLOSED ONE END – *continued*

INCH SERIES



J,JH



MJ-1, MJH-1

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design. See page C62 for mounting procedure.

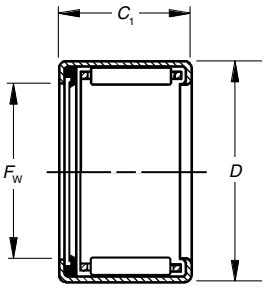
Shaft Diameter	Dimensions mm/in. +0 +0.000 -0.3 -0.100				Bearing Designation		Load Ratings kN/lbf.		Limiting Speed		
							Dynamic	Static	Grease	Oil	
in.	F_w	D	C	Y			C	C_0	RPM		C_g
	41.275 1.6250	50.800 2.0000	25.400 1.000	1.27 0.05	J-2616	M-26161	39.28 8830	68.95 15500	5100	7900	0.0508
1 3/4	44.450 1.7500	53.975 2.1250	19.050 0.750	1.27 0.05	J-2812	MJ-28121	29.58 6650	49.38 11100	4700	7300	0.0483
	44.450 1.7500	53.975 2.1250	25.400 1.000	1.27 0.05	J-2816	MJ-28161	40.08 9010	72.95 16400	4700	7300	0.0532
	44.450 1.7500	53.975 2.1250	38.100 1.500	1.27 0.05	J-2824	MJ-28241	59.61 13400	121.88 27400	4700	7300	0.0605
1 7/8	47.625 1.8750	57.150 2.2500	25.400 1.000	1.27 0.05	J-3016	MJ-30161	41.10 9240	76.06 17100	4400	6800	0.0553
2	50.800 2.0000	60.325 2.3750	25.400 1.000	1.27 0.05	J-3216	MJ-32161	42.39 9530	81.40 18300	4100	6300	0.0579
2 1/4	57.150 2.2500	66.675 2.6250	19.050 0.750	—	J-3612	—	35.41 7960	65.83 14800	3600	5600	0.0577
	57.150 2.2500	66.675 2.6250	25.400 1.000	—	J-3616	—	46.26 10400	92.52 20800	3600	5600	0.0628
2 3/4	69.850 2.7500	79.375 3.1250	19.050 0.750	—	J-4412	—	36.25 8150	72.95 16400	2900	4500	0.0649

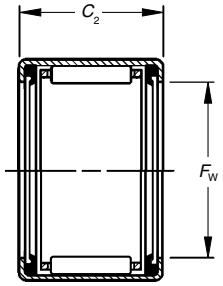
Wt. kg/lbs. Approx.		Bearing Mounting mm/in.				Inspection mm/in.			Matching Inner Ring	Shaft Diameter
Open Ends	Closed Ends	Max.	Min.	Min.	Max.	Ring Gage	Plug-GO	Plug-NO-Go		
		S		H						in.
0.0848 0.187	**0.1012** 0.223	**41.275** 1.6250	**41.262** 1.6245	**50.787** 1.9995	**50.813** 2.0005	**50.787** 1.9995	**41.288** 1.6255	**41.318** 1.6267		
0.0680 0.15	**0.0812** 0.179	**44.450** 1.7500	**44.437** 1.7495	**53.962** 2.1245	**53.988** 2.1255	**53.962** 2.1245	**44.463** 1.7505	**44.496** 1.7518		**1 3/4**
0.0907 0.2	**0.1084** 0.239	**44.450** 1.7500	**44.437** 1.7495	**53.962** 2.1245	**53.988** 2.1255	**53.962** 2.1245	**44.463** 1.7505	**44.496** 1.7518	**IR-2316**	
0.1361 0.3	**0.1624** 0.358	**44.450** 1.7500	**44.437** 1.7495	**53.962** 2.1245	**53.988** 2.1255	**53.962** 2.1245	**44.463** 1.7505	**44.496** 1.7518	**IR-2324**	
0.0966 0.213	**0.1152** 0.254	**47.625** 1.8750	**47.612** 1.8745	**57.137** 2.2495	**57.163** 2.2505	**57.137** 2.2495	**47.638** 1.8755	**47.671** 1.8768		**1 7/8**
0.1025 0.226	**0.1365** 0.301	**50.800** 2.0000	**50.785** 1.9994	**60.312** 2.3745	**60.338** 2.3755	**60.312** 2.3745	**50.815** 2.0006	**50.848** 2.0019		**2**
0.0857 0.189	—	**57.150** 2.2500	**57.135** 2.2494	**66.662** 2.6245	**66.688** 2.6255	**66.662** 2.6245	**57.165** 2.2506	**57.203** 2.2521		**2 1/4**
0.1143 0.252	—	**57.150** 2.2500	**57.135** 2.2494	**66.662** 2.6245	**66.688** 2.6255	**66.662** 2.6245	**57.165** 2.2506	**57.203** 2.2521		
0.1030 0.227	—	**69.850** 2.7500	**69.835** 2.7494	**79.362** 3.1245	**79.388** 3.1255	**79.362** 3.1245	**69.875** 2.7510	**69.914** 2.7525	**IR-4016**	**2 3/4**

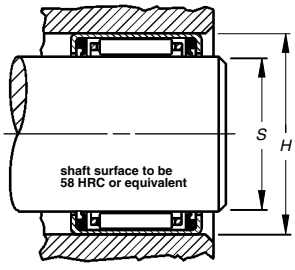
SEALED DRAWN CUP BEARINGS

INCH SERIES

- Check for availability. Not all bearings are in production.
- Prepacked with general purpose ball and roller bearing grease unless otherwise specified.
- Bearing operating temperature limited between -25° F and +225° F.
- Consult your Timken representative for operating temperatures outside the above range or if seals exposed to unusual fluids.
- Limiting speed based on shaft contact speed of 2000 RPM.
- Reduce the listed limiting speed by one-half for outer ring rotation.







Drawn cup bearings of nominal inch dimensions, with one seal and one end closed, may be made available upon request.

Mounting dimensions are based on the inner ring rotating and the outer ring being stationary relative to the load. The housing should be of high strength material. See engineering section for discussion of shaft and housing design. See page C62 for mounting procedure.

Shaft Diameter	Dimensions mm/in.			Bearings With One Seal mm/in.			Bearings With Two Seals mm/in.	
			+0 +0.000 -0,3 -0.100	Bearing Designation Open End	Wt. Approx. kg/lbs.	+0 +0.000 -0.3 -0.010	Bearing Designation	Wt. Approx. kg/lbs.
in.	F_w	D	C_1			C_2		
5/16	7.938 0.3125	12.700 0.5000	9.53 0.375	JT-56	0.004 0.008	11.13 0.438	JTT-57	0.004 0.009
	7.938 0.3125	12.700 0.5000	—	—	—	14.27 0.562	JTT-59	0.005 0.012
3/8	9.525 0.3750	14.288 0.5625	9.53 0.375	JT-66	0.004 0.009	11.13 0.438	JTT-67	0.005 0.011
	9.525 0.3750	14.288 0.5625	14.27 0.562	JT-69	0.006 0.014	—	—	—
1/2	12.700 0.5000	17.463 0.6875	9.53 0.375	JT-86	0.005 0.012	11.13 0.438	JTT-87	0.006 0.013
	12.700 0.5000	17.463 0.6875	14.27 0.562	JT-89	0.008 0.017	15.88 0.625	JTT-810	0.009 0.019
	12.700 0.5000	17.463 0.6875	—	—	—	22.23 0.875	JTT-814	0.012 0.027
9/16	14.288 0.5625	19.050 0.7500	14.27 0.562	JT-99	0.009 0.019	15.88 0.625	JTT-910	0.010 0.021
	14.288 0.5625	19.050 0.7500	—	—	—	19.05 0.75	JTT-912	0.011 0.025
5/8	15.875 0.6250	20.638 0.8125	14.27 0.562	JT-109	0.010 0.021	15.88 0.625	JTT-1010	0.010 0.023
	15.875 0.6250	20.638 0.8125	—	—	—	19.05 0.75	JTT-1012	0.013 0.028
	15.875 0.6250	20.638 0.8125	—	—	—	22.23 0.875	JTT-1014	0.015 0.032
11/16	17.463 0.6875	22.225 0.8750	—	—	—	22.23 0.875	JTT-1114	0.016 0.035
3/4	19.050 0.7500	25.400 1.0000	14.27 0.562	JT-129	0.015 0.034	15.88 0.625	JTT-1210	0.017 0.038
	19.050 0.7500	25.400 1.0000	17.48 0.688	JT-1211	0.019 0.041	—	—	—
	19.050 0.7500	25.400 1.0000	20.62 0.812	JT-1213	0.022 0.049	22.23 0.875	JTT-1214	0.024 0.053
7/4	22.225 0.8750	28.575 1.1250	14.27 0.562	JT-149	0.018 0.039	15.88 0.625	JTT-1410	0.020 0.043
	22.225 0.8750	28.575 1.1250	26.97 1.062	JT-1417	0.033 0.073	—	—	—
1	25.400 1.0000	31.750 1.2500	20.62 0.812	JT-1613	0.029 0.063	22.23 0.875	JTT-1614	0.031 0.068
1 1/8	28.575 1.1250	34.925 1.3750	20.62 0.812	JT-1813	0.032 0.070	22.23 0.875	JTT-1814	0.034 0.075
1 1/4	31.750 1.2500	38.100 1.5000	20.62 0.812	JT-2013	0.035 0.077	—	—	—
	31.750 1.2500	38.100 1.500	—	—	—	28.58 1.125	JTT-2018	0.048 0.106
1 1/2	38.100 1.500	47.625 1.875	33.32 1.312	JT-2421	0.104 0.229	—	—	—

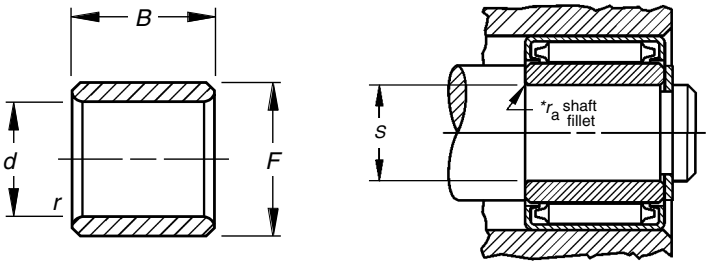
Load Ratings KN/lbf. Dynamic	Static	Limiting Speed Approx.		Bearing Mounting mm/in.				Shaft Diameter
				Max.	Min.	Min.	Max.	
C	C_0	RPM	C_g	S		H		in.
2.40 540	**2.00** 450	**18000**	**0.0117**	**7.938** 0.3125	**7.925** 0.3120	**12.687** 0.4995	**12.713** 0.5005	$^5/_{16}$
4.05 910	**3.91** 880	**18000**	**0.0138**	**7.938** 0.3125	**7.925** 0.3120	**12.687** 0.4995	**12.713** 0.5005	
2.74 615	**2.49** 560	**18000**	**0.0133**	**9.525** 0.3750	**9.512** 0.3745	**14.275** 0.5620	**14.300** 0.5630	$^3/_8$
5.20 1 170	**5.74** 1 290	**18000**	**0.0163**	**9.525** 0.3750	**9.512** 0.3745	**14.275** 0.5620	**14.300** 0.5630	
3.47 780	**3.65** 820	**15000**	**0.0164**	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	$^1/_2$
6.32 1 420	**7.92** 1 780	**15000**	**0.0199**	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	
10.2 2 300	**14.7** 3 310	**15000**	**0.0232**	**12.700** 0.5000	**12.687** 0.4995	**17.450** 0.6870	**17.475** 0.6880	
6.23 1 400	**8.01** 1 800	**14000**	**0.0210**	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	$^9/_{16}$
8.18 1 840	**11.4** 2 560	**14000**	**0.0229**	**14.288** 0.5625	**14.275** 0.5620	**19.037** 0.7495	**19.063** 0.7505	
6.72 1 510	**9.12** 2 050	**12000**	**0.0227**	**15.875** 0.6250	**15.862** 0.6245	**20.625** 0.8120	**20.650** 0.8130	$^5/_8$
8.81 1 980	**12.9** 2 910	**12000**	**0.0247**	**15.875** 0.6250	**15.862** 0.6245	**20.625** 0.8120	**20.650** 0.8130	
11.7 2 640	**18.9** 4 240	**12000**	**0.0272**	**15.875** 0.6250	**15.862** 0.6245	**20.625** 0.8120	**20.650** 0.8130	
12.5 2 800	**20.9** 4 700	**11000**	**0.0290**	**17.463** 0.6875	**17.450** 0.6870	**22.212** 0.8745	**22.238** 0.8755	$^{11}/_{16}$
9.92 2 230	**12.2** 2 740	**10000**	**0.0250**	**19.050** 0.7500	**19.037** 0.7495	**25.387** 0.9995	**25.413** 1.0005	$^3/_4$
12.5 2 810	**16.3** 3 670	**10000**	**0.0269**	**19.050** 0.7500	**19.037** 0.7495	**25.387** 0.9995	**25.413** 1.0005	
15.5 3 490	**21.6** 4 860	**10000**	**0.0288**	**19.050** 0.7500	**19.037** 0.7495	**25.387** 0.9995	**25.413** 1.0005	
10.9 2 460	**14.5** 3 260	**8700**	**0.0278**	**22.225** 0.8750	**22.212** 0.8745	**28.562** 1.1245	**28.588** 1.1255	$^7/_8$
23.7 5 320	**39.0** 8 760	**8700**	**0.0356**	**22.225** 0.8750	**22.212** 0.8745	**28.562** 1.1245	**28.588** 1.1255	
18.1 4 080	**28.8** 6 480	**7600**	**0.035**	**25.400** 1.0000	**25.387** 0.9995	**31.737** 1.2495	**31.763** 1.2505	**1**
19.0 4 280	**31.8** 7 140	**6800**	**0.0377**	**28.575** 1.125	**28.562** 1.1245	**34.912** 1.3745	**34.938** 1.3755	**1** $^1/_8$
19.8 4 460	**34.7** 7 800	**6100**	**0.0404**	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	**1** $^1/_4$
28.8 6 480	**56.5** 12 700	**6100**	**0.0455**	**31.750** 1.2500	**31.737** 1.2495	**38.087** 1.4995	**38.113** 1.5005	
49.4 11 100	**89.9** 20 200	**5100**	**0.0523**	**38.100** 1.5000	**38.087** 1.4995	**47.612** 1.8745	**47.638** 1.8755	**1** $^1/_2$

INNER RINGS FOR INCH SERIES DRAWN CUP BEARINGS

- Check for availability.
- Ideal choice where shaft not practical to use as inner raceway.
- Provided in inch (IR, IRA) nominal dimensions for use with inch series drawn cup bearings.
- Designed to meet established inch tolerances.
- Designed to be wider than matching drawn cup bearing.
- Maximum shaft fillet radius ($r_{as\text{-}max}$) cannot exceed inner ring bore chamfer ($r_{s\text{-}min}$) as shown.
- Optional centralized lubrication groove (bore) or thru-hole available – specify when ordering.
- Designed to be axially clamped against shoulder for loose transition fit on shaft.
- After mounting, for tight transition fit (keeping inner ring from rotating relative to shaft), inner ring O.D. must not exceed raceway diameter on matching bearing.
- See tables for required bearing dimensions raceway diameter.
- After mounting, if O.D. of inner ring exceeds required raceway diameter for matching bearing, ring should be ground to proper diameter while mounted on shaft.
- Unmarked end of inner ring to be assembled against shaft shoulder to assure clearing maximum allowable shaft fillet ($r_{as\ max}$) as indicated in tables shown.

Shaft Diameter	Dimensions mm/in.							Inner Ring Designation	Transition Fit				Wt. mm/lbs.
									Loose		Tight		
	Min.	Max.	Max.	Min.	Max.	Min.	Min.		Max.	Min.	Max.	Min.	Approx.
in.	d		F		B		$r_{s\ min.}$		S				
3/16	4.813 0.1895	4.826 0.1900	9.525 0.3750	9.512 0.3745	13.614 0.5360	13.360 0.5260	0.64 0.025	IRA-3	4.818 0.1897	4.806 0.1892	4.829 0.1901	4.816 0.1896	0.053 0.012
1/4	6.337 0.2495	6.350 0.2500	11.113 0.4375	11.100 0.4370	13.614 0.5360	13.360 0.5260	0.64 0.025	IRA-4	6.342 0.2497	6.330 0.2492	6.353 0.2501	6.340 0.2496	0.062 0.014
5/16	7.925 0.3120	7.938 0.3125	12.700 0.5000	12.687 0.4995	13.614 0.5360	13.360 0.5260	0.64 0.025	IRA-5	7.930 0.3122	7.917 0.3117	7.940 0.3126	7.927 0.3121	0.076 0.017
3/8	9.512 0.3745	9.525 0.3750	14.288 0.5625	14.275 0.5620	13.081 0.5150	12.827 0.5050	0.64 0.025	IR-68	9.517 0.3747	9.505 0.3742	9.528 0.3751	9.515 0.3746	0.085 0.019
	9.512 0.3745	9.525 0.3750	14.288 0.5625	14.275 0.5620	19.431 0.7650	19.177 0.7550	0.64 0.025	IR-612	9.517 0.3747	9.505 0.3742	9.528 0.3751	9.515 0.3746	0.125 0.028
	9.512 0.3745	9.525 0.3750	14.288 0.5625	14.275 0.5620	19.964 0.7860	19.710 0.7760	0.64 0.025	IRA-6	9.517 0.3747	9.505 0.3742	9.528 0.3751	9.515 0.3746	0.129 0.029
	9.512 0.3745	9.525 0.3750	15.875 0.6250	15.862 0.6245	13.081 0.5150	12.827 0.5050	0.64 0.025	IR-68-1	9.517 0.3747	9.505 0.3742	9.528 0.3751	9.515 0.3746	0.120 0.027
	9.512 0.3745	9.525 0.3750	15.875 0.6250	15.862 0.6245	19.431 0.7650	19.177 0.7550	0.64 0.025	IR-612-1	9.517 0.3747	9.505 0.3742	9.528 0.3751	9.515 0.3746	0.178 0.040
7/16	11.100 0.4370	11.113 0.4375	15.875 0.6250	15.862 0.6245	19.964 0.7860	19.710 0.7760	0.64 0.025	IRA-7	11.105 0.4372	11.092 0.4367	11.115 0.4376	11.102 0.4371	0.147 0.033
1/2	12.687 0.4995	12.700 0.5000	19.050 0.7500	19.037 0.7495	13.081 0.5150	12.827 0.5050	1.02 0.040	IR-88	12.692 0.4997	12.680 0.4992	12.703 0.5001	12.690 0.4996	0.147 0.033
	12.687 0.4995	12.700 0.5000	19.050 0.7500	19.037 0.7495	19.431 0.7650	19.177 0.7550	1.02 0.040	IR-812	12.692 0.4997	12.680 0.4992	12.703 0.5001	12.690 0.4996	0.222 0.050
	12.687 0.4995	12.700 0.5000	19.050 0.7500	19.037 0.7495	19.964 0.7860	19.710 0.7760	1.02 0.040	IRA-8	12.692 0.4997	12.680 0.4992	12.703 0.5001	12.690 0.4996	0.227 0.051
5/8	15.862 0.6245	15.875 0.6250	22.225 0.8750	22.212 0.8745	19.431 0.7650	19.177 0.7550	1.02 0.040	IR-1012	15.867 0.6247	15.855 0.6242	15.878 0.6251	15.865 0.6246	0.267 0.060
	15.862 0.6245	15.875 0.6250	22.225 0.8750	22.212 0.8745	19.964 0.7860	19.710 0.7760	1.02 0.040	IRA-10	15.867 0.6247	15.855 0.6242	15.878 0.6251	15.865 0.6246	0.276 0.062
	15.862 0.6245	15.875 0.6250	22.225 0.8750	22.212 0.8745	25.781 1.0150	25.527 1.0050	1.02 0.040	IR-1016	15.867 0.6247	15.855 0.6242	15.878 0.6251	15.865 0.6246	0.356 0.080
3/4	19.037 0.7495	19.050 0.7500	25.400 1.0000	25.387 0.9995	13.081 0.5150	12.827 0.5050	1.02 0.040	IR-128	19.042 0.7497	19.030 0.7492	19.053 0.7501	19.040 0.7496	0.209 0.047
	19.037 0.7495	19.050 0.7500	25.400 1.0000	25.387 0.9995	19.431 0.7650	19.177 0.7550	1.02 0.040	IR-1212	19.042 0.7497	19.030 0.7492	19.053 0.7501	19.040 0.7496	0.311 0.070
	19.037 0.7495	19.050 0.7500	25.400 1.0000	25.387 0.9995	25.781 1.0150	25.527 1.0050	1.02 0.040	IR-1216	19.042 0.7497	19.030 0.7492	19.053 0.7501	19.040 0.7496	0.414 0.093
	19.037 0.7495	19.050 0.7500	25.400 1.0000	25.387 0.9995	26.314 1.0360	26.060 1.0260	1.02 0.040	IRA-12	19.042 0.7497	19.030 0.7492	19.053 0.7501	19.040 0.7496	0.423 0.095
	19.037 0.7495	19.050 0.7500	25.400 1.0000	25.387 0.9995	32.131 1.2650	31.877 1.2550	1.02 0.040	IR-1220	19.042 0.7497	19.030 0.7492	19.053 0.7501	19.040 0.7496	0.516 0.116

Bore and O.D. tolerance limits correspond to the single mean diameter
(the arithmetical mean of the largest and smallest diameters in a single radial plane).
*$r_{as\ max}$ is equal to minimum inner ring bore chamfer ($r_{s\ min}$) at unmarked end.

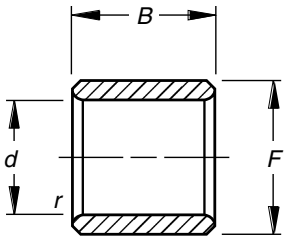


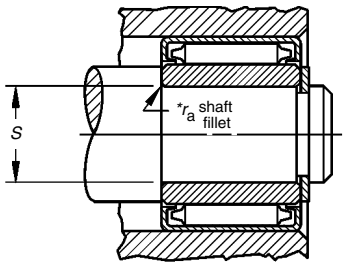
Shaft Diameter	Dimensions mm/in.							Inner Ring Designation	Transition Fit				Wt. mm/lbs.
									Loose		Tight		
	Min.	Max.	Max.	Min.	Max.	Min.	Min.		Max.	Min.	Max.	Min.	Approx.
in.	d		F		B		$r_{s\ min.}$		S				
	19.037 0.7495	19.050 0.7500	25.400 1.0000	25.387 0.9995	38.481 1.5150	38.227 1.5050	1.02 0.040	IR-1224	19.042 0.7497	19.030 0.7492	19.053 0.7501	19.040 0.7496	0.618 0.139
13/16	20.625 0.8120	20.638 0.8125	25.400 1.0000	25.387 0.9995	19.431 0.7650	19.177 0.7550	1.02 0.040	IR-1312	20.630 0.8122	20.617 0.8117	20.640 0.8126	20.627 0.8121	0.240 0.054
	20.625 0.8120	20.638 0.8125	25.400 1.0000	25.387 0.9995	25.781 1.0150	25.527 1.0050	1.02 0.040	IR-1316	20.630 0.8122	20.617 0.8117	20.640 0.8126	20.627 0.8121	0.320 0.072
7/8	22.212 0.8745	22.225 0.8750	28.575 1.1250	28.562 1.1245	25.781 1.0150	25.527 1.0050	1.02 0.040	IR-1416	22.217 0.8747	22.205 0.8742	22.228 0.8751	22.215 0.8746	0.494 0.111
	22.212 0.8745	22.225 0.8750	28.575 1.1250	28.562 1.1245	26.314 1.0360	26.060 1.0260	1.02 0.040	IRA-14	22.217 0.8747	22.205 0.8742	22.228 0.8751	22.215 0.8746	0.480 0.108
15/16	23.800 0.9370	23.813 0.9375	28.575 1.1250	28.562 1.1245	25.781 1.0150	25.527 1.0050	1.02 0.040	IR-1516	23.805 0.9372	23.792 0.9367	23.815 0.9376	23.802 0.9371	0.365 0.082
1	25.387 0.9995	25.400 1.0000	31.750 1.2500	31.737 1.2495	19.431 0.7650	19.177 0.7550	1.02 0.040	IR-1612	25.392 0.9997	25.380 0.9992	25.403 1.0001	25.390 0.9996	0.400 0.090
	25.387 0.9995	25.400 1.0000	31.750 1.2500	31.737 1.2495	25.781 1.0150	25.527 1.0050	1.02 0.040	IR-1616	25.392 0.9997	25.380 0.9992	25.403 1.0001	25.390 0.9996	0.556 0.125
	25.387 0.9995	25.400 1.0000	31.750 1.2500	31.737 1.2495	26.314 1.0360	26.060 1.0260	1.02 0.040	IRA-16	25.392 0.9997	25.380 0.9992	25.403 1.0001	25.390 0.9996	0.543 0.122
1 1/8	28.562 1.1245	28.575 1.1250	34.925 1.3750	34.912 1.3745	19.431 0.7650	19.177 0.7550	1.02 0.040	IR-1812	28.567 1.1247	28.555 1.1242	28.578 1.1251	28.565 1.1246	0.445 0.100
	28.562 1.1245	28.575 1.1250	34.925 1.3750	34.912 1.3745	25.781 1.0150	25.527 1.0050	1.02 0.040	IR-1816	28.567 1.1247	28.555 1.1242	28.578 1.1251	28.565 1.1246	0.592 0.133
	28.562 1.1245	28.575 1.1250	34.925 1.3750	34.912 1.3745	32.131 1.2650	31.877 1.2550	1.02 0.040	IR-1820	28.567 1.1247	28.555 1.1242	28.578 1.1251	28.565 1.1246	0.738 0.166
1 3/16	30.150 1.1870	30.163 1.1875	38.100 1.5000	38.087 1.4995	25.781 1.0150	25.527 1.0050	1.02 0.040	IR-1916	30.155 1.1872	30.142 1.1867	30.165 1.1876	30.152 1.1871	0.827 0.186
	30.150 1.1870	30.163 1.1875	38.100 1.5000	38.087 1.4995	32.131 1.2650	31.877 1.2550	1.02 0.040	IR-1920	30.155 1.1872	30.142 1.1867	30.165 1.1876	30.152 1.1871	0.992 0.223
1 1/4	31.737 1.2495	31.750 1.2500	38.100 1.5000	38.087 1.4995	25.781 1.0150	25.527 1.0050	1.52 0.060	IR-2016	31.742 1.2497	31.730 1.2492	31.753 1.2501	31.740 1.2496	0.676 0.152
	31.737 1.2495	31.750 1.2500	38.100 1.5000	38.087 1.4995	32.131 1.2650	31.877 1.2550	1.52 0.060	IR-2020	31.742 1.2497	31.730 1.2492	31.753 1.2501	31.740 1.2496	0.845 0.190
	31.737 1.2495	31.750 1.2500	38.100 1.5000	38.087 1.4995	32.664 1.2860	32.410 1.2760	1.52 0.060	IRA-20	31.742 1.2497	31.730 1.2492	31.753 1.2501	31.740 1.2496	0.845 0.190
1 3/8	34.912 1.3745	34.925 1.3750	41.275 1.6250	41.262 1.6245	32.131 1.2650	31.877 1.2550	1.52 0.060	IR-2220	34.917 1.3747	34.905 1.3742	34.928 1.3751	34.915 1.3746	0.925 0.208
1 7/16	36.500 1.4370	36.513 1.4375	44.450 1.7500	44.437 1.7495	25.781 1.0150	25.527 1.0050	1.52 0.060	IR-2316	36.505 1.4372	36.492 1.4367	36.515 1.4376	36.502 1.4371	0.979 0.220

Continued on next page.

INNER RINGS FOR INCH SERIES DRAWN CUP BEARINGS

- Check for availability.
- Ideal choice where shaft not practical to use as inner raceway.
- Provided in inch (IR, IRA) nominal dimensions for use with inch series drawn cup bearings.
- Designed to meet established inch tolerances.
- Designed to be wider than matching drawn cup bearing.
- Maximum shaft fillet radius ($r_{as\text{-}max}$) cannot exceed inner ring bore chamfer ($r_{s\text{-}min}$) as shown.
- Optional centralized lubrication groove (bore) or thru-hole available – specify when ordering.
- Designed to be axially clamped against shoulder for loose transition fit on shaft.
- After mounting, for tight transition fit (keeping inner ring from rotating relative to shaft), inner ring O.D. must not exceed raceway diameter on matching bearing.
- See tables for required bearing dimensions raceway diameter.
- After mounting, if O.D. of inner ring exceeds required raceway diameter for matching bearing, ring should be ground to proper diameter while mounted on shaft.
- Unmarked end of inner ring to be assembled against shaft shoulder to assure clearing maximum allowable shaft fillet ($r_{as\ max}$) as indicated in tables shown.





Shaft Diameter	Dimensions mm/in.							Inner Ring Designation	Transition Fit				Wt. mm/lbs. Approx.
									Loose		Tight		
	Min.	Max.	Max.	Min.	Max.	Min.	Min.		Max.	Min.	Max.	Min.	
in.	d		F		B		$r_{s\ min.}$		S				
	36.500 1.4370	36.513 1.4375	44.450 1.7500	44.437 1.7495	38.481 1.5150	38.227 1.5050	1.52 0.060	IR-2324	36.505 1.4372	36.492 1.4367	36.515 1.4376	36.502 1.4371	1.472 0.331
1 1/2	38.087 1.4995	38.100 1.5000	44.450 1.7500	44.437 1.7495	25.781 1.0150	25.527 1.0050	1.52 0.060	IR-2416	38.092 1.4997	38.080 1.4992	38.103 1.5001	38.090 1.4996	0.770 0.173
	38.087 1.4995	38.100 1.5000	44.450 1.7500	44.437 1.7495	38.481 1.5150	38.227 1.5050	1.52 0.060	IR-2424	38.092 1.4997	38.080 1.4992	38.103 1.5001	38.090 1.4996	1.201 0.270
1 11/16	42.850 1.6870	42.863 1.6875	52.388 2.0625	52.375 2.0620	38.481 1.5150	38.227 1.5050	1.52 0.060	IR-2724	42.855 1.6872	42.842 1.6867	42.865 1.6876	42.852 1.6871	2.082 0.468
1 3/4	44.437 1.7495	44.450 1.7500	52.388 2.0625	52.375 2.0620	38.481 1.5150	38.227 1.5050	1.52 0.060	IR-2824	44.442 1.7497	44.430 1.7492	44.453 1.7501	44.440 1.7496	1.761 0.396
1 13/16	46.025 1.8120	46.038 1.8125	52.388 2.0625	52.375 2.0620	25.781 1.0150	25.527 1.0050	1.52 0.060	IR-2916	46.030 1.8122	46.017 1.8117	46.040 1.8126	46.027 1.8121	0.952 0.214
	46.025 1.8120	46.038 1.8125	52.388 2.0625	52.375 2.0620	38.481 1.5150	38.227 1.5050	1.52 0.060	IR-2924	46.030 1.8122	46.017 1.8117	46.040 1.8126	46.027 1.8121	1.432 0.322
1 7/8	47.612 1.8745	47.625 1.8750	53.975 2.1250	53.962 2.1245	38.481 1.5150	38.227 1.5050	1.52 0.060	IR-3024	47.617 1.8747	47.605 1.8742	47.628 1.8751	47.615 1.8746	1.419 0.319
2 1/2	63.487 2.4995	63.500 2.5000	69.850 2.7500	69.837 2.7495	25.781 1.0150	25.527 1.0050	1.52 0.060	IR-4016	63.495 2.4998	63.477 2.4991	63.505 2.5002	63.487 2.4995	1.290 0.290

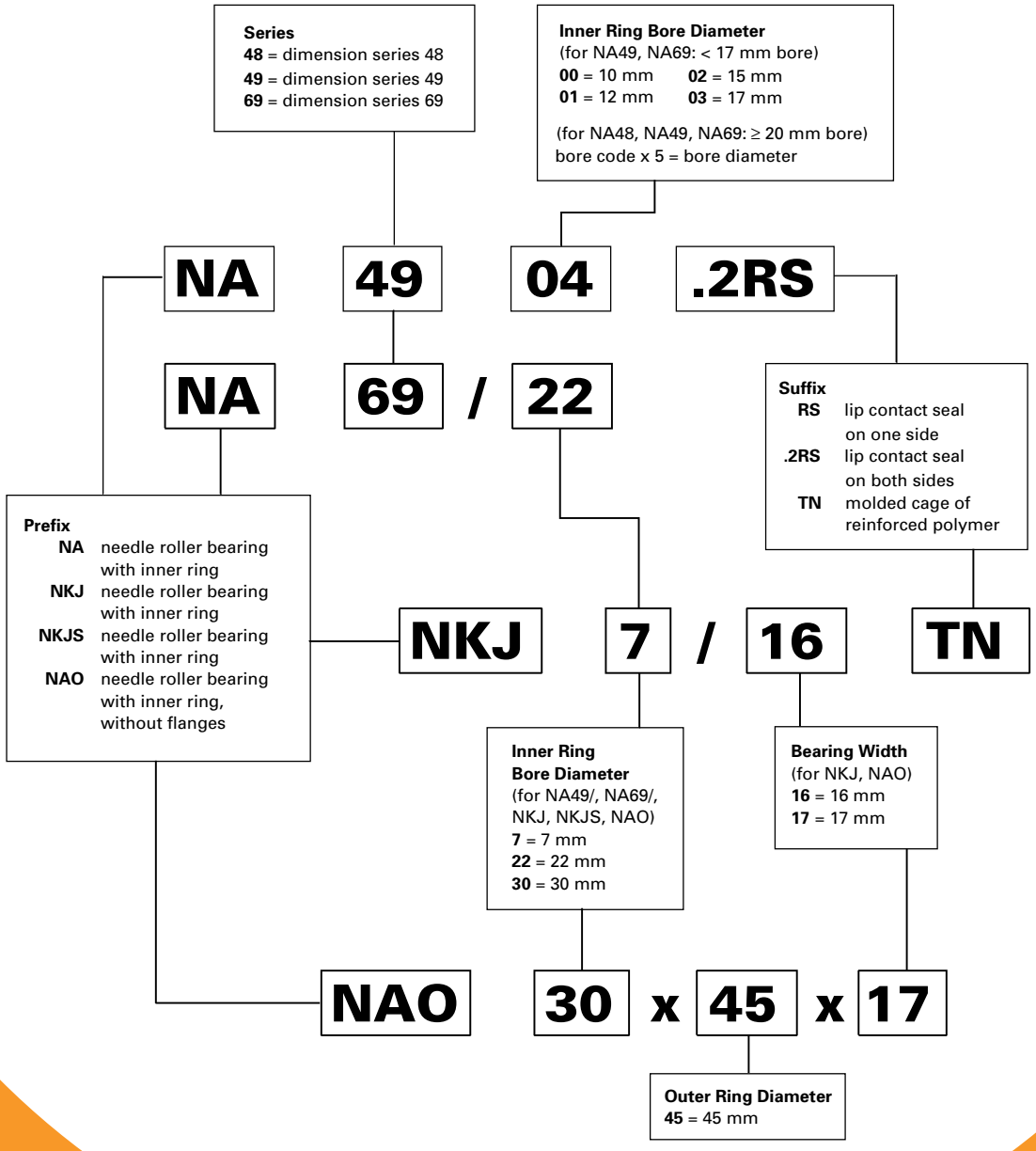
Bore and O.D. tolerance limits correspond to the single mean diameter
(the arithmetical mean of the largest and smallest diameters in a single radial plane).
*$r_{as\ max}$ is equal to minimum inner ring bore chamfer ($r_{s\ min}$) at unmarked end.

HEAVY-DUTY NEEDLE ROLLER BEARINGS

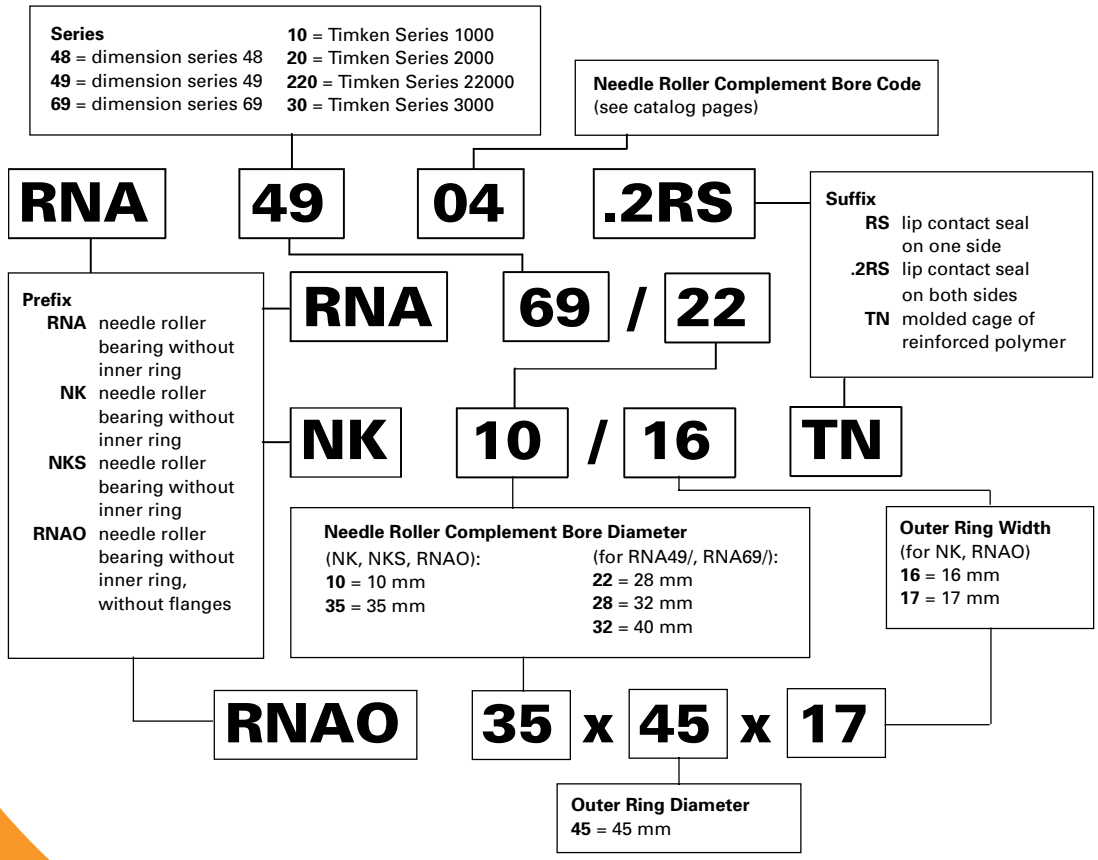
Overview: Heavy-duty needle roller bearings consist of a machined and ground channel-shaped outer ring with a complement of needle rollers retained and guided by a cage. The high-strength cage retains and guides the rollers. An optional lubrication groove and hole in the outer ring facilitate relubrication. These bearings can be used with or without a machined and ground inner ring, depending on the suitability of the shaft as a raceway surface.

- **Sizes: Metric:** 5 mm - 175 mm bore (0.19685 in. - 6.88976 in.).
- **Markets:** Gear pumps, sheaves, automotive transmissions and two-cycle engines.
- **Features:** Thick outer ring provides maximum load capacity and shock resistance with a relatively small radial cross section.
- **Benefits:** Optimum speed and lubrication-retention capability.

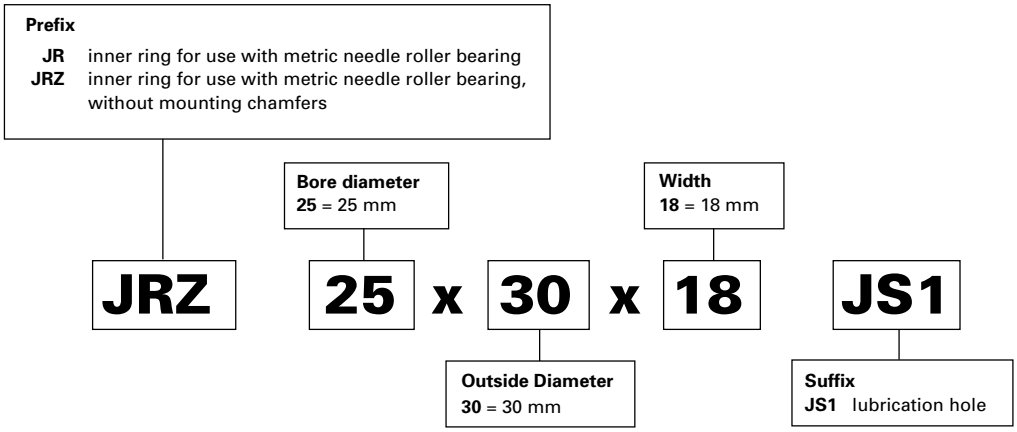
Needle Roller Bearings with Inner Rings – Metric Nominal Dimensions



Needle Roller Bearings without Inner Rings – Metric Nominal Dimensions



Inner Rings for Needle Roller Bearings – Metric Nominal Dimensions



C

Heavy-Duty Needle Roller

C

NEEDLE ROLLER BEARINGS

METRIC SERIES

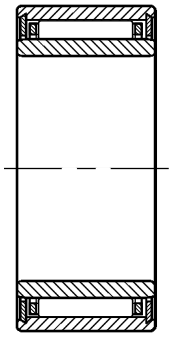
When applications involve very heavy dynamic, static or even shock load conditions the needle roller bearing may be found to give best results.

REFERENCE STANDARDS ARE:

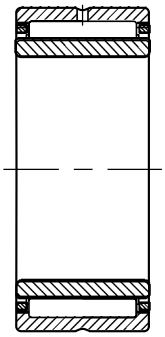
- **ISO 1206** – Needle roller bearings – Light and medium series – Dimensions and tolerances.
- **DIN 617** – Rolling bearings – Needle roller bearings with cage – Dimension Series 48 and 49.

TYPES OF METRIC SERIES NEEDLE ROLLER BEARINGS

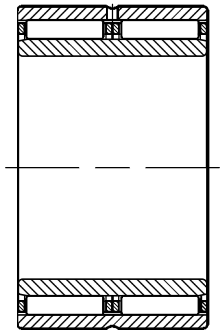
Needle roller bearings with inner rings



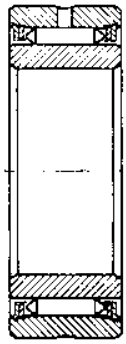
NKJ
(d ≤ 7 mm)



NKJ, NKJS
(d ≥ 9 mm)
NA48, NA49
NA69 (d ≤ 30 mm)

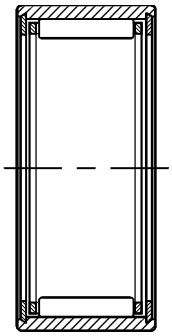


NA69
(d ≥ 32 mm)

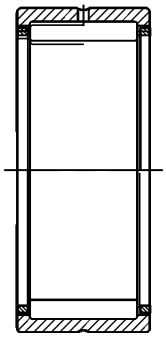


Full Complement

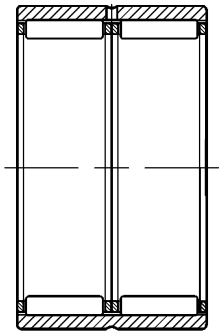
Needle roller bearings without inner rings



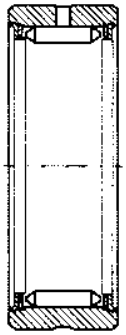
NK
(F_w ≤ 10 mm)



NK (F_w ≥ 12 mm)
NKS, RNA48, RNA49
RNA69 (F_w ≤ 35 mm)

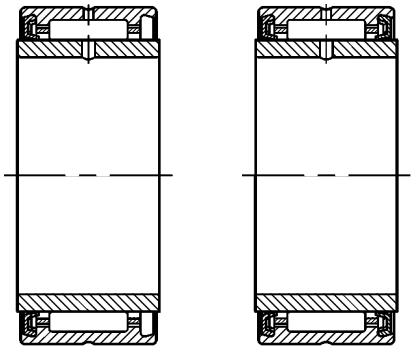


RNA69
(F_w ≥ 40 mm)



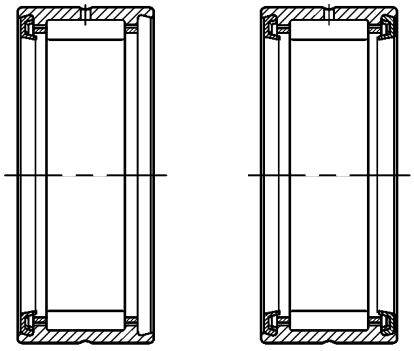
Full Complement

Sealed needle roller bearings with inner rings



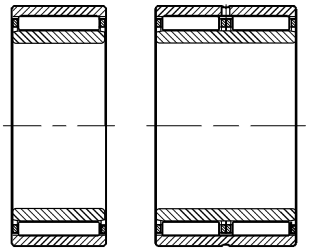
NA49RS **NA49.2RS**

Sealed needle roller bearings without inner rings



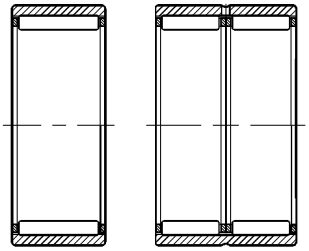
RNA49RS **RNA49.2RS**

Needle roller bearings without flanges, with inner rings



NAO NAO

Needle roller bearings without flanges, without inner rings



RNAO RNAO

Suffixes	
RS	One Seal
.2RS	Two Seals
TN	Molded Cage of Engineered Reinforced Polymer

CONSTRUCTION

The basic constructions of metric series needle roller bearings are:

- with integral end flanges on the one piece channel-shaped outer rings. ($F_w \geq 12$ mm)
- with inserted end washers to provide axial retention of the needle roller and cage assemblies. ($F_w \leq 10$ mm)
- without flanges where separate end washers or housing shoulders are required to provide axial retention of the needle roller and cage assemblies.
- full, outer ring-piloted complement of needle rollers (with or without inner ring).

METRIC SERIES NEEDLE ROLLER BEARINGS WITH INNER RINGS

When it is impractical to finish the shaft to meet the desired raceway design requirements, an inner ring may be used. Standard needle roller bearings are available with inner rings (such as the NA Series) forming complete bearings. Bearings furnished with inner rings meet the quality requirements in accordance with ISO standards.

- For inner and outer ring tolerances the metric series bearings follow the normal tolerance class in ISO Standard 492 covering radial bearings. Bearings to more precise tolerance classes P6 and P5 may be obtained upon request (see the engineering section).
- The metric series bearings may be obtained with radial internal clearance in accordance with ISO Standard 5753 also specified for cylindrical roller bearings. Mostly, they follow the normal (C0) radial clearance group although bearings to clearance groups C2, C3, and C4 may be made available on request (see the engineering section).
- Inner ring and outer ring chamfer dimensions meet the requirements of ISO Standard 582.

METRIC SERIES NEEDLE ROLLER BEARINGS WITHOUT INNER RINGS

Whenever the shaft can be used as the inner raceway, needle roller bearings without inner rings provide advantages of economy and close control of radial internal clearance in operation. Tolerance class F6 is the normal specification for the metric series needle roller complement bore diameter of an unmounted bearing as shown in Table 1. In the case of needle roller bearings of series RNAO, without flanges and without inner rings, the outer rings and needle roller and cage assemblies are not interchangeable.

TABLE 1 –
METRIC SERIES CAGED NEEDLE ROLLER COMPLEMENT BORE DIAMETER FOR BEARINGS WITHOUT INNER RINGS.

mm		μm	
>	≤	low	high
F_w		ΔF_w min	
3	6	+10	+18
6	10	+13	+22
10	18	+16	+27
18	30	+20	+33
30	50	+25	+41
50	80	+30	+49
80	120	+36	+58
120	180	+43	+68
180	250	+50	+79
250	315	+56	+88
315	400	+62	+98

TABLE 1. A –
FULL COMPLEMENT METRIC NEEDLE ROLLER COMPLEMENT
BORE DIAMETER FOR BEARINGS WITHOUT INNER RINGS

mm		μm	
>	≤	low	high
F_w		ΔF_{us} min	
5	15	+20	+40
15	25	+20	+43
25	30	+25	+48
30	35	+30	+53
35	60	+35	+58
60	80	+45	+73
80	115	+50	+78
115	180	+60	+88
180	220	+70	+103
220	270	+80	+113
270	350	+90	+128

METRIC SERIES NEEDLE ROLLER BEARINGS WITH INTEGRAL FLANGES

The Timken® Torrington® needle roller bearing has a one-piece channel-shaped outer ring of bearing quality steel, heat treated to yield maximum load rating. The integral end flanges provide axial location for the needle rollers. The bores of the end flanges serve as piloting surfaces for the cage.

A steel cage provides inward retention for the needle rollers and the design assures roller stability and minimizes friction between the cage and the needle rollers. The cage has maximum strength consistent with the inherent high load ratings of needle roller bearings.

Needle roller bearings of series NKJ, NKJS, NA48, and NA49 contain one needle roller and cage assembly, bearings of series NA69 with bearing bores of 32 mm and above have two needle roller and cage assemblies.

The outer ring has a lubricating groove and a lubricating hole for more convenient lubrication of the bearing. However, the smaller bearings of series NKJ and NK do not have a lubricating groove or a lubricating hole. ($F_w \leq 10$ mm)

METRIC SERIES NEEDLE ROLLER BEARINGS WITH INSERTED END WASHERS

Some metric series needle roller bearings have inserted end washers to provide axial retention of the needle roller and cage assembly. The needle roller and cage radial assemblies, consistent with other Timken Torrington designs, provide inward and outward retention for the needle rollers.

METRIC SERIES NEEDLE ROLLER BEARINGS WITHOUT FLANGES

The needle roller and cage radial assembly used in the metric series needle roller bearings without flanges is slightly narrower than the inner and outer rings to ensure unobstructed operation. Separate end washers are required to provide axial retention of the needle roller and cage radial assembly. Wide needle roller bearings using two needle roller and cage assemblies have a lubricating groove and one lubricating hole in the outer ring to facilitate relubrication of the bearing. Narrow needle roller bearings do not have a lubricating groove or a lubricating hole in the outer ring.

SEALED METRIC SERIES NEEDLE ROLLER BEARINGS OF DIMENSION SERIES 49

Needle roller bearings of Series 49 are available with one or two integral lip contact seals as listed on page C118. One seal is designated by suffix letters RS. Two seals are designated by .2RS. When combining sealed metric series needle roller bearings with inner rings it is suggested to use inner rings shown on page C340 with designation JRZ because they are wider than the outer rings to ensure positive seal contact.

These seals limit the bearing operating temperature between -30° C and 110° C. If the operating temperature must be outside the above range or if the seals are exposed to unusual fluids, external seals using suitable seal materials or other solutions should be investigated. Sealed bearings are normally packed with a high quality lithium soap base grease suitable up to 120° C for short periods of operation.

The limiting speeds specified for sealed bearings listed in the bearing tables are based on operating conditions determined by testing. Optimum performance may be expected providing the bearing is properly installed, with appropriate internal clearances, and be subjected to a load of low magnitude. Care should be taken that overheating will not occur, thus preventing breakdown of the grease and eventual bearing failure.

METRIC SERIES FULL COMPLEMENT NEEDLE ROLLER BEARINGS

Series NA and RNA 1000, 2000, 22000 and 3000 are available with possible options of extra wide and/or crowned inner ring raceways. Consult your local Timken representative for application details.

BEARING MOUNTING

MOUNTING DIMENSIONS

It is suggested that needle roller bearings are mounted in their housings with a clearance fit if the load is stationary relative to the housing, or with a tight transition fit if the load rotates relative to the housing. Table 2 lists the suggested tolerances for the housing bore and the shaft raceway for metric series bearings without inner rings. Table 3 lists the suggested shaft tolerances for the above two mounting conditions when the metric series bearings are used with inner rings. The suggested housing bore tolerances for metric series bearings with inner rings is the same as the housing bore tolerance listed in Table 2 for metric series bearings without inner rings. Other quality requirements for shafts and housings are given in the engineering section of this catalog.

Other mounting dimensions may be required for special operating conditions such as:

1. Extremely heavy radial loads
2. Shock loads
3. Temperature gradient across bearing
4. Housing material with heat expansion coefficient different than that of the bearing
5. Oscillating motion applications

Regardless of the fit of the bearing outer ring in the housing, the outer ring should be axially located by housing shoulders or other positive means. The bearing rings should closely fit against the shaft and housing shoulders and must not contact the fillet radius. The maximum shaft or housing fillet $r_{as\ max}$ should be no greater than the minimum bearing chamfer $r_{s\ min}$ as shown in Table 4.

In order to permit mounting and dismounting of the shaft, the maximum diameter D_1 in Table 5 must not be exceeded. F_w is shown in the bearing tables.

Needle roller bearings without flanges of series RNAO and NAO must have the needle roller and cage radial assembly properly end guided by shoulders as shown in Table 6, or other suitable means such as the spring steel washers (SNSH) shown on page C349. These end guiding surfaces should be hardened and precision turned or ground to minimize wear and should properly fit against the outer rings and the inner rings to provide the desired end clearance for the needle roller and cage assembly.

C

TABLE 2 – MOUNTING TOLERANCES FOR METRIC SERIES BEARINGS WITHOUT INNER RING

Rotation conditions	Nominal housing bore diameter D	ISO tolerance zone for housing		Nominal shaft diameter F	ISO tolerance zone for shaft	
	mm	caged	full	mm	caged	full
Load stationary relative to housing	all diameters	H7	J6	all diameters	h6	h5
General work with larger clearance	all diameters	K7	—	all diameters	g6	—
Load rotates relative to housing	all diameters	N7	M6	all diameters	f6	g5

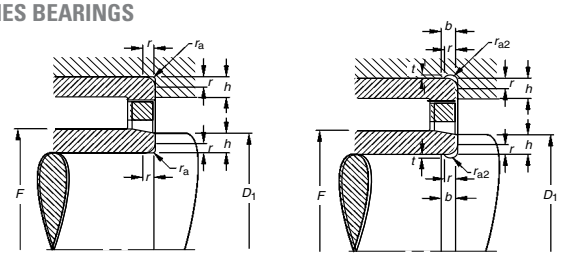
NOTE: Care should be taken that the selected bearing internal clearance is appropriate for the operating conditions. Details of shaft and housing quality requirements are given in the engineering section of this catalog.

TABLE 3 – SHAFT TOLERANCES FOR METRIC SERIES BEARINGS WITH INNER RINGS (USE HOUSING TOLERANCE SHOWN IN TABLE 2)

Rotation conditions	Nominal shaft diameter d, mm		ISO tolerance zone for shaft caged	ISO tolerance zone for shaft full
load rotates relative to housing	all diameters		g6	h5 (h6)
load stationary relative to housing	>	≤		
		40	k6	k5
	40	100	M6	M5
	100	140	M6	M5
	140		n6	n6

NOTE: Care should be taken that the selected bearing internal clearance is appropriate for the operating conditions. Details of shaft and housing quality requirements are given in the engineering section of this catalog.

TABLE 4 – FILLETS, UNDERCUTS, AND SHOULDER HEIGHTS FOR METRIC SERIES BEARINGS



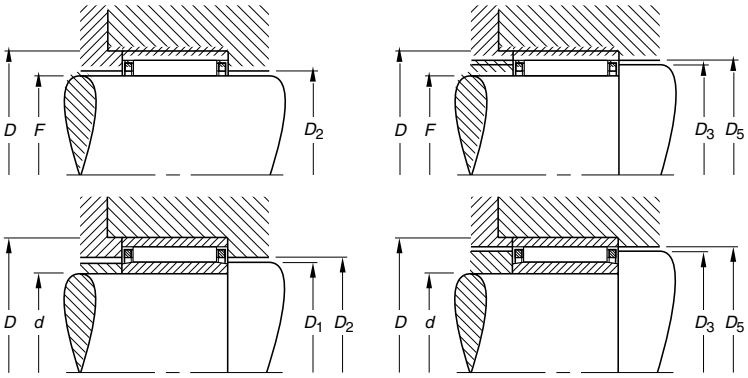
r_s Min. mm	r_{as} Max.	t	r_{a2s} Min.	b	h Min.
0.15	0.15				0.6
0.3	0.3				1
0.6	0.6				2
1	1	0.2	1.3	2	2.5
1.1	1	0.3	2	3	3.25
1.5	1.5	0.4	2	3.2	4
2	2	0.5	2.5	4	5
2.1	2.1	0.5	3	4.7	5.5
3	2.5	0.5	3.5	5.3	6

TABLE 5 – SHOULDER DIAMETER D_{1MAX} FOR METRIC SERIES BEARINGS

		Dimensions in mm				
Needle roller complement bore diameter F_w	>		20	55	100	250
	≤	20	55	100	250	
Diameter	D_{1max}	F_w -0.3	F_w -0.5	F_w -0.7	F_w -1	F_w -1.5

C

TABLE 6 –
MOUNTING DIMENSIONS FOR METRIC SERIES NEEDLE ROLLER NEARINGS WITHOUT FLANGES



Guidance in the housing

Guidance on the shaft

Dimensions mm	Bearing Series RNAO		
	Min.	Max.	Min.
FxD	D_2	D_3	D_5
10x17	10.3	12.7	13.3
12x19	12.3	14.7	15.3
14x22	14.4	17.6	18.3
15x23	15.4	18.6	19.3
16x24	16.4	19.6	20.3
17x25	17.4	20.6	21.3
18x26	18.4	21.6	22.3
18x30	18.6	23.6	24.5
20x28	20.4	23.6	24.3
20x32	20.6	25.6	26.5
22x30	22.4	25.6	26.3
22x35	22.8	28.4	29.5
25x35	25.6	29.4	30.5
25x37	25.8	31.4	32.5
28x40	28.8	34.4	35.5
30x40	30.6	34.4	35.5
30x42	30.8	36.4	37.5
35x45	35.6	39.4	40.5
35x47	35.8	41.4	42.5
40x50	40.6	44.4	45.5
40x55	41	47.2	48.5
45x55	45.6	49.4	50.5
45x62	46	52.2	53.5
50x62	50.6	54.4	55.8
50x65	51	57.2	58.5
55x68	55.6	59.4	60.8
55x72	56	62.2	63.8
60x78	61	67.2	68.8
65x85	66	72.2	73.8
70x90	71	77.2	78.8
75x95	76	82.2	84
80x100	81	87.2	89
85x105	86	92.2	94
90x110	91	97.2	99
95x115	96	102.2	104
100x120	101	107.2	109

Dimensions mm	Bearing Series NAO			
	Max.	Min.	Max.	Min.
dxD	D_1	D_2	D_3	D_5
6x17	9.7	10.3	12.7	13.3
8x19	11.7	12.3	14.7	15.3
10x22	13.7	14.4	17.6	18.3
10x26	13.7	14.6	19.6	20.3
12x24	15.7	16.4	19.6	20.3
12x28	15.7	16.6	21.6	22.3
15x28	19.5	20.4	23.6	24.3
15x32	19.5	20.6	25.6	26.5
17x30	21.5	22.4	25.6	26.3
17x35	21.5	22.8	28.4	29.5
20x35	24.5	25.6	29.4	30.5
20x37	24.5	25.8	31.4	32.5
25x40	29.5	30.6	34.4	35.5
25x42	29.5	30.8	36.4	37.5
30x45	34.5	35.6	39.4	40.5
30x47	34.5	35.8	41.4	42.5
35x50	39.5	40.6	44.4	45.5
35x55	39.5	41	47.2	48.5
40x55	44.5	45.6	49.4	50.5
40x62	44.5	46	52.2	53.5
45x62	49.5	50.6	54.4	55.8
45x72	54.5	56	62.2	63.8
50x68	54.5	55.6	59.4	60.8
50x78	59.3	61	67.2	68.8
55x85	64.3	66	72.2	73.8
60x90	69.3	71	77.2	78.8
65x95	74.3	76	82.2	84
70x100	79.3	81	87.2	89
75x105	84.3	86	92.2	94
80x110	89.3	91	97.2	99
85x115	94.3	96	102.2	104
90x120	99.3	101	107.2	109

LOAD RATING FACTORS

DYNAMIC LOADS

Needle roller bearings can accommodate only radial loads.

$$P = F_r \quad (kN)$$

P = The maximum dynamic radial load that may be applied to a needle roller bearing based on the dynamic load rating C given in the tabular pages. This load should be ≤ C/3.

STATIC LOADS

Needle roller bearings can accommodate only radial loads.

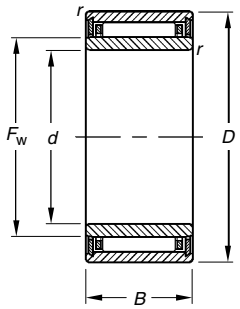
$$P_0 = F_r \quad (kN)$$

MOUNTING IN SETS

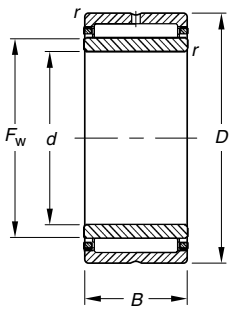
Needle roller bearings which are mounted side by side or must have the same cross-section and radial internal clearances, after mounting.

NEEDLE ROLLER BEARINGS WITH INNER RINGS

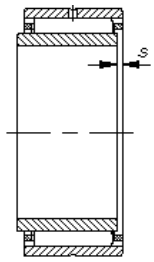
METRIC SERIES



NKJ
(d ≤ 7)



NKJ, NKJS
NA49, NA69



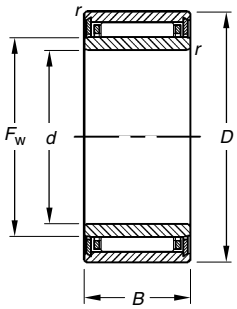
Shaft Diameter	Dimensions mm/in.						Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
								Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	$r_{s\,min}$	s[1]		C	C_0	RPM		C_g	
5	5 0.1969	15 0.5906	12 0.472	8 0.3150	0.3 0.012	1.5 0.059	NKJ5/12	4.57 1030	4.89 1100	41000	26000	0.0148	0.014 0.031
	5 0.1969	15 0.5906	16 0.630	8 0.3150	0.3 0.012	1.5 0.059	NKJ5/16	5.22 1170	5.78 1300	41000	26000	0.0154	0.017 0.037
6	6 0.2362	16 0.6299	12 0.472	9 0.3543	0.3 0.012	1.5 0.059	NKJ6/12	4.27 960	4.60 1030	40000	26000	0.0153	0.015 0.033
	6 0.2362	16 0.6299	16 0.630	9 0.3543	0.3 0.012	1.5 0.059	NKJ6/16	5.57 1250	6.47 1450	40000	26000	0.0167	0.019 0.042
7	7 0.2756	17 0.6693	12 0.472	11.5 0.4528	0.3 0.012	1.5 0.059	NKJ7/12	5.40 1210	6.43 1450	39000	25000	0.0174	0.017 0.037
	7 0.2756	17 0.6693	16 0.630	11.5 0.4528	0.3 0.012	1.5 0.059	NKJ7/16TN	5.30 1190	6.27 1410	39000	25000	0.0173	0.021 0.046
9	9 0.3543	19 0.7480	12 0.472	12 0.4724	0.3 0.012	1.5 0.059	NKJ9/12	6.86 1540	7.60 1710	30000	19000	0.0189	0.018 0.040
	9 0.3543	19 0.7480	16 0.630	12 0.4724	0.3 0.012	1.5 0.059	NKJ9/16	6.78 1520	9.03 2030	30000	19000	0.0204	0.024 0.053
10	10 0.3937	22 0.8661	13 0.512	14 0.5512	0.3 0.012	1.0 0.039	NA4900	9.39 2110	10.3 2320	24000	16000	0.0211	0.025 0.055
	10 0.3937	22 0.8661	16 0.630	14 0.5512	0.6 0.024	1.5 0.059	NKJ10/16	12.4 2790	14.8 3330	24000	16000	0.0231	0.032 0.071
	10 0.3937	22 0.8661	20 0.787	14 0.5512	0.3 0.012	1.5 0.059	NKJ10/20	14.7 3300	18.4 4140	24000	16000	0.0244	0.040 0.088
12	12 0.4724	24 0.9449	13 0.512	16 0.6299	0.3 0.012	1.0 0.039	NA4901	10.5 2360	12.0 2700	28000	18000	0.0233	0.028 0.062
	12 0.4724	24 0.9449	16 0.630	16 0.6299	0.3 0.012	1.5 0.059	NKJ12/16	13.0 2920	16.2 3640	28000	18000	0.0250	0.036 0.079
	12 0.4724	24 0.9449	20 0.787	16 0.6299	0.3 0.012	1.5 0.059	NKJ12/20	15.4 3460	20.2 4540	28000	18000	0.0264	0.046 0.101
	12 0.4724	24 0.9449	22 0.866	16 0.6299	0.3 0.012	1.0 0.039	NA6901	16.1 3620	21.3 4790	28000	18000	0.0267	0.051 0.11
15	15 0.5906	27 1.0630	16 0.630	19 0.7480	0.3 0.012	1.5 0.059	NKJ15/16	14.1 3170	19.0 4270	24000	15000	0.0279	0.042 0.093
	15 0.5906	27 1.0630	20 0.787	19 0.7480	0.3 0.012	1.5 0.059	NKJ15/20	16.8 3780	23.6 5310	24000	15000	0.0295	0.054 0.119
	15 0.5906	28 1.1024	13 0.512	20 0.7874	0.3 0.012	1.0 0.039	NA4902	11.8 2650	15.3 3440	22000	14000	0.0270	0.037 0.082
	15 0.5906	28 1.1024	23 0.906	20 0.7874	0.3 0.012	1.5 0.059	NA6902	18.4 4140	26.9 6050	22000	14000	0.0311	0.067 0.148
17	17 0.6693	29 1.1417	16 0.630	21 0.8268	0.3 0.012	2.0 0.079	NKJ17/16	15.3 3440	21.6 4860	21000	14000	0.0301	0.047 0.104
	17 0.6693	29 1.1417	20 0.787	21 0.8268	0.3 0.012	1.5 0.059	NKJ17/20	18.1 4070	2 3.9 5370	21000	14000	0.0317	0.059 0.130
	17 0.6693	30 1.1811	13 0.512	22 0.8661	0.3 0.012	1.0 0.039	NA4903	12.2 2740	16.4 3690	20000	13000	0.0286	0.040 0.088

(1) Max. axial displacement

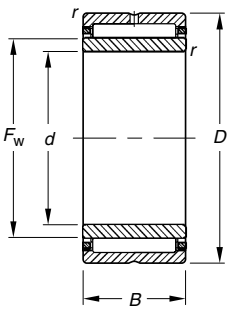
Continued on next page.

NEEDLE ROLLER BEARINGS WITH INNER RINGS – *continued*

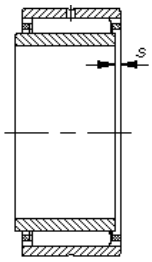
METRIC SERIES



NKJ
(d ≤ 7)



NKJ, NKJS
NA49, NA69



Shaft Diameter	Dimensions mm/in.						Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
								Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	$r_{s\ min}$	s[1]		C	C_0	RPM		C_g	
	17 0.6693	30 1.1811	23 0.906	22 0.8661	0.6 0.024	1.0 0.039	NA6903	19.8 4450	30.6 6880	20000	13000	0.0334	0.084 0.185
	17 0.6693	37 1.4567	20 0.787	24 0.9449	0.6 0.024	1.0 0.039	NKJS17	29.1 6540	32.8 7370	20000	13000	0.0325	0.108 0.238
20	20 0.7874	32 1.2598	16 0.630	24 0.9449	0.3 0.012	1.5 0.059	NKJ20/16	16.2 3640	24.3 5460	18000	12000	0.0328	0.053 0.117
	20 0.7874	32 1.2598	20 0.787	24 0.9449	0.3 0.012	1.5 0.059	NKJ20/20	19.3 4340	30.3 6810	18000	12000	0.0346	0.067 0.148
	20 0.7874	37 1.4567	17 0.669	25 0.9843	0.3 0.012	1.5 0.059	NA4904	21.3 4790	25.5 5730	18000	12000	0.0318	0.084 0.185
	20 0.7874	37 1.4567	30 1.181	25 0.9843	0.3 0.012	1.5 0.059	NA6904	36.6 8230	51.0 11500	18000	12000	0.0378	0.133 0.293
	20 0.7874	42 1.6535	20 0.787	28 1.1024	0.6 0.024	1.0 0.039	NKJS20	30.3 6810	38.4 8630	16000	11000	0.0364	0.130 0.287
22	22 0.8661	34 1.3386	16 0.630	26 1.0236	0.3 0.012	1.5 0.059	NKJ22/16	16.6 3730	25.7 5780	17000	11000	0.0344	0.058 0.128
	22 0.8661	34 1.3386	20 0.787	26 1.0236	0.3 0.012	2.0 0.079	NKJ22/20	19.7 4430	32.0 7190	17000	11000	0.0363	0.071 0.157
	22 0.8661	39 1.5354	17 0.669	28 1.1024	0.3 0.012	1.5 0.059	NA49/22	23.3 5240	29.6 6650	16000	10000	0.0346	0.089 0.196
	22 0.8661	39 1.5354	30 1.181	28 1.1024	0.3 0.012	1.0 0.039	NA69/22	30.6 6880	50.7 11400	16000	10000	0.0487	0.163 0.359
25	25 0.9843	38 1.4961	20 0.787	29 1.1417	0.3 0.012	2.0 0.079	NKJ25/20	23.4 5260	36.4 8180	15000	9800	0.0383	0.086 0.190
	25 0.9843	38 1.4961	30 1.181	29 1.1417	0.3 0.012	2.0 0.079	NKJ25/30	29.8 6700	56.4 12700	15000	9800	0.0438	0.130 0.287
	25 0.9843	42 1.6535	17 0.669	30 1.1811	0.3 0.012	1.5 0.059	NA4905	24.3 5460	31.7 7130	15000	9700	0.0362	0.099 0.218
	25 0.9843	42 1.6535	30 1.181	30 1.1811	0.3 0.012	1.5 0.059	NA6905	39.7 8920	59.6 13400	15000	9700	0.0424	0.178 0.392
	25 0.9843	47 1.8504	22 0.866	32 1.2598	0.6 0.024	1.5 0.059	NKJS25	36.0 8090	36.2 8140	14000	9200	0.0398	0.174 0.384
28	28 1.1024	42 1.6535	20 0.787	32 1.2598	0.3 0.012	2.0 0.079	NKJ28/20	24.8 5580	40.4 9080	14000	8800	0.0411	0.104 0.229
	28 1.1024	42 1.6535	30 1.181	32 1.2598	0.3 0.012	2.0 0.079	NKJ28/30	35.6 8000	64.3 14500	14000	8800	0.0461	0.156 0.344
	28 1.1024	45 1.7717	17 0.669	32 1.2598	0.3 0.012	1.5 0.059	NA49/28	25.1 5640	33.8 7600	14000	9000	0.0378	0.108 0.238
	28 1.1024	45 1.7717	30 1.181	32 1.2598	0.3 0.012	1.5 0.059	NA69/28	37.1 8340	55.4 12500	14000	9000	0.0434	0.190 0.419
30	30 1.1811	45 1.7717	20 0.787	35 1.3780	0.3 0.012	1.5 0.059	NKJ30/20	26.1 5870	44.4 9980	12000	8000	0.0437	0.120 0.265
	30 1.1811	45 1.7717	30 1.181	35 1.3780	0.3 0.012	1.5 0.059	NKJ30/30	37.4 8410	70.6 15900	12000	8000	0.0491	0.179 0.395

(1) Max. axial displacement

Continued on next page.

Shaft Diameter	Dimensions mm/in.						Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
								Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	$r_{s\ min}$	s[1]		C	C_0	RPM		C_g	
	30 1.1811	47 1.8504	17 0.669	35 1.3780	0.3 0.012	1.5 0.059	NA4906	25.9 5820	36.0 8090	13000	8200	0.0399	0.114 0.251
	30 1.1811	47 1.8504	30 1.181	35 1.3780	0.3 0.012	1.0 0.039	NA6906	42.6 9580	68.2 15300	13000	8200	0.0467	0.205 0.452
	30 1.1811	52 2.0472	22 0.866	37 1.4567	0.6 0.024	1.5 0.059	NKJS30	39.0 8770	53.4 12000	12000	7900	0.0438	0.198 0.437
32	32 1.2598	47 1.8504	20 0.787	37 1.4567	0.3 0.012	2.0 0.079	NKJ32/20	26.6 5980	46.4 10400	12000	7600	0.0453	0.127 0.280
	32 1.2598	47 1.8504	30 1.181	37 1.4567	0.3 0.012	1.5 0.059	NKJ32/30	38.2 8590	73.9 16600	12000	7600	0.0508	0.192 0.423
	32 1.2598	52 2.0472	20 0.787	40 1.5748	0.6 0.024	1.5 0.059	NA49/32	32.0 7190	49.3 11100	11000	7100	0.0457	0.169 0.373
	32 1.2598	52 2.0472	36 1.417	40 1.5748	0.6 0.024	1.0 0.039	NA69/32	48.6 10900	84.5 19000	11000	7100	0.0620	0.313 0.690
35	35 1.3780	50 1.9685	20 0.787	40 1.5748	0.3 0.012	2.0 0.079	NKJ35/20	27.8 6250	50.4 11300	11000	7000	0.0479	0.135 0.298
	35 1.3780	50 1.9685	30 1.181	40 1.5748	0.3 0.012	1.5 0.059	NKJ35/30	40.0 8990	80.2 18000	11000	7000	0.0537	0.208 0.459
	35 1.3780	55 2.1654	20 0.787	42 1.6535	0.6 0.024	1.5 0.059	NA4907	32.8 7370	51.7 11600	10000	6700	0.0472	0.179 0.395
	35 1.3780	55 2.1654	36 1.417	42 1.6535	0.6 0.024	1.0 0.039	NA6907	49.9 11200	88.7 19900	10000	6700	0.0540	0.340 0.750
	35 1.3780	58 2.2835	22 0.866	43 1.6929	0.6 0.024	1.0 0.039	NKJS35	41.6 9350	60.7 13600	10000	6700	0.0481	0.235 0.518
38	38 1.4961	53 2.0866	20 0.787	43 1.6929	0.3 0.012	2.0 0.079	NKJ38/20	29.0 6520	54.4 12200	9900	6400	0.0504	0.146 0.322
	38 1.4961	53 2.0866	30 1.181	43 1.6929	0.3 0.012	1.5 0.059	NKJ38/30	41.6 9350	86.6 19500	9900	6400	0.0565	0.196 0.432
40	40 1.5748	55 2.1654	20 0.787	45 1.7717	0.3 0.012	2.0 0.079	NKJ40/20	29.5 6630	56.4 12700	9400	6100	0.0519	0.152 0.335
	40 1.5748	55 2.1654	30 1.181	45 1.7717	0.3 0.012	1.5 0.059	NKJ40/30	42.3 9510	89.8 20200	9400	6100	0.0582	0.229 0.505
	40 1.5748	62 2.4409	22 0.866	48 1.8898	0.6 0.024	1.5 0.059	NA4908	44.2 9940	67.8 15200	9100	5900	0.0519	0.248 0.547
	40 1.5748	62 2.4409	40 1.575	48 1.8898	0.6 0.024	1.5 0.059	NA6908	70.8 15900	124 27900	9100	5900	0.0717	0.473 1.043
	40 1.5748	65 2.5591	22 0.866	50 1.9685	1.0 0.039	1.0 0.039	NKJS40	45.5 10200	71.3 16000	8700	5700	0.0535	0.292 0.644
42	42 1.6535	57 2.2441	20 0.787	47 1.8504	0.3 0.012	2.0 0.079	NKJ42/20	30.0 6740	58.5 13200	9000	5900	0.0534	0.159 0.351
	42 1.6535	57 2.2441	30 1.181	47 1.8504	0.3 0.012	1.5 0.059	NKJ42/30	39.9 8970	84.1 18900	9000	5900	0.0584	0.241 0.531
45	45 1.7717	62 2.4409	25 0.984	50 1.9685	0.6 0.024	3.0 0.118	NKJ45/25	40.7 9150	79.3 17800	8500	5500	0.0580	0.223 0.492
	45 1.7717	62 2.4409	35 1.378	50 1.9685	0.6 0.024	3.0 0.118	NKJ45/35	55.0 12400	117 26300	8500	5500	0.0636	0.345 0.761
	45 1.7717	68 2.6772	22 0.866	52 2.0472	0.6 0.024	2.0 0.079	NA4909	46.8 10500	74.8 16800	8400	5400	0.0550	0.291 0.642
	45 1.7717	68 2.6772	40 1.575	52 2.0472	0.6 0.024	1.5 0.059	NA6909	74.7 16800	137 30800	8400	5400	0.0759	0.55 1.232
	45 1.7717	72 2.8346	22 0.866	55 2.1654	1.0 0.039	1.0 0.039	NKJS45	47.9 10800	78.4 17600	7900	5100	0.0571	0.360 0.794
50	50 1.9685	68 2.6772	25 0.984	55 2.1654	0.6 0.024	3.0 0.118	NKJ50/25	46.1 10400	87.3 19600	7800	5000	0.0605	0.288 0.635
	50 1.9685	68 2.6772	35 1.378	55 2.1654	0.6 0.024	3.0 0.118	NKJ50/35	62.3 14000	129 29000	7800	5000	0.0667	0.406 0.895
	50 1.9685	72 2.8346	22 0.866	58 2.2835	0.6 0.024	2.0 0.079	NA4910	48.9 11000	82.0 18400	7400	4800	0.0591	0.296 0.653

(1) Max. axial displacement

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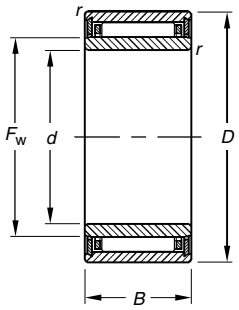
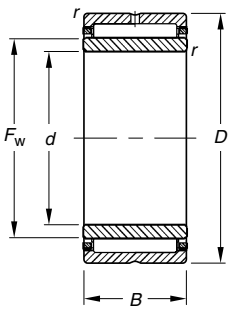
NEEDLE ROLLER BEARINGS WITH INNER RINGS – *continued*

METRIC SERIES



NKJ
(d ≤ 7)



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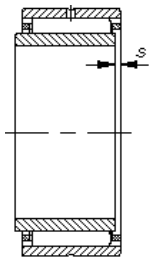
NA49, NA69



Shaft Diameter	Dimensions mm/in.						Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
								Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	$r_{s\,min}$	s[1]		C	C_0	RPM		C_g	
	50 1.9685	**72** 2.8346	**40** 1.575	**58** 2.2835	**0.6** 0.024	**1.5** 0.059	**NA6910**	**75.7** 17000	**144** 32400	**7400**	**4800**	**0.0806**	**0.577** 1.272
	50 1.9685	**80** 3.1496	**28** 1.102	**60** 2.3622	**1.1** 0.043	**1.5** 0.059	**NKJS50**	**66.9** 15000	**103** 23200	**7300**	**4800**	**0.0612**	**0.523** 1.153
55	**55** 2.1654	**72** 2.8346	**25** 0.984	**60** 2.3622	**0.6** 0.024	**3.0** 0.118	**NKJ55/25**	**44.3** 9960	**94.0** 21100	**7000**	**4600**	**0.0654**	**0.290** 0.639
	55 2.1654	**72** 2.8346	**35** 1.378	**60** 2.3622	**0.6** 0.024	**3.0** 0.118	**NKJ55/35**	**59.9** 13500	**139** 31200	**7000**	**4600**	**0.0721**	**0.410** 0.904
	55 2.1654	**80** 3.1496	**25** 0.984	**63** 2.4803	**1.0** 0.039	**2.5** 0.098	**NA4911**	**62.0** 13900	**107** 24100	**6900**	**4500**	**0.0645**	**0.426** 0.939
	55 2.1654	**80** 3.1496	**45** 1.772	**63** 2.4803	**1.0** 0.039	**2.5** 0.098	**NA6911**	**94.2** 21200	**172** 38700	**6900**	**4500**	**0.0852**	**0.800** 1.764
	55 2.1654	**85** 3.3465	**28** 1.102	**65** 2.5591	**1.1** 0.043	**1.5** 0.059	**NKJS55**	**71.0** 16000	**114** 25600	**6700**	**4400**	**0.0650**	**0.569** 1.254
60	**60** 2.3622	**82** 3.2283	**25** 0.984	**68** 2.6772	**0.6** 0.024	**2.0** 0.079	**NKJ60/25**	**49.0** 11000	**101** 22700	**6200**	**4000**	**0.0691**	**0.440** 0.970
	60 2.3622	**82** 3.2283	**35** 1.378	**68** 2.6772	**0.6** 0.024	**2.5** 0.098	**NKJ60/35**	**66.2** 14900	**149** 33500	**6200**	**4000**	**0.0760**	**0.520** 1.146
	60 2.3622	**85** 3.3465	**25** 0.984	**68** 2.6772	**1.0** 0.039	**1.5** 0.059	**NA4912**	**64.8** 14600	**116** 26100	**6300**	**4100**	**0.0681**	**0.457** 1.008
	60 2.3622	**85** 3.3465	**45** 1.772	**68** 2.6772	**1.0** 0.039	**2.0** 0.079	**NA6912**	**99.3** 22300	**189** 42500	**6400**	**4100**	**0.0901**	**0.829** 1.828
	60 2.3622	**90** 3.5433	**28** 1.102	**70** 2.7559	**1.1** 0.043	**1.5** 0.059	**NKJS60**	**72.6** 16300	**120** 27000	**6200**	**4000**	**0.0679**	**0.607** 1.338
65	**65** 2.5591	**90** 3.5433	**25** 0.984	**72** 2.8346	**1.0** 0.039	**1.5** 0.059	**NA4913**	**66.0** 14800	**121** 27200	**5900**	**3900**	**0.0705**	**0.489** 1.078
	65 2.5591	**90** 3.5433	**25** 0.984	**73** 2.8740	**0.6** 0.024	**2.0** 0.079	**NKJ65/25**	**61.5** 13800	**119** 26800	**5800**	**3800**	**0.0717**	**0.500** 1.102
	65 2.5591	**90** 3.5433	**35** 1.378	**73** 2.8740	**0.6** 0.024	**2.0** 0.079	**NKJ65/35**	**82.5** 18500	**173** 38900	**5800**	**3800**	**0.0787**	**0.690** 1.521
	65 2.5591	**90** 3.5433	**45** 1.772	**72** 2.8346	**1.0** 0.039	**2.0** 0.079	**NA6913**	**107** 24100	**213** 47900	**6000**	**3900**	**0.0952**	**0.945** 2.083
	65 2.5591	**95** 3.7402	**28** 1.102	**75** 2.9528	**1.1** 0.043	**1.5** 0.059	**NKJS65**	**76.5** 17200	**132** 29700	**5800**	**3700**	**0.0716**	**0.655** 1.444
70	**70** 2.7559	**95** 3.7402	**25** 0.984	**80** 3.1496	**1.0** 0.039	**2.0** 0.079	**NKJ70/25**	**65.0** 14600	**131** 29400	**5300**	**3400**	**0.0766**	**0.561** 1.237
	70 2.7559	**95** 3.7402	**35** 1.378	**80** 3.1496	**1.0** 0.039	**3.5** 0.138	**NKJ70/35**	**79.7** 17900	**184** 41400	**5300**	**3400**	**0.0846**	**0.779** 1.717
	70 2.7559	**100** 3.9370	**28** 1.102	**80** 3.1496	**1.1** 0.043	**1.5** 0.059	**NKJS70**	**80.1** 18000	**143** 32100	**5400**	**3500**	**0.0752**	**0.772** 1.702
	70 2.7559	**100** 3.9370	**30** 1.181	**80** 3.1496	**1.0** 0.039	**2.5** 0.098	**NA4914**	**86.3** 19400	**157** 35300	**5400**	**3500**	**0.0770**	**0.772** 1.702
	70 2.7559	**100** 3.9370	**54** 2.126	**80** 3.1496	**1.0** 0.039	**2.0** 0.079	**NA6914**	**137** 30800	**286** 64300	**5400**	**3500**	**0.1061**	**1.450** 3.197

(1) Max. axial displacement

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Shaft Diameter	Dimensions mm/in.						Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
								Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	$r_{s\ min}$	s[1]		C	C_0	RPM		C_g	
75	75 2.9528	105 4.1339	25 0.984	85 3.3465	1.0 0.039	2.0 0.079	NKJ75/25	76.4 17200	137 30800	5000	3300	0.0764	0.640 1.411
	75 2.9528	105 4.1339	30 1.181	85 3.3465	1.0 0.039	2.5 0.098	NA4915	92.4 20800	175 39300	5000	3300	0.0812	0.817 1.801
	75 2.9528	105 4.1339	32 1.260	90 3.5433	1.1 0.043	1.5 0.059	NKJS75	91.5 20600	176 39600	4700	3100	0.0834	1.060 2.337
	75 2.9528	105 4.1339	35 1.378	85 3.3465	1.0 0.039	2.0 0.079	NKJ75/35	108 24300	214 48100	5000	3300	0.0854	1.050 2.315
	75 2.9528	105 4.1339	54 2.126	85 3.3465	1.0 0.039	2.0 0.079	NA6915	143 32100	308 69200	5000	3300	0.1110	1.554 3.426
80	80 3.1496	110 4.3307	25 0.984	90 3.5433	1.0 0.039	2.0 0.079	NKJ80/25	79.5 17900	147 33000	4700	3100	0.0798	0.790 1.742
	80 3.1496	110 4.3307	30 1.181	90 3.5433	1.0 0.039	2.5 0.098	NA4916	91.5 20600	176 39600	4700	3100	0.0834	0.862 1.900
	80 3.1496	110 4.3307	32 1.260	95 3.7402	1.1 0.043	2.0 0.079	NKJS80	95.1 21400	188 42300	4500	2900	0.0869	1.140 2.513
	80 3.1496	110 4.3307	35 1.378	90 3.5433	1.0 0.039	2.0 0.079	NKJ80/35	113 25400	230 51700	4700	3100	0.0891	0.980 2.161
	80 3.1496	110 4.3307	54 2.126	90 3.5433	1.0 0.039	2.0 0.079	NA6916	126 28300	320 71900	4700	3000	0.1197	1.615 3.560
85	85 3.3465	115 4.5276	26 1.024	95 3.7402	1.0 0.039	3.0 0.118	NKJ85/26	49.3 11100	114 25600	4400	2800	0.0839	0.862 1.900
	85 3.3465	115 4.5276	36 1.417	95 3.7402	1.0 0.039	2.0 0.079	NKJ85/36	114 25600	238 53500	4400	2800	0.0921	1.040 2.293
	85 3.3465	120 4.7244	30 1.181	100 3.9370	1.1 0.043	2.5 0.098	NA4917	110 24700	230 51700	4200	2800	0.0935	1.310 2.888
	85 3.3465	120 4.7244	63 2.480	100 3.9370	1.1 0.043	2.0 0.079	NA6917	150 33700	416 93500	4200	2700	0.1340	2.427 5.351
90	90 3.5433	120 4.7244	26 1.024	100 3.9370	1.0 0.039	3.0 0.118	NKJ90/26	83.6 18800	163 36600	4200	2800	0.0857	0.780 1.720
	90 3.5433	120 4.7244	36 1.417	100 3.9370	1.0 0.039	2.5 0.098	NKJ90/36	118 26500	254 57100	4200	2800	0.0958	1.080 2.381
	90 3.5433	125 4.9213	35 1.378	105 4.1339	1.1 0.043	2.5 0.098	NA4918	114 25600	245 55100	4000	2600	0.0970	1.370 3.020
	90 3.5433	125 4.9213	63 2.480	105 4.1339	1.1 0.043	2.0 0.079	NA6918	175 39300	427 96000	4000	2600	0.1323	2.640 5.820
95	95 3.7402	125 4.9213	26 1.024	105 4.1339	1.0 0.039	2.5 0.098	NKJ95/26	52.2 11700	127 28600	3900	2600	0.0892	0.935 2.061
	95 3.7402	125 4.9213	36 1.417	105 4.1339	1.0 0.039	3.5 0.138	NKJ95/36	72.8 16400	195 43800	3900	2600	0.0992	1.300 2.866
	95 3.7402	130 5.1181	35 1.378	110 4.3307	1.1 0.043	2.5 0.098	NA4919	115 25900	253 56900	3800	2500	0.0999	1.430 3.153
	95 3.7402	130 5.1181	63 2.480	110 4.3307	1.1 0.043	2.0 0.079	NA6919	158 35500	458 103000	3800	2500	0.1434	2.670 5.88
100	100 3.9370	130 5.1181	30 1.181	110 4.3307	1.1 0.043	2.0 0.079	NKJ100/30	103 23200	220 49500	3800	2500	0.0965	0.984 2.169
	100 3.9370	130 5.1181	40 1.575	110 4.3307	1.1 0.043	2.0 0.079	NKJ100/40	132 29700	301 67700	3800	2500	0.1043	1.410 3.109
	100 3.9370	135 5.3150	32 1.260	115 4.5276	1.1 0.043	2.0 0.079	NKJS100	104 23400	226 50800	3700	2400	0.0991	2.010 4.431
	100 3.9370	140 5.5118	40 1.575	115 4.5276	1.1 0.043	3.5 0.138	NA4920	139 31200	296 66500	3700	2400	0.1037	2.010 4.431
110	110 4.3307	140 5.5118	30 1.181	120 4.7244	1.0 0.039	0.5 0.020	NA4822	90.3 20300	230 51700	3500	2300	0.1059	1.210 2.668
	110 4.3307	150 5.9055	40 1.575	125 4.9213	1.1 0.043	3.5 0.138	NA4922	147 33000	325 73100	3400	2200	0.1101	2.190 4.828
120	120 4.7244	150 5.9055	30 1.181	130 5.1181	1.0 0.039	0.5 0.020	NA4824	94.2 21200	249 56000	3200	2100	0.1121	1.310 2.888

(1) Max. axial displacement

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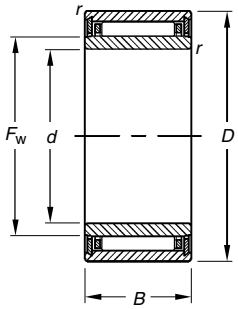
NEEDLE ROLLER BEARINGS WITH INNER RINGS – *continued*

METRIC SERIES



NKJ
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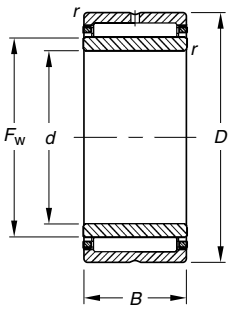
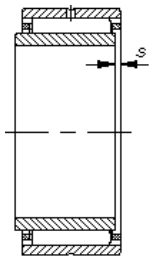


NKJ, NKJS
NA49, NA69

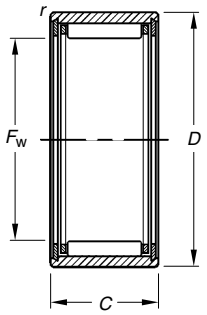


Shaft Diameter	Dimensions mm/in.						Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
								Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	$r_{s\,min}$	s[1]		C	C_0	RPM		C_g	
	120 4.7244	165 6.4961	45 1.772	135 5.3150	1.1 0.043	3.5 0.138	NA4924	177 39800	407 91500	3100	2000	0.1193	3.040 6.702
130	130 5.1181	165 6.4961	35 1.378	145 5.7087	1.1 0.043	1.0 0.039	NA4826	112 25200	323 72600	2900	1900	0.1258	1.990 4.387
	130 5.1181	180 7.0866	45 1.772	150 5.9055	1.5 0.059	3.0 0.118	NA4926	201 45200	495 111000	2800	1800	0.1314	4.140 9.127
140	140 5.5118	175 6.8898	35 1.378	155 6.1024	1.1 0.043	1.0 0.039	NA4828	116 26100	346 77800	2700	1700	0.1320	2.120 4.674
	140 5.5118	190 7.4803	50 1.969	160 6.2992	1.5 0.059	3.0 0.118	NA4928	214 48100	549 123000	2600	1700	0.1389	4.410 9.72
150	150 5.9055	190 7.4803	40 1.575	165 6.4961	1.1 0.043	2.0 0.079	NA4830	142 31900	402 90400	2500	1600	0.1367	2.700 5.952
160	160 6.2992	200 7.8740	40 1.575	175 6.8898	1.1 0.043	2.0 0.079	NA4832	146 32800	425 95500	2400	1500	0.1425	3.150 6.944

(1) Max. axial displacement

NEEDLE ROLLER BEARINGS WITHOUT INNER RINGS — *continued*

METRIC SERIES



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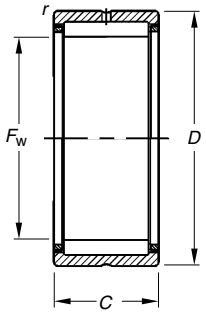
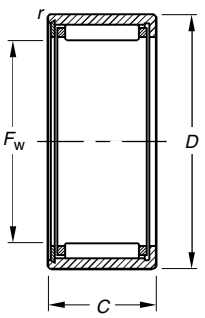


NK, NKS
RNA49, RNA69



Shaft Diameter	Dimensions mm/in.				Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
						Dynamic	Static	Oil	Grease		
mm	F_w	D	C	$r_{s\ min}$		C	C_0	RPM		C_g	
5	5 0.1969	10 0.3937	10 0.394	0.2 0.006	NK5/10TN	2.18 490	1.71 384	47000	31000	0.0095	0.004 0.009
	5 0.1969	10 0.3937	12 0.472	0.2 0.006	NK5/12TN	3.04 683	2.63 591	47000	31000	0.0106	0.004 0.009
6	6 0.2362	12 0.4724	10 0.394	0.2 0.006	NK6/10	3.19 717	2.90 652	44000	29000	0.0116	0.005 0.011
	6 0.2362	12 0.4724	12 0.472	0.2 0.006	NK6/12TN	3.07 690	2.74 616	44000	29000	0.0115	0.006 0.013
7	7 0.2756	14 0.5512	10 0.394	0.3 0.012	NK7/10TN	2.74 616	2.44 549	42000	28000	0.0118	0.007 0.015
	7 0.2756	14 0.5512	12 0.472	0.3 0.012	NK7/12TN	3.40 764	3.22 724	42000	28000	0.0127	0.009 0.020
8	8 0.3150	15 0.5906	12 0.472	0.3 0.012	NK8/12	4.57 1030	4.89 1 100	41000	26000	0.0148	0.011 0.024
	8 0.3150	15 0.5906	12 0.472	0.3 0.012	NK8/12ASR1	4.57 1030	4.89 1100	41000	26000	0.0148	0.011 0.024
	8 0.3150	15 0.5906	16 0.630	0.3 0.012	NK8/16	5.22 1170	5.78 1300	41000	26000	0.0154	0.013 0.029
9	9 0.3543	16 0.6299	12 0.472	0.3 0.012	NK9/12	4.27 960	4.60 1030	40000	26000	0.0153	0.012 0.026
	9 0.3543	16 0.6299	16 0.630	0.3 0.012	NK9/16	5.57 1250	6.47 1450	40000	26000	0.0170	0.015 0.033
10	10 0.3937	17 0.6693	12 0.472	0.3 0.012	NK10/12	5.40 1210	6.43 1450	39000	25000	0.0174	0.013 0.029
	10 0.3937	17 0.6693	16 0.630	0.3 0.012	NK10/16TN	5.30 1190	6.27 1410	39000	25000	0.0173	0.015 0.033
12	12 0.4724	19 0.7480	12 0.472	0.3 0.012	NK12/12	6.86 1540	7.60 1710	30000	19000	0.0195	0.013 0.029
	12 0.4724	19 0.7480	12 0.472	0.3 0.012	NK12/16	6.78 1520	9.03 2030	37000	24000	0.0204	0.018 0.040
14	14 0.5512	22 0.8661	13 0.512	0.3 0.012	RNA4900	9.39 2110	10.3 2320	24000	16000	0.0211	0.018 0.040
	14 0.5512	22 0.8661	16 0.630	0.3 0.012	NK14/16	12.4 2790	14.8 3330	24000	16000	0.0231	0.023 0.051
	14 0.5512	22 0.8661	20 0.787	0.3 0.012	NK14/20	14.7 3300	18.4 4140	24000	16000	0.0244	0.028 0.06
15	15 0.5906	23 0.9055	16 0.630	0.3 0.012	NK15/16	12.4 2790	15.0 3370	24000	15000	0.0238	0.024 0.053
	15 0.5906	23 0.9055	20 0.787	0.3 0.012	NK15/20	14.7 3300	18.6 4180	24000	15000	0.0252	0.031 0.068
16	16 0.6299	24 0.9449	13 0.512	0.3 0.012	RNA4901	10.5 2360	12.3 2770	28000	18000	0.0233	0.020 0.044
	16 0.6299	24 0.9449	16 0.630	0.3 0.012	NK16/16	15.4 3460	20.2 4540	28000	18000	0.0250	0.025 0.055

(1) Max. axial displacement

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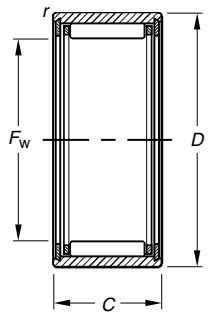
NEEDLE ROLLER BEARINGS WITHOUT INNER RINGS — *continued*

METRIC SERIES



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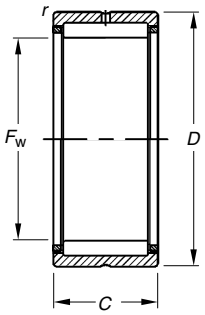
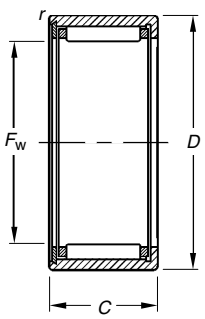


NK, NKS
RNA49, RNA69



NKTN

Shaft Diameter	Dimensions mm/in.				Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
						Dynamic	Static	Oil	Grease		
mm	F_w	D	C	$r_{s\,min}$		C	C_0	RPM		C_g	
	16 0.6299	24 0.9449	20 0.787	0.3 0.012	NK16/20	16.1 3620	21.3 4790	28000	18000	0.0264	0.036 0.079
	16 0.6299	24 0.9449	22 0.866	0.3 0.012	RNA6901	16.1 3620	21.3 4790	28000	18000	0.0267	0.036 0.079
17	17 0.6693	25 0.9843	16 0.630	0.3 0.012	NK17/16	13.6 3060	17.5 3930	27000	17000	0.0261	0.027 0.060
	17 0.6693	25 0.9843	20 0.787	0.3 0.012	NK17/20	15.4 3460	20.4 4590	27000	17000	0.0271	0.034 0.075
18	18 0.7087	26 1.0236	16 0.630	0.3 0.012	NK18/16	13.6 3060	17.7 3980	25000	16000	0.0268	0.028 0.062
	18 0.7087	26 1.0236	20 0.787	0.3 0.012	NK18/20	16.1 3620	22.0 4950	25000	16000	0.0283	0.035 0.077
19	19 0.7480	27 1.0630	16 0.630	0.3 0.012	NK19/16	14.1 3170	19.0 4270	24000	15000	0.0279	0.029 0.064
	19 0.7480	27 1.0630	20 0.787	0.3 0.012	NK19/20	18.8 4230	23.6 5310	24000	15000	0.0295	0.037 0.082
	19 0.7480	30 1.1811	16 0.630	0.3 0.012	NKS18	15.9 3570	16.2 3640	26000	17000	0.0255	0.045 0.099
20	20 0.7874	28 1.1024	13 0.512	0.3 0.012	RNA4902	11.8 2650	15.3 3440	22000	14000	0.0270	0.023 0.051
	20 0.7874	28 1.1024	16 0.630	0.3 0.012	NK20/16	14.1 3170	19.1 4290	22000	14000	0.0285	0.030 0.066
	20 0.7874	28 1.1024	20 0.787	0.3 0.012	NK20/20	17.5 3930	25.3 5690	22000	14000	0.0306	0.038 0.084
	20 0.7874	28 1.1024	23 0.906	0.3 0.012	RNA6902	18.4 4140	26.9 6050	22000	14000	0.0311	0.042 0.093
	20 0.7874	32 1.2598	20 0.787	0.6 0.024	NKS20	24.4 5490	26.7 6000	24000	15000	0.0290	0.058 0.128
21	21 0.8268	29 1.1417	16 0.630	0.3 0.012	NK21/16	15.3 3440	21.6 4860	21000	14000	0.0301	0.032 0.071
	21 0.8268	29 1.1417	20 0.787	0.3 0.012	NK21/20	18.1 4070	26.9 6050	21000	14000	0.0317	0.040 0.088
22	22 0.8661	30 1.1811	13 0.512	0.3 0.012	RNA4903	12.2 2740	16.4 3690	20000	13000	0.0286	0.025 0.055
	22 0.8661	30 1.1811	16 0.630	0.3 0.012	NK22/16	15.2 3420	21.7 4880	20000	13000	0.0307	0.033 0.073
	22 0.8661	30 1.1811	20 0.787	0.3 0.012	NK22/20	18.0 4050	27.0 6070	20000	13000	0.0324	0.041 0.090
	22 0.8661	30 1.1811	23 0.906	0.3 0.012	RNA6903	19.8 4450	30.6 6880	20000	13000	0.0334	0.056 0.123
	22 0.8661	35 1.3780	20 0.787	0.6 0.024	NKS22	22.9 5150	27.1 6090	21000	14000	0.0310	0.069 0.152
24	24 0.9449	32 1.2598	16 0.630	0.3 0.012	NK24/16	16.2 3640	24.3 5460	18000	12000	0.0328	0.035 0.077

(1) Max. axial displacement

Continued on next page.

Shaft Diameter	Dimensions mm/in.				Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
						Dynamic	Static	Oil	Grease		
mm	F_w	D	C	$r_{s\ min}$		C	C_0	RPM		C_g	
	24 0.9449	32 1.2598	20 0.787	0.3 0.012	NK24/20	19.3 4340	30.3 6810	18000	12000	0.0346	0.045 0.099
	24 0.9449	37 1.4567	20 0.787	0.6 0.024	NKS24	29.1 6540	32.8 7370	20000	13000	0.0325	0.073 0.161
25	25 0.9843	33 1.2992	16 0.630	0.3 0.012	NK25/16	16.1 3620	24.4 5490	17000	11000	0.0334	0.037 0.082
	25 0.9843	33 1.2992	20 0.787	0.3 0.012	NK25/20	19.1 4290	30.4 6830	17000	11000	0.0353	0.047 0.104
	25 0.9843	37 1.4567	17 0.669	0.3 0.012	RNA4904	21.3 4790	25.5 5730	18000	12000	0.0318	0.061 0.134
	25 0.9843	37 1.4567	30 1.181	0.3 0.012	RNA6904	36.6 8230	51.0 11500	18000	12000	0.0378	0.091 0.201
	25 0.9843	38 1.4961	20 0.787	0.6 0.024	NKS25	29.1 6540	33.0 7420	19000	12000	0.0331	0.076 0.168
26	26 1.0236	34 1.3386	16 0.630	0.3 0.012	NK26/16	16.6 3730	25.7 5780	17000	11000	0.0344	0.039 0.086
	26 1.0236	34 1.3386	20 0.787	0.3 0.012	NK26/20	19.7 4430	32.0 7190	17000	11000	0.0363	0.048 0.106
28	28 1.1024	37 1.4567	20 0.787	0.3 0.012	NK28/20	22.6 5080	34.4 7730	16000	10000	0.0373	0.057 0.126
	28 1.1024	37 1.4567	30 1.181	0.3 0.012	NK28/30	29.0 6520	53.8 12100	16000	10000	0.0427	0.088 0.194
	28 1.1024	39 1.5354	17 0.669	0.3 0.012	RNA49/22	23.3 5240	29.6 6650	16000	10000	0.0346	0.059 0.130
	28 1.1024	39 1.5354	30 1.181	0.3 0.012	RNA69/22	30.6 6880	50.7 11400	16000	10000	0.0487	0.107 0.236
	28 1.1024	42 1.6535	20 0.787	0.6 0.024	NKS28	30.3 6810	38.4 8630	16000	11000	0.0364	0.094 0.207
29	29 1.1417	38 1.4961	20 0.787	0.3 0.012	NK29/20	23.4 5260	36.4 8180	15000	9800	0.0383	0.059 0.130
	29 1.1417	38 1.4961	30 1.181	0.3 0.012	NK29/30	29.8 6700	56.4 12700	15000	9700	0.0438	0.090 0.198
30	30 1.1811	40 1.5748	20 0.787	0.3 0.012	NK30/20	24.2 5440	38.3 8610	15000	9500	0.0394	0.071 0.157
	30 1.1811	40 1.5748	30 1.181	0.3 0.012	NK30/30	34.7 7800	61.0 13700	15000	9500	0.0442	0.107 0.236
	30 1.1811	42 1.6535	17 0.669	0.3 0.012	RNA4905	24.3 5460	31.7 7130	15000	9700	0.0362	0.071 0.157
	30 1.1811	42 1.6535	30 1.181	0.3 0.012	RNA6905	39.7 8920	59.6 13400	15000	9700	0.0424	0.127 0.280
	30 1.1811	45 1.7717	20 0.787	0.6 0.024	NKS30	34.3 7710	42.8 9620	15000	9900	0.0380	0.114 0.251
32	32 1.2598	42 1.6535	20 0.787	0.3 0.012	NK32/20	24.8 5580	40.4 9080	14000	8800	0.0411	0.074 0.163
	32 1.2598	42 1.6535	30 1.181	0.3 0.012	NK32/30	35.6 8000	64.3 14500	14000	8800	0.0461	0.112 0.247
	32 1.2598	45 1.7717	17 0.669	0.3 0.012	RNA49/28	25.1 5640	33.8 7600	14000	9000	0.0378	0.080 0.176
	32 1.2598	45 1.7717	30 1.181	0.3 0.012	RNA69/28	43.2 9710	62.5 14100	14000	9100	0.0612	0.140 0.309
	32 1.2598	47 1.8504	22 0.866	0.6 0.024	NKS32	36.0 8090	46.2 10400	14000	9200	0.0398	0.120 0.265
35	35 1.3780	45 1.7717	20 0.787	0.3 0.012	NK35/20	26.1 5870	44.4 9980	12000	8000	0.0437	0.081 0.179
	35 1.3780	45 1.7717	30 1.181	0.3 0.012	NK35/30	37.4 8410	70.6 15900	12000	8000	0.0491	0.122 0.269
	35 1.3780	47 1.8504	18 0.709	0.3 0.012	RNA4906	25.9 5820	36.0 8090	13000	8200	0.0399	0.081 0.179

(1) Max. axial displacement

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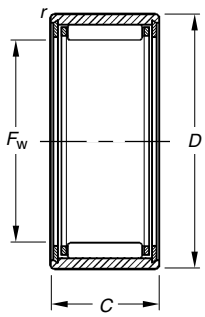
NEEDLE ROLLER BEARINGS WITHOUT INNER RINGS — *continued*

METRIC SERIES



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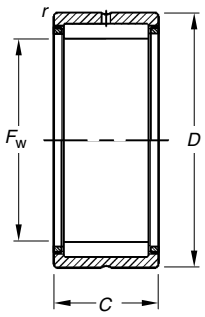
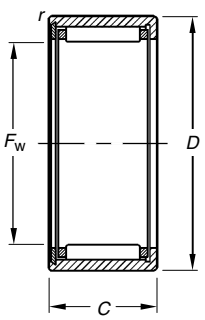


NK, NKS
RNA49, RNA69



NKTN

Shaft Diameter	Dimensions mm/in.				Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
						Dynamic	Static	Oil	Grease		
mm	F_w	D	C	$r_{s\ min}$		C	C_0	RPM		C_g	
	35 1.3780	47 1.8504	30 1.181	0.3 0.012	RNA6906	42.6 9580	68.2 15300	13000	8200	0.0467	0.148 0.326
	35 1.3780	50 1.9685	22 0.866	0.6 0.024	NKS35	37.5 8430	49.9 11200	13000	8400	0.0421	0.130 0.287
37	37 1.4567	47 1.8504	20 0.787	0.3 0.012	NK37/20	26.6 5980	46.4 10400	12000	7600	0.0453	0.084 0.185
	37 1.4567	47 1.8504	30 1.181	0.3 0.012	NK37/30	38.2 8590	73.9 16600	12000	7600	0.0508	0.128 0.282
	37 1.4567	52 2.0472	22 0.866	0.6 0.024	NKS37	39.0 8770	53.4 12000	12000	7900	0.0438	0.134 0.295
38	38 1.4961	48 1.8898	20 0.787	0.3 0.012	NK38/20	21.7 4880	40.9 9190	11000	7300	0.0456	0.087 0.192
	38 1.4961	48 1.8898	30 1.181	0.3 0.012	NK38/30	31.9 7170	67.0 15100	11000	7300	0.0516	0.131 0.289
40	40 1.5748	50 1.9685	20 0.787	0.3 0.012	NK40/20	27.8 6250	50.4 11300	11000	7000	0.0479	0.089 0.196
	40 1.5748	50 1.9685	30 1.181	0.3 0.012	NK40/30	40.0 8990	80.2 18000	11000	7000	0.0537	0.137 0.302
	40 1.5748	52 2.0472	20 0.787	0.6 0.024	RNA49/32	32.0 7190	49.3 11100	11000	7100	0.0457	0.100 0.220
	40 1.5748	52 2.0472	36 1.417	0.6 0.024	RNA69/32	48.6 10900	84.5 19000	11000	7100	0.0620	0.185 0.408
	40 1.5748	55 2.1654	22 0.866	0.6 0.024	NKS40	40.3 9060	57.0 12800	11000	7200	0.0460	0.140 0.309
42	42 1.6535	52 2.0472	20 0.787	0.3 0.012	NK42/20	28.3 6360	52.4 11800	10000	6600	0.0494	0.085 0.187
	42 1.6535	52 2.0472	30 1.181	0.3 0.012	NK42/30	40.7 9150	83.5 18800	10000	6600	0.0554	0.141 0.311
	42 1.6535	55 2.1654	20 0.787	0.6 0.024	RNA4907	32.8 7370	51.7 11600	10000	6700	0.0454	0.114 0.251
	42 1.6535	55 2.1654	36 1.417	0.6 0.024	RNA6907	49.9 11200	88.7 19900	10000	6700	0.0641	0.218 0.481
43	43 1.6929	53 2.0866	20 0.787	0.3 0.012	NK43/20	29.0 6520	54.4 12200	9900	6400	0.0504	0.096 0.212
	43 1.6929	53 2.0866	30 1.181	0.3 0.012	NK43/30	41.6 9350	86.6 19500	9900	6400	0.0565	0.134 0.295
	43 1.6929	58 2.2835	22 0.866	0.6 0.024	NKS43	41.6 9350	60.7 13600	10000	6700	0.0481	0.150 0.331
45	45 1.7717	55 2.1654	20 0.787	0.3 0.012	NK45/20	29.5 6630	56.4 12700	9400	6100	0.0519	0.100 0.220
	45 1.7717	55 2.1654	30 1.181	0.3 0.012	NK45/30	42.3 9510	89.8 20200	9400	6100	0.0582	0.151 0.333
	45 1.7717	60 2.3622	22 0.866	0.6 0.024	NKS45	43.0 9670	64.2 14400	9800	6400	0.0498	0.156 0.344

(1) Max. axial displacement

Continued on next page.

Shaft Diameter	Dimensions mm/in.				Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
						Dynamic	Static	Oil	Grease		
mm	F_w	D	C	$r_{s\,min}$		C	C_0	RPM		C_g	
47	47 1.8504	57 2.2441	20 0.787	0.3 0.012	NK47/20	30.0 6740	58.5 13200	9000	5900	0.0534	0.104 0.229
	47 1.8504	57 2.2441	30 1.181	0.3 0.012	NK47/30	43.0 9670	93.1 20900	9000	5900	0.0599	0.158 0.348
48	48 1.8898	62 2.4409	22 0.866	0.6 0.024	RNA4908	44.2 9940	67.8 15200	9100	5900	0.0519	0.154 0.340
	48 1.8898	62 2.4409	40 1.575	0.6 0.024	RNA6908	70.8 15900	124 27900	9100	5900	0.0717	0.300 0.661
50	50 1.9685	62 2.4409	25 0.984	0.3 0.012	NK50/25	40.7 9150	79.3 17800	8500	5500	0.0578	0.171 0.377
	50 1.9685	62 2.4409	35 1.378	0.6 0.024	NK50/35	55.0 12400	117 26300	8500	5500	0.0636	0.242 0.534
	50 1.9685	65 2.5591	22 0.866	1.0 0.039	NKS50	45.5 10200	71.3 16000	8700	5700	0.0535	0.170 0.375
52	52 2.0472	68 2.6772	22 0.866	0.6 0.024	RNA4909	46.8 10500	74.8 16800	8400	5400	0.0550	0.201 0.443
	52 2.0472	68 2.6772	40 1.575	0.6 0.024	RNA6909	74.7 16800	137 30800	8400	5400	0.0759	0.392 0.864
55	55 2.1654	68 2.6772	25 0.984	0.6 0.024	NK55/25	46.1 10400	87.3 19600	7800	5000	0.0605	0.207 0.456
	55 2.1654	68 2.6772	35 1.378	0.6 0.024	NK55/35	62.3 14000	129 29000	7800	5000	0.0667	0.293 0.646
	55 2.1654	72 2.8346	22 0.866	1.0 0.039	NKS55	47.9 10800	78.4 17600	7900	5100	0.0571	0.225 0.496
58	58 2.2835	72 2.8346	22 0.866	0.6 0.024	RNA4910	48.9 11000	82.0 18400	7400	4800	0.0591	0.179 0.395
	58 2.2835	72 2.8346	40 1.575	0.6 0.024	RNA6910	75.7 17000	144 32400	7400	4800	0.0806	0.364 0.802
60	60 2.3622	72 2.8346	25 0.984	0.6 0.024	NK60/25	44.3 9960	94.0 21100	7000	4400	0.0654	0.202 0.445
	60 2.3622	72 2.8346	35 1.378	0.6 0.024	NK60/35	59.9 13500	139 31200	7000	4400	0.0721	0.286 0.631
	60 2.3622	80 3.1496	28 1.102	1.1 0.043	NKS60	66.9 15000	103 23200	7300	4800	0.0612	0.337 0.743
63	63 2.4803	80 3.1496	25 0.984	1.0 0.039	RNA4911	62.0 13900	107 24100	6900	4500	0.0645	0.285 0.628
	63 2.4803	80 3.1496	45 1.772	1.0 0.039	RNA6911	94.2 21200	172 38700	6900	4500	0.0852	0.540 1.190
65	65 2.5591	78 3.0709	25 0.984	0.6 0.024	NK65/25	48.2 10800	97.7 22000	6500	4200	0.0671	0.257 0.567
	65 2.5591	78 3.0709	35 1.378	0.6 0.024	NK65/35	65.2 14700	144 32400	6500	4200	0.0739	0.298 0.657
	65 2.5591	85 3.3465	28 1.102	1.1 0.043	NKS65	71.0 16000	114 25600	6700	4200	0.0650	0.362 0.798
68	68 2.6772	82 3.2283	25 0.984	0.6 0.024	NK68/25	49.0 11000	101 22700	6200	4000	0.0691	0.287 0.633
	68 2.6772	82 3.2283	35 1.378	0.6 0.024	NK68/35	66.2 14900	149 33500	6200	4000	0.0760	0.350 0.772
	68 2.6772	85 3.3465	25 0.984	1.0 0.039	RNA4912	64.8 14600	116 26100	6300	4100	0.0681	0.304 0.670
	68 2.6772	85 3.3465	45 1.772	1.0 0.039	RNA6912	99.3 22300	189 42500	6300	4100	0.0901	0.546 1.204
70	70 2.7559	85 3.3465	25 0.984	0.6 0.024	NK70/25	43.6 9800	87.9 19800	6000	3900	0.0705	0.298 0.657
	70 2.7559	85 3.3465	35 1.378	0.6 0.024	NK70/35	62.2 14000	139 31200	6000	3900	0.0757	0.411 0.906
	70 2.7559	90 3.5433	28 1.102	1.1 0.043	NKS70	72.6 16300	120 27000	6200	4000	0.0679	0.383 0.844

(1) Max. axial displacement

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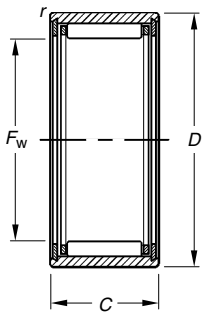
NEEDLE ROLLER BEARINGS WITHOUT INNER RINGS – *continued*

METRIC SERIES



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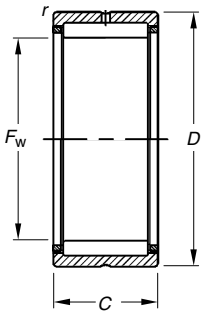
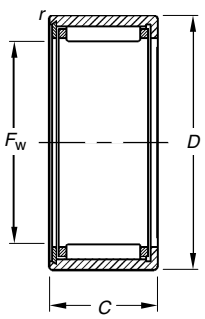


NK, NKS
RNA49, RNA69



NKTN

Shaft Diameter	Dimensions mm/in.				Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
						Dynamic	Static	Oil	Grease		
mm	F_w	D	C	$r_{s\,min}$		C	C_0	RPM		C_g	
72	72 2.8346	90 3.5433	25 0.984	1.0 0.039	RNA4913	66.0 14800	121 27200	5900	3900	0.0705	0.346 0.763
	72 2.8346	90 3.5433	45 1.772	1.0 0.039	RNA6913	107 24100	213 47900	5900	3900	0.0952	0.679 1.497
73	73 2.8740	90 3.5433	25 0.984	0.6 0.024	NK73/25	61.5 13800	119 26800	5800	3800	0.0717	0.320 0.705
	73 2.8740	90 3.5433	35 1.378	0.6 0.024	NK73/35	82.5 18500	173 38900	5800	3800	0.0787	0.450 0.992
75	75 2.9528	92 3.6220	25 0.984	0.6 0.024	NK75/25	43.7 9820	90.2 20300	5600	3600	0.0702	0.364 0.802
	75 2.9528	92 3.6220	35 1.378	0.6 0.024	NK75/35	60.9 13700	138 31000	5600	3600	0.0780	0.518 1.142
	75 2.9528	95 3.7402	28 1.102	1.1 0.043	NKS75	76.5 17200	132 29700	5800	3700	0.0716	0.413 0.911
80	80 3.1496	95 3.7402	25 0.984	1.0 0.039	NK80/25	65.0 14600	131 29400	5300	3400	0.0766	0.331 0.730
	80 3.1496	95 3.7402	35 1.378	1.0 0.039	NK80/35	79.7 17900	184 41400	5300	3400	0.0846	0.380 0.838
	80 3.1496	100 3.9370	30 1.181	1.0 0.039	RNA4914	86.3 19400	157 35300	5400	3500	0.0770	0.502 1.107
	80 3.1496	100 3.9370	54 2.126	1.0 0.039	RNA6914	137 30800	286 64300	5400	6500	0.1061	0.946 2.086
85	85 3.3465	105 4.1339	25 0.984	1.0 0.039	NK85/25	76.4 17200	137 30800	5000	3300	0.0764	0.506 1.116
	85 3.3465	105 4.1339	30 1.181	1.0 0.039	RNA4915	92.4 20800	175 39300	5000	3300	0.0812	0.528 1.164
	85 3.3465	105 4.1339	35 1.378	1.0 0.039	NK85/35	108 24300	214 48100	5000	3300	0.0854	0.610 1.345
	85 3.3465	105 4.1339	54 2.126	1.0 0.039	RNA6915	143 32100	308 69200	5000	3300	0.1110	1.020 2.249
90	90 3.5433	110 4.3307	25 0.984	1.0 0.039	NK90/25	79.5 17900	147 33000	4700	3100	0.0798	0.450 0.992
	90 3.5433	110 4.3307	30 1.181	1.0 0.039	RNA4916	91.5 20600	176 39600	4700	3100	0.0834	0.556 1.226
	90 3.5433	110 4.3307	35 1.378	1.0 0.039	NK90/35	113 25400	230 51700	4700	3100	0.0891	0.745 1.642
	90 3.5433	110 4.3307	54 2.126	1.0 0.039	RNA6916	126 28300	320 71900	4700	3100	0.1197	1.050 2.315
95	95 3.7402	115 4.5276	26 1.024	1.0 0.039	NK95/26	49.3 11100	114 25600	4400	2800	0.0829	0.572 1.261
	95 3.7402	115 4.5276	36 1.417	1.0 0.039	NK95/36	114 25600	238 53500	4500	2900	0.0921	0.803 1.770
100	100 3.9370	120 4.7244	26 1.024	1.0 0.039	NK100/26	83.6 18800	163 36600	4200	2800	0.0857	0.530 1.168

(1) Max. axial displacement

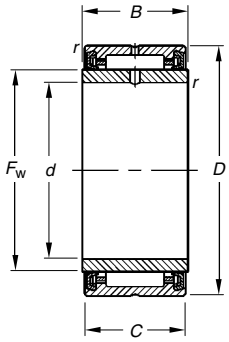
Continued on next page.

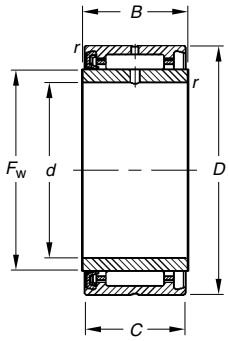
Shaft Diameter	Dimensions mm/in.				Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
						Dynamic	Static	Oil	Grease		
mm	F_w	D	C	$r_{s\ min}$		C	C_0	RPM		C_g	
	100 3.9370	**120** 4.7244	**35** 1.378	**1.1** 0.043	**RNA4917**	**110** 24700	**230** 51700	**4200**	**2800**	**0.0935**	**0.715** 1.576
	100 3.9370	**120** 4.7244	**36** 1.417	**1.0** 0.039	**NK100/36**	**118** 26500	**254** 57100	**4200**	**2800**	**0.0958**	**0.658** 1.451
	100 3.9370	**120** 4.7244	**63** 2.480	**1.1** 0.043	**RNA6917**	**150** 33700	**416** 93500	**4200**	**2800**	**0.1340**	**1.350** 2.976
105	**105** 4.1339	**125** 4.9213	**26** 1.024	**1.0** 0.039	**NK105/26**	**52.2** 11700	**127** 28600	**3900**	**2600**	**0.0892**	**0.595** 1.312
	105 4.1339	**125** 4.9213	**35** 1.378	**1.1** 0.043	**RNA4918**	**114** 25600	**245** 55100	**4000**	**2600**	**0.0970**	**0.746** 1.645
	105 4.1339	**125** 4.9213	**63** 2.480	**1.1** 0.043	**RNA6918**	**154** 34600	**437** 98200	**4000**	**2600**	**0.1323**	**1.500** 3.30
110	**110** 4.3307	**130** 5.1181	**30** 1.181	**1.1** 0.043	**NK110/30**	**103** 23200	**220** 49500	**3800**	**2500**	**0.0965**	**0.660** 1.455
	110 4.3307	**130** 5.1181	**35** 1.378	**1.1** 0.043	**RNA4919**	**115** 25900	**253** 56900	**3800**	**2500**	**0.0999**	**0.777** 1.713
	110 4.3307	**130** 5.1181	**40** 1.575	**1.1** 0.043	**NK110/40**	**132** 29700	**132** 29700	**3800**	**2500**	**0.1043**	**0.900** 1.984
	110 4.3307	**130** 5.1181	**63** 2.480	**1.1** 0.043	**RNA6919**	**158** 35500	**458** 103000	**3800**	**2500**	**0.1434**	**1.470** 3.241
115	**115** 4.5276	**140** 5.5118	**40** 1.575	**1.1** 0.043	**RNA4920**	**139** 31200	**296** 66500	**3700**	**2400**	**0.1037**	**1.220** 2.690
120	**120** 4.7244	**140** 5.5118	**30** 1.181	**1.0** 0.039	**RNA4822**	**90.3** 20300	**230** 51700	**3500**	**2300**	**0.1059**	**0.785** 1.731
125	**125** 4.9213	**150** 5.9055	**40** 1.575	**1.1** 0.043	**RNA4922**	**147** 33000	**325** 73100	**3400**	**2200**	**0.1101**	**1.320** 2.910
130	**130** 5.1181	**150** 5.9055	**30** 1.181	**1.0** 0.039	**RNA4824**	**94.1** 21200	**249** 56000	**3200**	**2100**	**0.1121**	**0.850** 1.874
135	**135** 5.3150	**165** 6.4961	**45** 1.772	**1.1** 0.043	**RNA4924**	**177** 39800	**407** 91500	**3100**	**2000**	**0.1193**	**1.980** 4.365
145	**145** 5.7087	**165** 6.4961	**35** 1.378	**1.0** 0.039	**RNA4826**	**112** 25200	**323** 72600	**2900**	**1900**	**0.1258**	**1.100** 2.425
150	**150** 5.9055	**180** 7.0866	**50** 1.969	**1.5** 0.059	**RNA4926**	**201** 45200	**495** 111000	**2800**	**1800**	**0.1314**	**2.420** 5.335
155	**155** 6.1024	**175** 6.8898	**35** 1.378	**1.1** 0.043	**RNA4828**	**116** 26100	**346** 77800	**2700**	**1700**	**0.1320**	**1.170** 2.579
160	**160** 6.2992	**190** 7.4803	**50** 1.969	**1.5** 0.059	**RNA4928**	**214** 48100	**549** 123000	**2600**	**1700**	**0.1389**	**2.560** 5.644
165	**165** 6.4961	**190** 7.4803	**40** 1.575	**1.1** 0.043	**RNA4830**	**142** 31900	**402** 90400	**2500**	**1600**	**0.1367**	**1.540** 3.395
175	**175** 6.8898	**200** 7.8740	**40** 1.575	**1.1** 0.043	**RNA4832**	**146** 32800	**425** 95500	**2400**	**1500**	**0.1425**	**1.910** 4.211

(1) Max. axial displacement

SEALED NEEDLE ROLLER BEARINGS WITH INNER RINGS

METRIC SERIES



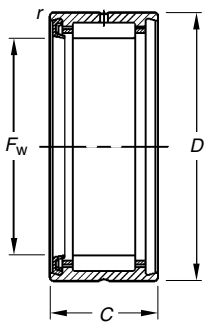


NA49RS

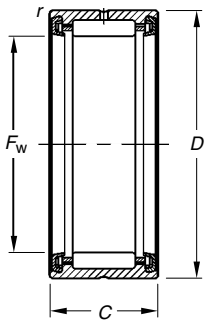
Shaft Diameter	Dimensions mm/in.						Bearing Designation	Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speeds Oil	Limiting Speeds Grease		Approx. Wt. kg/lbs.
mm	d	D	B	F_w	C	$r_{s\ min}$		C	C_0	RPM		C_g	
10	10 0.3937	22 0.8661	14 0.551	13 0.512	14 0.5512	0.3 0.012	NA4900RS	7.76 1740	8.06 1810	28000	18000	0.0199	0.027 0.060
	10 0.3937	22 0.8661	14 0.551	13 0.512	14 0.5512	0.3 0.012	NA4900.2RS	7.76 1740	8.06 1810	24000	16000	0.0199	0.027 0.060
12	12 0.4724	24 0.9449	14 0.551	13 0.512	16 0.6299	0.3 0.012	NA4901RS	8.64 1940	9.59 2160	28000	18000	0.0219	0.031 0.068
	12 0.4724	24 0.9449	14 0.551	13 0.512	16 0.6299	0.3 0.012	NA4901.2RS	8.64 1940	9.59 2160	28000	18000	0.0219	0.031 0.068
15	15 0.5906	28 1.1024	14 0.551	13 0.512	20 0.7874	0.3 0.012	NA4902RS	9.77 2200	12.0 2700	22000	14000	0.0254	0.041 0.090
	15 0.5906	28 1.1024	14 0.551	13 0.512	20 0.7874	0.3 0.012	NA4902.2RS	9.77 2200	12.0 2700	22000	14000	0.0254	0.041 0.090
17	17 0.6693	30 1.1811	14 0.551	13 0.512	22 0.8661	0.3 0.012	NA4903RS	10.1 2270	12.8 2880	20000	13000	0.0269	0.044 0.097
	17 0.6693	30 1.1811	14 0.551	13 0.512	22 0.8661	0.3 0.012	NA4903.2RS	10.1 2270	12.8 2880	20000	13000	0.0269	0.044 0.097
20	20 0.7874	37 1.4567	18 0.709	17 0.669	25 0.9843	0.3 0.012	NA4904RS	18.5 4160	21.2 4770	18000	12000	0.0309	0.087 0.192
	20 0.7874	37 1.4567	18 0.709	17 0.669	25 0.9843	0.3 0.012	NA4904.2RS	18.5 4160	21.2 4770	18000	12000	0.0304	0.087 0.192
25	25 0.9843	42 1.6535	18 0.709	17 0.669	30 1.1811	0.3 0.012	NA4905RS	21.0 4720	26.4 5930	15000	9700	0.0346	0.106 0.234
	25 0.9843	42 1.6535	18 0.709	17 0.669	30 1.1811	0.3 0.012	NA4905.2RS	21.0 4720	26.4 5930	15000	9700	0.0346	0.106 0.234
30	30 1.1811	47 1.8504	18 0.709	17 0.669	35 1.3780	0.3 0.012	NA4906RS	22.5 5060	30.0 6740	13000	8200	0.0381	0.119 0.262
	30 1.1811	47 1.8504	18 0.709	17 0.669	35 1.3780	0.3 0.012	NA4906.2RS	22.5 5060	30.0 6740	13000	8200	0.0381	0.119 0.262
35	35 1.3780	55 2.1654	21 0.827	20 0.787	42 1.6535	0.6 0.024	NA4907RS	29.1 6540	44.4 9980	10000	6700	0.0454	0.198 0.437
	35 1.3780	55 2.1654	21 0.827	20 0.787	42 1.6535	0.6 0.024	NA4907.2RS	29.1 6540	44.4 9980	10000	6700	0.0454	0.198 0.437
40	40 1.5748	62 2.4409	23 0.906	22 0.866	48 1.8898	0.6 0.024	NA4908RS	38.6 8680	57.0 12800	9100	5900	0.0497	0.263 0.580
	40 1.5748	62 2.4409	23 0.906	22 0.866	48 1.8898	0.6 0.024	NA4908.2RS	38.6 8680	57.0 12800	9100	5900	0.0497	0.263 0.580
45	45 1.7717	68 2.6772	23 0.906	22 0.866	52 2.0472	0.6 0.024	NA4909.2RS	39.4 8860	60.0 13500	8400	5400	0.0521	0.303 0.668
50	50 1.9685	72 2.8346	23 0.906	22 0.866	58 2.2835	0.6 0.024	NA4910RS	41.2 9260	65.8 14800	7400	4800	0.0559	0.309 0.681
	50 1.9685	72 2.8346	23 0.906	22 0.866	58 2.2835	0.6 0.024	NA4910.2RS	41.2 9260	65.8 14800	7400	4800	0.0559	0.309 0.681

SEALED NEEDLE ROLLER BEARINGS WITHOUT INNER RINGS

METRIC SERIES



RNA49RS

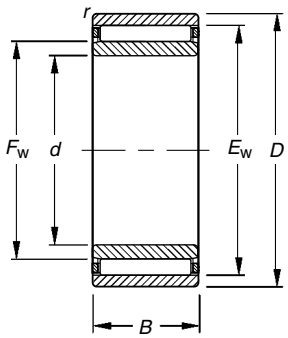


RNA49.2RS

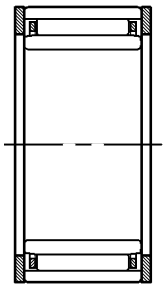
Shaft Diameter	Dimensions mm/in.				Bearing Designation	Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speeds Grease		Approx. Wt. kg/lbs.
mm	F_w	D	C	$r_{s\ min}$		C	C_0	RPM	C_g	
14	14 0.5512	22 0.8661	13 0.512	0.3 0.012	RNA4900RS	7.76 1740	8.06 1810	14000	0.0199	0.019 0.042
	14 0.5512	22 0.8661	13 0.512	0.3 0.012	RNA4900.2RS	7.76 1740	8.06 1810	14000	0.0199	0.019 0.042
16	16 0.6299	24 0.9449	13 0.512	0.3 0.012	RNA4901RS	8.64 1940	9.59 2160	12000	0.0219	0.021 0.046
	16 0.6299	24 0.0449	13 0.512	0.3 0.012	RNA4901.2RS	8.64 1940	9.59 2160	12000	0.0219	0.021 0.046
20	20 0.7874	28 1.1024	13 0.512	0.3 0.012	RNA4902RS	9.70 2180	12.0 2700	9700	0.0254	0.026 0.057
	20 0.7874	28 1.1024	13 0.512	0.3 0.012	RNA4902.2RS	9.70 2180	12.0 2700	9700	0.0254	0.026 0.057
22	22 0.8661	30 1.1811	13 0.512	0.3 0.012	RNA4903RS	10.1 2270	12.8 2880	8800	0.0269	0.027 0.060
	22 0.8661	30 1.1811	13 0.512	0.3 0.012	RNA4903.2RS	10.1 2270	12.8 2880	8800	0.0269	0.027 0.060
25	25 0.9843	37 1.4567	17 0.669	0.3 0.012	RNA4904RS	18.5 4160	21.2 4770	7800	0.0318	0.062 0.137
	25 0.9843	37 1.4567	17 0.669	0.3 0.012	RNA4904.2RS	18.5 4160	21.2 4770	7800	0.0318	0.062 0.137
30	30 1.1811	42 1.6535	17 0.669	0.3 0.012	RNA4905RS	21.0 4720	26.4 5930	6500	0.0362	0.075 0.165
	30 1.1811	42 1.6535	17 0.669	0.3 0.012	RNA4905.2RS	21.0 4720	26.4 5930	6500	0.0362	0.075 0.165
35	35 1.3780	47 1.864	18 0.709	0.3 0.012	RNA4906RS	22.5 5060	30.0 6740	5500	0.0399	0.083 0.183
	35 1.3780	47 1.8504	18 0.709	0.3 0.012	RNA4906.2RS	22.5 5060	30.0 6740	5500	0.0399	0.083 0.183
42	42 1.6535	55 2.1654	20 0.787	0.6 0.024	RNA4907RS	29.1 6540	44.4 9980	4600	0.0454	0.130 0.287
	42 1.6535	55 2.1654	20 0.787	0.6 0.024	RNA4907.2RS	29.1 6540	44.4 9980	4600	0.0454	0.130 0.287
48	48 1.8898	62 2.4409	22 0.866	0.6 0.024	RNA4908RS	38.6 8680	57.0 12800	4000	0.0519	0.163 0.359
	48 1.8898	62 2.4409	22 0.866	0.6 0.024	RNA4908.2RS	38.6 8680	57.0 12800	4000	0.0519	0.163 0.359
52	52 2.0472	68 2.6772	22 0.866	0.6 0.024	RNA4909RS	39.4 8860	60.0 13500	3700	0.0550	0.207 0.456
	52 2.0472	68 2.6772	22 0.866	0.6 0.024	RNA4909.2RS	39.4 8860	60.0 13500	3700	0.0550	0.207 0.456
58	58 2.2835	72 2.8346	22 0.866	0.6 0.024	RNA4910RS	41.2 9260	65.8 14800	3300	0.0591	0.187 0.412
	58 2.2835	72 2.8346	22 0.866	0.6 0.024	RNA4910.2RS	41.2 9260	65.8 14800	3300	0.0591	0.187 0.412

NEEDLE ROLLER BEARINGS WITHOUT FLANGES WITH INNER RINGS

METRIC SERIES



NAO



SNSH

Shaft Dia.	Dimensions mm/in.							Bearing Designation	End Washer Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
										Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	E_w	$r_{s\ min}$	s^1			C	C_0	RPM		C_g	
6	6 0.2362	17 0.6693	10 0.394	10 0.3937	13 0.5118	0.3 0.012	0.5 0.020	NAO6X17X10	SNSH10,5X17X0,5	5.40 1210	6.43 1450	39000	25000	0.0174	0.014 0.031
	8 0.3150	19 0.7480	10 0.394	12 0.4724	15 0.5906	0.3 0.012	0.5 0.020	NAO8X19X10	SNSH12,5X19X0,5	5.85 1320	7.51 1690	37000	24000	0.0195	0.017 0.037
10	10 0.3937	22 0.8661	13 0.512	14 0.5512	18 0.7087	0.3 0.012	1.0 0.039	NAO10X22X13	SNSH14,5X22X0,5	9.73 2190	12.5 2810	29000	19000	0.0227	0.026 0.057
	10 0.3937	22 0.8661	20 0.787	14 0.5512	18 0.7087	0.3 0.012	0.5 0.020	NAO10X22X20	SNSH14,5X22X0,5	12.3 2770	16.8 3780	29000	19000	0.0291	0.041 0.090
	10 0.3937	26 1.0236	12 0.472	14 0.5512	20 0.7874	0.3 0.012	0.7 0.028	NAO10X26X12	SNSH14,5X26X0,5	10.5 2360	10.6 2380	21000	14000	0.0209	0.036 0.079
12	12 0.4724	24 0.9449	13 0.512	16 0.6299	20 0.7874	0.3 0.012	1.0 0.039	NAO12X24X13	SNSH16,5X24X0,5	1 0.1 2270	13.5 3030	28000	18000	0.0245	0.030 0.066
	12 0.4724	24 0.9449	20 0.787	16 0.6299	20 0.7874	0.3 0.012	0.5 0.020	NAO12X24X20	SNSH16,5X24X0,5	13.4 3010	19.5 4380	28000	18000	0.0319	0.046 0.101
	12 0.4724	28 1.1024	12 0.472	16 0.6299	22 0.8661	0.3 0.012	0.7 0.028	NAO12X28X12	SNSH16,5X28X0,5	11.2 2520	11.9 2680	29000	19000	0.0227	0.041 0.090
15	15 0.5906	28 1.1024	13 0.512	20 0.7874	24 0.9449	0.3 0.012	1.0 0.039	NAO15X28X13	SNSH20,5X28X0,5	11.5 2590	17.3 3890	22000	14000	0.0287	0.039 0.086
	15 0.5906	28 1.1024	26 1.024	20 0.7874	24 0.9449	0.3 0.012	1.0 0.039	NAO15X28X26	SNSH20,5X28X0,5	19.8 4450	34.6 7780	22000	14000	0.0405	0.078 0.172
	15 0.5906	32 1.2598	12 0.472	20 0.7874	26 1.0236	0.3 0.012	0.7 0.028	NAO15X32X12	SNSH20,5X32X0,5	13.0 2920	15.0 3370	23000	15000	0.0264	0.050 0.110
17	17 0.6693	30 1.1811	13 0.512	22 0.8661	26 1.0236	0.3 0.012	1.0 0.039	NAO17X30X13	SNSH22,5X30X0,5	11.8 2650	18.3 4110	20000	13000	0.0303	0.043 0.095
	17 0.6693	30 1.1811	26 1.024	22 0.8661	26 1.0236	0.3 0.012	1.0 0.039	NAO17X30X26	SNSH22,5X30X0,5	20.2 4540	36.6 8230	20000	13000	0.0428	0.084 0.185
	17 0.6693	35 1.3780	16 0.630	22 0.8661	29 1.1417	0.3 0.012	1.5 0.059	NAO17X35X16	SNSH22,5X35X0,5	19.0 4270	23.3 5240	20000	13000	0.0299	0.078 0.172
	17 0.6693	35 1.3780	32 1.260	22 0.8661	29 1.1417	0.3 0.012	1.5 0.059	NAO17X35X32	SNSH22,5X35X0,5	32.7 7350	46.5 10500	20000	13000	0.0423	0.154 0.340
20	20 0.7874	35 1.3780	17 0.669	25 0.9843	30 1.1811	0.3 0.012	1.2 0.047	NAO20X35X17	SNSH25,5X35X0,5	18.8 4230	29.8 6700	17000	11000	0.0351	0.073 0.161
	20 0.7874	35 1.3780	26 1.024	25 0.9843	30 1.1811	0.3 0.012	1.2 0.047	NAO20X35X26	SNSH25,5X35X0,5	25.0 5620	42.8 9620	17000	11000	0.0456	0.112 0.247
	20 0.7874	37 1.4567	16 0.630	25 0.9843	32 1.2598	0.3 0.012	1.5 0.059	NAO20X37X16	SNSH25,5X37X0,5	19.8 4450	25.3 5690	17000	11000	0.0323	0.080 0.176
	20 0.7874	37 1.4567	32 1.260	25 0.9843	32 1.2598	0.3 0.012	1.5 0.059	NAO20X37X32	SNSH25,5X37X0,5	34.0 7640	50.7 11400	17000	11000	0.0455	0.162 0.357
25	25 0.9843	40 1.5748	17 0.669	30 1.1811	35 1.3780	0.3 0.012	1.2 0.047	NAO25X40X17	SNSH30,5X40X0,5	20.2 4540	34.9 7850	14000	9300	0.0394	0.088 0.194
	25 0.9843	40 1.5748	26 1.024	30 1.1811	35 1.3780	0.3 0.012	1.2 0.047	NAO25X40X26	SNSH30,5X40X0,5	26.8 6020	49.7 11200	14000	9300	0.0512	0.132 0.291
	25 0.9843	42 1.6535	16 0.630	30 1.1811	37 1.4567	0.3 0.012	1.5 0.059	NAO25X42X16		22.4 5040	31.0 6970	15000	9600	0.0366	0.096 0.212

(1) Max. axial displacement

Continued on next page.

Shaft Dia.	Dimensions mm/in.							Bearing Designation	End Washer Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
										Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	E_w	$r_{s\,min}$	s[1]			C	C_0	RPM		C_g	
	25 0.9843	42 1.6535	32 1.260	30 1.1811	37 1.4567	0.3 0.012	1.5 0.059	NAO25X42X32		38.2 8590	62.1 14000	15000	9600	0.0517	0.185 0.408
30	30 1.1811	45 1.7717	17 0.669	35 1.3780	40 1.5748	0.3 0.012	1.2 0.047	NAO30X45X17		22.1 4970	40.8 9170	12000	7900	0.0440	0.102 0.225
	30 1.1811	45 1.7717	26 1.024	35 1.3780	40 1.5748	0.3 0.012	1.2 0.047	NAO30X45X26		27.7 6230	54.5 12300	12000	7900	0.0561	0.155 0.342
	30 1.1811	47 1.8504	16 0.630	35 1.3780	42 1.6535	0.3 0.012	1.5 0.059	NAO30X47X16	SNSH35,5X47X0,5	24.5 5510	36.8 8270	12000	8100	0.0408	0.106 0.234
	30 1.1811	47 1.8504	32 1.260	35 1.3780	42 1.6535	0.3 0.012	1.5 0.059	NAO30X47X32	SNSH35,5X47X0,5	42.0 9440	73.5 16500	12000	8100	0.0576	0.218 0.481
35	35 1.3780	50 1.9685	17 0.669	35 1.3780	40 1.5748	0.3 0.012	1.2 0.047	NAO35X50X17		23.8 5350	47.0 10600	11000	6900	0.0484	0.126 0.278
	35 1.3780	50 1.9685	34 1.339	35 1.3780	40 1.5748	0.3 0.012	0.7 0.028	NAO35X50X34	SNSH40,5X50X0,5	40.9 9190	94.1 21200	11000	6900	0.0682	0.232 0.511
	35 1.3780	55 2.1654	20 0.787	35 1.3780	43 1.6929	0.3 0.012	1.5 0.059	NAO35X55X20	SNSH41X55X1	35.5 7980	56.3 12700	11000	7100	0.0472	0.185 0.408
	35 1.3780	55 2.1654	40 1.575	35 1.3780	43 1.6929	0.3 0.012	1.7 0.067	NAO35X55X40		60.8 13700	113 25400	11000	7100	0.0666	0.370 0.816
40	40 1.5748	55 2.1654	17 0.669	45 1.7717	50 1.9685	0.3 0.012	0.7 0.028	NAO40X55X17	SNSH45,5X55X0,5	24.9 5600	51.8 11600	9400	6100	0.0523	0.133 0.293
	40 1.5748	55 2.1654	34 1.339	45 1.7717	50 1.9685	0.3 0.012	0.7 0.028	NAO40X55X34	SNSH45,5X55X0,5	42.7 9600	104 23400	9400	6100	0.0737	0.257 0.567
	40 1.5748	62 2.4409	20 0.787	45 1.7717	53 2.0866	0.3 0.012	1.5 0.059	NAO40X62X20	SNSH46X62X1	36.0 8090	59.5 13400	9600	6200	0.0504	0.215 0.474
	40 1.5748	62 2.4409	40 1.575	45 1.7717	53 2.0866	0.3 0.012	1.7 0.067	NAO40X62X40	SNSH46X62X1	61.7 13900	119 26800	9600	6200	0.0711	0.440 0.970
45	45 1.7717	62 2.4409	20 0.787	50 1.9685	55 2.1654	0.3 0.012	0.7 0.028	NAO45X62X20		30.2 6790	68.5 15400	8400	5400	0.0588	0.200 0.441
	45 1.7717	62 2.4409	40 1.575	50 1.9685	55 2.1654	0.3 0.012	0.5 0.020	NAO45X62X40		50.7 11400	137 30800	8400	5400	0.0829	0.386 0.851
	45 1.7717	72 2.8346	20 0.787	55 2.1654	63 2.4803	1.0 0.039	1.5 0.059	NAO45X72X20	SNSH56X72X1	40.3 9060	73.5 16500	7800	5000	0.0580	0.345 0.761
	45 1.7717	72 2.8346	40 1.575	55 2.1654	63 2.4803	1.0 0.039	1.7 0.067	NAO45X72X40	SNSH56X72X1	69.1 15500	147 33000	7800	5000	0.0818	0.680 1.499
50	50 1.9685	68 2.6772	20 0.787	55 2.1654	60 2.3622	0.3 0.012	0.7 0.028	NAO50X68X20		30.7 6900	72.4 16300	7600	4900	0.0622	0.230 0.507
	50 1.9685	68 2.6772	40 1.575	55 2.1654	60 2.3622	0.3 0.012	0.5 0.020	NAO50X68X40		52.7 11800	145 32600	7600	4900	0.0878	0.450 0.992
	50 1.9685	78 3.0709	20 0.787	60 2.3622	68 2.6772	1.0 0.039	1.5 0.059	NAO50X78X20	SNSH61X78X1	41.8 9400	79.2 17800	7100	4600	0.0614	0.385 0.849
	50 1.9685	78 3.0709	40 1.575	60 2.3622	68 2.6772	1.0 0.039	1.7 0.067	NAO50X78X40	SNSH61X78X1	71.7 16100	158 35500	7100	4600	0.0867	0.746 1.645
55	55 2.1654	85 3.3465	30 1.181	65 2.5591	73 2.8740	1.0 0.039	2.0 0.079	NAO55X85X30	SNSH66X85X1	60.1 13500	129 29000	6500	4200	0.0719	0.690 1.521
	55 2.1654	85 3.3465	60 2.362	65 2.5591	73 2.8740	1.0 0.039	1.5 0.059	NAO55X85X60	SNSH66X85X1	103 23200	259 58200	6500	4200	0.1015	1.320 2.910
60	60 2.3622	90 3.5433	30 1.181	70 2.7559	78 3.0709	1.0 0.039	2.0 0.079	NAO60X90X30		62.2 14000	139 31200	6000	3900	0.0757	0.745 1.642
	60 2.3622	90 3.5433	60 2.362	70 2.7559	78 3.0709	1.0 0.039	1.7 0.067	NAO60X90X60		107 24100	277 62300	6000	3900	0.1068	1.405 3.097
65	65 2.5591	95 3.7402	30 1.181	75 2.9528	83 3.2677	1.0 0.039	2.0 0.079	NAO65X95X30		60.9 13700	138 31000	5600	3600	0.0780	0.770 1.698
	65 2.5591	95 3.7402	60 2.362	75 2.9528	83 3.2677	1.0 0.039	1.7 0.067	NAO65X95X60		116 26100	277 62300	5600	3600	0.1101	1.500 3.307
70	70 2.7559	100 3.9370	30 1.181	80 3.1496	88 3.4646	1.0 0.039	2.0 0.079	NAO70X100X30		67.5 15200	161 36200	5200	3400	0.0835	0.850 1.874
	70 2.7559	100 3.9370	60 2.362	80 3.1496	88 3.4646	1.0 0.039	1.7 0.067	NAO70X100X60		116 26100	322 72400	5200	3400	0.1178	1.600 3.527

(1) Max. axial displacement

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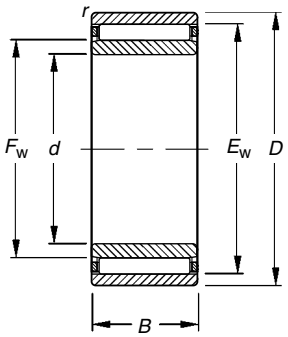
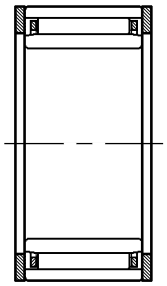
NEEDLE ROLLER BEARINGS WITHOUT FLANGES WITH INNER RINGS – *continued*

METRIC SERIES



NAO



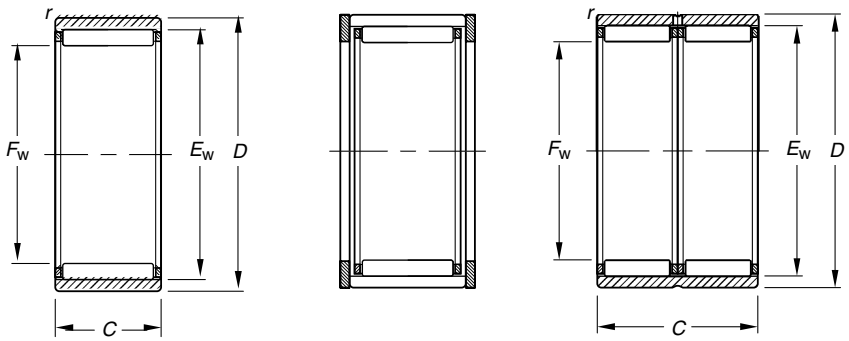
SNSH

Shaft Dia.	Dimensions mm/in.							Bearing Designation	End Washer Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
										Dynamic	Static	Oil	Grease		
mm	d	D	B	F_w	E_w	$r_{s\,min}$	s[1]			C	C_0	RPM		C_g	
80	80	110	30	90	98	1.0	2.0	NAO80X110X30		63.6	155	4600	3000	0.0873	0.920
	3.1496	4.3307	1.181	3.5433	3.8583	0.039	0.079			14300	34800				2.028
85	85	115	30	95	103	1.0	2.0	NAO85X115X30		71.0	183	4400	2800	0.0932	0.985
	3.3465	4.5276	1.181	3.7402	4.0551	0.039	0.079			16000	41100				2.172
90	90	120	30	100	108	1.0	2.0	NAO90X120X30		72.4	191	4200	2700	0.0965	1.010
	3.5433	4.7244	1.181	3.9370	4.2520	0.039	0.079			16300	42900				2.22

(1) Max. axial displacement

NEEDLE ROLLER BEARINGS WITHOUT FLANGES WITHOUT INNER RINGS

METRIC SERIES



RNAO SNSH RNAO

Shaft Dia.	Dimensions mm/in.					Bearing Designation	End Washer Designation	Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speeds Oil	Limiting Speeds Grease		Approx. Wt. kg/lbs.
mm	F_w	D	C	E_w	$r_{s\,min}$			C	C_0	RPM		C_g	
6	6 0.2362	13 0.5118	8 0.315	9 0.3543	0.3 0.012	RNAO6X13X8TN		2.47 560	2.07 470	44000	29000	0.0107	0.005 0.011
7	7 0.2756	14 0.5512	8 0.315	10 0.3937	0.3 0.012	RNAO7X14X8TN		2.74 620	2.44 550	42000	28000	0.0118	0.007 0.015
8	8 0.3150	15 0.5906	10 0.394	11 0.4331	0.3 0.012	RNAO8X15X10	SNSH8,5X15X0,5	4.57 1030	4.89 1100	41000	26000	0.0148	0.008 0.018
9	9 0.3543	16 0.6299	10 0.394	12 0.4724	0.3 0.012	RNAO9X16X10		4.27 960	4.60 1030	40000	26000	0.0153	0.009 0.020
10	10 0.3937	17 0.6693	10 0.394	13 0.5118	0.3 0.012	RNAO10X17X10	SNSH10,5X17X0,5	5.40 1210	6.43 1450	39000	25000	0.0174	0.010 0.022
	10 0.3937	17 0.6693	20 0.787	13 0.5118	0.3 0.012	RNAO10X17X20	SNSH10,5X17X0,5	9.25 2080	12.9 2900	39000	25000	0.0245	0.019 0.042
12	12 0.4724	19 0.7480	10 0.394	15 0.5906	0.3 0.012	RNAO12X19X10	SNSH12,5X19X0,5	5.85 1320	7.51 1690	37000	24000	0.0195	0.012 0.026
14	14 0.5512	22 0.8661	13 0.512	18 0.7087	0.3 0.012	RNAO14X22X13	SNSH14,5X22X0,5	9.73 2190	12.5 2810	29000	19000	0.0227	0.018 0.040
	14 0.5512	22 0.8661	20 0.787	18 0.7087	0.3 0.012	RNAO14X22X20	SNSH14,5X22X0,5	12.3 2770	16.8 3780	29000	19000	0.0291	0.029 0.064
	14 0.5512	26 1.0236	12 0.472	20 0.7874	0.3 0.012	RNAO14X26X12	SNSH14,5X26X0,5	10.5 2360	10.6 2380	21000	14000	0.0209	0.029 0.064
15	15 0.5906	23 0.9055	13 0.512	19 0.7480	0.3 0.012	RNAO15X23X13	SNSH15,5X23X0,5	9.66 2170	12.6 2830	28000	18000	0.0235	0.019 0.042
	15 0.5906	23 0.9055	20 0.787	19 0.7480	0.3 0.012	RNAO15X23X20	SNSH15,5X23X0,5	13.5 3030	19.4 4360	28000	18000	0.0310	0.029 0.064
16	16 0.6299	24 0.9449	13 0.512	20 0.7874	0.3 0.012	RNAO16X24X13	SNSH16,5X24X0,5	10.1 2270	13.5 3030	28000	18000	0.0245	0.022 0.049
	16 0.6299	24 0.9449	20 0.787	20 0.7874	0.3 0.012	RNAO16X24X20	SNSH16,5X24X0,5	13.4 3010	19.5 4380	28000	18000	0.0319	0.032 0.071
	16 0.6299	28 1.1024	12 0.472	22 0.8661	0.3 0.012	RNAO16X28X12	SNSH16,5X28X0,5	11.2 2520	11.9 2680	29000	19000	0.0227	0.033 0.073
17	17 0.6693	25 0.9843	13 0.512	21 0.8268	0.3 0.012	RNAO17X25X13	SNSH17,5X25X0,5	10.5 2360	14.5 3260	26000	17000	0.0256	0.022 0.049
	17 0.6693	25 0.9843	20 0.787	21 0.8268	0.3 0.012	RNAO17X25X20	SNSH17,5X25X0,5	14.7 3300	22.5 5060	26000	17000	0.0333	0.032 0.071
18	18 0.7087	26 1.0236	13 0.512	22 0.8661	0.3 0.012	RNAO18X26X13	SNSH18,5X26X0,5	10.8 2430	15.4 3460	24000	16000	0.0266	0.024 0.053
	18 0.7087	26 1.0236	13 0.512	22 0.8661	0.3 0.012	RNAO18X26X13ASR1	SNSH18,5X26X0,5	10.8 2430	15.4 3460	24000	16000	0.0266	0.024 0.053
	18 0.7087	26 1.0236	20 0.787	22 0.8661	0.3 0.012	RNAO18X26X20	SNSH18,5X26X0,5	14.4 3240	22.2 4990	24000	16000	0.0347	0.034 0.075
	18 0.7087	30 1.1811	24 0.945	24 0.9449	0.3 0.012	RNAO18X30X24		20.2 4540	26.2 5890	25000	17000	0.0343	0.070 0.154
20	20 0.7874	28 1.1024	13 0.512	24 0.9449	0.3 0.012	RNAO20X28X13	SNSH20,5X28X0,5	11.5 2590	17.3 3890	22000	14000	0.0287	0.025 0.055

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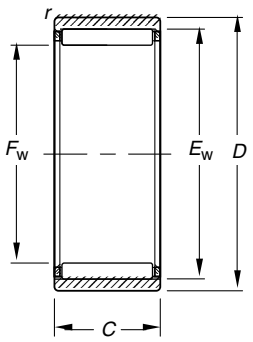
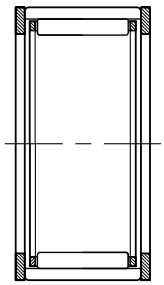
NEEDLE ROLLER BEARINGS WITHOUT FLANGES WITHOUT INNER RINGS

METRIC SERIES

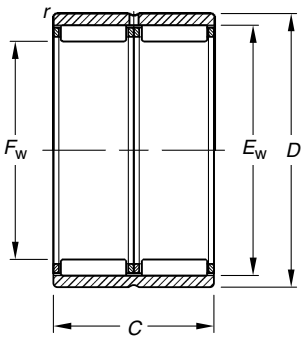
continued



RNAO



SNSH



RNAO

Shaft Dia.	Dimensions mm/in.					Bearing Designation	End Washer Designation	Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speeds RPM Oil	Limiting Speeds RPM Grease		Approx. Wt. kg/lbs.
mm	F_w	D	C	E_w	$r_{s\,min}$			C	C_0			C_g	
	20 0.7874	28 1.1024	26 1.024	24 0.9449	0.3 0.012	RNAO20X28X26	SNSH20,5X28X0,5	19.8 4450	34.6 7780	22000	14000	0.0405	0.050 0.110
	20 0.7874	32 1.2598	12 0.472	26 1.0236	0.3 0.012	RNAO20X32X12	SNSH20,5X32X0,5	13.0 2920	15.3 3440	23000	15000	0.0264	0.038 0.084
	20 0.7874	32 1.2598	24 0.945	26 1.0236	0.3 0.012	RNAO20X32X24	SNSH20,5X32X0,5	22.3 5010	30.6 6880	23000	15000	0.0373	0.080 0.176
22	22 0.8661	30 1.1811	13 0.512	26 1.0236	0.3 0.012	RNAO22X30X13	SNSH22,5X30X0,5	11.8 2650	18.3 4110	20000	13000	0.0303	0.028 0.062
	22 0.8661	30 1.1811	26 1.024	26 1.0236	0.3 0.012	RNAO22X30X26	SNSH22,5X30X0,5	20.2 4540	36.6 8230	20000	13000	0.0428	0.053 0.117
	22 .8661	35 1.3780	16 0.630	29 1.1417	0.3 0.012	RNAO22X35X16	SNSH22,5X35X0,5	19.1 4290	23.3 5240	21000	13000	0.0299	0.059 0.130
	22 0.8661	35 1.3780	32 1.260	29 1.1417	0.3 0.012	RNAO22X35X32	SNSH22,5X35X0,5	32.7 7350	46.5 10500	21000	13000	0.0423	0.116 0.256
25	25 0.9843	35 1.3780	17 0.669	30 1.1811	0.3 0.012	RNAO25X35X17	SNSH25,5X35X0,5	18.8 4230	29.8 6700	17000	11000	0.0351	0.050 0.110
	25 0.9843	35 1.3780	26 1.024	30 1.1811	0.3 0.012	RNAO25X35X26	SNSH25,5X35X0,5	25.0 5620	42.8 9620	17000	11000	0.0456	0.076 0.168
	25 0.9843	37 1.4567	16 0.630	32 1.2598	0.3 0.012	RNAO25X37X16	SNSH25,5X37X0,5	19.8 4450	25.3 5690	18000	12000	0.0323	0.058 0.128
	25 0.9843	37 1.4567	32 1.260	32 1.2598	0.3 0.012	RNAO25X37X32	SNSH25,5X37X0,5	19.2 4320	23.6 5310	18000	12000	0.0455	0.118 0.260
28	28 1.1024	40 1.5748	16 0.630	35 1.3780	0.3 0.012	RNAO28X40X16	SNSH28,5X40X0,5	20.9 4700	27.9 6270	16000	10000	0.0347	0.063 0.139
	28 1.1024	40 1.5748	32 1.260	35 1.3780	0.3 0.012	RNAO28X40X32	SNSH28,5X40X0,5	35.8 8050	55.9 12600	16000	10000	0.0489	0.128 0.282
30	30 1.1811	40 1.5748	17 0.669	35 1.3780	0.3 0.012	RNAO30X40X17	SNSH30,5X40X0,5	20.2 4540	34.6 7780	14000	9300	0.0394	0.060 0.132
	30 1.1811	40 1.5748	26 1.024	35 1.3780	0.3 0.012	RNAO30X40X26	SNSH30,5X40X0,5	26.8 6020	49.7 11200	14000	9300	0.0512	0.088 0.194
	30 1.1811	42 1.6535	16 0.630	37 1.4567	0.3 0.012	RNAO30X42X16		22.3 5010	31.0 6970	15000	9600	0.0366	0.069 0.152
	30 1.1811	42 1.6535	32 1.260	37 1.4567	0.3 0.012	RNAO30X42X32		38.2 8590	62.1 14000	15000	9600	0.0517	0.131 0.289
35	35 1.3780	45 1.7717	17 0.669	40 1.5748	0.3 0.012	RNAO35X45X17		22.1 4970	40.8 9170	12000	7900	0.0440	0.069 0.152
	35 1.3780	45 1.7717	26 1.024	40 1.5748	0.3 0.012	RNAO35X45X26		27.7 6230	54.5 12300	12000	7900	0.0561	0.091 0.201
	35 1.3780	47 1.8504	16 0.630	41 1.6142	0.3 0.012	RNAO35X47X16	SNSH35,5X47X0,5	24.5 5510	36.8 8270	12000	8100	0.0404	0.075 0.165
	35 1.3780	47 1.8504	32 1.260	42 1.6535	0.3 0.012	RNAO35X47X32	SNSH35,5X47X0,5	42.0 9440	73.5 16500	12000	8100	0.0576	0.156 0.344
40	40 1.5748	50 1.9685	17 0.669	45 1.7717	0.3 0.012	RNAO40X50X17	SNSH40,5X50X0,5	23.8 5350	47.0 10600	11000	6900	0.0484	0.086 0.190

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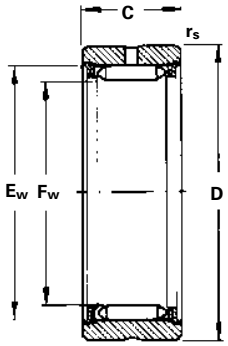
Shaft Dia.	Dimensions mm/in.					Bearing Designation	End Washer Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
								Dynamic	Static	Oil	Grease		
mm	F_w	D	C	E_w	$r_{s\,min}$			C	C_0	RPM		C_g	
	40 1.5748	50 1.9685	34 1.339	45 1.7717	0.3 0.012	RNAO40X50X34	SNSH40,5X50X0,5	40.9 9190	94.1 21200	11000	6900	0.0575	0.152 0.335
	40 1.5748	55 2.1654	20 0.787	48 1.8898	0.3 0.012	RNAO40X55X20	SNSH41X55X1	35.5 7980	56.3 12700	11000	7100	0.0472	0.139 0.306
	40 1.5748	55 2.1654	40 1.575	48 1.8898	0.3 0.012	RNAO40X55X40	SNSH41X55X1	60.8 13700	113 25400	11000	7100	0.0666	0.276 0.608
45	45 1.7717	55 2.1654	17 0.669	50 1.9685	0.3 0.012	RNAO45X55X17	SNSH45,5X55X0,5	24.9 5600	51.8 11600	9400	6100	0.0523	0.089 0.196
	45 1.7717	55 2.1654	34 1.339	50 1.9685	0.3 0.012	RNAO45X55X34	SNSH45,5X55X0,5	42.7 9600	104 23400	9400	6100	0.0737	0.168 0.370
	45 1.7717	62 2.4409	20 0.787	53 2.0866	0.3 0.012	RNAO45X62X20	SNSH46X62X1	30.8 6920	68.1 15300	9400	6100	0.0504	0.163 0.359
	45 1.7717	62 2.4409	40 1.575	53 2.0866	0.3 0.012	RNAO45X62X40	SNSH46X62X1	61.7 13900	119 26800	9600	6200	0.0711	0.325 0.717
50	50 1.9685	62 2.4409	20 0.787	55 2.1654	0.3 0.012	RNAO50X62X20		30.2 6790	68.5 15400	8400	5400	0.0588	0.142 0.313
	50 1.9685	62 2.4409	40 1.575	55 2.1654	0.3 0.012	RNAO50X62X40		51.7 11600	137 30800	8400	5400	0.0829	0.269 0.593
	50 1.9685	65 2.5591	20 0.787	58 2.2835	0.3 0.012	RNAO50X65X20	SNSH51X65X1	38.8 8720	67.8 15200	8600	5600	0.0545	0.167 0.368
	50 1.9685	65 2.5591	40 1.575	58 2.2835	0.3 0.012	RNAO50X65X40		66.5 14900	136 30600	8600	5600	0.0769	0.342 0.754
55	55 2.1654	68 2.6772	20 0.787	60 2.3622	0.3 0.012	RNAO55X68X20		30.7 6900	72.4 16300	7600	4900	0.0622	0.165 0.364
	55 2.1654	68 2.6772	40 1.575	60 2.3622	0.3 0.012	RNAO55X68X40		52.7 11800	145 32600	7600	4900	0.0878	0.320 0.705
	55 2.1654	72 2.8346	20 0.787	63 2.4803	1.0 0.039	RNAO55X72X20	SNSH56X72X1	40.3 9060	73.5 16500	7800	5000	0.0580	0.212 0.467
	55 2.1654	72 2.8346	40 1.575	63 2.4803	1.0 0.039	RNAO55X72X40	SNSH56X72X1	69.1 15500	127 28600	7800	5000	0.0818	0.433 0.955
60	60 2.3622	78 3.0709	20 0.787	68 2.6772	1.0 0.039	RNAO60X78X20	SNSH61X78X1	41.8 9400	79.2 17800	7100	4600	0.0614	0.230 0.507
	60 2.3622	78 3.0709	40 1.575	68 2.6772	1.0 0.039	RNAO60X78X40	SNSH61X78X1	71.7 16100	158 35500	7100	4600	0.0867	0.436 0.961
65	65 2.5591	85 3.3465	30 1.181	73 2.8740	1.0 0.039	RNAO65X85X30	SNSH66X85X1	60.1 13500	129 29000	6500	4200	0.0719	0.468 1.032
	65 2.5591	85 3.3465	60 2.362	73 2.8740	1.0 0.039	RNAO65X85X60	SNSH66X85X1	103 23200	259 58200	6500	4200	0.1015	0.876 1.931
70	70 2.7559	90 3.5433	30 1.181	78 3.0709	1.0 0.039	RNAO70X90X30		62.2 14000	139 31200	6000	3900	0.0757	0.505 1.113
	70 2.7559	90 3.5433	60 2.362	78 3.0709	1.0 0.039	RNAO70X90X60		107 24100	277 62300	6000	3900	0.1068	0.925 2.039
75	75 2.9528	95 3.7402	30 1.181	83 3.2677	1.0 0.039	RNAO75X95X30		60.9 13700	138 31000	5600	3600	0.0780	0.510 1.124
	75 2.9528	95 3.7402	60 2.362	83 3.2677	1.0 0.039	RNAO75X95X60		104 23400	277 62300	5600	3600	0.1101	0.980 2.161
80	80 3.1496	100 3.9370	30 1.181	88 3.4646	1.0 0.039	RNAO80X100X30		67.5 15200	161 36200	5200	3400	0.0835	0.580 1.279
	80 3.1496	100 3.9370	60 2.362	88 3.4646	1.0 0.039	RNAO80X100X60		116 26100	322 72400	5200	3400	0.1178	1.044 2.30
85	85 3.3465	105 4.1339	30 1.181	93 3.6614	1.0 0.039	RNAO85X105X30		69.4 15600	170 38200	4600	3000	0.0870	0.586 1.292
100	100 3.9370	120 4.7244	30 1.181	108 4.2520	1.0 0.039	RNAO100X120X30		72.4 16300	191 42900	4200	2700	0.0965	0.660 1.455

NEEDLE ROLLER BEARINGS
FULL COMPLEMENT
WITHOUT INNER RINGS
METRIC SERIES

- Check for availability.



C

Shaft Diameter	Dimensions mm/in.					Bearing Designation	Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speeds Oil	Limiting Speeds Grease		Approx. Wt. kg/lbs.
mm	F_w	D	C	E_w	$r_{s\ min}$		C	C_0	RPM		C_g	
7.3	7.3 0.2874	16 0.6299	12 0.472	12.3 0.4843	0.35 0.014	RNA 1005	3.95 888	4.45 1000	34000	52000	0.0134	0.010 0.022
9.7	9.7 0.3819	19 0.7480	12 0.472	14.7 0.5787	0.35 0.014	RNA 1007	4.80 1080	5.90 1330	25000	39000	0.0160	0.013 0.029
12.1	12.1 0.4764	22 0.8661	12 0.472	17.1 0.6732	0.35 0.014	RNA 1009	5.60 1260	7.40 1660	20000	31000	0.0184	0.018 0.040
14.4	14.4 0.5669	24 0.9449	12 0.472	19.4 0.7638	0.35 0.014	RNA 1010	6.35 1430	8.90 2000	17000	26000	0.0206	0.020 0.044
17.6	17.6 0.6929	28 1.1024	15 0.591	22.6 0.8898	0.35 0.014	RNA 1012	11.0 2470	16.5 3710	14000	22000	0.0261	0.034 0.075
20.8	20.8 0.8189	32 1.2598	15 0.591	25.8 1.0157	0.65 0.026	RNA 1015	12.4 2790	19.5 4380	12000	18000	0.0292	0.044 0.097
22.1	22.1 0.8701	35 1.3780	22 0.866	28.1 1.1063	0.65 0.026	RNA 2015	23.5 5280	37.5 8430	11000	17000	0.0345	0.082 0.181
23.9	23.9 0.9409	35 1.3780	15 0.591	28.9 1.1378	0.65 0.026	RNA 1017	13.7 3080	22.5 5060	10000	16000	0.0321	0.047 0.104
28.7	28.7 1.1299	42 1.6535	18 0.709	34.7 1.3661	0.65 0.026	RNA 1020	19.3 4340	33.5 7530	8600	13000	0.0374	0.084 0.185
	28.7 1.1299	42 1.6535	22 0.866	34.7 1.3661	0.65 0.026	RNA 2020	28.5 6410	49.0 11000	8600	13000	0.0411	0.104 0.229
33.5	33.5 1.3189	47 1.8504	18 0.709	39.5 1.5551	0.65 0.026	RNA 1025	21.5 4830	39.0 8770	7200	11000	0.0415	0.097 0.214
	33.5 1.3189	47 1.8504	22 0.866	39.5 1.5551	0.65 0.026	RNA 2025	33.0 7420	60.0 13500	7200	11000	0.0457	0.122 0.269
	33.5 1.3189	47 1.8504	30 1.181	39.5 1.5551	0.65 0.026	RNA 22025	52.0 11700	94.0 21100	7200	11000	0.0537	0.170 0.375
38.2	38.2 1.5039	52 2.0472	18 0.709	44.2 1.7402	0.65 0.026	RNA 1030	23.5 5280	44.5 10000	6500	10000	0.0455	0.107 0.236
	38.2 1.5039	52 2.0472	22 0.866	44.2 1.7402	0.65 0.026	RNA 2030	34.5 7760	66.0 14800	6500	10000	0.0501	0.139 0.306
	38.2 1.5039	52 2.0472	30 1.181	44.2 1.7402	0.65 0.026	RNA 22030	57.0 12800	108 24300	6500	10000	0.0588	0.193 0.425
44	44 1.7323	58 2.2835	18 0.709	50.0 1.9685	0.65 0.026	RNA 1035	26.0 5850	51.0 11500	5600	8600	0.0552	0.127 0.280
	44 1.7323	58 2.2835	22 0.866	50.0 1.9685	0.65 0.026	RNA 2035	38.0 8540	75.0 16900	5600	8600	0.0552	0.160 0.353
	44 1.7323	58 2.2835	30 1.181	50.0 1.9685	0.65 0.026	RNA 22035	63.0 14200	124 27900	5600	8600	0.0686	0.225 0.496
	44 1.7323	62 2.4409	30 1.181	51.0 2.0094	0.65 0.026	RNA 3030	64.0 14400	125 28100	5600	8600	0.0607	0.309 0.681
49.7	49.7 1.9567	65 2.5591	18 0.709	55.7 2.1929	0.85 0.033	RNA 1040	28.5 6410	58.0 13000	4900	7600	0.0546	0.160 0.353
	49.7 1.9567	65 2.5591	22 0.866	55.7 2.1929	0.65 0.026	RNA 2040	41.5 9330	85.0 19100	4900	7600	0.0601	0.200 0.441

Continued on next page.

Shaft Diameter	Dimensions mm/in.					Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
							Dynamic	Static	Oil	Grease		
mm	F_w	D	C	E_w	$r_{s\ min}$		C	C_0	RPM		C_g	
	49.7 1.9567	65 2.5591	30 1.181	55.7 2.1929	0.65 0.026	RNA 22040	68.0 15300	140 31500	4900	7600	0.0707	0.278 0.613
	49.7 1.9567	72 2.8346	36 1.417	56.8 2.2346	0.65 0.026	RNA 3035	90.0 20200	183 41100	4900	7600	0.0704	0.545 1.202
55.4	55.4 2.1811	72 2.8346	18 0.709	61.4 2.4173	0.85 0.033	RNA 1045	30.5 6860	65.0 14600	4500	6900	0.0590	0.193 0.425
	55.4 2.1811	72 2.8346	22 0.866	61.4 2.4173	0.85 0.033	RNA 2045	45.0 10100	95.0 21400	4500	6900	0.0649	0.242 0.534
	55.4 2.1811	80 3.1496	36 1.417	62.5 2.4591	0.85 0.033	RNA 3040	97.0 21800	204 45900	4500	6900	0.0759	0.672 1.482
62.1	62.1 2.4449	80 3.1496	20 0.787	68.1 2.6811	0.85 0.033	RNA 1050	33.0 7420	73.0 16400	4000	6100	0.0639	0.255 0.562
	62.1 2.4449	80 3.1496	28 1.102	68.1 2.6811	0.85 0.033	RNA 2050	64.0 14400	142 31900	4000	6100	0.0754	0.375 0.827
	62.1 2.4449	85 3.3465	38 1.496	69.2 2.7228	0.85 0.033	RNA 3045	105 23600	230 51700	4000	6100	0.0823	0.710 1.565
68.8	68.8 2.7087	85 3.3465	20 0.787	74.8 2.9449	0.85 0.033	RNA 1055	35.5 7980	80.0 18000	3600	5500	0.0687	0.258 0.569
	68.8 2.7087	85 3.3465	28 1.102	74.8 2.9449	0.85 0.033	RNA 2055	69.0 15500	157 35300	3600	5500	0.0810	0.361 0.796
	68.8 2.7087	90 3.5433	38 1.496	75.9 2.9866	0.85 0.033	RNA 3050	113 25400	255 57300	3600	5500	0.0885	0.705 1.55
72.6	72.6 2.8583	90 3.5433	20 0.787	78.6 3.0945	0.85 0.033	RNA 1060	37.0 8320	85.0 19100	3400	5200	0.0714	0.283 0.624
	72.6 2.8583	90 3.5433	28 1.102	78.6 3.0945	0.85 0.033	RNA 2060	72.0 16200	165 37100	3400	5200	0.0842	0.413 0.911
	72.6 2.8583	95 3.7402	38 1.496	79.6 3.1339	0.85 0.033	RNA 3055	117 26300	268 60200	3400	5200	0.0811	0.782 1.724
78.3	78.3 3.0827	95 3.7402	20 0.787	84.3 3.3189	0.85 0.033	RNA 1065	41.5 9330	97.0 21800	3200	4900	0.0751	0.306 0.675
	78.3 3.0827	95 3.7402	28 1.102	84.3 3.3189	0.85 0.033	RNA 2065	78.0 17500	184 41400	3200	4900	0.0887	0.433 0.955
	78.3 3.0827	100 3.9370	38 1.496	85.3 3.3583	0.85 0.033	RNA 3060	123.0 27700	290 65200	3200	4900	0.0966	0.810 1.786
83.1	83.1 3.2717	100 3.9370	20 0.787	89.1 3.5079	0.85 0.033	RNA 1070	43.0 9670	103 23200	2900	4500	0.0784	0.322 0.710
	83.1 3.2717	100 3.9370	28 1.102	89.1 3.5079	0.85 0.033	RNA 2070	81.0 18200	195 43800	2900	4500	0.0926	0.470 1.036
	83.1 3.2717	105 4.1339	38 1.496	90.2 3.5496	0.85 0.033	RNA 3065	129 29000	308 69200	2900	4500	0.1012	0.865 1.907
88	88 3.4646	110 4.3307	24 0.945	95.0 3.7402	0.85 0.033	RNA 1075	64.0 14400	155 34800	2800	4300	0.0864	0.577 1.272
	88 3.4646	110 4.3307	32 1.260	95.0 3.7402	0.85 0.033	RNA 2075	104 23400	253 56900	2800	4300	0.0983	0.767 1.691
	88 3.4646	110 4.3307	38 1.496	95.0 3.7402	0.85 0.033	RNA 3070	134 30100	325 73100	2800	4300	0.1050	0.906 1.997
96	96 3.7795	115 4.5276	24 0.945	103.0 4.0551	0.85 0.033	RNA 1080	68.0 15300	170 38200	2600	4000	0.0918	0.510 1.124
	96 3.7795	115 4.5276	32 1.254	103.0 4.0551	0.85 0.033	RNA 2080	110 24700	275 61800	2600	4000	0.1045	0.694 1.530
	96 3.7795	120 4.7244	38 1.496	103.0 4.0551	0.85 0.033	RNA 3075	142 31900	355 79800	2600	4000	0.1117	1.098 2.421
99.5	99.5 3.9173	120 4.7244	32 1.260	106.5 4.1929	1.35 0.053	RNA 2085	113 25400	285 64100	2500	3800	0.1072	0.787 1.735
	99.5 3.9173	125 4.9213	38 1.496	106.5 4.1929	0.85 0.033	RNA 3080	145 32600	365 82100	2500	3800	0.1145	1.220 2.690
104.7	104.7 4.1220	125 4.9213	32 1.260	111.7 4.3976	1.35 0.053	RNA 2090	117 26300	300 67400	2300	3600	0.1113	0.837 1.845

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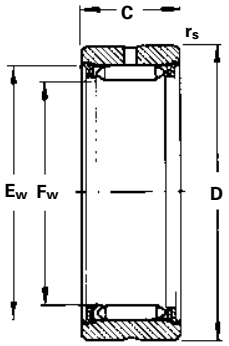
NEEDLE ROLLER BEARINGS FULL COMPLEMENT WITHOUT INNER RINGS – *continued*

METRIC SERIES

- Check for availability.



Shaft Diameter	Dimensions mm/in.					Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
							Dynamic	Static	Oil	Grease		
mm	F_w	D	C	E_w	$r_{s\,min}$		C	C_0	RPM		C_g	
	104.7 4.1220	130 5.1181	38 1.496	111.7 4.3976	1.35 0.053	RNA 3085	150 33700	390 87700	2300	3600	0.1189	1.252 2.760
109.1	109.1 4.2953	130 5.1181	32 1.260	116.1 4.5709	1.35 0.053	RNA 2095	120 27000	315 70800	2300	3500	0.1225	0.882 1.944
	109.1 4.2953	135 5.3150	43 1.693	116.1 4.5709	1.35 0.053	RNA 3090	185 41600	480 108000	2300	3500	0.1280	1.522 3.355
114.7	114.7 4.5157	135 5.3150	32 1.260	121.7 4.7913	1.35 0.053	RNA 2100	125 28100	330 74200	2100	3300	0.1188	0.677 1.493
	114.7 4.5157	140 5.5118	43 1.693	121.7 4.7913	1.35 0.053	RNA 3095	190 42700	505 114000	2100	3300	0.1327	1.551 3.419
119.2	119.2 4.6929	140 5.5118	32 1.260	126.2 4.9685	1.35 0.053	RNA 2105	129 29000	340 76400	2100	3200	0.1221	0.941 2.075
	119.2 4.6929	145 5.7087	43 1.693	126.2 4.9685	1.35 0.053	RNA 3100	195 43800	520 117000	2100	3200	0.1364	1.645 3.627
124.5	124.5 4.9016	145 5.7087	34 1.339	131.5 5.1772	1.35 0.053	RNA 2110	133 29900	360 80900	2000	3000	0.1260	1.015 2.238
	124.5 4.9016	150 5.9055	45 1.772	131.5 5.1772	1.35 0.053	RNA 3105	203 45600	550 124000	2000	3000	0.1408	1.762 3.885
132.5	132.5 5.2165	155 6.1024	34 1.339	139.5 5.4921	1.35 0.053	RNA 2115	139 31200	380 85400	1900	2900	0.1318	1.205 2.657
	132.5 5.2165	160 6.2992	45 1.772	139.5 5.4921	1.35 0.053	RNA 3110	210 47200	580 130000	1900	2900	0.1471	2.037 4.49
137	137 5.3937	160 6.2992	34 1.339	144.0 5.6693	1.35 0.053	RNA 2120	142 31900	395 88800	1800	2800	0.1350	1.265 2.789
	137 5.3937	165 6.4961	45 1.772	144.0 5.6693	1.35 0.053	RNA 3115	215 48300	600 135000	1800	2800	0.1507	2.140 4.718
143.5	143.5 5.6496	165 6.4961	34 1.339	150.5 5.9268	1.35 0.053	RNA 2125	145 32600	410 92200	1800	2700	0.1403	1.218 2.685
	143.5 5.6496	170 6.6929	45 1.772	150.5 5.9268	1.35 0.053	RNA 3120	224 50400	630 142000	1800	2700	0.1563	2.107 4.645
148	148 5.8268	170 6.6929	34 1.339	155.0 6.1039	1.35 0.053	RNA 2130	150 33700	425 95500	1700	2600	0.1435	1.292 2.848
158	158 6.2205	180 7.0866	36 1.417	165.0 6.4976	1.35 0.053	RNA 2140	157 35300	455 102000	1600	2400	0.1504	1.478 3.258
	158 6.2205	190 7.4803	52 2.047	166.0 6.5354	1.35 0.053	RNA 3130	275 61800	790 178000	1600	2400	0.1691	3.285 7.242
170.5	170.5 6.7126	195 7.6772	36 1.417	177.5 6.9882	1.35 0.053	RNA 2150	165 37100	490 110000	1400	2200	0.1591	1.790 3.946
	170.5 6.7126	205 8.0709	52 2.047	178.5 7.0276	1.35 0.053	RNA 3140	290 65200	860 193000	1400	2200	0.1787	3.840 8.466
179.3	179.3 7.0591	205 8.0709	36 1.417	186.3 7.3346	1.35 0.053	RNA 2160	170 38200	515 116000	1400	2100	0.1650	1.970 4.343
	179.3 7.0591	215 8.4646	52 2.047	187.3 7.3756	1.35 0.053	RNA 3150	300 67400	900 202000	1400	2100	0.1904	4.185 9.226

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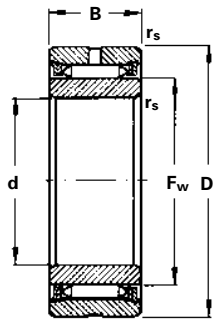
Shaft Diameter	Dimensions mm/in.					Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
							Dynamic	Static	Oil	Grease		
mm	F_w	D	C	E_w	$r_{s\ min}$		C	C_0	RPM		C_g	
193.8	193.8 7.6299	220 8.6614	42 1.654	200.8 7.9055	1.85 0.073	RNA 2170	233 52400	720 162000	1300	2000	0.1852	2.570 5.666
	193.8 7.6299	230 9.0551	57 2.244	201.9 7.9496	1.35 0.053	RNA 3160	360 80900	1110 250000	1300	2000	0.2071	4.955 10.924
202.6	202.6 7.9764	230 9.0551	42 1.654	209.6 8.2520	1.85 0.073	RNA 2180	240 54000	750 169000	1200	1900	0.2145	2.835 6.250
216	216 8.5039	245 9.6457	42 1.654	223.0 8.7795	1.85 0.073	RNA 2190	250 56200	800 180000	1200	1800	0.2004	3.210 7.077
	216 8.5039	255 10.0394	57 2.244	224.1 8.8236	1.85 0.073	RNA 3180	385 86600	1240 279000	1200	1800	0.2239	6.040 13.316
224.1	224.1 8.8228	255 10.0394	42 1.654	231.1 9.0984	1.85 0.073	RNA 2200	257 57800	830 187000	1100	1700	0.2057	3.560 7.848
236	236 9.2913	265 10.4331	42 1.654	243.1 9.5693	1.85 0.073	RNA 2210	279 62700	910 205000	1000	1600	0.2129	3.470 7.650
258.4	258.4 10.1732	300 11.8110	64 2.520	268.4 10.5677	1.85 0.073	RNA 3220	490 110000	1650 371000	980	1500	0.2519	8.570 18.894
269.6	269.6 10.6142	300 11.8110	49 1.929	276.6 10.8898	1.85 0.073	RNA 2240	345 77600	1190 268000	910	1400	0.2460	4.985 10.990
281.9	281.9 11.0984	325 12.7953	64 2.520	291.9 11.4921	1.85 0.073	RNA 3240	520 117000	1800 405000	850	1300	0.2684	9.480 20.900
335	335 13.1890	375 14.7638	54 2.126	343.0 13.5039	1.85 0.073	RNA 2300	460 103000	1690 380000	720	1100	0.2915	8.600 18.960

C

NEEDLE ROLLER BEARINGS
FULL COMPLEMENT
WITH INNER RINGS
METRIC SERIES

- Check for availability.



C

Shaft Diameter	Dimensions mm/in.					Bearing Designation	Load Ratings kN/lbf. Dynamic		Limiting Speeds Oil			Approx. Wt. kg/lbs.
mm	F_w	D	B	E_w	$r_{s\,min}$		C	C_0	RPM		C_g	
12	12 0.4724	28 1.1024	15 0.591	17.6 0.6929	0.35 0.014	NA 1012*	11.0 2470	16.5 3710	14000	22000	0.0261	0.050 0.110
15	15 0.5906	32 1.2598	15 0.591	20.8 0.8189	0.65 0.026	NA 1015*	12.4 2790	19.5 4380	12000	18000	0.0292	0.044 0.097
	15 0.5906	35 1.3780	22 0.866	22.1 0.8701	0.65 0.026	NA 2015	23.5 5280	37.5 8430	11000	17000	0.0345	0.082 0.181
17	17 0.6693	35 1.3780	15 0.591	23.9 0.9409	0.65 0.026	NA 1017*	13.7 3080	22.5 5060	10000	16000	0.0321	0.047 0.104
20	20 0.7874	42 1.6535	18 0.709	28.7 1.1299	0.65 0.026	NA 1020	19.3 4340	33.5 7530	8600	13000	0.0374	0.084 0.185
	20 0.7874	42 1.6535	22 0.866	28.7 1.1299	0.65 0.026	NA 2020	28.5 6410	49.0 11000	8600	13000	0.0411	0.104 0.229
25	25 0.9843	47 1.8504	18 0.709	33.5 1.3189	0.65 0.026	NA 1025	21.5 4830	39.0 8770	7200	11000	0.0415	0.097 0.214
	25 0.9843	47 1.8504	22 0.866	33.5 1.3189	0.65 0.026	NA 2025	33.0 7420	60.0 13500	7200	11000	0.0457	0.122 0.269
	25 0.9843	47 1.8504	30 1.181	33.5 1.3189	0.65 0.026	NA 22025	52.0 11700	94.0 21100	7200	11000	0.0537	0.170 0.375
30	30 1.1811	52 2.0472	18 0.709	38.2 1.5039	0.65 0.026	NA 1030	23.5 5280	44.5 10000	6500	10000	0.0455	0.107 0.236
	30 1.1811	52 2.0472	22 0.866	38.2 1.5039	0.65 0.026	NA 2030	34.5 7760	66.0 14800	6500	10000	0.0501	0.139 0.306
	30 1.1811	52 2.0472	30 1.181	38.2 1.5039	0.65 0.026	NA 22030	57.0 12800	108 24300	6500	10000	0.0588	0.193 0.425
	30 1.1811	62 2.4409	30 1.181	44.0 1.7323	0.65 0.026	NA 3030	64.0 14400	125 28100	5600	8600	0.0607	0.309 0.681
35	35 1.3780	58 2.2835	18 0.709	44.0 1.7323	0.65 0.026	NA 1035	26.0 5850	51.0 11500	5600	8600	0.0552	0.127 0.280
	35 1.3780	58 2.2835	22 0.866	44.0 1.7323	0.65 0.026	NA 2035	38.0 8540	75.0 16900	5600	8600	0.0552	0.160 0.353
	35 1.3780	58 2.2835	30 1.181	44.0 1.7323	0.65 0.026	NA 22035	63.0 14200	124 27900	5600	8600	0.0686	0.225 0.496
	35 1.3780	72 2.8346	36 1.417	50.0 1.9685	0.65 0.026	NA 3035	90.0 20200	183 41100	4900	7600	0.0706	0.545 1.202
40	40 1.5748	65 2.5591	18 0.709	49.7 1.9567	0.85 0.033	NA 1040	28.5 6410	58.0 13000	4900	7600	0.0546	0.160 0.353
	40 1.5748	65 2.5591	22 0.866	49.7 1.9567	0.85 0.033	NA 2040	41.5 9330	85.0 19100	4900	7600	0.0601	0.200 0.441
	40 1.5748	65 2.5591	30 1.181	49.7 1.9567	0.85 0.033	NA 22040	68.0 15300	140 31500	4900	7600	0.0707	0.278 0.613
	40 1.5748	80 3.1496	36 1.417	55.4 2.1811	0.85 0.033	NA 3040	97.0 21800	204 45900	4500	6900	0.0759	0.672 1.482
45	45 1.7717	72 2.8346	18 0.709	55.4 2.1811	0.85 0.033	NA 1045	30.5 6860	65.0 14600	4500	6900	0.0590	0.193 0.425

* No lubrication holes.

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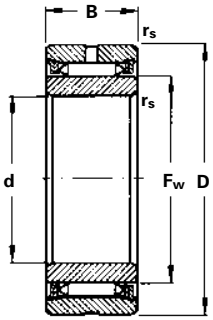
Shaft Diameter	Dimensions mm/in.					Bearing Designation	Load Ratings kN/lbf.		Limiting Speeds			Approx. Wt. kg/lbs.
							Dynamic	Static	Oil	Grease		
mm	F_w	D	B	E_w	$r_{s\ min}$		C	C_0	RPM		C_g	
	45 1.7717	72 2.8346	22 0.866	55.4 2.1811	0.85 0.033	NA 2045	45.0 10100	95.0 21400	4500	6900	0.0649	0.242 0.534
	45 1.7717	85 3.3465	38 1.496	62.1 2.4449	0.85 0.033	NA 3045	105.0 23600	230 51700	4000	6100	0.0823	0.710 1.565
50	50 1.9685	80 3.1496	20 0.787	62.1 2.4449	0.85 0.033	NA 1050	33.0 7420	73.0 16400	4000	6100	0.0639	0.255 0.562
	50 1.9685	80 3.1496	28 1.102	62.1 2.4449	0.85 0.033	NA 2050	64.0 14400	142 31900	4000	6100	0.0754	0.375 0.827
	50 1.9685	90 3.5433	38 1.496	68.8 2.7087	0.85 0.033	NA 3050	113.0 25400	255 57300	3600	5500	0.0885	0.705 1.554
55	55 2.1654	85 3.3465	20 0.787	68.8 2.7087	0.85 0.033	NA 1055	35.5 7980	80.0 18000	3600	5500	0.0687	0.258 0.569
	55 2.1654	85 3.3465	28 1.102	68.8 2.7087	0.85 0.033	NA 2055	69.0 15500	157 35300	3600	5500	0.0810	0.361 0.796
	55 2.1654	95 3.7402	38 1.496	72.6 2.8583	0.85 0.033	NA 3055	117.0 26300	268 60200	3400	5200	0.0811	0.782 1.724
60	60 2.3622	90 3.5433	20 0.787	72.6 2.8583	0.85 0.033	NA 1060	37.0 8320	85.0 19100	3400	5200	0.0714	0.283 0.624
	60 2.3622	90 3.5433	28 1.102	72.6 2.8583	0.85 0.033	NA 2060	72.0 16200	165 37100	3400	5200	0.0842	0.413 0.911
	60 2.3622	100 3.9370	38 1.496	78.3 3.0827	0.85 0.033	NA 3060	123.0 27700	290 65200	3200	4900	0.0966	0.810 1.786
65	65 2.5591	95 3.7402	28 1.102	78.3 3.0827	0.85 0.033	NA 2065	78.0 17500	184 41400	3200	4900	0.0887	0.433 0.955
	65 2.5591	105 4.1339	38 1.496	83.1 3.2717	0.85 0.033	NA 3065	129.0 29000	308 69200	2900	4500	0.1012	0.865 1.907
70	70 2.7559	100 3.9370	20 0.787	83.1 3.2717	0.85 0.033	NA 1070	43.0 9670	103 23200	2900	4500	0.0784	0.322 0.710
	70 2.7559	100 3.9370	28 1.102	83.1 3.2717	0.85 0.033	NA 2070	81.0 18200	195 43800	2900	4500	0.0926	0.470 1.036
	70 2.7559	110 4.3307	38 1.496	88.0 3.4646	0.85 0.033	NA 3070	134.0 30100	325 73100	2800	4300	0.1050	0.906 1.997
75	75 2.9528	110 4.3307	32 1.260	88.0 3.4646	0.85 0.033	NA 2075	104.0 23400	253 56900	2800	4300	0.0983	0.767 1.691
	75 2.9528	120 4.7244	38 1.496	96.0 3.7795	0.85 0.033	NA 3075	142.0 31900	355 79800	2600	4000	0.1117	1.098 2.421
80	80 3.1496	115 4.5276	24 0.945	96.0 3.7795	0.85 0.033	NA 1080	68.0 15300	170 38200	2600	4000	0.0918	0.510 1.124
	80 3.1496	115 4.5276	32 1.254	96.0 3.7795	0.85 0.033	NA 2080	110.0 24700	275 61800	2600	4000	0.1045	0.694 1.530
	80 3.1496	125 4.9213	38 1.496	99.5 3.9173	0.85 0.033	NA 3080	145.0 32600	365 82100	2500	3800	0.1145	1.220 2.690
85	85 3.3465	120 4.7244	32 1.260	99.5 3.9173	1.35 0.053	NA 2085	113.0 25400	285 64100	2500	3800	0.1072	0.787 1.735
	85 3.3465	130 5.1181	38 1.496	104.7 4.1220	1.35 0.053	NA 3085	150.0 33700	390 87700	2300	3600	0.1189	1.252 2.760
90	90 3.5433	125 4.9213	32 1.260	104.7 4.1220	1.35 0.053	NA 2090	117.0 26300	300 67400	2300	3600	0.1113	0.837 1.845
	90 3.5433	135 5.3150	43 1.693	109.7 4.3189	1.35 0.053	NA 3090	185.0 41600	480 108000	2300	3500	0.1283	1.522 3.355
95	95 3.7402	130 5.1181	32 1.260	109.1 4.2953	1.35 0.053	NA 2095	120.0 27000	315 70800	2300	3500	0.1225	0.882 1.944
	95 3.7402	140 5.5118	43 1.693	114.7 4.5157	1.35 0.053	NA 3095	190.0 42700	505 114000	2100	3300	0.1327	1.551 3.419
100	100 3.9370	135 5.3150	32 1.260	114.7 4.5157	1.35 0.053	NA 2100	125.0 28100	330 74200	2100	3300	0.1188	0.677 1.493
	100 3.9370	145 5.7087	43 1.693	119.2 4.6929	1.35 0.053	NA 3100	195.0 43800	520 117000	2100	3200	0.1364	1.645 3.627

Continued on next page.

NEEDLE ROLLER BEARINGS FULL COMPLEMENT WITH INNER RINGS – *continued*

METRIC SERIES

- Check for availability.



Shaft Diameter	Dimensions mm/in.					Bearing Designation	Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speeds Oil	Limiting Speeds Grease		Approx. Wt. kg/lbs.
mm	F_w	D	B	E_w	$r_{s\,min}$		C	C_0	RPM		C_g	
105	105 4.1339	140 5.5118	32 1.260	119.2 4.6929	1.35 0.053	NA 2105	129.0 29000	340 76400	2100	3200	0.1221	0.941 2.075
	105 4.1339	150 5.9055	45 1.772	124.7 4.9094	1.35 0.053	NA 3105	203.0 45600	550 124000	2000	3000	0.1409	1.762 3.885
110	110 4.3307	145 5.7087	34 1.339	124.7 4.9094	1.35 0.053	NA 2110	133.0 29900	360 80900	2000	3000	0.1261	1.015 2.238
	110 4.3307	160 6.2992	45 1.772	132.5 5.2165	1.35 0.053	NA 3110	210.0 47200	580 130000	1900	2900	0.1471	2.037 4.491
115	115 4.5276	155 6.1024	34 1.339	132.5 5.2165	1.35 0.053	NA 2115	139.0 31200	380 85400	1900	2900	0.1318	1.205 2.657
	115 4.5276	165 6.4961	45 1.772	137.0 5.3937	1.35 0.053	NA 3115	215.0 48300	600 135000	1800	2800	0.1507	2.140 4.718
120	120 4.7244	160 6.2992	34 1.339	137.0 5.3937	1.35 0.053	NA 2120	142.0 31900	395 88800	1800	2800	0.1350	1.265 2.789
	120 4.7244	170 6.6929	45 1.772	143.5 5.6496	1.35 0.053	NA 3120	224.0 50400	630 142000	1800	2700	0.1563	2.107 4.645
125	125 4.9213	165 6.4961	34 1.339	143.5 5.6496	1.35 0.053	NA 2125	145.0 32600	410 92200	1800	2700	0.1403	1.218 2.685
130	130 5.1181	170 6.6929	34 1.339	148.0 5.8268	1.35 0.053	NA 2130	150.0 33700	425 95500	1700	2600	0.1435	1.292 2.848
140	140 5.5118	180 7.0866	36 1.417	158.0 6.2205	1.35 0.053	NA 2140	157.0 35300	455 102000	1600	2400	0.1504	1.478 3.258
	140 5.5118	205 8.0709	52 2.047	170.5 6.7126	1.35 0.053	NA 3140	290.0 65200	860 193000	1400	2200	0.1787	3.840 8.466
150	150 5.9055	195 7.6772	36 1.417	170.5 6.7126	1.35 0.053	NA 2150	165.0 37100	490 110000	1400	2200	0.1591	1.790 3.946
160	160 6.2992	205 8.0709	36 1.417	179.3 7.0591	1.35 0.053	NA 2160	170.0 38200	515 116000	1400	2100	0.1650	1.970 4.343
170	170 6.6929	220 8.6614	42 1.654	193.8 7.6299	1.35 0.053	NA 2170	233.0 52400	720 162000	1300	2000	0.1852	2.570 5.666
180	180 7.0866	230 9.0551	42 1.654	202.6 7.9764	1.35 0.053	NA 2180	240.0 54000	750 169000	1200	1900	0.2145	2.835 6.250
190	190 7.4803	245 9.6457	42 1.654	216.0 8.5039	1.35 0.053	NA 2190	250.0 56200	800 180000	1200	1800	0.2004	3.210 7.077
200	200 7.8740	255 10.0394	42 1.654	224.1 8.8228	1.35 0.053	NA 2200	257.0 57800	830 187000	1100	1700	0.2057	3.560 7.848

SINGLE ROW RADIAL BEARINGS –

METRIC SERIES

The cylindrical roller radial bearing has integral end ribs on the outer ring for end guiding the cylindrical rollers. The inner ring is separable for simplified mounting and removal.

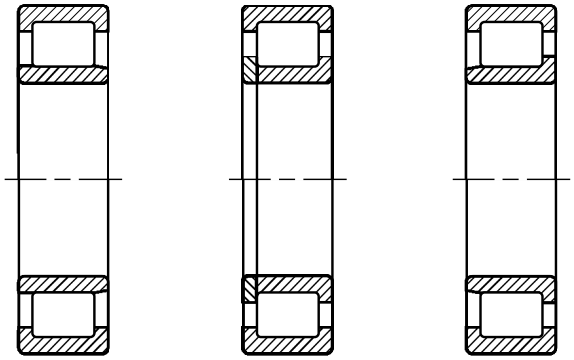
All NU design bearings are available on request without inner rings. For this requirement add letter R in the prefix.

The modified line contact between the cylindrical rollers and raceways reduces edge stressing.

REFERENCE STANDARDS ARE:

- **DIN 5412** single-row cylindrical roller bearings.
- **ISO 246 & DIN 5412** Angle rings (thrust collar).

TYPES OF METRIC SERIES CYLINDRICAL ROLLER RADIAL BEARINGS



NU NUP NJ

Suffixes	
E.TVP	E-design bearing, molded window type cage of engineered polymer.
M	Machined brass cages.

CONSTRUCTION

Cylindrical roller radial bearings can be recognized by the arrangement of their end ribs. Bearings of NU design have two ribs on the outer ring, the inner ring being cylindrical, which makes them well-suited for use as floating bearings. They are separable, which simplifies mounting and removal. Cylindrical roller radial bearings of NJ design have two ribs on the outer ring and one rib on the inner ring. They can accept axial loading in one direction.

Bearings of NUP design have two ribs on the outer ring, and one fixed and one loose rib (a flat washer) on the inner ring. These cylindrical roller radial bearings are used for locating purposes and can accept reversing axial loading. A cylindrical radial roller bearing of NJ design with an HJ Type thrust collar forms a locating bearing similar to the NUP design.

Cylindrical roller bearings of RNU Type, available on request, are supplied without an inner ring so that the cylindrical rollers run directly on a hardened and ground shaft. For most general applications the shaft may be machined to g6 and the housing bore to K6 tolerances.

CAGE DESIGNS

Cylindrical roller bearings of series 2..E, 22..E, 3..E and 23.. E mostly use cages of glass fiber reinforced nylon. This cage construction allows for bearings to be designed with maximum load carrying capability. These cages can be used at operating temperatures of up to 120° C over extended periods. When bearings are lubricated with an oil, presence of additives may reduce operating life if the temperature exceeds 100° C over extended periods. Furthermore, stagnant oil may affect the performance of the cage at these temperatures, requiring oil change intervals to be strictly observed.

Suffix M indicates that the bearings use machined brass cages.

FOR MORE INFORMATION ON CYLINDRICAL ROLLER TYPES NU, NUP AND NJ, SEE THE RADIAL CYLINDRICAL SECTION

DIMENSIONAL ACCURACY

TOLERANCES AND BEARING CLEARANCE

Metric series cylindrical roller radial bearings are available in various tolerance classes and clearance groups. Single row cylindrical roller bearings are made to normal clearance group C0 although bearings with radial clearance groups C2, C3 and C4 may be obtained on request.

For tolerances of cylindrical roller radial bearings see page B336. For radial internal clearances of cylindrical roller radial bearings see page B336.

ALIGNMENT

The modified line contact between the cylindrical rollers and raceways of cylindrical roller bearings reduces stress concentration at ends of the rollers and provides some aligning capability. The angular alignment of single row cylindrical roller bearings must not exceed a maximum of 4 angular minutes at a load of $P/C < 0.2$ (P = equivalent dynamic load, kN.) At higher applied loads, or with presence of greater misalignment, consultation with your Timken representative is strongly encouraged.

MOUNTING DIMENSIONS

The bearing inner and outer rings should be mounted against the stepped portion on the shaft and the shoulder of the housing. Under no circumstances should they interfere with the shaft or housing fillets. For this reason the maximum fillet radius $r_{as\ max}$ of the mating component must be no greater than the minimum chamfer dimension of the corresponding cylindrical roller bearing ring corner $r_{s\ min}$.

The shoulder of the mating components must be such that, even with the maximum permissible single chamfer dimension of the corresponding bearing ring, there is an adequate contact surface area. Table 1 lists the maximum fillet radius $r_{as\ max}$ and the minimum shoulder height. At high axial loads the ribs must be supported over half their height.

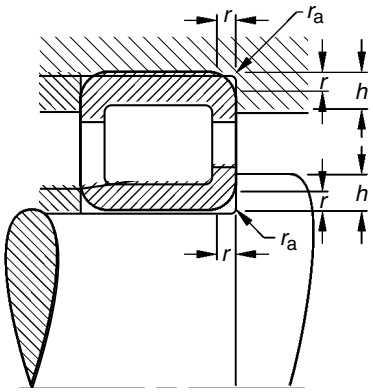
$$\left(\frac{H+E}{2} \text{ and } \frac{F+J}{2} \right)$$

where from bearing tables:

F raceway diameter of the inner ring
E raceway diameter of the outer ring
J rib diameter of the inner ring
H rib diameter of the outer ring

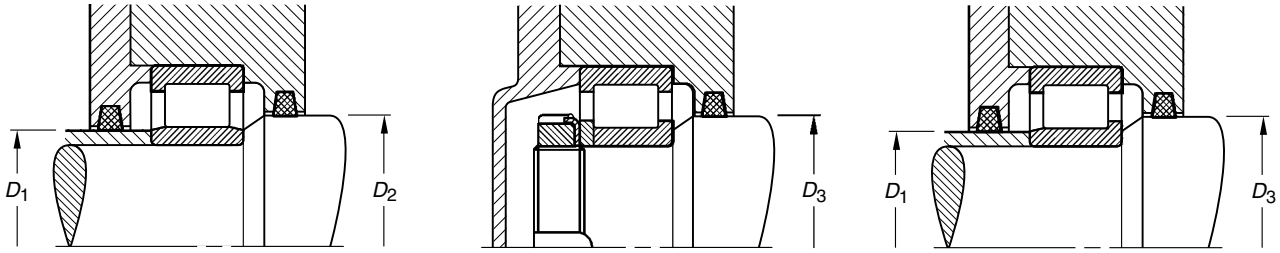
The shaft can be mounted and removed if the mounting dimensions shown in Table 2 on page C135 are observed.

TABLE 1 –
ABUTMENT DIMENSIONS AS SPECIFIED IN DIN 5418 FOR METRIC SERIES BEARINGS



mm		Bearing series	
		10	2..E 3..E 22..E 23..E
$r_{s\ min}$	$r_{as\ max}$	h_{min}	
0.3	0.3	1	1.2
0.6	0.6	1.6	2.1
1	1	2.3	2.8
1.1	1	3	3.5
1.5	1.5	3.5	4.5
2	2	4.4	5.5
2.1	2.1	5.1	6
3	2.5	6.2	7
4	3	7.3	8.5
5	4	9	10
6	5	11.5	13

See engineering section for shaft tolerances for cylindrical roller bearings with inner rings.



NU NUP NJ

TABLE 2 – MOUNTING DIMENSIONS FOR METRIC SERIES SINGLE-ROW CYLINDRICAL ROLLER BEARINGS

Bore Reference Number	Shaft Diameter mm	Bearing Series 10							
				2..E 22..E			3..E 23..E		
		Max.	Min.	Max.	Min.	Min.	Max.	Min.	Min.
		D_1	D_2	D_1	D_2	D_3	D_1	D_2	D_3
02	15			20	23	26			
03	17			21	25	27	24	27	30
04	20	25	27	26	29	32	27	30	33
05	25	30	32	31	34	37	33	37	40
06	30	35	38	37	40	44	40	44	48
07	35	41	44	43	46	50	45	48	53
08	40	46	49	49	52	56	51	55	60
09	45	52	54	54	57	61	57	60	66
10	50	57	59	58	62	67	63	67	73
11	55	63	66	65	68	73	69	72	80
12	60	68	71	71	75	80	75	79	86
13	65	73	76	77	81	87	81	85	93
14	70	78	82	82	86	92	87	92	100
15	75	83	87	87	90	96	93	97	106
16	80	90	94	94	97	104	99	105	114

LOAD RATINGS

MAXIMUM CAPACITY BEARINGS

The maximum capacity cylindrical roller radial bearings are designated with a letter E in the suffix. The cylindrical rollers are designed for maximum load carrying capability and are available in bearings of series 2, 22, 3 and 23.

EQUIVALENT DYNAMIC LOADS

For cylindrical roller bearings with purely radial applied load:

$P = F_r$ (kN)

P = Equivalent dynamic load (kN)

F_r = The maximum dynamic radial load that may be applied to a cylindrical roller bearing based on the dynamic load rating C given in the tabular pages. This load should be $\leq C/3$.

If, in addition to the radial load, an axial load F_a acts on the bearing, this axial load is taken into consideration when calculating the life of a bearing (with $F_a \leq F_{az}$; F_{az} is the allowable axial load).

Dimension Series	Load Ratio	Equivalent Dynamic Load
10, 2..E, 3..E	$F_a/F_r \leq 0.11$	$P = F_r$
	$F_a/F_r > 0.11$	$P = 0.93 \bullet F_r + 0.69 \bullet F_a$
22..E, 23..E	$F_a/F_r \leq 0.17$	$P = F_r$
	$F_a/F_r > 0.17$	$P = 0.93 \bullet F_r + 0.45 \bullet F_a$

ALLOWABLE AXIAL LOAD

Metric series cylindrical roller bearings of NUP, NJ, as well as NU or NJ designs with a thrust collar can transmit axial loads if they are radially loaded at the same time. The allowable axial load ratio F_a/C of 0,1 maximum depends to a great extent on the magnitude of radial load, the operating speed, type of lubricant used, the operating temperature and heat transfer conditions at the bearing location. The heat balance achieved at the bearing location is used as a basis for determination of the allowable axial load.

The nomogram on page C137 should be used to determine the allowable axial load F_{az} based on the following operating conditions:

- The axial load is of constant direction and magnitude
- Radial load ratio $F_r/C \leq 0.2$
- Ratio of axial load to radial load $F_a/F_r<0.4$
- The temperature of the bearing is 80° C at an ambient temperature of 20° C.
- Lubricating oil is ISO VG 100 using oil bath lubrication or circulating oil.
- As an alternative, the bearing may be lubricated with a grease using the above specified base oil and viscosity. Use of EP additives will be necessary, although considerably shorter relubrication intervals may be expected than with purely radially loaded cylindrical roller radial bearings.

EXAMPLE OF USING THE NOMOGRAM

From the lower part of the nomogram, determine the intersection point of the inner ring bore diameter and the dimension series of the bearing. From the upper part, the allowable axial load ratio F_{az}/C can be found as a function of the operating speed, n.

For a cylindrical roller radial bearing **NU2207E.TVP**

C = 63 kN; d = 35 mm

n = 2000 RPM

F_r = 10 kN

From the nomogram:

$F_{az}/C = 0.06$

Then $F_{az} = 0.06 \bullet 63$

The calculated allowable axial load F_{az} is 3.78 kN

It should be noted that an axial load as high as that determined by means of the nomogram should not be applied if an oil of rated kinematic viscosity lower than ISO VG 100 is used. Suitable EP additives, which are known for fatigue life improving qualities, may allow for an increase in applied axial load subject to thorough testing.

HIGHER APPLIED AXIAL LOADS

Axial loads greater than those determined by means of the nomogram may be considered, providing they are to be applied intermittently. Also, the bearing should be cooled using circulating oil lubrication and if the operating temperature, due to the internal friction and the higher axial load, exceeds 80° C, a more viscous oil must be used.

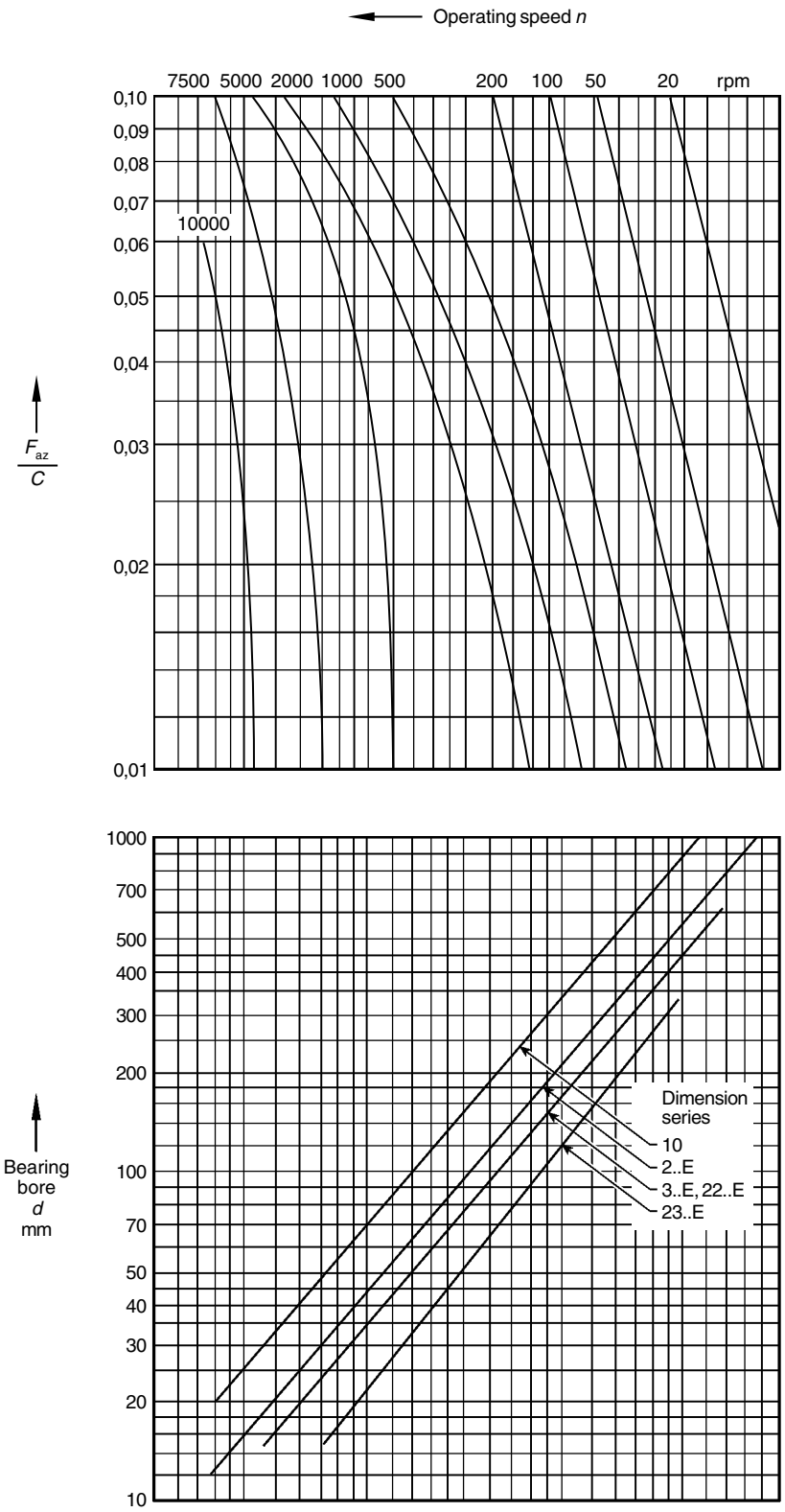
EQUIVALENT STATIC LOAD

For cylindrical roller radial bearings with radially applied static loads

$P_0 = F_r$ (kN)

FOR MORE INFORMATION ON CYLINDRICAL ROLLER TYPES NU, NUP AND NJ, SEE THE RADIAL CYLINDRICAL SECTION

NOMOGRAM FOR DETERMINING THE ALLOWABLE AXIAL LOAD F_{AZ}



NEEDLE ROLLER BEARINGS –

INCH SERIES

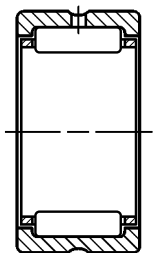
When there is a requirement for a rolling bearing to support very high dynamic, static or even shock loads with a restricted mounting space, the needle roller bearing may be found to give best results.

REFERENCE STANDARDS ARE:

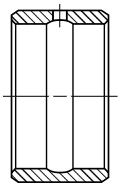
- **ANSI/ABMA Standard 18.2** – Needle Roller Bearings – Radial, Inch Design.
- **ASTM Standard F 2246** – Standard Specification for Bearing, Roller, Needle: Thick Outer Ring with Rollers and Cage.
- **Military Standard MS 51961** – Bearing, Roller, Needle: Thick Outer Ring with Rollers and Cage.

C

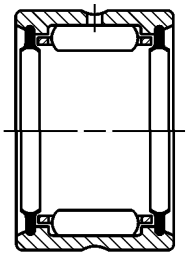
IDENTIFICATION



HJ



IR



HJ – .2RS

The prefix letters HJ in the needle roller bearing designation denote that the bearing is manufactured to inch nominal dimensions.

Bearings are available with one or two lip contact seals as listed on pages C148-C149. One seal is designated by suffix letters RS. Two seals are designated by .2RS.

Inner rings can be used with HJ Series needle roller bearings for applications where it is impractical to use the shaft as the inner raceway. These inch series inner rings are identified by the prefix letters IR.

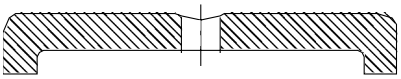
Since the entire identification code may not appear on the bearing itself, the manufacturer's parts list or another reliable source should always be consulted when ordering bearings for service or field replacement, to make certain that the correct bearing with the correct lubricant is used.

CONSTRUCTION

The HJ Series needle roller bearing has a one-piece channel-shaped outer ring of bearing quality steel, heat treated to provide maximum load rating. The integral end flanges provide axial location for the needle rollers. The bores of the end flanges serve as piloting surfaces for the cage, locating it to prevent removal of the lubricant film on the raceway.

These bearings have a steel cage which provides inward retention for the needle rollers. The design assures roller stability and minimizes friction between the cage and the needle rollers. The cage has a maximum strength consistent with the inherent high load ratings of needle roller bearings.

The needle rollers are made from high carbon chrome steel, through-hardened, ground and lapped to close tolerance with controlled contour for optimum load distribution.



One Piece Channel-Shaped, Outer Ring

DIMENSIONAL ACCURACY, BEARINGS –

INCH SERIES

Tolerances for the HJ bearings are given in Tables 1 and 2.

Pages C142-C149 list the nominal outside diameter, width and needle roller complement bore diameter for the HJ bearings.

TABLE 1 – OUTSIDE DIAMETER AND WIDTH TOLERANCES, HJ BEARINGS

D Nominal Outside Diameter				Deviations from Nominal of Single Mean Outside Diameter, D_{mp}[1]				of Width, C			
mm		inch		mm		inch		mm		inch	
>	≤	>	≤	high	low	high	low	high	low	high	low
19.050	50.800	0.7500	2.0000	+0	-0.013	+0	-0.0005	+0	-0.013	+0	-0.005
50.800	82.550	2.0000	3.2500	+0	-0.015	+0	-0.0006	+0	-0.013	+0	-0.005
82.550	120.650	3.2500	4.7500	+0	-0.020	+0	-0.0008	+0	-0.013	+0	-0.005
120.650	184.150	4.7500	7.2500	+0	-0.025	+0	-0.0010	+0	-0.013	+0	-0.005
184.150	260.350	7.2500	10.2500	+0	-0.030	+0	-0.0012	+0	-0.013	+0	-0.005
260.350	317.500	10.2500	12.5000	+0	-0.036	+0	-0.0014	+0	-0.013	+0	-0.005

[1] "Single mean diameter" is defined as the mean diameter in a single radial plane.

TABLE 2 – ROLLER COMPLEMENT BORE TOLERANCE, HJ BEARINGS

F_w Nominal Roller Complement Bore Diameter				Deviations from Nominal of the smallest Single Diameter[1] of the Roller Complement Bore, $F_{w\ min.}$			
mm		inch		mm		inch	
>	≤	>	≤	low	high	low	high
12.700	15.875	0.5000	0.6250	+0.020	+0.043	+0.0008	+0.0017
15.875	28.575	0.6250	1.1250	+0.023	+0.046	+0.0009	+0.0018
28.575	41.275	1.1250	1.6250	+0.025	+0.048	+0.0010	+0.0019
41.275	47.625	1.6250	1.8750	+0.025	+0.050	+0.0010	+0.0020
47.625	69.850	1.8750	2.7500	+0.028	+0.053	+0.0011	+0.0021
69.850	76.200	2.7500	3.0000	+0.028	+0.058	+0.0011	+0.0023
76.200	101.600	3.0000	4.0000	+0.030	+0.060	+0.0012	+0.0024
101.600	114.300	4.0000	4.5000	+0.030	+0.066	+0.0012	+0.0026
114.300	152.400	4.5000	6.0000	+0.033	+0.069	+0.0013	+0.0027
152.400	165.120	6.0000	6.5000	+0.033	+0.074	0.0013	+0.0029
165.100	195.850	6.5000	7.7500	+0.036	+0.077	0.0014	+0.0030
196.850	234.950	7.7500	9.2500	+0.036	+0.082	0.0014	+0.0032

[1] " The smallest single diameter of the roller complement bore" is defined as the diameter of the cylinder which, when used as a bearing inner ring, results in zero radial internal clearance in the bearing on at least one diameter.

DIMENSIONAL ACCURACY, INNER RINGS –

INCH SERIES

Tolerances for the IR inner rings are given in Table 3 and 4. Pages C150-C153 list the nominal outside diameter, width and bore diameter for the IR series inner rings.

TABLE 3 – BORE AND WIDTH TOLERANCES, IR INNER RING

d Nominal Outside Diameter				Deviations from Nominal of Single Mean Outside Diameter, d_{mp}[1]				of Width, B			
mm		inch		mm		inch		mm		inch	
>	≤	>	≤	high	low	high	low	high	low	high	low
7.938	19.050	0.3125	0.7500	+0	-0.010	+0	-0.0004	+0.25	+0.12	+0.010	+0.005
19.050	50.800	0.7500	2.0000	+0	-0.013	+0	-0.0005	+0.25	+0.12	+0.010	+0.005
50.800	82.550	2.0000	3.2500	+0	-0.015	+0	-0.0006	+0.25	+0.12	+0.010	+0.005
82.550	107.950	3.2500	4.2500	+0	-0.020	+0	-0.0008	+0.25	+0.12	+0.010	+0.005
107.950	120.650	4.2500	4.7500	+0	-0.020	+0	-0.0009	+0.38	+0.25	+0.015	+0.010
120.650	177.800	4.7500	7.0000	+0	-0.025	+0	-0.0010	+0.38	+0.25	+0.015	+0.010
177.800	203.200	7.0000	8.0000	+0	-0.030	+0	-0.00012	+0.38	+0.25	+0.015	+0.010

[1] "Single mean diameter" is defined as the mean diameter in a single radial plane.

TABLE 4 – OUTSIDE DIAMETER TOLERANCE, IR INNER RINGS

F_w Nominal Bore Diameter				Deviations from Nominal of Single Mean Outside Diameter, F_{mp}[1]			
mm		inch		mm		inch	
>	≤	>	≤	low	high	low	high
12.700	15.875	0.5000	0.6250	-0.013	-0.023	-0.0005	-0.0009
15.875	25.400	0.6250	1.0000	-0.018	-0.031	-0.0007	-0.0012
25.400	28.575	1.0000	1.1250	-0.023	-0.036	-0.0009	-0.0014
28.575	34.925	1.1250	1.3750	-0.023	-0.036	-0.0009	-0.0015
34.925	47.625	1.3750	1.8750	-0.025	-0.038	-0.0010	-0.0016
47.625	76.200	1.8750	3.0000	-0.028	-0.040	-0.0011	-0.0018
76.200	95.250	3.0000	3.7500	-0.033	-0.046	-0.0013	-0.0022
95.250	114.300	3.7500	4.5000	-0.038	-0.056	-0.0015	-0.0024
114.300	139.700	4.5000	5.5000	-0.038	-0.061	-0.0015	-0.0025
139.700	165.100	5.5000	6.5000	0.043	-0.063	-0.0017	-0.0027
165.100	209.550	6.5000	8.2500	-0.046	-0.068	-0.0019	-0.0031
209.550	234.950	8.2500	9.2500	-0.051	-0.078	-0.0020	-0.0032

[1] "Single mean diameter" is defined as the mean diameter in a single radial plane.

LUBRICATION

The outer rings of the HJ bearings are supplied with a lubrication groove on the O.D. and a lubrication hole in this groove to facilitate relubrication through the outer ring. The IR inner rings have lubrication grooves in the bore and a relubrication hole to facilitate relubrication through the inner ring.

HJ Series bearings (with or without seals) are typically shipped protected with a corrosion preventive compound which is not a lubricant. When specified by the customer, HJ Series bearings may be ordered prelubricated with suitable greases and oils. For general information regarding lubrication of needle roller bearings, refer to the engineering section.

SEALS

Shaft contact seals which fit into the same housing bore as the heavy-duty needle roller bearings may be obtained from recognized seal manufacturers. Bearings can also be made available with one or two integral seals — for information and listing of sealed bearings see pages C148-C149.

SPECIAL BEARINGS

For needle roller bearings with special dimensions or special features such as split outer ring, consult the Timken automotive representative.

MOUNTING DIMENSIONS

HJ needle roller bearings are normally mounted in their housings with a clearance fit if the load is stationary relative to the housing, and with a tight transition fit if the load rotates relative to the housing. Since the tight transition fit of the bearing in its housing may result in a reduction of the needle roller complement bore diameter, the shaft raceway diameter should be reduced a like amount.

The tables of dimensions list the suggested ISO H7 tolerances for the housing bore and the suggested ISO h6 tolerances for the shaft raceway when the outer ring is to be mounted with a clearance fit. They also list the suggested ISO N7 tolerances for the housing bore and the suggested ISO f6 tolerances for the shaft raceway when the outer ring is to be mounted with a tight transition fit.

Other mounting dimensions may be required for special conditions such as:

1. Extremely heavy radial loads
2. Shock loads
3. Load rotating relative to both inner and outer rings
4. Temperature gradient across bearing
5. Housing with heat expansion coefficient differing from that of the bearing.

If these conditions are expected, please consult your Timken representative.

Regardless of the fit of the bearing outer ring in the housing, the outer rings should be axially located by housing shoulders or other positive means. The bearing rings should closely fit against shaft and housing shoulders and must not contact the fillet radius. The maximum shaft or housing fillet $r_{as\ max}$ should be no greater than the minimum bearing chamfer $r_{s\ min}$ shown in the bearing tables. The unmarked end of the outer ring should be assembled against the housing shoulder to assure clearing the maximum housing fillet. Similarly, the unmarked end of the inner ring should be assembled against the shaft shoulder to assure clearing the maximum shaft fillet.

LOAD RATING FACTORS

DYNAMIC LOADS

Needle roller bearings can accommodate only radial loads.

$$P = F_r$$

P = The maximum dynamic radial load that may be applied to a needle roller bearing based on the dynamic load rating C given in the tabular pages. This load should be $\leq$ C/3.

STATIC LOADS

Needle roller bearings can accommodate only radial loads.

$$P_0 = F_r$$

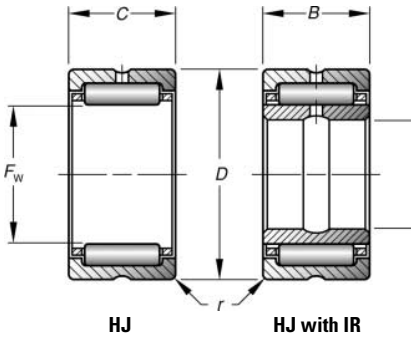
HJ TYPE

INCH SERIES

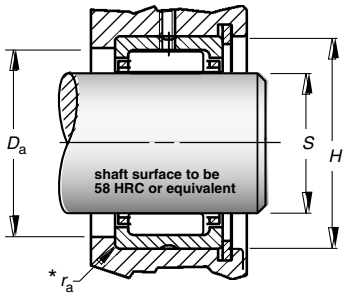
- Check for availability.
- Nominal bearing diameters and widths shown.
- Tolerance tables found on page C139.
- Clearance fit suggested for outer ring when housing is stationary relative to load.
- Tight transition fit suggested if housing rotates relative to load.
- See page C141 for further discussion on mounting practices.
- Consult your Timken representative for oscillating applications (e.g., low radial clearance concerns).
- Unmarked end of outer ring should be assembled against housing shoulder to clear maximum allowed housing fillet ($r_{as\ max}$*).
- Meets Military Standard MS 51961.

Shaft Diameter	Dimensions mm/in.				Bearing Designation	Used With Inner Ring Designation †	Load Ratings kN/lbf. Basic Dynamic	Basic Static	Limiting Speed Grease	Limiting Speed Oil	Approx Wt. kg/lbs.
in.	F_w	D	C/B	$r_{s\ min}$			C	C_o	RPM		
5/8	15.875 0.6250	28.575 1.1250	19.050 0.750	0.64 0.03	HJ-101812	IR-061012	19.3 4350	20.7 4650	20000	30000	0.050 0.11
3/4	19.050 0.7500	31.750 1.2500	19.050 0.750	1.02 0.04	HJ-122012	IR-081212	20.7 4650	23.3 5240	16000	25000	0.059 0.13
	19.050 0.7500	31.750 1.2500	25.400 1.000	1.02 0.04	HJ-122016	IR-081216	27.5 6190	33.7 7580	16000	25000	0.077 0.17
7/8	22.225 0.8750	34.925 1.3750	19.050 0.750	1.02 0.04	HJ-142212	IR-101412	23 5180	27.9 6270	13000	21000	0.064 0.14
	22.225 0.8750	34.925 1.3750	25.400 1.000	1.02 0.04	HJ-142216	IR-101416	30.7 6910	40.3 9070	13000	21000	0.086 0.19
1	25.400 1.0000	38.100 1.5000	19.050 0.750	1.02 0.04	HJ-162412	IR-121612	25.3 5680	32.5 7300	12000	18000	0.073 0.16
	25.400 1.0000	38.100 1.5000	25.400 1.000	1.02 0.04	HJ-162416	IR-121616 IR-131616	33.6 7560	47.2 10600	12000	18000	0.095 0.21
1 1/8	28.575 1.1250	41.275 1.6250	25.400 1.000	1.02 0.04	HJ-182616	IR-141816 IR-151816	36.3 8170	53.8 12100	10000	16000	0.104 0.23
	28.575 1.1250	41.275 1.6250	31.750 1.250	1.02 0.04	HJ-182620	IR-141820 IR-151820	44.9 10100	70.3 15800	10000	16000	0.132 0.29
1 1/4	31.750 1.2500	44.450 1.7500	25.400 1.000	1.02 0.04	HJ-202816	IR-162016	37.4 8410	57.4 12900	9100	14000	0.113 0.25
	31.750 1.2500	44.450 1.7500	31.750 1.250	1.02 0.04	HJ-202820	IR-162020	46.3 10400	75.2 16900	9100	14000	0.145 0.32
1 3/8	34.925 1.3750	47.625 1.8750	25.400 1.000	1.02 0.04	HJ-223016	IR-182216	39.8 8950	64.1 14400	8200	13000	0.127 0.28
	34.925 1.3750	47.625 1.8750	31.750 1.250	1.02 0.04	HJ-223020	IR-182220	49.4 11100	84.1 18900	8200	13000	0.159 0.35
1 1/2	38.100 1.5000	52.388 2.0625	25.400 1.000	1.52 0.06	HJ-243316	IR-202416	47.6 10700	72.5 16300	7600	12000	0.154 0.34
	38.100 1.5000	52.388 2.0625	31.750 1.250	1.52 0.06	HJ-243320	IR-192420 IR-202420	58.7 13200	95.2 21400	7600	12000	0.195 0.43
1 5/8	41.275 1.6250	55.563 2.1875	25.400 1.000	1.52 0.06	HJ-263516	IR-212616	48.5 10900	76.5 17200	7000	11000	0.163 0.36
	41.275 1.6250	55.563 2.1875	31.750 1.250	1.52 0.06	HJ-263520	IR-212620 IR-222620	60.1 13500	100.5 22600	7000	11000	0.209 0.46
1 3/4	44.450 1.7500	58.738 2.3125	25.400 1.000	1.52 0.06	HJ-283716	IR-232816 IR-242816	49.8 11200	81.0 18200	6400	9900	0.177 0.39
	44.450 1.7500	58.738 2.3125	31.750 1.250	1.52 0.06	HJ-283720	IR-222820 IR-232820 IR-242820	61.8 13900	106 23900	6400	9900	0.222 0.49
1 7/8	47.625 1.8750	61.913 2.4375	31.750 1.250	1.52 0.06	HJ-303920	IR-253020	65.4 14700	117 26300	6000	9200	0.236 0.52

† See pages C150-C153 for inch series inner rings. Order inner rings separately.



HJ HJ with IR



	Mounting Dimensions mm/in. Clearance Fit				Bearing Designation	Mounting Dimensions mm/in. Tight Transition Fit				Shoulder Dia. ±.38 ±.015	Shaft Diameter
	Max.	Min.	Min.	Max.		Max.	Min.	Min.	Max.		
C_g[1]	S		H			S		H		D_a	in.
0.0252	15.875 0.6250	15.865 0.6246	28.575 1.1250	28.595 1.1258	HJ-101812	15.860 0.6244	15.850 0.6240	28.547 1.1239	28.567 1.1247	23.83 0.938	5/8
0.0279	19.050 0.7500	19.037 0.7495	31.750 1.2500	31.775 1.2510	HJ-122012	19.030 0.7492	19.017 0.7487	31.717 1.2487	31.742 1.2497	26.97 1.062	3/4
0.0305	19.050 0.7500	19.037 0.7495	31.750 1.2500	31.775 1.2510	HJ-122016	19.030 0.7492	19.017 0.7487	31.717 1.2487	31.742 1.2497	26.97 1.062	
0.0310	22.225 0.8750	22.212 0.8745	34.925 1.3750	34.950 1.3760	HJ-142212	22.205 0.8742	22.192 0.8737	34.892 1.3737	34.917 1.3747	30.18 1.188	7/8
0.0340	22.225 0.8750	22.212 0.8745	34.925 1.3750	34.950 1.3760	HJ-142216	22.205 0.8742	22.192 0.8737	34.892 1.3737	34.917 1.3747	30.18 1.188	
0.0340	25.400 1.0000	25.387 0.9995	38.100 1.5000	38.125 1.5010	HJ-162412	25.380 0.9992	25.367 0.9987	38.067 1.4987	38.092 1.4997	33.32 1.312	1
0.0373	25.400 1.0000	25.387 0.9995	38.100 1.5000	38.125 1.5010	HJ-162416	25.380 0.9992	25.367 0.9987	38.067 1.4987	38.092 1.4997	33.32 1.312	
0.0404	28.575 1.1250	28.562 1.1245	41.275 1.6250	41.300 1.6260	HJ-182616	28.555 1.1242	28.542 1.1237	41.242 1.6237	41.267 1.6247	36.53 1.438	1 1/8
0.0433	28.575 1.1250	28.562 1.1245	41.275 1.6250	41.300 1.6260	HJ-182620	28.555 1.1242	28.542 1.1237	41.242 1.6237	41.267 1.6247	36.53 1.438	
0.0430	31.750 1.2500	31.735 1.2494	44.450 1.7500	44.475 1.7510	HJ-202816	31.725 1.2490	31.709 1.2484	44.417 1.7487	44.442 1.7497	39.67 1.562	1 1/4
0.0460	31.750 1.2500	31.735 1.2494	44.450 1.7500	44.475 1.7510	HJ-202820	31.725 1.2490	31.709 1.2484	44.417 1.7487	44.442 1.7497	39.67 1.562	
0.0460	34.925 1.3750	34.910 1.3744	47.625 1.8750	47.650 1.8760	HJ-223016	34.900 1.374	34.884 1.3734	47.592 1.8737	47.617 1.8747	42.88 1.688	1 3/8
0.0492	34.925 1.3750	34.910 1.3744	47.625 1.8750	47.650 1.8760	HJ-223020	34.900 1.3740	34.884 1.3734	47.592 1.8737	47.617 1.8747	42.88 1.688	
0.0480	38.100 1.5000	38.085 1.4994	52.388 2.0625	52.418 2.0637	HJ-243316	38.075 1.4990	38.059 1.4984	52.349 2.0610	52.380 2.0622	47.63 1.875	1 1/2
0.0514	38.100 1.5000	38.085 1.4994	52.388 2.0625	52.418 2.0637	HJ-243320	38.075 1.4990	38.059 1.4984	52.349 2.0610	52.380 2.0622	47.63 1.875	
0.0503	41.275 1.6250	41.260 1.6244	55.563 2.1875	55.593 2.1887	HJ-263516	41.250 1.6240	41.234 1.6234	55.524 2.1860	55.555 2.1872	50.80 2.000	1 5/8
0.0539	41.275 1.6250	41.260 1.6244	55.563 2.1875	55.593 2.1887	HJ-263520	41.250 1.6240	41.234 1.6234	55.524 2.1860	55.555 2.1872	50.80 2.000	
0.0527	44.450 1.7500	44.435 1.7494	58.738 2.3125	58.768 2.3137	HJ-283716	44.425 1.7490	44.409 1.7484	58.699 2.3110	58.730 2.3122	53.98 2.125	1 3/4
0.0564	44.450 1.7500	44.435 1.7494	58.738 2.3125	58.768 2.3137	HJ-283720	44.425 1.7490	44.409 1.7484	58.699 2.3110	58.730 2.3122	53.98 2.125	
0.0595	47.625 1.8750	47.610 1.8744	61.913 2.4375	61.943 2.4387	HJ-303920	47.600 1.8740	47.584 1.8734	61.874 2.4360	61.905 2.4372	57.15 2.250	1 7/8

*$r_{as\ max}$ is equal to the minimum bearing chamfer ($r_{s\ min}$) at unmarked end.
(1) C_g factor for bearing without inner ring

Continued on next page.

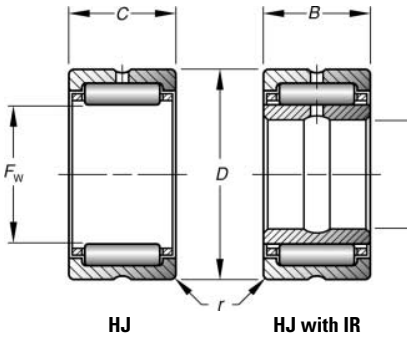
HJ TYPE – *continued*

INCH SERIES

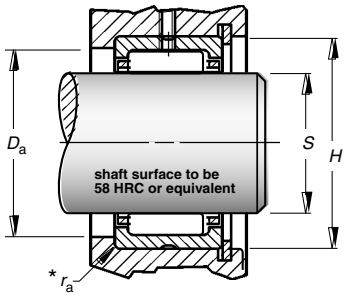
- Check for availability.
- Nominal bearing diameters and widths shown.
- Tolerance tables found on page C139.
- Clearance fit suggested for outer ring when housing is stationary relative to load.
- Tight transition fit suggested if housing rotates relative to load.
- See page C141 for further discussion on mounting practices.
- Consult your Timken representative for oscillating applications (e.g., low radial clearance concerns).
- Unmarked end of outer ring should be assembled against housing shoulder to clear maximum allowed housing fillet ($r_{as\ max}$*).
- Meets Military Standard MS 51961.

Shaft Diameter	Dimensions mm/in.				Bearing Designation	Used With Inner Ring Designation †	Load Ratings kN/lbf. Basic Dynamic	Basic Static	Limiting Speed Grease	Limiting Speed Oil	Approx. Wt. kg/lbs.
in.	F_w	D	C/B	$r_{s\ min}$			C	C_o	RPM		
2	50.800 2.0000	65.088 2.5625	25.400 1.000	1.52 0.06	HJ-324116	IR-273216	53.8 12100	93.0 20900	5600	8600	0.200 0.44
	50.800 2.0000	65.088 2.5625	31.750 1.250	1.52 0.06	HJ-324120	IR-243220 IR-253220 IR-263220 IR-273220	66.7 15000	122 27500	5600	8600	0.249 0.55
2 1/4	57.150 2.2500	76.200 3.0000	38.100 1.500	1.52 0.06	HJ-364824	IR-283624	89.9 20200	164 36900	5000	7600	0.458 1.01
	57.150 2.2500	76.200 3.0000	44.450 1.750	1.52 0.06	HJ-364828	IR-283628	104 23400	198 44500	5000	7600	0.531 1.17
2 1/2	63.500 2.5000	82.550 3.2500	38.100 1.500	2.03 0.08	HJ-405224	IR-314024 IR-324024	97.0 21800	187 42100	4400	6800	0.499 1.10
	63.500 2.5000	82.550 3.2500	44.450 1.750	2.03 0.08	HJ-405228	IR-314028 IR-324028	97.0 25200	187 50800	4400	6800	0.499 1.29
2 3/4	69.850 2.7500	88.900 3.5000	25.400 1.000	2.03 0.08	HJ-445616	—	67.2 15100	120 27000	4000	6200	0.363 0.80
	69.850 2.7500	88.900 3.5000	38.100 1.500	2.03 0.08	HJ-445624	IR-364424	101 22700	203 45700	4000	6200	0.544 1.20
	69.850 2.7500	88.900 3.5000	44.450 1.750	2.03 0.08	HJ-445628	IR-354428 IR-364428	117 26300	245 55100	4000	6200	0.635 1.40
3	76.200 3.0000	95.250 3.7500	38.100 1.500	2.03 0.08	HJ-486024	IR-404824	107 24100	226 50900	3700	5600	0.585 1.29
	76.200 3.0000	95.250 3.7500	44.450 1.750	2.03 0.08	HJ-486028	IR-384828 IR-404828	124 27900	273 61400	3700	5600	0.685 1.51
3 1/4	82.550 3.2500	107.950 4.2500	44.450 1.750	2.03 0.08	HJ-526828	IR-445228	162 36400	305 68600	3400	5300	1.016 2.24
	82.550 3.2500	107.950 4.2500	50.800 2.000	2.03 0.08	HJ-526832	IR-445232	184 41300	358 80500	3400	5300	1.161 2.56
3 1/2	88.900 3.5000	114.300 4.5000	50.800 2.000	2.03 0.08	HJ-567232	IR-475632 IR-485632	187 42000	375 84300	3200	4900	1.238 2.73
3 3/4	95.250 3.7500	120.650 4.7500	50.800 2.000	2.54 0.10	HJ-607632	IR-506032 IR-526032	197 44200	405 91000	4540	4375	1.455 3.208
4	101.600 4.0000	127.000 5.0000	50.800 2.000	2.54 0.10	HJ-648032	IR-526432 IR-546432 IR-566432	205 46000	436 98000	4230	4625	1.541 3.397
4 1/4	107.950 4.2500	133.350 5.2500	50.800 2.000	2.54 0.10	HJ-688432	IR-566832 IR-606832	207 46500	454 102000	3970	4875	1.626 3.586
4 1/2	114.300 4.5000	152.400 6.0000	57.150 2.250	2.54 0.10	HJ-729636	IR-607236	286 64400	516 116000	3850	5438	3.035 6.691
	114.3000 4.5000	152.4000 6.0000	63.500 2.500	2.54 0.10	HJ-729640	IR-607240	319 71700	596 134000	3850	5438	3.372 7.434

† See pages C150-C153 for inch series inner rings. Order inner rings separately.
(1) C_g factor for bearing without inner ring.



HJ HJ with IR



	Mounting Dimensions mm/in. Clearance Fit				Bearing Designation	Mounting Dimensions mm/in. Tight Transition Fit				Shoulder Dia. ±.38 ±.015	Shaft Diameter
	Max.	Min.	Min.	Max.		Max.	Min.	Min.	Max.		
C_g[1]	S		H			S		H		D_a	in.
0.0578	50.800 2.0000	50.782 1.9993	65.088 2.5625	65.118 2.5637	HJ-324116	50.770 1.9988	50.752 1.9981	65.049 2.5610	65.080 2.5622	60.33 2.375	
0.0618	50.800 2.0000	50.782 1.9993	65.088 2.5625	65.118 2.5637	HJ-324120	50.770 1.9988	50.752 1.9981	65.049 2.5610	65.080 2.5622	60.33 2.375	2
0.0683	57.150 2.2500	57.132 2.2493	76.200 3.0000	76.230 3.0012	HJ-364824	57.120 2.2488	57.102 2.2481	76.162 2.9985	76.192 2.9997	68.28 2.688	2 1/4
0.0715	57.150 2.2500	57.132 2.2493	76.200 3.0000	76.230 3.0012	HJ-364828	57.120 2.2488	57.102 2.2481	76.162 2.9985	76.192 2.9997	68.28 2.688	
0.0739	63.500 2.5000	63.482 2.4993	82.550 3.2500	82.586 3.2514	HJ-405224	63.470 2.4988	63.452 2.4981	82.502 3.2481	82.537 3.2495	74.63 2.938	2 1/2
0.0774	63.500 2.5000	63.482 2.4993	82.550 3.2500	82.586 3.2514	HJ-405228	63.470 2.4988	63.452 2.4981	82.502 3.2481	82.537 3.2495	74.63 2.938	
0.0690	69.850 2.7500	69.832 2.7493	88.900 3.5000	88.936 3.5014	HJ-445616	69.820 2.7488	69.802 2.7481	88.852 3.4981	88.887 3.4995	80.98 3.188	
0.0786	69.850 2.7500	69.832 2.7493	88.900 3.5000	88.936 3.5014	HJ-445624	69.820 2.7488	69.802 2.7481	88.852 3.4981	88.887 3.4995	80.98 3.188	2 3/4
0.0823	69.850 2.7500	69.832 2.7493	88.900 3.5000	88.936 3.5014	HJ-445628	69.820 2.7488	69.802 2.7481	88.852 3.4981	88.887 3.4995	80.98 3.188	
0.0839	76.200 3.0000	76.182 2.9993	95.250 3.7500	95.286 3.7514	HJ-486024	76.170 2.9988	76.152 2.9981	95.202 3.7481	95.237 3.7495	87.33 3.438	3
0.0879	76.200 3.0000	76.182 2.9993	95.250 3.7500	95.286 3.7514	HJ-486028	76.170 2.9988	76.152 2.9981	95.202 3.7481	95.237 3.7495	87.33 3.438	
0.0888	82.550 3.2500	82.527 3.2491	107.950 4.2500	107.986 4.2514	HJ-526828	82.514 3.2486	82.492 3.2477	107.902 4.2481	107.937 4.2495	98.43 3.875	3 1/4
0.0924	82.550 3.2500	82.527 3.2491	107.950 4.2500	107.986 4.2514	HJ-526832	82.514 3.2486	82.492 3.2477	107.902 4.2481	107.937 4.2495	98.43 3.875	
0.0965	88.900 3.5000	88.877 3.4991	114.300 4.5000	114.336 4.5014	HJ-567232	88.864 3.4986	88.842 3.4977	114.252 4.4981	114.287 4.4995	104.78 4.125	3 1/2
0.1011	95.250 3.7500	95.227 3.7491	120.650 4.7500	120.691 4.7516	HJ-607632	95.217 3.7487	95.192 3.7477	120.594 4.7478	120.635 4.7494	111.13 4.375	3 3/4
0.1060	101.600 4.0000	101.577 3.9991	127.000 5.0000	127.041 5.0016	HJ-648032	101.564 3.9986	101.542 3.9977	126.944 4.9978	126.985 4.9994	117.48 4.625	4
0.1099	107.950 4.2500	107.927 4.2491	133.350 5.2500	133.391 5.2516	HJ-688432	107.914 4.2486	107.892 4.2477	133.294 5.2478	133.335 5.2494	123.83 4.875	4 1/4
	114.300 4.5000	114.277 4.4991	152.400 6.0000	152.441 6.0016	HJ-729636	114.264 4.4986	114.242 4.4977	152.344 5.9978	152.385 5.9994	138.11 5.438	4 1/2
0.1137	114.300 4.5000	114.277 4.4991	152.400 6.0000	152.441 6.0016	HJ-729640	114.264 4.4986	114.242 4.4977	152.344 5.9978	152.385 5.9994	138.11 5.438	

*$r_{as\ max}$ is equal to the minimum bearing chamfer ($r_{s\ min}$) at unmarked end.
(1) C_g factor for bearing without inner ring.

Continued on next page.

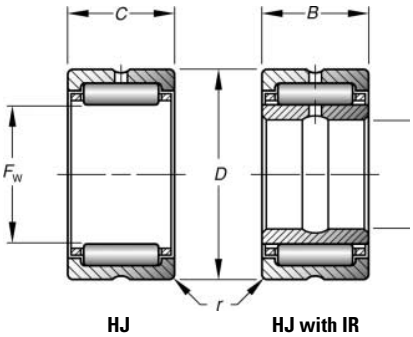
HJ TYPE – *continued*

INCH SERIES

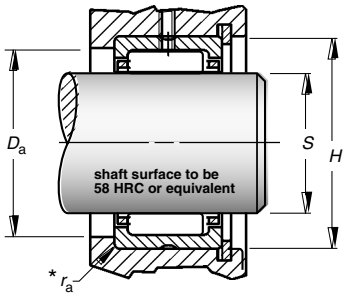
- Check for availability.
- Nominal bearing diameters and widths shown.
- Tolerance tables found on page C139.
- Clearance fit suggested for outer ring when housing is stationary relative to load.
- Tight transition fit suggested if housing rotates relative to load.
- See page C141 for further discussion on mounting practices.
- Consult your Timken representative for oscillating applications (e.g., low radial clearance concerns).
- Unmarked end of outer ring should be assembled against housing shoulder to clear maximum allowed housing fillet ($r_{as\ max}$*).
- Meets Military Standard MS 51961.

Shaft Diameter	Dimensions mm/in.				Bearing Designation	Used With Inner Ring Designation †	Load Ratings kN/lbf. Basic Dynamic	Basic Static	Limiting Speed Grease	Limiting Speed Oil	Approx. Wt. kg/lbs.
in.	F_w	D	C/B	$r_{s\ min}$			C	C_o	RPM		
5	127.000 5.0000	165.100 6.5000	50.800 2.000	2.54 0.10	HJ-8010432	—	272 61200	503 113000	3430	5938	——
	127.000 5.0000	165.100 6.5000	57.150 2.250	2.54 0.10	HJ-8010436	IR-648036 IR-688036	309 69400	592 133000	3430	5938	3.324 7.327
	127.000 5.0000	165.100 6.5000	63.500 2.500	2.54 0.10	HJ-8010440	IR-648040	344 77300	676 152000	3430	5938	3.693 8.141
5 1/2	139.700 5.5000	177.800 7.0000	63.500 2.500	2.54 0.10	HJ-8811240	IR-728840	350 78600	712 160000	3120	6438	4.014 8.849
	139.700 5.5000	177.800 7.0000	76.200 3.000	2.54 0.10	HJ-8811248	IR-728848	415 93300	885 199000	3120	6438	4.817 10.62
5 3/4	146.050 5.7500	184.150 7.2500	76.200 3.000	3.05 0.12	HJ-9211648	IR-769248	422 94800	921 207000	2960	6688	5.009 11.04
6	152.400 6.0000	190.500 7.5000	63.500 2.500	3.05 0.12	HJ-9612040	IR-809640	369 83000	792 178000	2830	6938	4.335 9.557
	152.400 6.0000	190.500 7.5000	76.200 3.000	3.05 0.12	HJ-9612048	IR-809648	442 99300	996 224000	2830	6938	5.202 11.47
6 1/2	165.100 6.5000	203.200 8.0000	63.500 2.500	3.05 0.12	HJ-10412840	IR-8810440	383 86000	850 191000	2600	7438	4.656 10.26
	165.100 6.5000	203.200 8.0000	76.200 3.000	3.05 0.12	HJ-10412848	IR-8810448	454 102000	1054 237000	2600	7438	5.582 12.31
7 1/4	184.150 7.2500	231.775 9.1250	76.200 3.000	3.05 0.12	HJ-11614648	IR-9611648	526 118300	1125 253000	2340	8500	7.888 17.39
7 3/4	196.850 7.7500	244.475 9.6250	76.200 3.000	3.05 0.12	HJ-12415448	IR-10412448	547 123000	1205 271000	2180	9000	8.370 18.45
8 1/4	209.550 8.2500	257.175 10.1250	76.200 3.000	3.05 0.12	HJ-13216248	IR-11213248	565 127000	1290 290000	2040	9500	8.852 19.51
8 3/4	222.250 8.7500	269.875 10.6250	76.200 3.000	4.06 0.16	HJ-14017048	IR-12014048	578 130000	1370 308000	1920	10000	9.333 20.58
9 1/4	234.950 9.2500	282.575 11.1250	76.200 3.000	4.06 0.16	HJ-14817848	IR-12814848	605 136000	1450 326000	1810	10500	9.815 21.64

† See pages C150-C153 for inch series inner rings. Order inner rings separately.
(1) C_g factor for bearing without inner ring.



HJ HJ with IR



	Mounting Dimensions mm/in. Clearance Fit				Bearing Designation	Mounting Dimensions mm/in. Tight Transition Fit				Shoulder Dia. ±.38 ±.015	Shaft Diameter
	Max.	Min.	Min.	Max.		Max.	Min.	Min.	Max.		
C_g[1]	S		H			S		H		D_a	in.
–	127.000 5.0000	126.975 4.9990	165.100 6.5000	165.141 6.5016	HJ-8010432	126.959 4.9984	126.934 4.9974	165.044 6.4978	165.085 6.4994	150.81 5.938	5
0.1188	127.000 5.0000	126.975 4.9990	165.100 6.5000	165.141 6.5016	HJ-8010436	126.959 4.9984	126.934 4.9974	165.044 6.4978	165.085 6.4994	150.81 5.938	
0.1213	127.000 5.0000	126.975 4.9990	165.100 6.5000	165.141 6.5016	HJ-8010440	126.959 4.9984	126.934 4.9974	165.044 6.4978	165.085 6.4994	150.81 5.938	
0.1297	139.700 5.5000	139.675 5.4990	177.800 7.0000	177.841 7.0016	HJ-8811240	139.659 5.4984	139.634 5.4974	177.744 6.9978	177.785 6.9994	163.51 6.438	5 1/2
0.1369	139.700 5.5000	139.675 5.4990	177.800 7.0000	177.841 7.0016	HJ-8811248	139.659 5.4984	139.634 5.4974	177.744 6.9978	177.785 6.9994	163.51 6.438	
0.1409	146.050 5.7500	146.025 5.7490	184.150 7.2500	184.196 7.2518	HJ-9211648	146.009 5.7484	145.984 5.7474	184.089 7.2476	184.135 7.2494	169.86 6.688	5 3/4
0.1384	152.400 6.0000	152.375 5.9990	190.500 7.5000	190.546 7.5018	HJ-9612040	152.359 5.9984	152.334 5.9974	190.439 7.4976	190.485 7.4994	176.21 6.938	6
0.1461	152.400 6.0000	152.375 5.9990	190.500 7.5000	190.546 7.5018	HJ-9612048	152.359 5.9984	152.334 5.9974	190.439 7.4976	190.485 7.4994	176.21 6.938	
0.1459	165.100 6.5000	165.075 6.4990	203.200 8.0000	203.246 8.0018	HJ-10412840	165.059 6.4984	165.034 6.4974	203.139 7.9976	203.185 7.9994	188.91 7.438	6 1/2
0.1539	165.100 6.5000	165.075 6.4990	203.200 8.0000	203.246 8.0018	HJ-10412848	165.059 6.4984	165.034 6.4974	203.139 7.9976	203.185 7.9994	188.91 7.438	
0.1586	184.150 7.2500	184.120 7.2488	231.775 9.1250	231.821 9.1268	HJ-11614648	184.099 7.2480	184.069 7.2468	231.714 9.1226	231.760 9.1244	215.90 8.500	7 1/4
0.1662	196.850 7.7500	196.820 7.7488	244.475 9.6250	244.521 9.6268	HJ-12415448	196.799 7.7480	196.769 7.7468	244.414 9.6226	244.460 9.6244	228.60 9.000	7 3/4
0.1736	209.550 8.2500	209.520 8.2488	257.175 10.1250	257.226 10.1270	HJ-13216248	209.499 8.2480	209.469 8.2468	257.109 10.122	257.160 10.124	241.30 9.500	8 1/4
0.1810	222.250 8.7500	222.220 8.7488	269.875 10.6250	269.926 10.6270	HJ-14017048	222.199 8.7480	222.169 8.7468	269.809 10.622	269.860 10.624	254.00 10.000	8 3/4
0.1885	234.950 9.2500	234.920 9.2488	282.575 11.1250	282.626 11.1270	HJ-14817848	234.899 9.2480	234.869 9.2468	282.509 11.122	282.560 11.124	266.70 10.500	9 1/4

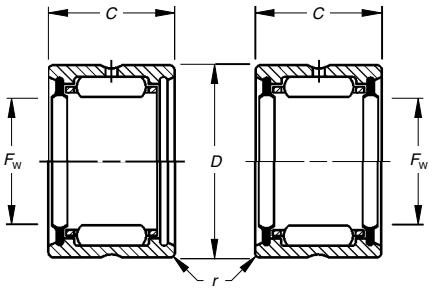
SEALED HEAVY-DUTY NEEDLE ROLLER BEARINGS

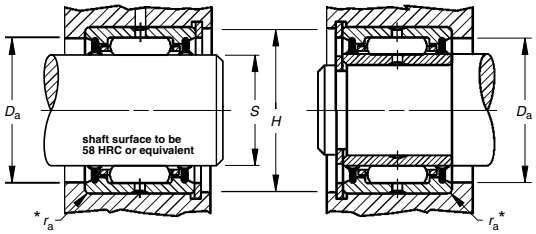
INCH SERIES

- Bearing diameters and widths listed are nominal.
- For inspection purposes, see tolerance tables on page C139.
- Available with one or two contact lip seals designed to retain lubricant and exclude foreign material.
- Single seals are normally installed in the stamped end of bearing.
- Seals limit the bearing operating temperature between -25° F and +225° F (-30° C and +110° C).
- For operating temperature outside of the above range, or if seals are exposed to unusual fluids, please consult your Timken representative.

Shaft Diameter	Dimensions mm/in.				Bearing Designation		Used With Inner Ring †	Load Ratings kN/lbf.			
					One Seal	Two Seals		Dynamic C	Static Co	Limiting Speed	
in.	F_w	D	C/B	$r_{s\ min}$						RPM	C_o
5/8	15.875 0.6250	28.575 1.1250	25.40 1.000	0.64 0.03	HJ-101816RS	HJ-101816.2RS	—	19.3 4350	20.7 4650	12000	0.025
3/4	19.050 0.7500	31.750 1.2500	25.40 1.000	1.02 0.04	HJ-122016RS	HJ-122016.2RS	IR-081216	20.7 4650	23.3 5240	10000	0.028
7/8	22.225 0.8750	34.925 1.3750	25.40 1.000	1.02 0.04	HJ-142216RS	HJ-142216.2RS	IR-101416	23.0 5180	27.9 6270	8700	0.031
1	25.400 1.0000	38.100 1.5000	25.40 1.000	1.02 0.04	HJ-162416RS	HJ-162416.2RS	IR-121616 IR-131616	25.3 5680	32.5 7300	7600	0.034
1 1/8	28.575 1.1250	41.275 1.6250	31.75 1.250	1.02 0.04	HJ-182620RS	HJ-182620.2RS	IR-141820	36.3 8170	53.8 12100	6800	0.040
1 1/4	31.750 1.2500	44.450 1.7500	31.75 1.250	1.02 0.04	HJ-202820RS	HJ-202820.2RS	IR-162020	37.4 8410	57.4 12900	6100	0.043
1 3/8	34.925 1.3750	47.625 1.8750	31.75 1.250	1.02 0.04	HJ-223020RS	HJ-223020.2RS	IR-182220	39.8 8950	64.1 14400	5600	0.046
1 1/2	38.100 1.5000	52.388 2.0625	31.75 1.250	1.52 0.06	HJ-243320RS	HJ-243320.2RS	IR-192420	47.6 10700	72.5 16300	5100	0.0480
1 5/8	41.275 1.6250	55.563 2.1875	31.75 1.250	1.52 0.06	HJ-263520RS	HJ-263520.2RS	IR-212620	48.5 10900	76.5 17200	2400	0.050
1 3/4	44.450 1.7500	58.738 2.3125	31.75 1.250	1.52 0.06	HJ-283720RS	HJ-283720.2RS	IR-222820 IR-232820 IR-242820	49.8 11200 —	81.0 18200 —	4400	0.053
2	50.800 2.0000	65.088 2.5625	31.75 1.250	1.52 0.06	HJ-324120RS	HJ-324120.2RS	IR-243220 IR-253220 IR-263220 IR-273220	53.8 12100 — —	93.0 20900 — —	3800	0.058
2 1/4	57.150 2.2500	76.200 3.0000	44.45 1.750	1.52 0.06	HJ-364828RS	HJ-364828.2RS	IR-283628	89.9 20200	164.1 36900	1700	0.068
2 1/2	63.500 2.5000	82.550 3.2500	44.45 1.750	2.03 0.08	HJ-405228RS	HJ-405228.2RS	IR-222620 IR-314028 IR-324028	97.0 21800 —	187.3 42100 —	3100	0.074
2 3/4	69.850 2.7500	88.900 3.5000	44.45 1.750	2.03 0.08	HJ-445628RS	HJ-445628.2RS	IR-354428 IR-364428	101.0 22700	203.3 45700	1400	0.079
3	76.200 3.0000	95.250 3.7500	44.45 1.750	2.03 0.08	HJ-486028RS	HJ-486028.2RS	IR-384828 IR-404828	107.2 24100	226.4 50900	2500	0.084

† See pages C150-C153 for inch series inner rings. Order inner rings separately.
§ Based on standard seal shaft contact speed of **305 m/min.**, 1000 ft./min.





Bearing **Bearing with Inner Ring**

Approx. Wt. kg/lbs.	Mounting Dimensions mm/in. Clearance Fit Max.	Min.	Min.	Max.	Bearing Designation	Mounting Dimensions mm/in. Tight Transition Fit Max.	Min.	Min.	Max.	Shoulder Dia. ±.38 ±.015	Shaft Diameter
	S		H			S		H		D_a	in.
0.07 0.15	**15.875** 0.6250	**15.865** 0.6246	**28.575** 1.1250	**28.595** 1.1258	-101816	**15.860** 0.6244	**15.850** 0.6240	**28.547** 1.1239	**28.567** 1.1247	**23.83** 0.938	**5/8**
0.08 0.17	**19.050** 0.7500	**19.037** 0.7495	**31.750** 1.2500	**31.775** 1.2510	-122016	**19.030** 0.7492	**19.017** 0.7487	**31.717** 1.2487	**31.742** 1.2497	**26.97** 1.062	**3/4**
0.09 0.19	**22.225** 0.8750	**22.212** 0.8745	**34.925** 1.3750	**34.950** 1.3760	-142216	**22.205** 0.8742	**22.192** 0.8737	**34.892** 1.3737	**34.917** 1.3747	**30.18** 1.188	**7/8**
0.10 0.21	**25.400** 1.0000	**25.387** 0.9995	**38.100** 1.5000	**38.125** 1.5010	-162416	**25.380** 0.9992	**25.367** 0.9987	**38.067** 1.4987	**38.092** 1.4997	**33.32** 1.312	**1**
0.13 0.29	**28.575** 1.1250	**28.562** 1.1245	**41.275** 1.6250	**41.300** 1.6260	-182620	**28.555** 1.1242	**28.542** 1.1237	**41.242** 1.6237	**41.267** 1.6247	**36.53** 1.438	**1 1/8**
0.15 0.32	**31.750** 1.2500	**31.735** 1.2494	**44.450** 1.7500	**44.475** 1.7510	-202820	**31.725** 1.2490	**31.709** 1.2484	**44.417** 1.7487	**44.442** 1.7497	**39.67** 1.562	**1 1/4**
0.16 0.35	**34.925** 1.3750	**34.910** 1.3744	**47.625** 1.8750	**47.650** 1.8760	-223020	**34.900** 1.3740	**34.884** 1.3734	**47.592** 1.8737	**47.617** 1.8747	**42.88** 1.688	**1 3/8**
0.20 0.43	**38.100** 1.5000	**38.085** 1.4994	**52.388** 2.0625	**52.418** 2.0637	-243320	**38.075** 1.4990	**38.059** 1.4984	**52.349** 2.0610	**52.380** 2.0622	**47.63** 1.875	**1 1/2**
0.21 0.46	**41.275** 1.6250	**41.260** 1.6244	**55.563** 2.1875	**55.593** 2.1887	-263520	**41.250** 1.6240	**41.234** 1.6234	**55.524** 2.1860	**55.555** 2.1872	**50.80** 2.000	**1 5/8**
0.22 0.49	**44.450** 1.7500	**44.435** 1.7494	**58.738** 2.3125	**58.768** 2.3137	-283720	**44.425** 1.7490	**44.409** 1.7484	**58.699** 2.3110	**58.730** 2.3122	**53.98** 2.125	**1 3/4**
0.25 0.55	**50.800** 2.0000	**50.782** 1.9993	**65.088** 2.5625	**65.118** 2.5637	-324120	**50.770** 1.9988	**50.752** 1.9981	**65.049** 2.5610	**65.080** 2.5622	**60.33** 2.375	**2**
0.53 1.17	**57.150** 2.2500	**57.132** 2.2493	**76.200** 3.0000	**76.230** 3.0012	-364828	**57.120** 2.2488	**57.102** 2.2481	**76.162** 2.9985	**76.192** 2.9997	**68.28** 2.688	**2 1/4**
0.59 1.29	**63.500** 2.5000	**63.482** 2.4993	**82.550** 3.2500	**82.586** 3.2514	-405228	**63.470** 2.4988	**63.452** 2.4981	**82.502** 3.2481	**82.537** 3.2495	**74.63** 2.938	**2 1/2**
0.64 1.40	**69.850** 2.7500	**69.832** 2.7493	**88.900** 3.5000	**88.936** 3.5014	-445628	**69.820** 2.7488	**69.802** 2.7481	**88.852** 3.4981	**88.887** 3.4995	**80.98** 3.188	**2 3/4**
0.68 1.51	**76.200** 3.0000	**76.182** 2.9993	**95.250** 3.7500	**95.286** 3.7514	-486028	**76.170** 2.9988	**76.152** 2.9981	**95.202** 3.7481	**95.237** 3.7495	**87.33** 3.438	**3**

*$r_{as\ max}$ is equal to the minimum bearing chamfer ($r_{s\ min}$) at unmarked end.

INNER RINGS

INCH SERIES

- Check for availabilty.
- Ideal choice where shaft not practical to use as inner raceway.
- Provided in inch nominal dimensions for use with inch series heavy-duty needle roller bearings.
- Designed to meet established inch tolerances.
- Selected size should be wider than matching drawn cup bearing.
- Maximum shaft fillet radius ($r_{as\ max}$) cannot exceed inner ring bore chamfer ($r_{s\ min}$) as shown.
- Optional centralized lubrication groove (bore) or through-hole available – specify when ordering.
- Designed to be axially clamped against shoulder for loose transition fit on shaft.
- After mounting, for tight transition fit (keeping inner ring from rotating relative to shaft), inner ring O.D. must not exceed raceway diameter on matching bearing.

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Approx. Wt. kg/lbs.	Loose Transition Fit mm/in.		Inner Ring Designation	Interference Fit mm/in.		Used With Bearing Designation
							Max.	Min.		Max.	Min.	
in.	d	F	B	$r_{s\ min}$			S			S		
3/8	9.525 0.3750	15.875 0.6250	19.05 0.750	0.64 0.025	IR-061012	0.018 0.040	9.520 0.3748	9.510 0.3744	IR-061012	9.538 0.3755	9.530 0.3752	HJ-101812
1/2	12.700 0.5000	19.050 0.7500	19.05 0.750	1.02 0.04	IR-081212	0.023 0.050	12.692 0.4997	12.682 0.4993	IR-081212	12.715 0.5006	12.708 0.5003	HJ-122012
	12.700 0.5000	19.050 0.7500	25.40 1.000	1.02 0.04	IR-081216	0.032 0.070	12.692 0.4997	12.682 0.4993	IR-081216	12.715 0.5006	12.708 0.5003	HJ-122016
5/8	15.875 0.6250	22.225 0.8750	19.05 0.750	1.02 0.04	IR-101412	0.027 0.060	15.867 0.6247	15.857 0.6243	IR-101412	15.890 0.6256	15.883 0.6253	HJ-142212
	15.875 0.6250	22.225 0.8750	25.40 1.000	1.02 0.04	IR-101416	0.036 0.080	15.867 0.6247	15.857 0.6243	IR-101416	15.890 0.6256	15.883 0.6253	HJ-142216
11/16	17.463 0.6875	22.225 0.8750	19.05 0.750	1.02 0.04	IR-111412	0.023 0.050	17.455 0.6872	17.445 0.6868	IR-111412	17.478 0.6881	17.470 0.6878	HJ-142212
3/4	19.050 0.7500	25.400 1.0000	19.05 0.750	1.02 0.04	IR-121612	0.032 0.070	19.042 0.7497	19.030 0.7492	IR-121612	19.068 0.7507	19.058 0.7503	HJ-162412
	19.050 0.7500	25.400 1.0000	25.40 1.000	1.02 0.04	IR-121616	0.041 0.090	19.042 0.7497	19.030 0.7492	IR-121616	19.068 0.7507	19.058 0.7503	HJ-162416
13/16	20.638 0.8125	25.400 1.0000	25.40 1.000	1.02 0.04	IR-131616	0.032 0.070	20.630 0.8122	20.617 0.8117	IR-131616	20.655 0.8132	20.645 0.8128	HJ-162416
7/8	22.225 0.8750	28.575 1.1250	25.40 1.000	1.02 0.04	IR-141816	0.050 0.110	22.217 0.8747	22.205 0.8742	IR-141816	22.243 0.8757	22.233 0.8753	HJ-182616
	22.225 0.8750	28.575 1.1250	31.75 1.250	1.02 0.04	IR-141820	0.059 0.130	22.217 0.8747	22.205 0.8742	IR-141820	22.243 0.8757	22.233 0.8753	HJ-182620
15/16	23.813 0.9375	28.575 1.1250	25.40 1.000	1.02 0.04	IR-151816	0.036 0.080	23.805 0.9372	23.792 0.9367	IR-151816	23.830 0.9382	23.820 0.9378	HJ-182616
	23.813 0.9375	28.575 1.1250	31.75 1.250	1.02 0.04	IR-151820	0.045 0.100	23.805 0.9372	23.792 0.9367	IR-151820	23.830 0.9382	23.820 0.9378	HJ-182620
1	25.400 1.0000	31.750 1.2500	25.40 1.000	1.02 0.04	IR-162016	0.054 0.120	25.392 0.9997	25.380 0.9992	IR-162016	25.418 1.0007	25.408 1.0003	HJ-202816
	25.400 1.0000	31.750 1.2500	31.75 1.250	1.02 0.04	IR-162020	0.068 0.150	25.392 0.9997	25.380 0.9992	IR-162020	25.418 1.0007	25.408 1.0003	HJ-202820
1 1/8	28.575 1.1250	34.925 1.3750	25.40 1.000	1.02 0.04	IR-182216	0.059 0.130	28.567 1.1247	28.555 1.1242	IR-182216	28.593 1.1257	28.583 1.1253	HJ-223016
	28.575 1.1250	34.925 1.3750	31.75 1.250	1.02 0.04	IR-182220	0.077 0.170	28.567 1.1247	28.555 1.1242	IR-182220	28.593 1.1257	28.583 1.1253	HJ-223020
1 1/16	30.163 1.1875	38.100 1.5000	31.75 1.250	1.52 0.06	IR-192420	0.100 0.220	30.155 1.1872	30.142 1.1867	IR-192420	30.180 1.1882	30.170 1.1878	HJ-243320
1 1/4	31.750 1.2500	38.100 1.5000	25.40 1.000	1.52 0.06	IR-202416	0.068 0.150	31.740 1.2496	31.725 1.2490	IR-202416	31.770 1.2508	31.760 1.2504	HJ-243316
	31.750 1.2500	38.100 1.5000	31.75 1.250	1.52 0.06	IR-202420	0.082 0.180	31.740 1.2496	31.725 1.2490	IR-202420	31.770 1.2508	31.760 1.2504	HJ-243320
1 5/16	33.338 1.3125	41.275 1.6250	25.40 1.000	1.52 0.06	IR-212616	0.086 0.190	33.327 1.3121	33.312 1.3115	IR-212616	33.358 1.3133	33.348 1.3129	HJ-263516

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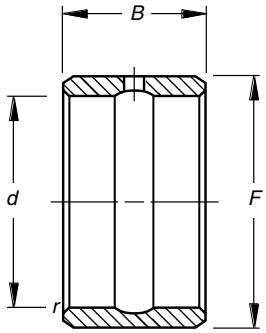
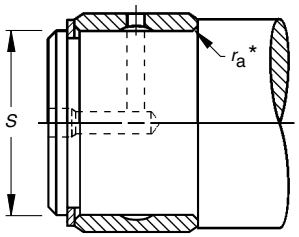
- See tables for required bearing dimensions raceway diameter.
- After mounting, if O.D. of inner ring exceeds the required raceway diameter for matching bearing, ring should be ground to proper diameter while mounted on shaft.
- Unmarked end of inner ring to be assembled against the shaft shoulder to assure clearing the maximum allowable shaft fillet ($r_{as\ max}$) as indicated in tables shown.





Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Approx. Wt. kg/lbs.	Loose Transition Fit mm/in.		Inner Ring Designation	Interference Fit mm/in.		Used With Bearing Designation
							Max.	Min.		Max.	Min.	
in.	d	F	B	$r_{s\ min}$			S			S		
	33.338 1.3125	41.275 1.6250	31.75 1.250	1.52 0.06	IR-212620	0.109 0.240	33.327 1.3121	33.312 1.3115	IR-212620	33.358 1.3133	33.348 1.3129	HJ-263520
1 3/8	34.925 1.3750	41.275 1.6250	31.75 1.250	1.52 0.06	IR-222620	0.091 0.200	34.915 1.3746	34.900 1.3740	IR-222620	34.945 1.3758	34.935 1.3754	HJ-263520
	34.925 1.3750	44.450 1.7500	31.75 1.250	1.52 0.06	IR-222820	0.141 0.310	34.915 1.3746	34.900 1.3740	IR-222820	34.945 1.3758	34.935 1.3754	HJ-283720
1 7/16	36.513 1.4375	44.450 1.7500	25.40 1.000	1.52 0.06	IR-232816	0.095 0.210	36.502 1.4371	36.487 1.4365	IR-232816	36.533 1.4383	36.523 1.4379	HJ-283716
	36.513 1.4375	44.450 1.7500	31.75 1.250	1.52 0.06	IR-232820	0.118 0.260	36.502 1.4371	36.487 1.4365	IR-232820	36.533 1.4383	36.523 1.4379	HJ-283720
1 1/2	38.100 1.5000	44.450 1.7500	25.40 1.000	1.52 0.06	IR-242816	0.077 0.170	38.090 1.4996	38.075 1.4990	IR-242816	38.120 1.5008	38.110 1.5004	HJ-283716
	38.100 1.5000	44.450 1.7500	31.75 1.250	1.52 0.06	IR-242820	0.095 0.210	38.090 1.4996	38.075 1.4990	IR-242820	38.120 1.5008	38.110 1.5004	HJ-283720
	38.100 1.5000	50.800 2.0000	31.75 1.250	1.52 0.06	IR-243220	0.209 0.460	38.090 1.4996	38.075 1.4990	IR-243220	38.120 1.5008	38.110 1.5004	HJ-324120
1 9/16	39.688 1.5625	47.625 1.8750	31.75 1.250	1.52 0.06	IR-253020	0.127 0.280	39.677 1.5621	39.662 1.5615	IR-253020	39.708 1.5633	39.698 1.5629	HJ-303920
	39.688 1.5625	50.800 2.0000	31.75 1.250	1.52 0.06	IR-253220	0.186 0.410	39.677 1.5621	39.662 1.5615	IR-253220	39.708 1.5633	39.698 1.5629	HJ-324120
1 5/8	41.275 1.6250	50.800 2.0000	31.75 1.250	1.52 0.06	IR-263220	0.163 0.360	41.265 1.6246	41.250 1.6240	IR-263220	41.295 1.6258	41.285 1.6254	HJ-324120
1 11/16	42.863 1.6875	50.800 2.0000	25.40 1.000	1.52 0.06	IR-273216	0.109 0.240	42.852 1.6871	42.837 1.6865	IR-273216	42.883 1.6883	42.873 1.6879	HJ-324116
	42.863 1.6875	50.800 2.0000	31.75 1.250	1.52 0.06	IR-273220	0.136 0.300	42.852 1.6871	42.837 1.6865	IR-273220	42.883 1.6883	42.873 1.6879	HJ-324120
1 3/4	44.450 1.7500	57.150 2.2500	38.10 1.500	1.52 0.06	IR-283624	0.286 0.630	44.440 1.7496	44.425 1.7490	IR-283624	44.470 1.7508	44.460 1.7504	HJ-364824
	44.450 1.7500	57.150 2.2500	44.45 1.750	1.52 0.06	IR-283628	0.336 0.740	44.440 1.7496	44.425 1.7490	IR-283628	44.470 1.7508	44.460 1.7504	HJ-364828
1 15/16	49.213 1.9375	63.500 2.5000	38.10 1.500	2.03 0.08	IR-314024	0.358 0.790	49.202 1.9371	49.187 1.9365	IR-314024	49.233 1.9383	49.223 1.9379	HJ-405224
	49.213 1.9375	63.500 2.5000	44.45 1.750	2.03 0.08	IR-314028	0.417 0.920	49.202 1.9371	49.187 1.9365	IR-314028	49.233 1.9383	49.223 1.9379	HJ-405228
2	50.800 2.0000	63.500 2.5000	38.10 1.500	2.03 0.08	IR-324024	0.322 0.710	50.790 1.9996	50.772 1.9989	IR-324024	50.823 2.0009	50.810 2.0004	HJ-405224
	50.800 2.0000	63.500 2.5000	44.45 1.750	2.03 0.08	IR-324028	0.376 0.830	50.790 1.9996	50.772 1.9989	IR-324028	50.823 2.0009	50.810 2.0004	HJ-405228
2 3/16	55.563 2.1875	69.850 2.7500	44.45 1.750	2.03 0.08	IR-354428	0.467 1.030	55.552 2.1871	55.535 2.1864	IR-354428	55.585 2.1884	55.573 2.1879	HJ-445628
2 1/4	57.150 2.2500	69.850 2.7500	38.10 1.500	2.03 0.08	IR-364424	0.358 0.790	57.140 2.2496	57.122 2.2489	IR-364424	57.173 2.2509	57.160 2.2504	HJ-445624

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INNER RINGS – *continued*

INCH SERIES

- Check for availabilty.
- Ideal choice where shaft not practical to use as inner raceway.
- Provided in inch nominal dimensions for use with inch series heavy-duty needle roller bearings.
- Designed to meet established inch tolerances.
- Selected size should be wider than matching drawn cup bearing.
- Maximum shaft fillet radius ($r_{as\ max}$) cannot exceed inner ring bore chamfer ($r_{s\ min}$) as shown.
- Optional centralized lubrication groove (bore) or through-hole available – specify when ordering.
- Designed to be axially clamped against shoulder for loose transition fit on shaft.
- After mounting, for tight transition fit (keeping inner ring from rotating relative to shaft), inner ring O.D. must not exceed raceway diameter on matching bearing.

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Approx. Wt. kg/lbs.	Loose Transition Fit mm/in.		Inner Ring Designation	Interference Fit mm/in.		Used With Bearing Designation
							Max.	Min.		Max.	Min.	
in.	d	F	B	$r_{s\ min}$			S			S		
	57.150 2.2500	69.850 2.7500	44.45 1.750	2.03 0.08	IR-364428	0.417 0.920	57.140 2.2496	57.122 2.2489	IR-364428	57.173 2.2509	57.160 2.2504	HJ-445628
2 3/8	60.325 2.3750	76.200 3.0000	44.45 1.750	2.03 0.08	IR-384828	0.562 1.240	60.315 2.3746	60.297 2.3739	IR-384828	60.348 2.3759	60.335 2.3754	HJ-486028
2 1/2	63.500 2.5000	76.200 3.0000	38.10 1.500	2.03 0.08	IR-404824	0.395 0.870	63.490 2.4996	63.472 2.4989	IR-404824	63.523 2.5009	63.510 2.5004	HJ-486024
	63.500 2.5000	76.200 3.0000	44.45 1.750	2.03 0.08	IR-404828	0.463 1.020	63.490 2.4996	63.472 2.4989	IR-404828	63.523 2.5009	63.510 2.5004	HJ-486028
2 3/4	69.850 2.7500	82.550 3.2500	44.45 1.750	2.03 0.08	IR-445228	0.503 1.110	69.840 2.7496	69.822 2.7489	IR-445228	69.873 2.7509	69.860 2.7504	HJ-526828
	69.850 2.7500	82.550 3.2500	50.80 2.000	2.03 0.08	IR-445232	0.576 1.270	69.840 2.7496	69.822 2.7489	IR-445232	69.873 2.7509	69.860 2.7504	HJ-526832
2 15/16	74.613 2.9375	88.900 3.5000	50.80 2.000	2.03 0.08	IR-475632	0.694 1.530	74.602 2.9371	74.585 2.9364	IR-475632	74.635 2.9384	74.623 2.9379	HJ-567232
3	76.200 3.0000	88.900 3.5000	50.80 2.000	2.03 0.08	IR-485632	0.621 1.370	76.190 2.9996	76.172 2.9989	IR-485632	76.223 3.0009	76.210 3.0004	HJ-567232
3 1/8	79.375 3.1250	95.250 3.7500	50.80 2.000	2.54 0.1	IR-506032	0.880 1.940	79.365 3.1246	79.347 3.1239	IR-506032	79.398 3.1259	79.385 3.1254	HJ-607632
3 1/4	82.550 3.2500	95.250 3.7500	50.80 2.000	2.54 0.1	IR-526032	0.708 1.560	82.537 3.2495	82.517 3.2487	IR-526032	82.578 3.2511	82.563 3.2505	HJ-607632
	82.550 3.2500	101.600 4.0000	50.80 2.000	2.54 0.1	IR-526432	1.089 2.400	82.537 3.2495	82.517 3.2487	IR-526432	82.578 3.2511	82.563 3.2505	HJ-648032
3 3/8	85.725 3.3750	101.600 4.0000	50.80 2.000	2.54 0.1	IR-546432	0.930 2.050	85.712 3.3745	85.692 3.3737	IR-546432	85.753 3.3761	85.738 3.3755	HJ-648032
3 1/2	88.900 3.5000	101.600 4.0000	50.80 2.000	2.54 0.1	IR-566432	0.757 1.670	88.887 3.4995	88.867 3.4987	IR-566432	88.928 3.5011	88.913 3.5005	HJ-648032
	88.900 3.5000	107.950 4.2500	50.80 2.000	2.54 0.1	IR-566832	1.179 2.600	88.887 3.4995	88.867 3.4987	IR-566832	88.928 3.5011	88.913 3.5005	HJ-688432
3 3/4	95.250 3.7500	107.950 4.2500	50.80 2.000	2.54 0.1	IR-606832	1.012 2.230	95.237 3.7495	95.217 3.7487	IR-606832	95.278 3.7511	95.263 3.7505	HJ-688432
	95.250 3.7500	114.300 4.5000	57.15 2.250	2.54 0.1	IR-607236	1.406 3.100	95.237 3.7495	95.217 3.7487	IR-607236	95.278 3.7511	95.263 3.7505	HJ-729636
	95.250 3.7500	114.300 4.5000	63.50 2.500	2.54 0.1	IR-607240	1.565 3.450	95.237 3.7495	95.217 3.7487	IR-607240	95.278 3.7511	95.263 3.7505	HJ-729640
4	101.600 4.0000	127.000 5.0000	57.15 2.250	2.54 0.1	IR-648036	2.046 4.510	101.587 3.9995	101.567 3.9987	IR-648036	101.628 4.0011	101.613 4.0005	HJ-8010436
	101.600 4.0000	127.000 5.0000	63.50 2.500	2.54 0.1	IR-648040	2.272 5.010	101.587 3.9995	101.567 3.9987	IR-648040	101.628 4.0011	101.613 4.0005	HJ-8010440
4 1/4	107.950 4.2500	127.000 5.0000	57.15 2.250	2.54 0.1	IR-688036	1.565 3.450	107.937 4.2495	107.917 4.2487	IR-688036	107.978 4.2511	107.963 4.2505	HJ-8010436
4 1/2	114.300 4.5000	139.700 5.5000	63.50 2.500	2.54 0.1	IR-728840	2.495 5.500	114.287 4.4995	114.267 4.4987	IR-728840	114.328 4.5011	114.313 4.5005	HJ-8811240

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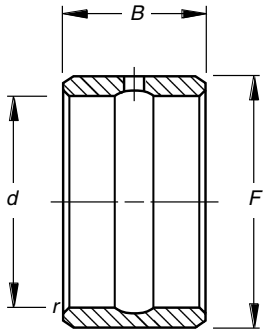
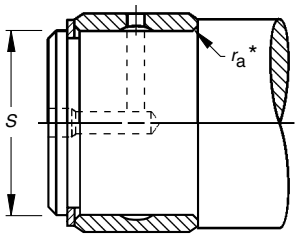
- See tables for required bearing dimensions raceway diameter.
- After mounting, if O.D. of inner ring exceeds the required raceway diameter for matching bearing, ring should be ground to proper diameter while mounted on shaft.
- Unmarked end of inner ring to be assembled against the shaft shoulder to assure clearing the maximum allowable shaft fillet ($r_{as\ max}$) as indicated in tables shown.





Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Approx. Wt. kg/lbs.	Loose Transition Fit mm/in.		Inner Ring Designation	Interference Fit mm/in.		Used With Bearing Designation
							Max.	Min.		Max.	Min.	
in.	d	F	B	$r_{s\ min}$			S			S		
	114.300 4.5000	139.700 5.5000	76.20 3.000	2.54 0.1	IR-728848	2.989 6.590	114.287 4.4995	114.267 4.4987	IR-728848	114.328 4.5011	114.313 4.5005	HJ-8811248
4 3/4	120.650 4.7500	146.050 5.7500	76.20 3.000	3.05 0.12	IR-769248	3.180 7.010	120.635 4.7494	120.612 4.7485	IR-769248	120.683 4.7513	120.665 4.7506	HJ-9211648
5	127.000 5.0000	152.400 6.0000	63.50 2.500	3.05 0.12	IR-809640	2.781 6.130	126.985 4.9994	126.962 4.9985	IR-809640	127.033 5.0013	127.015 5.0006	HJ-9612040
	127.000 5.0000	152.400 6.0000	76.20 3.000	3.05 0.12	IR-809648	3.325 7.330	126.985 4.9994	126.962 4.9985	IR-809648	127.033 5.0013	127.015 5.0006	HJ-9612048
5 1/2	139.700 5.5000	165.100 6.5000	63.50 2.500	3.05 0.12	IR-8810440	3.035 6.690	139.685 5.4994	139.662 5.4985	IR-8810440	139.733 5.5013	139.715 5.5006	HJ-10412840
	139.700 5.5000	165.100 6.5000	76.20 3.000	3.05 0.12	IR-8810448	3.629 8.000	139.685 5.4994	139.662 5.4985	IR-8810448	139.733 5.5013	139.715 5.5006	HJ-10412848
6	152.400 6.0000	184.150 7.2500	76.20 3.000	3.05 0.12	IR-9611648	4.935 10.880	152.385 5.9994	152.362 5.9985	IR-9611648	152.433 6.0013	152.415 6.0006	HJ-11614648
6 1/2	165.100 6.5000	196.850 7.7500	76.20 3.000	3.05 0.12	IR-10412448	5.343 11.780	165.085 6.4994	165.062 6.4985	IR-10412448	165.133 6.5013	165.115 6.5006	HJ-12415448
7	177.800 7.0000	209.550 8.2500	76.20 3.000	3.05 0.12	IR-11213248	5.389 11.880	177.785 6.9994	177.762 6.9985	IR-11213248	177.833 7.0013	177.815 7.0006	HJ-13216248
7 1/2	190.500 7.5000	222.250 8.7500	76.20 3.000	4.06 0.16	IR-12014048	6.110 13.470	190.485 7.4994	190.454 7.4982	IR-12014048	190.536 7.5014	190.515 7.5006	HJ-14017048
8	203.200 8.0000	234.950 9.2500	76.20 3.000	4.06 0.16	IR-12814848	6.518 14.370	203.185 7.9994	203.154 7.9982	IR-12814848	203.236 8.0014	203.215 8.0006	HJ-14817848

NOTES

TRACK ROLLERS

Overview: Track rollers (also known as cam followers) are characterized by their thick-walled outer rings that run directly on a track. The thick outer rings permit high load-carrying capability while minimizing both distortion and bending stresses. Sealed designs with internal thrust washers help extend service life under conditions of infrequent lubrication.

- **Sizes:** 16 mm - 110 mm ($^1/_2$ in. - 4 in.) bore.
- **Markets:** Ram support rollers, material handling and indexing equipment.
- **Features:** Available in two basic designs: with an inner ring for straddle mounting in a yoke or with an integral stud for cantilever mounting.
- **Benefits:** High load-carrying capability with minimized distortion and bending stresses. Extended service life under conditions of infrequent relubrication.

Yoke Type Track Rollers – Metric Nominal Dimensions

Bore diameter from 10 mm to 17 mm (for NA22)
00 = 10 mm
01 = 12 mm
02 = 15 mm
03 = 17 mm

Bore diameter > 17 mm (for NA22)
05 = 25 mm

NA22 **05** **2RS**

Prefix
NA22 track roller, yoke type, profiled outside diameter with inner ring, sealed
RNA22 track roller, yoke type, profiled outside diameter without inner ring, sealed
RSTO track roller, yoke type, profiled outside diameter without inner ring, without washers
STO track roller, yoke type, profiled outside diameter with inner ring, without washers
NATR track roller, yoke type, profiled outside diameter with inner ring, with washers
NUTR track roller, yoke type, profiled outside diameter with inner ring, with washers; two paths of full complement cylindrical rollers

Suffix
TN molded cage of reinforced, engineered polymer
DZ cylindrical outside diameter
ZZ two washers for track rollers used for axial location
.2RS lip contact seal on each side of the bearing
ZZ.DZ two washers for track rollers used for axial location; cylindrical outside diameter
DZ.TN cylindrical outside diameter; molded cage of reinforced, engineered polymer
.2RS.DZ lip contact seal on each side of bearing; cylindrical outside diameter

STO **25** **DZ**

Bore diameter for STO, NATR, NUTR:
25 = 25 mm
45 = 45 mm

NUTR **45** **100** **DZ**

Outside diameter for NUTR
100 = 100 mm

Stud Type Track Rollers – Metric Nominal Dimensions

Prefix Modification
E Eccentric stud

Suffix
SK hexagonal wrench socket in stud head
DZ.2RS cylindrical outside diameter: lip contact seals on each end of bearing
.2RS lip contact seal on each side of the bearing
DZ cylindrical outside diameter

KR **E** **22** **.2RS**

Prefix
KR track roller, stud type with cage; profiled outside diameter
KRV track roller, stud type, full complement needle rollers; profiled outside diameter
NUKR track roller, stud type, full complement of cylindrical rollers (2 rows) profiled outside diameter

Outside diameter
22 = 22 mm

Track Rollers / Cam Followers – Inch Nominal Dimensions

Prefix
CR stud type
YCR yoke type

Outside Diameter
8 = 8/16 = 1/2 in.
16 = 16/16 = 1 in.
32 = 32/16 = 2 in.
36 = 36/16 = 2 1/4 in.

CR **S** **B** **E** - **16**

Design Modifications
S seals with internal thrust washers (CR Type only)
B hex wrench socket
C crowned O.D.
E eccentric stud (CR Type only)

Full Complement Yoke Type Track Rollers - Metric Nominal Dimensions

Prefix
NUTR track roller, yoke type, profiled outside diameter with inner ring and washers (two paths of cylindrical rollers)
FG track roller, yoke type, profiled outside diameter standard series
FGU track roller, yoke type, profiled outside diameter light series
FGU track roller, yoke type, profiled outside diameter heavy series (larger O.D. than light series of same bore size)
FP track roller, yoke type, profiled outside diameter small series
RNA track roller, yoke type, profiled outside diameter 11000 Series (without seals)

(see tables for dimensions)

RNA 110 12 B6

NUTR 45 100 .DZ

Suffix
.DZ cylindrical outside diameter (NUTR styles only)
EE 2 polymer shields (FG styles only)
EEM 2 metal shields (FG styles only)
MM 2 metal shields (FGU styles only)

Bore diameter
45 = 45 mm

Outside diameter
100 = 100 mm

FG L 6 19 EEM

Prefix Modification
L cylindrical outside diameter

Full Complement Stud Type Track Rollers - Metric Nominal Dimensions

Prefix
NUKR track roller, stud type, profiled outside diameter (two paths of cylindrical rollers)
KRV track roller, stud type, profiled outside diameter with full complement of needle rollers
GC track roller, stud type, profiled outside diameter small series (up to 15 mm O.D.), standard series
GCU track roller, stud type, profiled outside diameter light series

Outside diameter
16 = 16 mm

KRV 16 .DZ

NUKR 62 .2SK

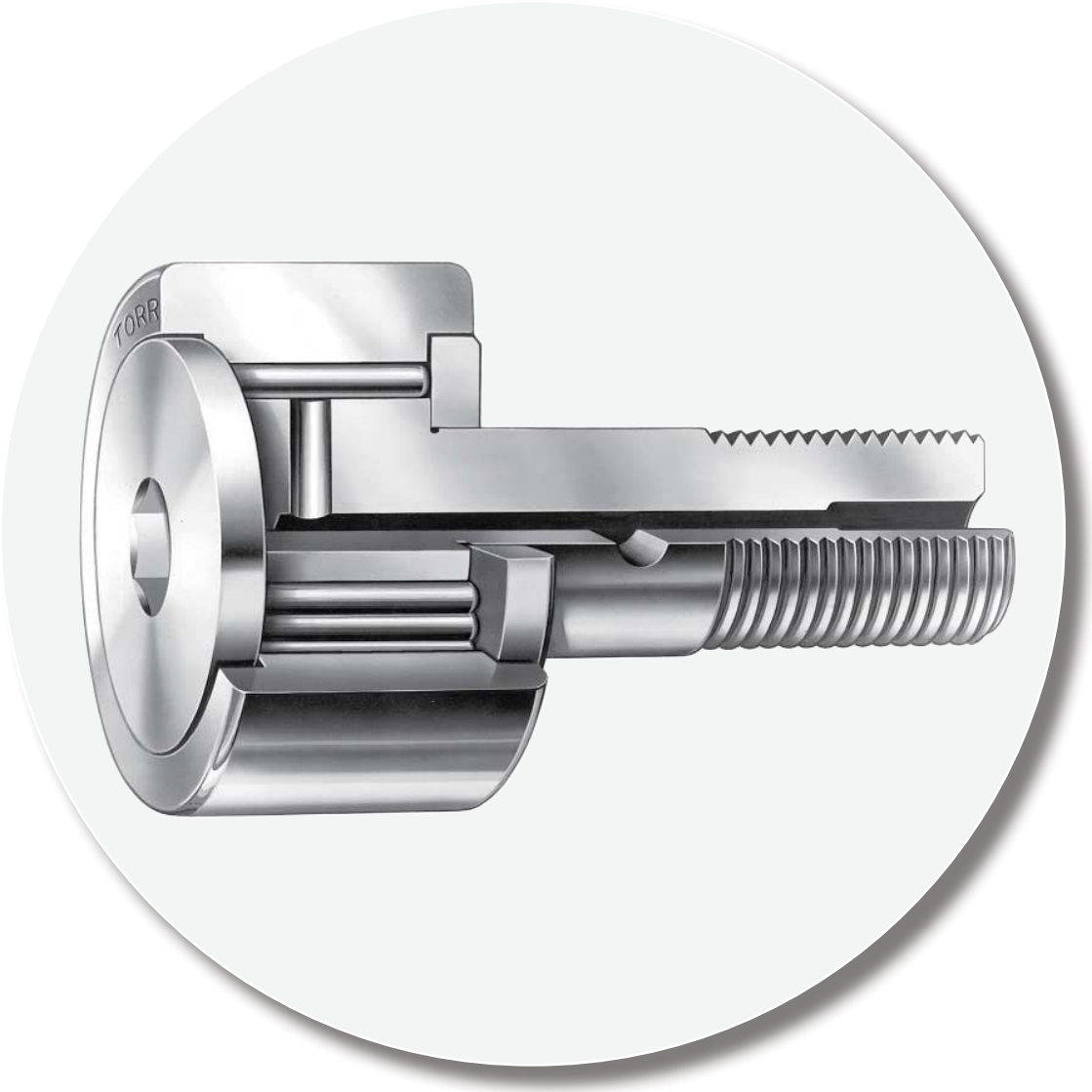
GC L 6 19 EEM

Prefix Modification
L cylindrical outside diameter
R eccentric collar

Bore diameter
45 = 45 mm

Suffix
.DZ cylindrical outside diameter (KRV styles only)
.2SK hexagonal socket in stud head (NUKR styles only)
EE 2 polymer shields (GC, GCR styles only)
EEM 2 metal shields (GC, GCR styles only)
MM 2 metal shields (GCU, GCUR styles only)

C



Stud Type and Yoke Type Track Rollers

C

STUD TYPE AND YOKE TYPE TRACK ROLLERS –

METRIC SERIES

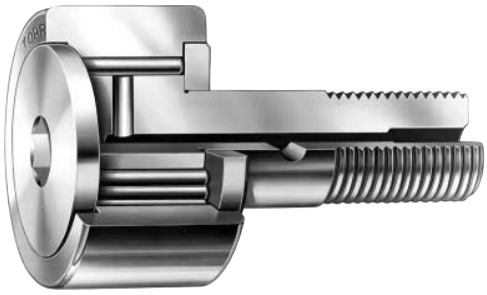
Timken track rollers listed in this catalog have been designed with outer rings of a large radial cross section to withstand heavy rolling and shock loads on track type or cam-controlled equipment. The outside diameters of the outer rings are either profiled or cylindrical. Profiled track rollers are designed to alleviate uneven bearing loading resulting from deflection, bending or misalignment in mounting.

Stud type track rollers are available in various open designs, as well as with lip contact seals or metal shields.

Yoke type track rollers are designed for straddle mounting. The various metric series designs are grouped and organized as illustrated below.

REFERENCE STANDARDS ARE:

- **ISO 6278** – Needle roller bearings – Track rollers – Boundary dimensions
- **ISO 492** – Radial bearings – Tolerances
- **DIN 620** – Tolerances of Ball and Roller Bearings
- **ISO 281** – Rolling bearings – Dynamic load ratings and rating life



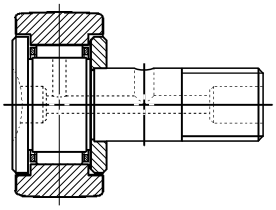
Suffixes – Stud Type, Metric Series (except GC types)	
.2RS	two seals
DZ	cylindrical outside diameter
DZ.2RS	cylindrical outside diameter • two seals
SK	hexagonal socket in flange end
2SK	hexagonal socket in both flange and stud ends

Suffixes – Yoke Type, Metric Series (except FP or FG types)	
DZ.TN	cylindrical outside diameter • molded cage of reinforced engineered polymer
TN	molded cage of reinforced engineered polymer
DZ	cylindrical outside diameter
ZZ	two end washers for the outer ring
ZZ.DZ	two end washers for the outer ring • cylindrical outside diameter
.2RS	two seals
.2RS.DZ	two seals • cylindrical outside diameter

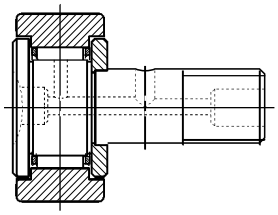
Suffixes – Yoke Type (FP, FG) and Stud Type (GC)	
EE	polymer seals
EEM	metal shields
MM	metal shields

STUD TYPE METRIC SERIES TRACK ROLLER TYPES

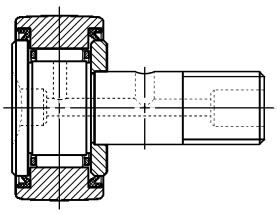
STUD TYPE TRACK ROLLERS, CAGED NEEDLE ROLLERS



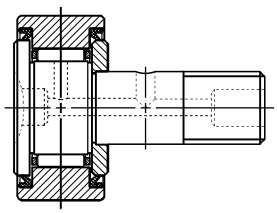
KR



KR.DZ

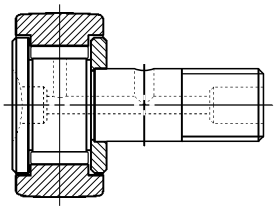


KR.2RS

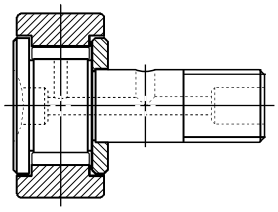


KR.DZ.2RS

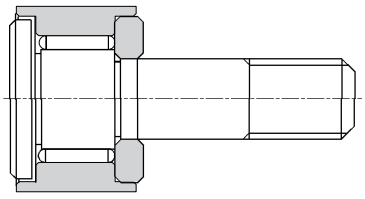
STUD TYPE TRACK ROLLERS, FULL COMPLEMENT NEEDLE ROLLERS



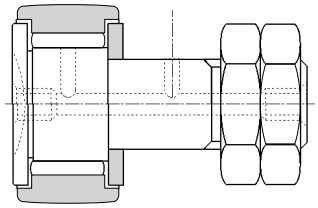
KRV



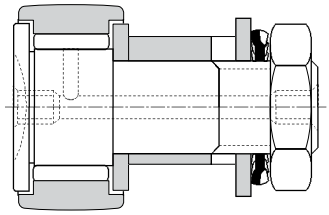
KRV.DZ



GC/GCL

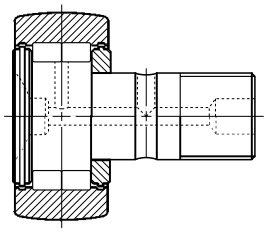


GC/GCL

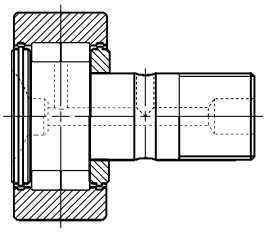


GCR/GCRL

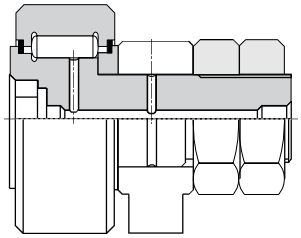
STUD TYPE TRACK ROLLERS, FULL COMPLEMENT CYLINDRICAL ROLLERS



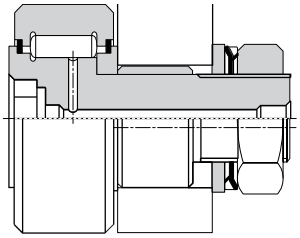
NUKR



NUKR.DZ



GCU/GCUL

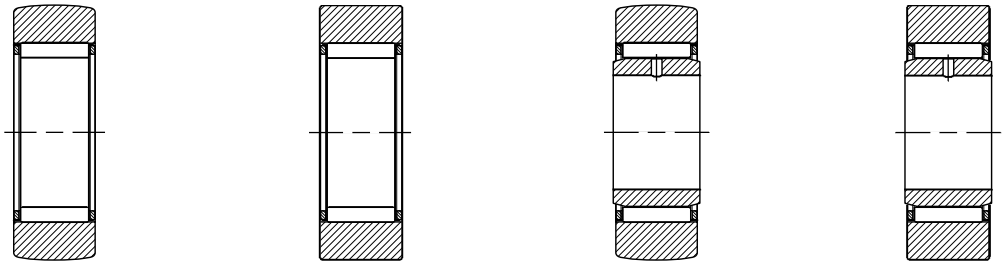


GCUR/GCURL

C

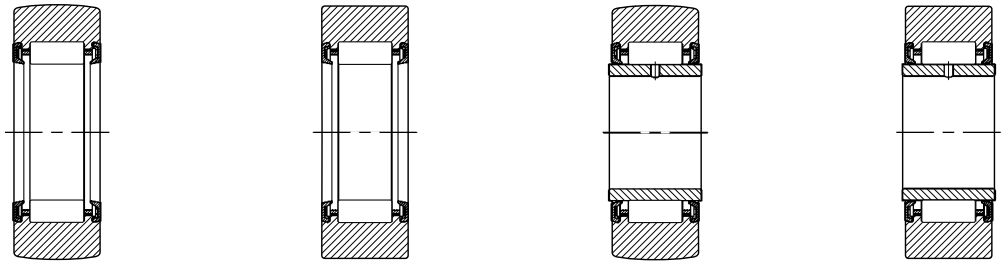
TYPES OF METRIC SERIES YOKE TYPE TRACK ROLLERS

YOKE TYPE TRACK ROLLERS WITHOUT END WASHERS



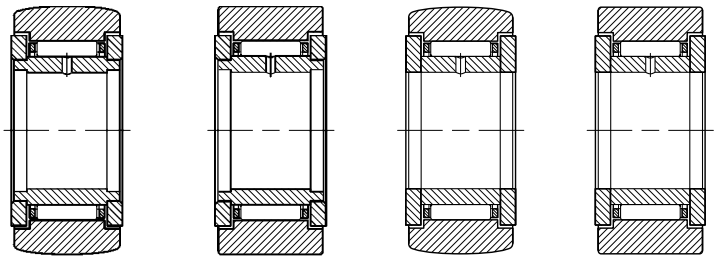
RSTO | RSTO.DZ | STO | STO.DZ

SEALED YOKE TYPE TRACK ROLLERS WITHOUT END WASHERS.



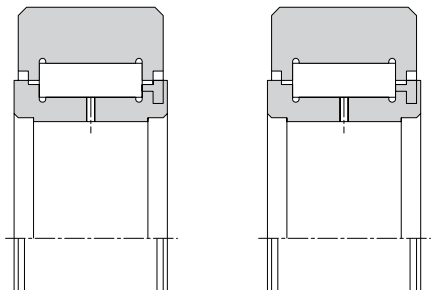
RNA22.2RS | RNA22.2RS.DZ | NA22.2RS | NA22.2RS.DZ

YOKE TYPE TRACK ROLLERS WITH END WASHERS



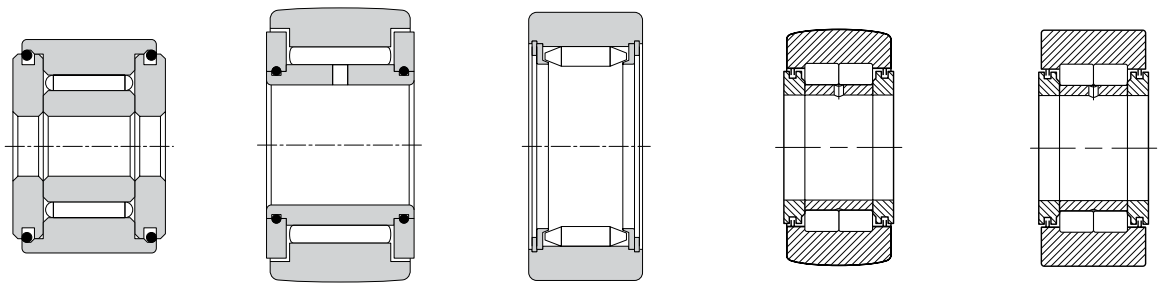
NATR | NATR.DZ | STO.ZZ | STO.ZZ.DZ

YOKE TYPE TRACK ROLLERS WITH FULL COMPLEMENT OF CYLINDRICAL ROLLERS



FGU/FGUL Light | FGU/FGUL Heavy

YOKE TYPE TRACK ROLLERS WITH END WASHERS, FULL COMPLEMENT OF NEEDLE ROLLERS



FP/FPL | FG/FGL | RNA1100 | NUTR | NUTR.DZ

CONSTRUCTION

STUD TYPE TRACK ROLLERS

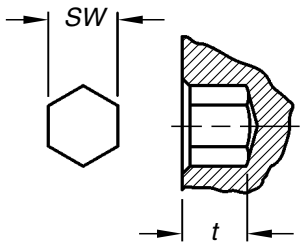
The metric series stud type track roller is a non-separable unit, consisting of a large radial cross-section outer ring, needle roller and cage radial assembly or a full complement of needle or cylindrical rollers, a stud and a retaining washer securely fastened to the stud.

The seals on the sealed stud type track rollers are located in the counterbores of the outer ring and seal against the stud flange and the retaining washer, providing good retention of lubricant and exclusion of foreign material. The seals are thermally stable in a temperature range between -30° C and 110° C.

A screwdriver slot (standard) or a hexagonal wrench socket (customer requested) in the head of the stud facilitates mounting. Wrench sizes are listed on the dimensional tables where found among certain GC Series sizes on pages later in this section. Other metric series hexagonal socket sizes are listed in Table 1.

TABLE 1 –
HEXAGONAL SOCKET – METRIC SERIES

Stud Type Track Roller Outside Diameter		Dimensions	
> mm	≤	SW	t
	16	3	2.5
19	26	4	2.5
30	35	6	4
40	52	8	5
62	72	12	7
80	90	17	10



ECCENTRIC STUDS FOR STUD TYPE TRACK ROLLERS

To provide radial adjustment of the outer ring toward the track or cam surface at the time of installation, some metric series stud type track rollers are available with eccentric studs which are specified by adding the letter "E" to the designation letters: KRE and NUKRE. The GCR and GCUR Series include an eccentric bushing added to the track roller stud. Appropriate dimensions of the eccentric stud bushing are listed in Table 2 and 2A.

Since a track roller with an eccentric stud is usually adjusted upon installation by turning the stud in the mounting hole, a close clearance fit between the outside diameter of the bushing and the mounting hole is necessary. For turning the stud, a hexagonal wrench is generally more convenient than a screwdriver, thus, the option of a hexagonal wrench socket in the head of the stud should be considered.

Some applications may require more secure positioning than provided by the tightened stud nut. If so, it is recommended that the mounting hole and the eccentric bushing be drilled at the time of installation to accept a locating dowel pin.

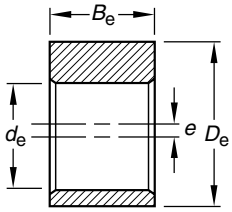


TABLE 2 –
ECCENTRIC BUSHING DIMENSIONS –
METRIC SERIES (EXCEPT GCR, GCUR SERIES)

Stud Type Outside >	Track Roller Diameter mm ≤	Dimensions			
		d_e	D_e	B_e	e
	16	6	9	7	0.5
19	19	8	11	9	0.5
22	26	10	13	10	0.5
30	32	12	15	11	0.5
35	35	16	20	14	1.0
40	40	18	22	16	1.0
47	52	20	24	18	1.0
62	72	24	28	22	1.0
80	90	30	35	29	1.5

TABLE 2A -
ECCENTRIC BUSHING DIMENSIONS
METRIC SERIES GCR, GCUR

over mm	incl.	de	De	Bw	e
-	19	6	9	7.5	0.5
19	28	10	14	10.5	1.0
28	32	12	16	11.5	1.0
32	35	16	21	15.1	1.5
35	40	18	24	17.1	1.5
40	52	20	27	19.1	2.0
52	72	24	36	24.1	3.0
72	90	30	42	30.7	3.0
90	110	36	48	36.5	3.0
110	-	42	54	43.5	3.0

YOKE TYPE TRACK ROLLERS

METRIC SERIES YOKE TYPE TRACK ROLLERS WITHOUT END WASHERS

These yoke type track rollers are available with a profiled or a cylindrical outside diameter of the outer ring, and with or without a separable inner ring. Since they are supplied without end washers, their outer rings must be guided by the adjacent end locating surfaces. Tolerance class F6 is the normal specification for the bore of the metric series needle roller and cage radial assemblies used with these yoke type track rollers.

YOKE TYPE TRACK ROLLERS – SERIES RSTO & STO

Series STO have a separable inner ring and when the inner ring is removed they become series RSTO. They run directly on a hardened and ground inner raceway. Quality requirements for inner raceways are given in the engineering section of this catalog.

SEALED YOKE TYPE TRACK ROLLERS WITHOUT END WASHERS – SERIES RNA 22.2RS & NA22.2RS

These yoke type track rollers have the same bore diameter and outside diameter as most of the other metric series yoke type track rollers listed in this catalog. The thick section outer ring is made of one-piece channel-shaped bearing quality steel, heat treated to yield maximum load carrying capability. The integral end flanges provide axial guidance for the large diameter needle rollers, and a cage supplies their inward retention. These track rollers have two integral lip contact seals designated by .2RS. The seals are thermally stable in a temperature range between -30° C and 110° C. Care should be exercised when mounting track rollers without inner rings onto inner raceways to avoid damage to the seals. Inner raceway quality requirements are given in the engineering section of this catalog.

METRIC SERIES YOKE TYPE TRACK ROLLERS WITH END WASHERS

These yoke type track rollers are available with a crowned or a cylindrical outside diameter of the outer ring. Metric series yoke type track rollers with end washers, depending on the internal construction, may be end guided, either through the end washers or between the end faces of the rollers and the inside faces of the outer ring flanges.

YOKE TYPE TRACK ROLLERS – SERIES NATR & STO.ZZ

The series NATR yoke type track rollers are of non-separable design consisting of a crowned or a cylindrical outer ring, caged needle rollers, an inner ring and two retaining end washers securely fastened to the inner ring. The series STO.ZZ yoke type track rollers are of separable design with two loose end washers. These end washers placed in the counter bores of the outer ring form very effective labyrinth type shields, providing good retention of lubricant and exclusion of foreign material. A lubrication hole in the inner ring enables relubrication when a cross-drilled bolt or shaft, which can be serviced from the end, is used.

YOKE TYPE TRACK ROLLERS – SERIES NUTR

The series NUTR yoke type track rollers are of non-separable design consisting of a profiled or cylindrical outer ring, two rows of full complements of cylindrical rollers, an inner ring, two retaining end washers and two shields. The outer ring is located axially through the cylindrical rollers.

A lubricating hole in the inner ring enables relubrication when a cross-drilled bolt or shaft, which can be serviced from the end, is used.

The smallest track roller of this series has an outside diameter of 35 mm. NUTR yoke type track rollers are well suited to carry high loads and designs with a thicker outer ring are particularly suitable for high shock loads. Designs with thicker outer ring have a larger outside diameter which can be identified by the bearing designation (e.g., NUTR 1542).

YOKE TYPE TRACK ROLLERS – SERIES FP AND FG

The FP and FG non-separable inner ring designs are available in profiled or cylindrical outer rings. Both employ a full complement of needle rollers and require relubrication via a pathway through the shaft. The FP Series is the smallest series available and is not offered with seals.

YOKE TYPE TRACK ROLLERS – SERIES FGU (LIGHT AND HEAVY TYPES)

The FGU non-separable inner ring desings are available in profiled or cylindrical outer rings. All FGU Series use a full complement of cylindrical rollers between the inner and outer rings and require relubrication via a pathway through the shaft. The FGU Heavy series uses a thicker outer ring section and are capable of higher loads.

Both FGU Series are only available with a metal shield for a roller sealing option.

YOKE TYPE TRACK ROLLERS – SERIES RNA, RNAB, RNAL

The RNA and RNAB Series design use a full complement of needle rollers retained with a pair of end washers. A separate, matching inner ring is listed in the tables of part numbers. The RNAL Series use a cylindrical outer ring and is only offered in limited sizes.

DIMENSIONAL ACCURACY

The tolerances of the basic metric series caged roller and NUKR stud type and yoke type track rollers whose outer rings have a cylindrical outside diameter, correspond to tolerances specified in ISO-492 Radial bearings - Tolerances. The outer ring tolerances given in Table 4 apply to the outer rings used in the caged roller and NUKR stud type and caged roller and NUTR yoke type, metric series, track rollers. Metric series track rollers with a crowned outside diameter are the exception: their outside diameter tolerances is 0-0.05 for all caged roller sizes and NUTR, NUKR types. The remaining types have h9 tolerance on profiled outer diameters and h7 for straight diameters. Stud diameter and stud length tolerances are given in Table 3. The inner ring tolerances given in Table 5 apply to inner rings used in metric series caged roller, NUKR Series yoke type track rollers.

TABLE 3 –
TOLERANCES FOR STUD DIAMETER AND STUD LENGTH – METRIC SERIES

Stud Diameter mm		μm		Stud Length mm		
>	≤	high	low		high	low
d_1		Δd_{1S}		B_2	ΔB_2	
3	6	0	-12			
6	10	0	-15	all		
10	18	0	-18	lengths	0	-1
18	30	0	-21			
30	50	0	-25			
50	80	0	-30			
80	100	0	-35			

MOUNTING STUD TYPE TRACK ROLLERS

When the stud shank of a metric series stud type track roller is mounted in a hole of tolerance H7, the installation force should be applied only to the center portion of the flanged end of the stud, preferably with an arbor press. The surface of the hole in the machine element which supports the stud must not deform under the expected load, and the support should be sufficiently rigid to resist bending loads. Deformation and bending will cause uneven loading of the outer ring.

In mounting the stud type track roller, the retaining washer must be firmly backed up by a flat shoulder which is square with the stud center line. The shoulder diameter must be no smaller than the minimum clamping diameter, d_a listed in the tabular data.

The maximum inherent strength of the stud is obtained when the track roller is supported as close as possible to the retaining washer, which minimizes the bending moment. For this reason the edge of the housing which supports the stud shank should be kept as sharp as practical, but free from burrs.

The clamping nut should not be tightened with a torque value higher than the maximum listed. A screwdriver slot or hexagonal wrench socket in the flanged end of the stud is provided for a tool to prevent the stud from turning when the nut is being tightened. Hexagonal nuts are supplied with all metric series stud type track rollers.

TABLE 4 –OUTER RING – METRIC SERIES (CAGED ROLLER AND NUKR, NUTR TYPES)

Tolerances in mm (0.001 mm)

mm		cylindrical		crowned				
>	≤	high	low	high	low	high	low	max.
D		Δ_{Dmp}				Δ_{Cs}		K_{ea}
10	18	0	-8	0	-50	0	-120	15
18	30	0	-9	0	-50	0	-120	15
30	50	0	-11	0	-50	0	-120	20
50	80	0	-13	0	-50	0	-120	25
80	120	0	-15	0	-50	0	-120	35
120	150	0	-18	0	-50	0	-120	40
150	180	0	-25	0	-50	0	-150	45
180	240	0	-30	0	-50	0	-200	50

TABLE 5 – INNER RING – METRIC SERIES (CAGED ROLLER AND NUTR TYPES)

Tolerances in mm (0.001 mm)

mm					
>	≤	high	low	high	low
d		Δ_{dmp}		Δ_{Bs}	
2.5	18	0	-8	0	-180
18	30	0	-10	0	-210
30	50	0	-12	0	-250
50	80	0	-15	0	-300
80	120	0	-20	0	-350

YOKE TYPE TRACK ROLLERS

The machine element with the holes in which the mounting bolt or shaft is supported must be sufficiently rigid to resist local crushing under the applied load, and to resist bending which can cause uneven loading of the needle rollers.

When applied loads are high, the h6 or j6 tolerance should be used in conjunction with a high strength shaft or bolt for mounting metric series yoke type track rollers. When loads are moderate, a g6 tolerance may be used with a high strength shaft or bolt. For light loads, the loose transition fit with the f6 tolerance may be used with an unhardened shaft or bolt.

The yoke type track rollers with inner rings, also those with end washers as well as inner rings, should be clamped endwise between parallel faces perpendicular to the axis to prevent the retaining washers from coming off under load. The dimensions of machine parts adjoining the metric series yoke type track rollers should be based on the minimum clamping diameter d_a to ensure that the washers are adequately supported. If the track roller cannot be end clamped, a close axial fit in the yoke is required. Care should be taken that the lubricating hole is located in the unloaded zone of the raceway.

The metric series yoke type track rollers without inner rings require a hardened and ground shaft or bolt with a k5 tolerance. Inner raceway quality requirements are given in the engineering section of this catalog.

C

LOAD RATINGS

DYNAMIC LOADING AS A TRACK ROLLER

When the outer ring of a stud type or yoke type track roller runs on a track, the contact, under a radial load, causes elastic (oval) deformation of the outer ring. As a result, a smaller zone of the raceway is loaded and the load is distributed on fewer needle rollers. This in turn affects the dynamic and static load ratings of the track rollers. Also, this deformation generates bending stress in the outer ring which must not exceed the maximum permitted for the material of the outer ring. The maximum permissible dynamic ($F_{r\ perm}$) radial load condition is determined by this requirement.

The rating life of stud type or yoke type track rollers should be calculated using the dynamic load ratings C_w shown in the tables. The tables also show the maximum permissible radial load, $F_{r\ perm}$ that can be dynamically applied on stud type or yoke type track rollers. However, to calculate the L_{10} life of a track roller, the applied radial load must not be greater than $C_w/2$ based on ideal operating conditions of alignment, lubrication, temperature, speed, and accelerations.

STATIC RATING AS A TRACK ROLLER

In addition to the basic static load rating C_0, the tables also list the maximum permissible static radial load $F_{0r\ perm}$ that may be applied to a stud type or yoke type metric series track roller. The values of $F_{0r\ perm}$ result in a calculated minimum static factor f_s of 0.7 for the worst condition of internal load distribution in metric series track roller operation. **The $F_{0r\ perm}$ values must not be exceeded**. The static factor f_s can be calculated using the following formula:

$$f_s \geq 0.7 \bullet \frac{F_{0r\ perm}}{P_{0r}}$$

where

$F_{0r\ perm}$ = Maximum permissible static radial load (kN)

P_{0r} = Equivalent static load (kN)
$P_{0r} = F_{0r}$ for metric series track rollers

F_{0r} = Static radial load (kN)

f_s = Static factor whose values should not be smaller than those suggested in Table 6.

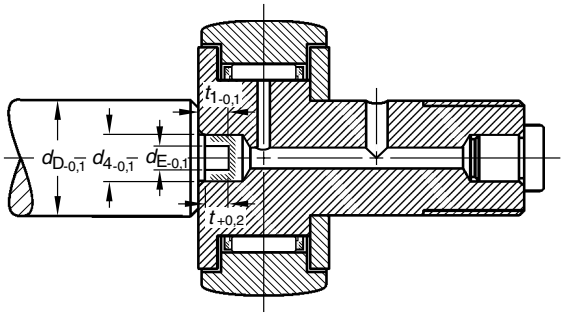
TABLE 6 –
SUGGESTED VALUES FOR STATIC FACTORS F_S FOR METRIC SERIES TRACK ROLLERS

Requirements For Yoke Type Track Rollers And Stud Type Track Rollers	Suggested f_s Values
High shock-type loads	
Quiet running	1.5...2.5
Normal loading	
Normal quietness of running	1...1.5
Minor impact loads and rotary motion particularly quiet running not required	0.7...1

LUBRICATION OF STUD TYPE TRACK ROLLERS

Timken metric series stud type track rollers are supplied with a lithium soap based, general purpose grease. When the caged KR Series track rollers are operated at low speeds, with light loads and in clean environments, there often is no need to relubricate the track roller. In other applications, periodic relubrication may be necessary to obtain optimum performance. The full complement series of track rollers have less internal volume available for grease storage, therefore, they may require more frequent lubrication than caged type track rollers. Stud type track rollers, with a screwdriver slot in the flanged end of the stud, have provisions for relubrication through the flanged end of the stud. Metric series stud type track rollers with hexagonal sockets can not be relubricated from the flanged end of the stud. Both types of metric series stud type track rollers, with outside diameters larger than 22 mm (28 mm for all GC variations), allow for relubrication through the threaded end of the stud. In addition, caged roller and NUKR Series stud type track rollers with 30 mm and larger outside diameters allow for relubrication through a cross-drilled hole in the stud shank. The ends of the axial holes are counterbored to accept press-fit grease fittings of series VENN. The grease fittings are supplied with metric series stud type track rollers. Hole diameters (d_4) for these grease fittings are listed in the tables of dimensions on pages later in this chapter as it applies. Note that the GC small series has no axial hole.

One or more plugs are supplied with every metric series stud type track roller to close off unused holes. At the flanged end, the plug must not be pushed in too deeply as it may cover the cross-drilled lubricating hole. The plug should be pressed in using an installation tool whose dimensions are given in Table 8. If the cross-drilled hole in the stud shank is not used, it will be covered when the track roller is properly installed.



During installation of the track roller it will be desirable to ensure that the cross drilled hole is positioned in the unloaded zone of the track roller raceway. The location of the cross-drilled hole can be best recognized by its alignment with the manufacturer's stamp or parallel to the screwdriver slot, in certain cases.

LUBRICATION OF YOKE TYPE TRACK ROLLERS

Yoke type track rollers are produced with a lubricating hole in the inner ring so they can be relubricated through a cross-drilled hole in the supporting shaft or bolt. When mounting yoke type track rollers, care should be taken that the lubrication hole is located in the unloaded raceway zone.

Oil is the preferred lubricant for yoke type track rollers. Continuous oil lubrication or frequent grease lubrication should be used for steady rotating conditions. Applications involving slow, intermittent oscillations are not as critical, and longer intervals between relubrication are permitted. Sealed yoke type track rollers are normally supplied with an initial charge of a medium temperature grease. Caged yoke type track rollers have maximum grease storage capacity and, consequently, longer pregreased life than full complement types.

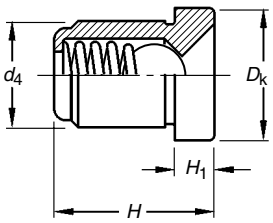


TABLE 7 – METRIC SERIES GREASE FITTINGS, SERIES VENN

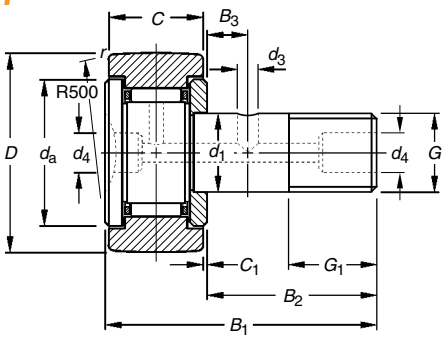
Designation	Dimensions mm				Wt. g approx.
	d_4	D_K	H	H_1	
VENN 4	4	6	6	1.5	0.4
VENN 6	6	8	7	2	1.6
VENN 8	8	10	12	3	4.7

TABLE 8 – INSTALLATION TOOL FOR METRIC SERIES PLUG

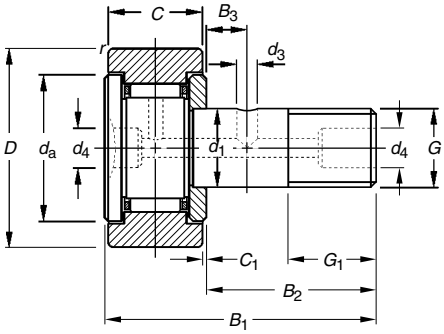
Stud Type Track Roller Outside Diameter mm		Dimensions				
>	≤	d_4	d_D	d_E	t	t_1
16	26	3.9	10	2.7	3.7	4.5
30	40	5.9	12	4.7	4.7	7
47	90	7.9	15	6.7	6.7	10

NEEDLE ROLLER AND CAGE ASSEMBLIES, STUD TYPE (KR SERIES)

METRIC SERIES

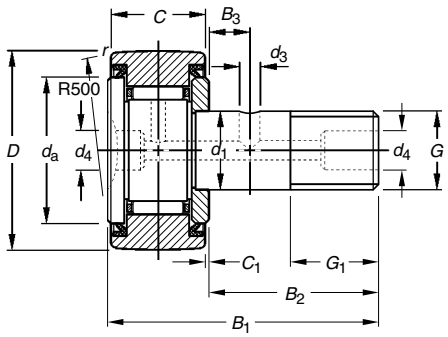


KR



KR.DZ

Outer Dia.	Dimensions mm/in.										Thread	
mm	d_1	h_7	C	$r_{s\ min}$	B_1	B_2	B_3	G_1	d_4	d_3	G	C_1
16	6 0.2362	16 0.6299	11 0.433	0.3 0.012	28.2 1.110	16 0.630		8 0.315	4 0.157		M6x1	0.6 0.024
	6 0.2362	16 0.6299	11 0.433	0.3 0.012	28.2 1.110	16 0.630		8 0.315	4 0.157		M6x1	0.6 0.024
19	8 0.3150	19 0.7480	11 0.433	0.3 0.012	32.2 1.268	20 0.787		10 0.394	4 0.157		M8x1.25	0.6 0.024
	8 0.3150	19 0.7480	11 0.433	0.3 0.012	32.2 1.268	20 0.787		10 0.394	4 0.157		M8x1.25	0.6 0.024
22	10 0.3937	22 0.8661	12 0.472	0.3 0.012	36.0 1.417	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
	10 0.3937	22 0.8661	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
26	10 0.3937	26 1.0236	12 0.472	0.3 0.012	36.0 1.417	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
	10 0.3937	26 1.0236	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
30	12 0.4724	30 1.1811	14 0.551	0.6 0.024	40.0 1.575	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
	12 0.4724	30 1.1811	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
32	12 0.4724	32 1.2598	14 0.551	0.6 0.024	40.0 1.575	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
	12 0.4724	32 1.2598	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024

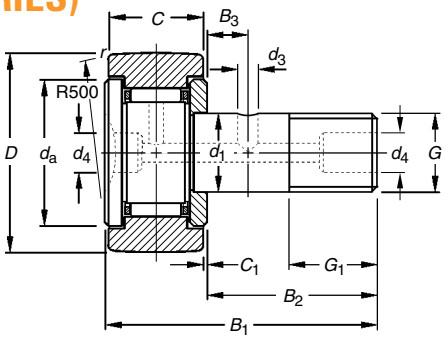


KR.2RS

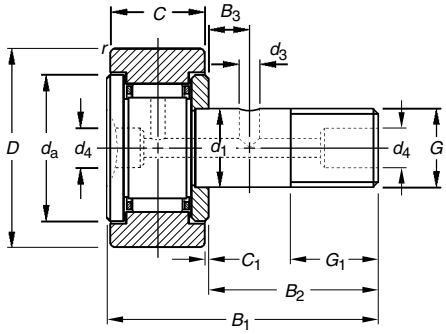
	Bearing Designation	Load Ratings kN/lbf. Dynamic	Static	As a Track Roller Dynamic		Static	Tightening Torque Nm/in.-lbs.	Limiting Speed Grease	Wt. kg/lbs.
d_a		C	C_o	C_w	$F_{r\ perm}$	$F_{0r\ perm}$		RPM	
11 0.433	**KR16**	**3.60** 810	**3.58** 800	**2.97** 670	**2.85** 640	**3.58** 800	**7** 62.0	**17000**	**0.019** 0.042
11 0.433	**KR16.DZ**	**3.60** 810	**3.58** 800	**2.97** 670	**2.85** 640	**3.58** 800	**7** 62.0	**17000**	**0.019** 0.042
13 0.512	**KR19**	**4.18** 940	**4.65** 1050	**3.28** 740	**3.29** 740	**4.22** 950	**16** 142	**13000**	**0.031** 0.068
13 0.512	**KR19.DZ**	**4.18** 940	**4.65** 1050	**3.28** 740	**3.29** 740	**4.22** 950	**16** 142	**13000**	**0.031** 0.068
15 0.591	**KR22**	**5.35** 1200	**6.79** 1530	**3.94** 890	**4.04** 910	**5.45** 1230	**28** 248	**10000**	**0.046** 0.101
15 0.591	**KR22.DZ**	**5.35** 1200	**6.79** 1530	**3.94** 890	**4.04** 910	**5.45** 1230	**28** 248	**10000**	**0.046** 0.101
15 0.591	**KR26**	**5.35** 1200	**6.79** 1530	**4.55** 1020	**6.78** 1520	**7.24** 1630	**28** 248	**10000**	**0.059** 0.130
15 0.591	**KR26.DZ**	**5.35** 1200	**6.79** 1530	**4.55** 1020	**6.78** 1520	**7.24** 1630	**28** 248	**10000**	**0.059** 0.130
21 0.827	**KR30**	**7.89** 1770	**9.79** 2200	**6.32** 1420	**7.74** 1740	**9.31** 2090	**45** 398	**8200**	**0.087** 0.192
21 0.827	**KR30.DZ**	**7.89** 1770	**9.79** 2200	**6.32** 1420	**7.74** 1740	**9.31** 2090	**45** 398	**8200**	**0.087** 0.192
21 0.827	**KR32**	**7.89** 1770	**9.79** 2200	**6.65** 1490	**9.62** 2160	**10.3** 2320	**45** 398	**8200**	**0.095** 0.209
21 0.827	**KR32.DZ**	**7.89** 1770	**9.79** 2200	**6.65** 1490	**9.62** 2160	**10.3** 2320	**45** 398	**8200**	**0.098** 0.216

NEEDLE ROLLER AND CAGE ASSEMBLIES, SEALED, STUD TYPE (KR...2S SERIES)

METRIC SERIES

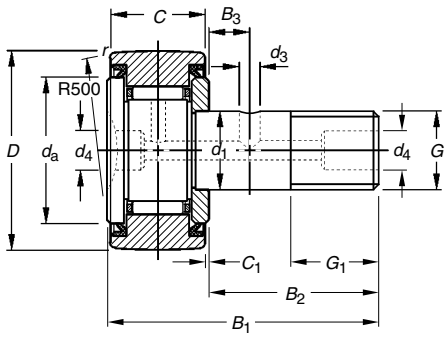


KR



KR.DZ

Outer Dia.	Dimensions mm/in.										Thread	
mm	d_1	h_7	C	$r_{s\ min}$	B_1	B_2	B_3	G_1	d_4	d_3	G	C_1
16	6 0.2362	16 0.6299	11 0.433	0.3 0.012	28.2 1.110	16 0.630		8 0.315	4 0.157		M6x1	0.6 0.024
	6 0.2362	16 0.6299	11 0.433	0.3 0.012	28.2 1.110	16 0.630		8 0.315	4 0.157		M6x1	0.6 0.024
19	8 0.3150	19 0.7480	11 0.433	0.3 0.012	32.2 1.268	20 0.787		10 0.394	4 0.157		M8x1.25	0.6 0.024
	8 0.3150	19 0.7480	11 0.433	0.3 0.012	32.2 1.268	20 0.787		10 0.394	4 0.157		M8x1.25	0.6 0.024
22	10 0.3937	22 0.8661	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
	10 0.3937	22 0.8661	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
26	10 0.3937	26 1.0236	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
	10 0.3937	26 1.0236	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
30	12 0.4724	30 1.1811	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
	12 0.4724	30 1.1811	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
32	12 0.4724	32 1.2598	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
	12 0.4724	32 1.2598	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024

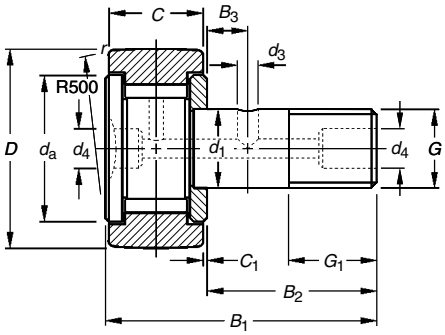


KR.2RS

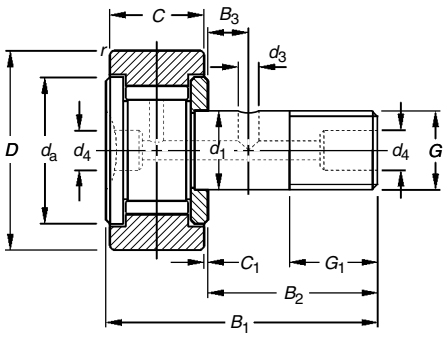
		Load Ratings kN/lbf.					Tightening Torque Nm/in.-lbs.	Limiting Speed Grease	Wt. kg/lbs.
	Bearing Designation	Dynamic	Static	As a Track Roller Dynamic		Static			
d_a		C	C_o	C_w	$F_{r\ perm}$	$F_{Or\ perm}$		RPM	
11 0.433	**KR16.2RS**	**3.60** 810	**3.58** 800	**2.97** 670	**2.85** 640	**3.58** 800	**7.0** 61.96	**17000**	**0.019** 0.042
11 0.433	**KR16.DZ.2RS**	**3.60** 810	**3.58** 800	**2.97** 670	**2.85** 640	**3.58** 800	**7.0** 61.96	**17000**	**0.01** 0.042
13 0.512	**KR19.2RS**	**4.18** 940	**4.65** 1050	**3.28** 740	**3.29** 740	**4.22** 950	**16** 141.61	**13000**	**0.031** 0.068
13 0.512	**KR19.DZ.2RS**	**4.18** 940	**4.65** 1050	**3.28** 740	**3.29** 740	**4.22** 950	**16** 141.61	**13000**	**0.031** 0.068
15 0.591	**KR22.2RS**	**5.35** 1200	**6.79** 1530	**3.94** 890	**4.04** 910	**5.45** 1230	**28** 247.82	**10000**	**0.046** 0.101
15 0.591	**KR22.DZ.2RS**	**5.35** 1200	**6.79** 1530	**3.94** 890	**4.04** 910	**5.45** 1230	**28** 247.82	**10000**	**0.046** 0.101
15 0.591	**KR26.2RS**	**5.35** 1200	**6.79** 1530	**4.55** 1020	**6.78** 1520	**7.24** 1630	**28** 247.82	**10000**	**0.059** 0.130
15 0.591	**KR26.DZ.2RS**	**5.35** 1200	**6.79** 1530	**4.55** 1020	**6.78** 1520	**7.24** 1630	**28** 247.82	**10000**	**0.059** 0.130
21 0.827	**KR30.2RS**	**7.89** 1770	**9.79** 2200	**6.32** 1420	**7.74** 1740	**9.31** 2090	**45** 398.28	**8200**	**0.087** 0.192
21 0.827	**KR30.DZ.2RS**	**7.89** 1770	**9.79** 2200	**6.32** 1420	**7.74** 1740	**9.31** 2090	**45** 398.28	**8200**	**0.087** 0.192
21 0.827	**KR32.2RS**	**7.89** 1770	**9.79** 2200	**6.65** 1490	**9.62** 2160	**10.3** 2320	**45** 398.28	**8200**	**0.098** 0.216
21 0.827	**KR32.DZ.2RS**	**7 .89** 1770	**9.79** 2200	**6.65** 1490	**9.62** 2160	**10.3** 2320	**45** 398.28	**8200**	**0.098** 0.216

FULL COMPLEMENT WITH NEEDLE ROLLER (KRV SERIES) OR CYLINDRICAL ROLLERS, STUD TYPE (NUKR SERIES)

METRIC SERIES

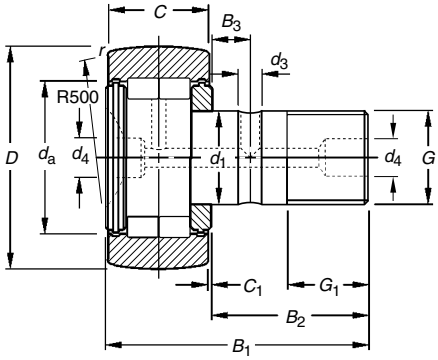


KRV

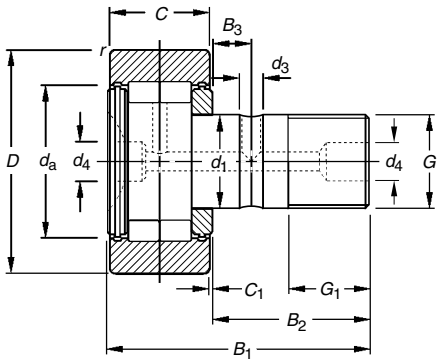


KRV.DZ

Outer Dia.	Dimensions mm/in.										Thread	
mm	d_1	D, h_7	C	$r_{s\ min}$	B_1	B_2	B_3	G_1	d_4	d_3	G	C_1
16	6 0.2362	16 0.6299	11 0.433	0.3 0.012	28.2 1.110	16 0.630		8 0.315	4 0.157		M6x1	0.6 0.024
	6 0.2362	16 0.6299	11 0.433	0.3 0.012	28.2 1.110	16 0.630		8 0.315	4 0.157		M6x1	0.6 0.024
19	8 0.3150	19 0.7480	11 0.433	0.3 0.012	32.2 1.268	20 0.787		10 0.394	4 0.157		M8x1.25	0.6 0.024
	8 0.3150	19 0.7480	11 0.433	0.3 0.012	32.2 1.268	20 0.787		10 0.394	4 0.157		M8x1.25	0.6 0.024
22	10 0.3937	22 0.8661	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
	10 0.3937	22 0.8661	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
26	10 0.3937	26 1.0236	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
	10 0.3937	26 1.0236	12 0.472	0.3 0.012	36.2 1.425	23 0.906		12 0.472	4 0.157		M10x1	0.6 0.024
30	12 0.4724	30 1.1811	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
	12 0.4724	30 1.1811	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
32	12 0.4724	32 1.2598	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
	12 0.4724	32 1.2598	14 0.551	0.6 0.024	40.2 1.583	25 0.984	6 0.236	13 0.512	6 0.236	3 0.118	M12x1.5	0.6 0.024
35	16 0.6299	35 1.3780	18 0.709	0.6 0.024	52 2.047	32.5 1.280	8 0.315	17 0.669	6 0.236	3 0.118	M16x1.5	0.8 0.031
40	18 0.7087	40 1.5748	20 0.787	1 0.039	58 2.283	36.5 1.437	8 0.315	19 0.748	6 0.236	3 0.118	M18x1.5	0.8 0.031
47	20 0.7874	47 1.8504	24 0.945	1 0.039	66 2.598	40.5 1.594	9 0.354	21 0.827	6 0.236	4 0.157	M20x1.5	0.8 0.031
52	20 0.7874	52 2.0472	24 0.945	1 0.039	66 2.598	40.5 1.594	9 0.354	21 0.827	6 0.236	4 0.157	M20x1.5	0.8 0.031
62	24 0.9449	62 2.4409	29 1.142	1 0.039	80 3.150	49.5 1.949	11 0.433	25 0.984	8 0.315	4 0.157	M24x1.5	0.8 0.031
72	24 0.9449	72 2.8346	29 1.142	1.1 0.043	80 3.150	49.5 1.949	11 0.433	25 0.984	8 0.315	4 0.157	M24x1.5	0.8 0.031
80	30 1.1811	80 3.1496	35 1.378	1.1 0.043	100 3.937	63 2.480	15 0.591	32 1.260	8 0.315	4 0.157	M30x1.5	1.0 0.039
90	30 1.1811	90 3.5433	35 1.378	1.1 0.043	100 3.937	63 2.480	15 0.591	32 1.260	8 0.315	4 0.157	M30x1.5	1.0 0.039



NUKR



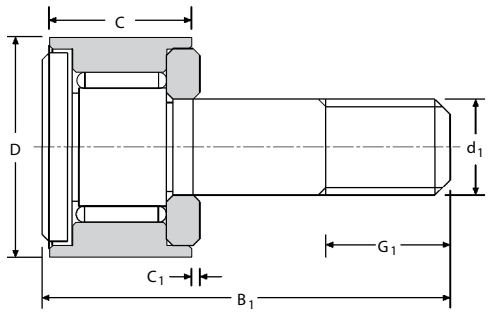
NUKR.DZ

		Load Ratings kN/lbf.					Tightening Torque Nm/in.-lbs.	Limiting Speed Grease	Wt. kg/lbs.
	Bearing Designation	Dynamic	Static	As a Track Roller Dynamic		Static			
d_a		C	C_0	C_w	$F_{r\ perm}$	$F_{0r\ perm}$		RPM	
11 0.433	**KRV16**	**6.90** 1550	**8.40** 1890	**5.11** 1150	**3.49** 780	**6.28** 1410	**7** 62.0	**5700**	**0.019** 0.042
11 0.433	**KRV16.DZ**	**6.90** 1550	**8.40** 1890	**5.11** 1150	**3.49** 780	**6.28** 1410	**7** 62.0	**5700**	**0.019** 0.042
13 0.512	**KRV19**	**8.08** 1820	**11.0** 2470	**5.66** 1270	**4.13** 930	**7.43** 1670	**16** 142	**4300**	**0.031** 0.068
13 0.512	**KRV19.DZ**	**8.08** 1820	**11.0** 2470	**5.66** 1270	**4.13** 930	**7.43** 1670	**16** 142	**4300**	**0.031** 0.068
15 0.591	**KRV22**	**9.45** 2120	**14.3** 3210	**6.32** 1420	**5.04** 1130	**9.07** 2040	**28** 248	**3400**	**0.046** 0.101
15 0.591	**KRV22.DZ**	**9.45** 2120	**14.3** 3210	**6.32** 1420	**5.04** 1130	**9.07** 2040	**28** 248	**3400**	**0.046** 0.101
15 0.591	**KRV26**	**9.45** 2120	**14.3** 3210	**7.30** 1640	**8.60** 1930	**12.7** 2860	**28** 248	**3400**	**0.059** 0.130
15 0.591	**KRV26.DZ**	**9.45** 2120	**14.3** 3210	**7.30** 1640	**8.60** 1930	**12.7** 2860	**28** 248	**3400**	**0.059** 0.130
21 0.827	**KRV30**	**13.4** 3010	**19.8** 4450	**9.85** 2210	**9.20** 2070	**15.7** 3530	**45** 398	**2800**	**0.087** 0.192
21 0.827	**KRV30.DZ**	**13.4** 3010	**19.8** 4450	**9.85** 2210	**9.20** 2070	**15.7** 3530	**45** 398	**2800**	**0.087** 0.192
21 0.827	**KRV32**	**13.4** 3010	**19.8** 4450	**10.4** 2340	**11.3** 2540	**17.4** 3910	**45** 398	**2800**	**0.098** 0.216
21 0.827	**KRV32.DZ**	**13.4** 3010	**19.8** 4450	**10.4** 2340	**11.3** 2540	**17.4** 3910	**45** 398	**2800**	**0.098** 0.216
25 0.984	**NUKR35.2SK**	**24.7** 5550	**29.4** 6610	**16.2** 3640	**10.1** 2270	**16.1** 3620	**53.2** 471	**6100**	**0.170** 0.375
27 1.063	**NUKR40.2SK**	**26.6** 5980	**33.3** 7490	**18.7** 4200	**15.0** 3370	**23.9** 5370	**77.5** 686	**5300**	**0.250** 0.551
33 1.299	**NUKR47.2SK**	**41.4** 9310	**53.2** 12000	**28.1** 6320	**20.5** 4610	**32.7** 7350	**109** 965	**4500**	**0.380** 0.838
37 1.457	**NUKR52.2SK**	**45.8** 10300	**63.1** 14200	**29.6** 6650	**22.2** 4990	**35.4** 7960	**109** 965	**3700**	**0.461** 1.016
45 1.772	**NUKR62.2SK**	**62.7** 14100	**83.1** 18700	**40.9** 9190	**29.6** 6650	**47.2** 10600	**193** 1 708	**3200**	**0.790** 1.742
51 2.008	**NUKR72.2SK**	**68.9** 15500	**97.8** 22000	**46.1** 10400	**39.6** 8900	**63.1** 14200	**193** 1 708	**2600**	**1.040** 2.293
52 2.047	**NUKR80.2SK**	**95.4** 21400	**130** 29200	**69.7** 15700	**63.2** 14200	**101** 22700	**390** 3 452	**2900**	**1.550** 3.417
52 2.047	**NUKR90.2SK**	**95.4** 21400	**130** 29200	**77.8** 17500	**97.8** 22000	**128** 28800	**390** 3 452	**2900**	**2.020** 4.453

FULL COMPLEMENT, SMALL SERIES, UNSEALED, STUD TYPE (GC SERIES)

METRIC SERIES

GC: convex outer ring
GCL: cylindrical outer ring



GC Series

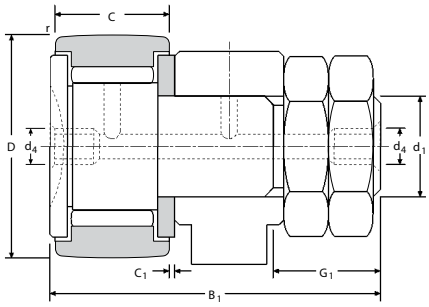
Outer Dia.	Dimensions mm/in.							Profiled Designation
mm	D	d_1	C	C_1	$r_{s\ min}$	B_1	G_1	
10	10	4	8	0.25	0.2	19.5	6	GC 10
	0.3937	0.1575	0.315	0.010	0.008	0.768	0.236	
11	11	4	8	0.25	0.2	19.5	6	GC 11
	0.4331	0.1575	0.315	0.010	0.008	0.768	0.236	
12	12	5	9	0.25	0.2	22.5	7	GC 12
	0.4724	0.1969	0.354	0.010	0.008	0.886	0.276	
13	13	5	9	0.25	0.2	22.5	7	GC 13
	0.5118	0.1969	0.354	0.010	0.008	0.886	0.276	
14	14	6	9.5	0.25	0.3	26	8	GC 14
	0.5512	0.2362	0.374	0.010	0.012	1.024	0.315	
15	15	6	9.5	0.25	0.3	26	8	GC 15
	0.5906	0.2362	0.374	0.010	0.012	1.024	0.315	

Cylindrical Designation	Tightening Torque Nm/in.-lbs.	Load Ratings kN/lbf. Dynamic		Static	Limiting Speed Grease	Wt. kg/lbs.
		C_1	$F_{r\ perm}$	F_0	RPM	
GCL 10	**0.9**	**2.13**	**0.52**	**0.96**	**14000**	**0.006**
	7.97	479	117	216		0.014
GCL 11	**0.9**	**2.48**	**0.52**	**0.96**	**14000**	**0.007**
	7.97	558	117	216		0.016
GCL 12	**1.8**	**2.98**	**0.90**	**1.68**	**11000**	**0.011**
	15.93	670	202	378		0.024
GCL 13	**1.8**	**3.35**	**0.90**	**1.68**	**11000**	**0.011**
	15.93	753	202	378		0.024
GCL 14	**3.0**	**3.5**	**1.48**	**2.75**	**10000**	**0.016**
	26.55	787	333	618		0.035
GCL 15	**3.0**	**3.75**	**1.48**	**2.75**	**10000**	**0.018**
	26.55	843	333	618		0.039

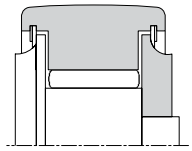
FULL COMPLEMENT, STANDARD SERIES, WITH OR WITHOUT SEALS, STUD TYPE (GC SERIES)

METRIC SERIES

GC: convex outer ring
GCL: cylindrical outer ring



GC/GCL



GC...EE, GC...EM

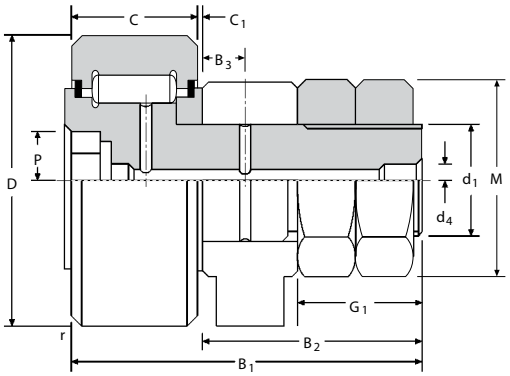
Outer Dia.	Dimensions mm/in.							Profiled Designation
mm	D	d_1	C	C_1	$r_{s\ min}$	B_1	G_1	
16	16	6	11	0.60	0.3	28.3	8	GC 16
	0.6299	0.2362	0.433	0.024	0.012	1.114	0.315	
19	19	8	11	0.60	0.3	32.3	10	GC 19
	0.748	0.315	0.433	0.024	0.012	1.272	0.394	
22	22	10	12	0.60	0.3	36.3	12	GC 22
	0.8661	0.3937	0.472	0.024	0.012	1.429	0.472	
24	24	10	12	0.60	0.3	36.3	12	GC 24
	0.9449	0.3937	0.472	0.024	0.012	1.429	0.472	
26	26	10	12	0.60	0.3	36.3	12	GC 26(4)
	1.0236	0.3937	0.472	0.024	0.012	1.429	0.472	
28	28	10	12	0.60	0.3	36.3	12	GC 28
	1.1024	0.3937	0.472	0.024	0.012	1.429	0.472	
30	30	12	14	0.60	0.6	40.3	13	GC 30
	1.1811	0.4724	0.51	0.024	0.024	1.587	0.512	
32	32	12	14	0.60	0.6	40.3	13	GC 32
	1.2598	0.4724	0.51	0.024	0.024	1.587	0.512	
35	35	16	18	0.80	0.6	52.3	17	GC 35
	1.378	0.6299	0.709	0.031	0.024	2.059	0.669	
47	47	20	24	0.80	1	66.3	21	GC 47
	1.8504	0.7874	0.45	0.031	0.039	2.61	0.827	
52	52	20	24	0.80	1	66.3	21	GC 52
	2.0472	0.7874	0.45	0.031	0.039	2.61	0.827	
62	62	24	29	0.80	1	80.3	25	GC 62
	2.4409	0.9449	1.142	0.031	0.039	3.161	0.984	
72	72	24	29	0.80	1	80.3	25	GC 72
	2.8346	0.9449	1.142	0.031	0.039	3.161	0.984	
80	80	30	35	1.00	1	100.3	32	GC 80
	3.1496	1.1811	1.378	0.039	0.039	3.949	1.26	
85	85	30	35	1.00	1	100.3	32	GCL 85 EE
	3.3465	1.1811	1.378	0.039	0.039	3.949	1.26	
	85	30	35	1.00	1	100.3	32	GCL 85 EEM
	3.3465	1.1811	1.378	0.039	0.039	3.949	1.26	
90	90	30	35	1.00	1	100.3	32	GC 90
	3.5433	1.1811	1.378	0.039	0.039	3.949	1.26	

Tightening Torque **Nm**/in.-lbs.	Load Ratings **kN**/lbf. Dynamic		Static	Limiting Speed Grease	mm wrench	**mm**/in.	Wt. **kg**/lbs.
	C	$F_{r\ perm}$	F_0	**RPM**			
3	**5.05**	**1.18**	**2.2**	**9300**	**N/A**	**4**	**0.021**
26.6	1140	265	495			0.157	0.046
8	**5.75**	**2.83**	**5.2**	**7600**	**N/A**	**4**	**0.034**
70.8	1290	636	1170			0.157	0.075
20	**6.3**	**4.9**	**8.1**	**6300**	**N/A**	**4**	**0.058**
177	1420	1100	1820			0.157	0.128
20	**6.9**	**5.2**	**9.2**	**6300**	**N/A**	**4**	**0.067**
177	1550	1170	2070			0.157	0.148
20	**8.9**	**5.2**	**9.6**	**5500**	**N/A**	**4**	**0.072**
177	2000	1170	2160			0.157	0.159
20	**9.6**	**5.2**	**9.6**	**5500**	**N/A**	**4**	**0.08**
177	2160	1170	2160			0.157	0.176
26	**12.9**	**7.7**	**14.3**	**4800**	**8**	**4**	**0.115**
230	2900	1730	3210			0.157	0.254
26	**13.8**	**7.7**	**14.3**	**4800**	**8**	**4**	**0.12**
230	3100	1730	3210			0.157	0.265
64	**19.2**	**11.4**	**24**	**3850**	**10**	**6**	**0.208**
566	4320	2560	5400			0.236	0.459
120	**28.3**	**21.4**	**40**	**2700**	**14**	**6**	**0.477**
1060	6360	4810	8990			0.236	1.052
120	**34**	**21.4**	**40**	**2700**	**14**	**6**	**0.542**
1060	7640	4810	8990			0.236	1.195
220	**42**	**31**	**57.5**	**2330**	**12**	**6**	**0.944**
1950	9440	6970	12900			0.236	2.081
220	**44**	**31**	**57.5**	**2330**	**12**	**6**	**1.165**
1950	9890	6970	12900			0.236	2.568
450	**60**	**50**	**93**	**1700**	**14**	**8**	**1.915**
3980	13500	11200	20900			0.315	4.222
450	**64**	**50**	**93**	**1700**	**14**	**8**	**2.096**
3980	14400	11200	20900			0.315	4.621
450	**64**	**50**	**93**	**1700**	**14**	**8**	**2.096**
3980	14400	11200	20900			0.315	4.621
450	**65**	**50**	**93**	**1700**	**14**	**8**	**2.287**
3980	14600	11200	20900			0.315	5.042

FULL COMPLEMENT, WITH METAL SEALS, STUD TYPE (GCU...MM SERIES)

METRIC SERIES

GCU: convex outer ring
GCUL: cylindrical outer ring



GCU, GCUL

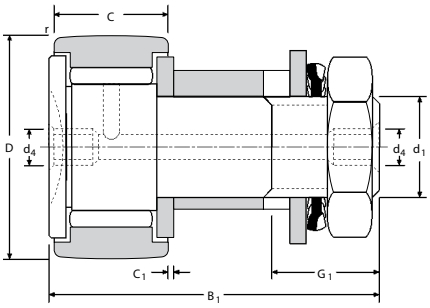
Outside Dia.	Dimensions mm/in.							Profiled Designation	Cylindrical Designation
mm	D	d_1	C	C_1	B_1	G_1	r_{smin}		
35	35 1.3780	16 0.6299	18 0.709	0.85 0.033	52.3 2.059	17 0.669	0.6 0.024	GCU 35 MM	GCUL 35 MM
40	40 1.5748	18 0.7087	20 0.787	0.85 0.033	58.3 2.295	19 0.748	1.0 0.039	GCU 40	
	40 1.5748	18 0.7087	20 0.787	0.85 0.033	58.3 2.295	19 0.748	1.0 0.039	GCU 40 MM	GCUL 40 MM
47	47 1.8504	20 0.7874	24 0.945	0.85 0.033	66.3 2.610	21 0.827	1.0 0.039	GCU 47 MM	GCUL 47 MM
52	52 2.0472	20 0.7874	24 0.945	0.85 0.033	66.3 2.610	21 0.827	1.0 0.039		GCUL 52
	52 2.0472	20 0.7874	24 0.945	0.85 0.033	66.3 2.610	21 0.827	1.0 0.039	GCU 52 MM	GCUL 52 MM
62	62 2.4409	24 0.9449	29 1.142	0.85 0.033	80.3 3.161	25 0.984	1.0 0.039	GCU 62 MM	
72	72 2.8346	24 0.9449	29 1.142	0.85 0.033	80.3 3.161	25 0.984	1.1 0.043		GCUL 72 MM
80	80 3.1496	30 1.1811	35 1.378	1.10 0.043	100.3 3.949	32 1.260	1.1 0.043	GCU 80 MM	
90	90 3.5433	30 1.1811	35 1.378	1.10 0.043	100.3 3.949	32 1.260	1.1 0.043		GCUL 90
	90 3.5433	30 1.1811	35 1.378	1.10 0.043	100.3 3.949	32 1.260	1.1 0.043	GCU 90 MM	
100	100 3.9370	36 1.4173	40 1.575	1.10 0.043	117.3 4.618	38 1.496	2.0 0.079	GCU 100	
	100 3.9370	36 1.4173	40 1.575	1.10 0.043	117.3 4.618	38 1.496	2.0 0.079	GCU 100 MM	
110	110 4.3307	36 1.4173	40 1.575	1.10 0.043	117.3 4.618	38 1.496	2.0 0.079	GCU 110 MM	GCUL 110 MM
120	120 4.7244	42 1.6535	46 1.811	1.10 0.043	136.3 5.366	44 1.732	2.0 0.079	GCU 120 MM	
130	130 5.1181	42 1.6535	46 1.811	1.10 0.043	136.3 5.366	44 1.732	2.0 0.079		GCUL 130
	130 5.1181	42 1.6535	46 1.811	1.10 0.043	136.3 5.366	44 1.732	2.0 0.079	GCU 130 MM	

Tightening Torque Nm/in.-lbs.	Load Ratings kN/lbf. Dynamic		Static	Limiting Speed Grease	mm wrench	mm/in.		Wt. kg/lbs.
	C	$F_{r\ perm}$	F_{01}	RPM		B_3	d_4	
64 566	**17.0** 3820	**7.80** 1750	**17.2** 3870	**5700**	**10**	**8** 0.315	**6** 0.236	**0.200** 0.441
90 797	**20.0** 4500	**11.5** 2590	**22.0** 4950	**5200**	**12**	**8** 0.315	**6** 0.236	**0.289** 0.637
90 797	**20.0** 4500	**11.5** 2590	**22.0** 4950	**5200**	**12**	**8** 0.315	**6** 0.236	**0.289** 0.637
120 1060	**29.5** 6630	**15.5** 3480	**33.0** 7420	**4400**	**14**	**9** 0.354	**6** 0.236	**0.450** 0.992
120 1060	**36.5** 8210	**21.5** 4830	**40.0** 8990	**4400**	**14**	**9** 0.354	**6** 0.236	**0.520** 1.146
120 1060	**36.5** 8210	**21.5** 4830	**40.0** 8990	**4400**	**14**	**9** 0.354	**6** 0.236	**0.520** 1.146
220 1950	**52.0** 11700	**31.0** 6970	**58.0** 13000	**3700**	**12**	**11** 0.433	**6** 0.236	**0.910** 2.006
220 1950	**63.0** 14200	**31.0** 6970	**58.0** 13000	**3700**	**12**	**11** 0.433	**6** 0.236	**1.140** 2.513
450 3980	**76.0** 17100	**48.0** 10800	**93.0** 20900	**2700**	**14**	**15** 0.591	**8** 0.315	**1.870** 4.123
450 3980	**94.0** 21100	**50.0** 11200	**93.0** 20900	**2700**	**14**	**15** 0.591	**8** 0.315	**2.230** 4.916
450 3980	**94.0** 21100	**50.0** 11200	**93.0** 20900	**2700**	**14**	**15** 0.591	**8** 0.315	**2.230** 4.914
740 6550	**115** 25900	**76.0** 17100	**142** 31900	**2300**	**17**	**20** 0.787	**8** 0.315	**3.290** 7.253
740 6550	**115** 25900	**76.0** 17100	**142** 31900	**2300**	**17**	**20** 0.787	**8** 0.315	**3.290** 7.253
740 6550	**129** 29000	**76.0** 17100	**142** 31900	**2300**	**17**	**20** 0.787	**8** 0.315	**3.800** 8.378
1 200 10620	**150** 33700	**120** 27000	**200** 45000	**2000**	**19**	**24** 0.945	**8** 0.315	**5.422** 1.953
1 200 10620	**163** 36600	**121** 27200	**223** 50100	**2000**	**19**	**24** 0.945	**8** 0.315	**5.780** 12.743
1 200 10620	**163** 36600	**121** 27200	**223** 50100	**2000**	**19**	**24** 0.945	**8** 0.315	**5.780** 12.743

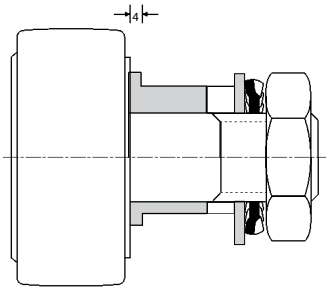
FULL COMPLEMENT, ECCENTRIC, STUD TYPE (GCR SERIES)

METRIC SERIES

GCR: convex outer ring
GCRL: cylindrical outer ring



GCR 16-52



GCR 62-90

Outer Dia.	Dimensions mm/in.							Profiled Designation	Cylindrical Designation
mm	D	d_1	C	C_1	B_1	G_1	$r_{a\ min}$		
16	16 0.6299	6 0.2362	11 0.433	0.60 0.024	28.3 1.114	8 0.315	0.3 0.012	GCR 16	
	16 0.6299	6 0.2362	11 0.433	0.60 0.024	28.3 1.114	8 0.315	0.3 0.012	GCR 16 EE	GCRL 16 EE
	16 0.6299	6 0.2362	11 0.433	0.60 0.024	28.3 1.114	8 0.315	0.3 0.012	GCR 16 EEM	GCRL 16 EEM
19	19 0.748	8 0.315	11 0.433	0.60 0.024	32.3 1.272	10 0.394	0.3 0.012	GCR 19	
	19 0.748	8 0.315	11 0.433	0.60 0.024	32.3 1.272	10 0.394	0.3 0.012	GCR 19 EE	GCRL 19 EE
	19 0.748	8 0.315	11 0.433	0.60 0.024	32.3 1.272	10 0.394	0.3 0.012	GCR 19 EEM	
22	22 0.8661	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 22 EE	GCRL 22 EE
	22 0.8661	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 22 EEM	GCRL 22 EEM
24	24 0.9449	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 24	
	24 0.9449	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 24 EE	GCRL 24 EE
	24 0.9449	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 24 EEM	GCRL 24 EEM
26	26 1.0236	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 26	
	26 1.0236	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 26 EE	GCRL 26 EE
28	28 1.1024	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 28 EE	
	28 1.1024	10 0.3937	12 0.472	0.60 0.024	36.3 1.429	12 0.472	0.3 0.012	GCR 28 EEM	GCRL 28 EEM
30	30 1.1811	12 0.4724	14 0.551	0.60 0.024	40.3 1.587	13 0.512	0.6 0.024	GCR 30 EE	GCRL 30 EE
	30 1.1811	12 0.4724	14 0.551	0.60 0.024	40.3 1.587	13 0.512	0.6 0.024	GCR 30 EEM	GCRL 30 EEM
32	32 1.2598	12 0.4724	14 0.551	0.60 0.024	40.3 1.587	13 0.512	0.6 0.024	GCR 32	
	32 1.2598	12 0.4724	14 0.551	0.60 0.024	40.3 1.587	13 0.512	0.6 0.024	GCR 32 EE	GCRL 32 EE
	32 1.2598	12 0.4724	14 0.551	0.60 0.024	40.3 1.587	13 0.512	0.6 0.024	GCR 32 EEM	
35	35 1.378	16 0.6299	18 0.709	0.80 0.031	52.3 2.059	17 0.669	0.6 0.024	GCR 35	
	35 1.378	16 0.6299	18 0.709	0.80 0.031	52.3 2.059	17 0.669	0.6 0.024	GCR 35 EE	GCRL 35 EE
	35 1.378	16 0.6299	18 0.709	0.80 0.031	52.3 2.059	17 0.669	0.6 0.024	GCR 35 EEM	GCRL 35 EEM

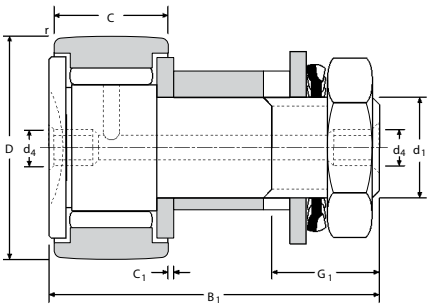
Tightening Torque Nm/in.-lbs.	Load Ratings kN/lbf. Dynamic		Static	Limiting Speed Grease	mm/in.	Wt. kg/lbs.
	C_0	$F_{r\ perm}$	F_0	RPM	d_4	
2 17.7	**5.05** 1140	**1.18** 265	**2.20** 495	**9300**	**4** 0.157	**0.024** 0.053
2 17.7	**5.05** 1140	**1.18** 265	**2.20** 495	**9300**	**4** 0.157	**0.024** 0.053
2 17.7	**5.05** 1140	**1.18** 265	**2.20** 495	**9300**	**4** 0.157	**0.024** 0.053
5 44.3	**5.75** 1290	**2.83** 636	**4.50** 1010	**7600**	**4** 0.157	**0.039** 0.086
5 44.3	**5.75** 1290	**2.83** 636	**4.50** 1010	**7600**	**4** 0.157	**0.039** 0.086
5 44.3	**5.75** 1290	**2.83** 636	**4.50** 1010	**7600**	**4** 0.157	**0.039** 0.086
16 142	**6.30** 1420	**4.90** 1100	**5.60** 1260	**6300**	**4** 0.157	**0.057** 0.126
16 142	**6.30** 1420	**4.90** 1100	**5.60** 1260	**6300**	**4** 0.157	**0.057** 0.126
16 142	**6.90** 1550	**5.20** 1170	**5.60** 1260	**6300**	**4** 0.157	**0.072** 0.159
16 142	**6.90** 1550	**5.20** 1170	**5.60** 1260	**6300**	**4** 0.157	**0.072** 0.159
16 142	**6.90** 1550	**5.20** 1170	**5.60** 1260	**6300**	**4** 0.157	**0.072** 0.159
16 142	**8.90** 2000	**5.20** 1170	**6.10** 1370	**5500**	**4** 0.157	**0.080** 0.176
16 142	**8.90** 2000	**5.20** 1170	**6.10** 1370	**5500**	**4** 0.157	**0.080** 0.176
16 142	**9.60** 2160	**5.20** 1170	**6.10** 1370	**5500**	**4** 0.157	**0.088** 0.194
16 142	**9.60** 2160	**5.20** 1170	**6.10** 1370	**5500**	**4** 0.157	**0.088** 0.194
22 195	**12.9** 2900	**7.70** 1730	**10.4** 2340	**4800**	**4** 0.157	**0.118** 0.260
22 195	**12.9** 2900	**7.70** 1730	**10.4** 2340	**4800**	**4** 0.157	**0.118** 0.260
22 195	**13.8** 3100	**7.70** 1730	**10.4** 2340	**4800**	**4** 0.157	**0.126** 0.278
22 195	**13.8** 3100	**7.70** 1730	**10.4** 2340	**4800**	**4** 0.157	**0.126** 0.278
22 195	**13.8** 3100	**7.70** 1730	**10.4** 2340	**4800**	**4** 0.157	**0.126** 0.278
55 487	**19.2** 4320	**11.4** 2560	**11.0** 2470	**3850**	**6** 0.236	**0.220** 0.485
55 487	**19.2** 4320	**11.4** 2560	**11.0** 2470	**3850**	**6** 0.236	**0.220** 0.485
55 487	**19.2** 4320	**11.4** 2560	**11.0** 2470	**3850**	**6** 0.236	**0.220** 0.485

Continued on next page.

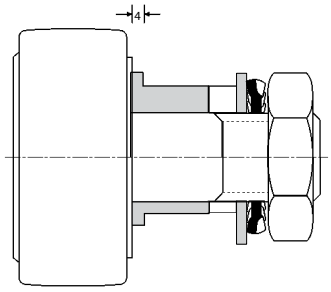
FULL COMPLEMENT, ECCENTRIC, STUD TYPE (GCR SERIES) – *continued*

METRIC SERIES

GCR: convex outer ring
GCRL: cylindrical outer ring



GCR 16-52



GCR 62-90

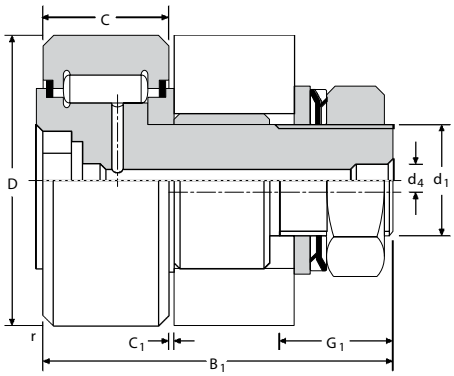
Outer Dia.	Dimensions mm/in.							Profiled Designation	Cylindrical Designation
mm	D	d_1	C	C_1	B_1	G_1	$r_{a\ min}$		
40	40 1.5748	18 0.7087	20 0.787	0.80 0.709	58.3 2.295	19 0.748	1 0.039	GCR 40	GCRL 40
	40 1.5748	18 0.7087	20 0.787	0.80 0.709	58.3 2.295	19 0.748	1 0.039	GCR 40 EE	GCRL 40 EE
	40 1.5748	18 0.7087	20 0.787	0.80 0.709	58.3 2.295	19 0.748	1 0.039	GCR 40 EEM	GCRL 40 EEM
47	47 1.8504	20 0.7874	24 0.945	0.80 0.709	66.3 2.61	21 0.827	1 0.039	GCR 47 EE	
	47 1.8504	20 0.7874	24 0.945	0.80 0.709	66.3 2.61	21 0.827	1 0.039	GCR 47 EEM	GCRL 47 EEM
52	52 2.0472	20 0.7874	24 0.945	0.80 0.709	66.3 2.61	21 0.827	1 0.039	GCR 52	
	52 2.0472	20 0.7874	24 0.945	0.80 0.709	66.3 2.61	21 0.827	1 0.039	GCR 52 EE	GCRL 52 EE
	52 2.0472	20 0.7874	24 0.945	0.80 0.709	66.3 2.61	21 0.827	1 0.039	GCR 52 EEM	GCRL 52 EEM
62	62 2.4409	24 0.9449	29 1.142	0.80 0.709	80.3 3.161	25 0.984	1 0.039	GCR 62	
	62 2.4409	24 0.9449	29 1.142	0.80 0.709	80.3 3.161	25 0.984	1 0.039	GCR 62 EE	
	62 2.4409	24 0.9449	29 1.142	0.80 0.709	80.3 3.161	25 0.984	1 0.039	GCR 62 EEM	GCRL 62 EEM
72	72 2.8346	24 0.9449	29 1.142	0.80 0.709	80.3 3.161	25 0.984	1 0.039	GCR 72 EE	GCRL 72 EE
	72 2.8346	24 0.9449	29 1.142	0.80 0.709	80.3 3.161	25 0.984	1 0.039		GCRL 72 EEM
80	80 3.1496	30 1.1811	35 1.378	1.00 0.039	100.3 3.949	32 1.26	1 0.039	GCR 80	
	80 3.1496	30 1.1811	35 1.378	1.00 0.039	100.3 3.949	32 1.26	1 0.039	GCR 80 EE	GCRL 80 EE
	80 3.1496	30 1.1811	35 1.378	1.00 0.039	100.3 3.949	32 1.26	1 0.039	GCR 80 EEM	GCRL 80 EEM
90	90 3.5433	30 1.1811	35 1.378	1.00 0.039	100.3 3.949	32 1.26	1 0.039	GCR 90	GCRL 90
	90 3.5433	30 1.1811	35 1.378	1.00 0.039	100.3 3.949	32 1.26	1 0.039	GCR 90 EE	
	90 3.5433	30 1.1811	35 1.378	1.00 0.039	100.3 3.949	32 1.26	1 0.039	GCR 90 EEM	

Tightening Torque Nm/in.-lbs.	Load Ratings kN/lbf. Dynamic		Static	Limiting Speed Grease	mm/in.	Wt. kg/lbs.
	C_0	$F_{r\ perm}$	F_0	RPM	d_4	
75 664	**20.0** 4500	**14.2** 3190	**12.3** 2770	**3150**	**6** 0.236	**0.321** 0.708
75 664	**20.0** 4500	**14.2** 3190	**12.3** 2770	**3150**	**6** 0.236	**0.321** 0.708
75 664	**20.0** 4500	**14.2** 3190	**12.3** 2770	**3150**	**6** 0.236	**0.321** 0.708
100 885	**28.3** 6360	**21.4** 4810	**23.7** 5330	**2700**	**6** 0.236	**0.500** 1.102
100 885	**28.3** 6360	**21.4** 4810	**23.7** 5330	**2700**	**6** 0.236	**0.500** 1.102
100 885	**34.0** 7640	**21.4** 4810	**23.7** 5330	**2700**	**6** 0.236	**0.568** 1.252
100 885	**34.0** 7640	**21.4** 4810	**23.7** 5330	**2700**	**6** 0.236	**0.568** 1.252
100 885	**34.0** 7640	**21.4** 4810	**23.7** 5330	**2700**	**6** 0.236	**0.568** 1.252
180 1590	**42.0** 9440	**31.0** 6970	**28.8** 6470	**2330**	**8** 0.315	**1.035** 2.282
180 1590	**42.0** 9440	**31.0** 6970	**28.8** 6470	**2330**	**8** 0.315	**1.035** 2.282
180 1590	**42.0** 9440	**31.0** 6970	**28.8** 6470	**2330**	**8** 0.315	**1.035** 2.282
180 1590	**44.0** 9890	**31.0** 6970	**28.8** 6470	**2330**	**8** 0.315	**1.278** 2.818
180 1590	**44.0** 9890	**31.0** 6970	**28.8** 6470	**2330**	**8** 0.315	**1.278** 2.818
370 3270	**60.0** 13500	**50.0** 11200	**54.0** 12100	**1700**	**8** 0.315	**2.074** 4.572
370 3270	**60.0** 13500	**50.0** 11200	**54.0** 12100	**1700**	**8** 0.315	**2.074** 4.572
370 3270	**60.0** 13500	**50.0** 11200	**54.0** 12100	**1700**	**8** 0.315	**2.074** 4.572
370 3270	**65.0** 14600	**50.0** 11200	**54.0** 12100	**1700**	**8** 0.315	**2.435** 5.368
370 3270	**65.0** 14600	**50.0** 11200	**54.0** 12100	**1700**	**8** 0.315	**2.435** 5.368
370 3270	**65.0** 14600	**50.0** 11200	**54.0** 12100	**1700**	**8** 0.315	**2.435** 5.368

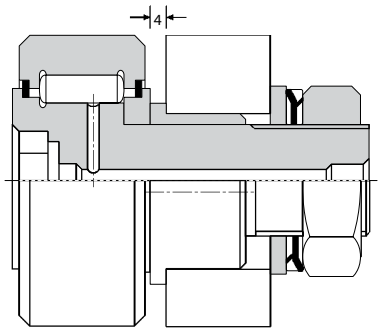
FULL COMPLEMENT ECCENTRIC, WITH METAL SEALS, STUD TYPE (GCUR...MM SERIES)

METRIC SERIES

GCUR: convex outer ring
GCURL: cylindrical outer ring



GCUR 35-52



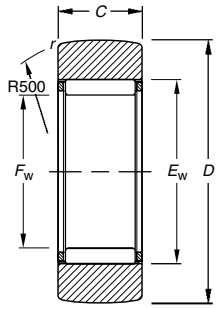
GCUR 62-130

Outside Dia.	Dimensions mm/in.							Profiled Designation	Cylindrical Designation
mm	D	d_1	C	C_1	B_1	G_1	r_{smin}		
35	35 1.3780	16 0.6299	18 0.709	0.85 0.033	52.3 2.059	17 0.669	0.6 0.024	GCUR 35	
40	40 1.5748	18 0.7087	20 0.787	0.85 0.033	58.3 2.295	19 0.748	1.0 0.039	GCUR 40	
	40 1.5748	18 0.7087	20 0.787	0.85 0.033	58.3 2.295	19 0.748	1.0 0.039		GCURL 40 MM
52	52 2.0472	20 0.7874	24 0.945	0.85 0.033	66.3 2.610	21 0.827	1.0 0.039	GCUR 52 MM	
62	62 2.4409	24 0.9449	29 1.142	0.85 0.033	80.3 3.161	25 0.984	1.0 0.039	GCUR 62	
	62 2.4409	24 0.9449	29 1.142	0.85 0.033	80.3 3.161	25 0.984	1.0 0.039	GCUR 62 MM	
72	72 2.8346	24 0.9449	29 1.142	0.85 0.033	80.3 3.161	25 0.984	1.1 0.043	GCUR 72	
	72 2.8346	24 0.9449	29 1.142	0.85 0.033	80.3 3.161	25 0.984	1.1 0.043	GCUR 72 MM	
80	80 3.1496	30 1.1811	35 1.378	1.10 0.014	100.3 3.949	32 1.260	1.1 0.043	GCUR 80	
	80 3.1496	30 1.1811	35 1.378	1.10 0.043	100.3 3.949	32 1.260	1.1 0.043	GCUR 80 MM	
90	90 3.5433	30 1.1811	35 1.378	1.10 0.043	100.3 3.949	32 1.260	1.1 0.043	GCUR 90	
100	100 3.9370	36 1.4173	40 1.575	1.10 0.043	117.3 4.618	38 1.496	2.0 0.079	GCUR 100	
	100 3.9370	36 1.4173	40 1.575	1.10 0.043	117.3 4.618	38 1.496	2.0 0.079	GCUR 100 MM	
110	110 4.3307	36 1.4173	40 1.575	1.10 0.043	117.3 4.618	38 1.496	2.0 0.079	GCUR 110 MM	
120	120 4.7244	42 1.6535	46 1.811	1.10 0.043	136.3 5.366	44 1.732	2.0 0.079	GCUR 120 MM	
130	130 5.1181	42 1.6535	46 1.811	1.10 0.043	136.3 5.366	44 1.732	2.0 0.079	GCUR 130	
	130 5.1181	42 1.6535	46 1.811	1.10 0.043	136.3 5.366	44 1.732	2.0 0.079	GCUR 130 MM	

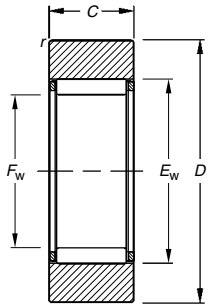
Tightening Torque Nm/in.-lbs.	Load Ratings kN/lbf. Dynamic		Static	Limiting Speed Grease	mm wrench	mm/in.	Wt. kg/lbs.
	C	$F_{r\ perm}$	F_{01}	RPM		d_4	
55 487	**17.0** 3820	**7.8** 1750	**10.0** 2250	**5700**	**10**	**6** 0.236	**0.215** 0.474
75 664	**20.0** 4500	**10.9** 2450	**10.9** 2450	**5200**	**12**	**6** 0.236	**0.313** 0.690
75 664	**20.0** 4500	**10.9** 2450	**10.9** 2450	**5200**	**12**	**6** 0.236	**0.313** 0.690
100 885	**36.5** 8210	**21.3** 4790	**21.3** 4790	**4400**	**14**	**6** 0.236	**0.555** 1.224
180 1593	**52.0** 11690	**28.8** 6470	**28.8** 6470	**3700**	**12**	**6** 0.236	**1.022** 2.253
180 1593	**52.0** 11690	**28.8** 6470	**28.8** 6470	**3700**	**12**	**6** 0.236	**1.022** 2.253
180 1593	**63.0** 14160	**28.8** 6470	**28.8** 6470	**3700**	**12**	**6** 0.236	**0.113** 0.249
180 1593	**63.0** 14160	**28.8** 6470	**28.8** 6470	**3700**	**12**	**6** 0.236	**0.113** 0.249
370 3275	**76.0** 17090	**48.0** 10790	**54.0** 12140	**2700**	**14**	**8** 0.315	**0.182** 0.401
370 3275	**76.0** 17090	**48.0** 10790	**54.0** 12140	**2700**	**14**	**8** 0.315	**0.182** 0.401
370 3275	**94.0** 21130	**50.0** 11240	**54.0** 12140	**2700**	**14**	**8** 0.315	**0.182** 0.402
610 5399	**115** 25850	**76.0** 17090	**83.0** 18660	**2300**	**17**	**8** 0.315	**0.244** 0.539
610 5399	**115** 25850	**76.0** 17090	**83.0** 18660	**2300**	**17**	**8** 0.315	**0.244** 0.539
610 5399	**129** 29000	**76.0** 17090	**83.0** 18660	**2300**	**17**	**8** 0.315	**0.245** 0.540
1000 8851	**150** 33720	**120** 26980	**130** 29230	**2000**	**19**	**8** 0.315	**0.328** 0.724
1000 8851	**150** 33720	**121** 27200	**130** 29230	**2000**	**19**	**8** 0.315	**0.329** 0.725
1000 8851	**150** 33720	**121** 27200	**130** 29230	**2000**	**19**	**8** 0.315	**0.329** 0.725

CAGED, WITHOUT INNER RING, NO END WASHERS, YOKE TYPE (RSTO SERIES)

METRIC SERIES



RSTO



RSTO.DZ

C

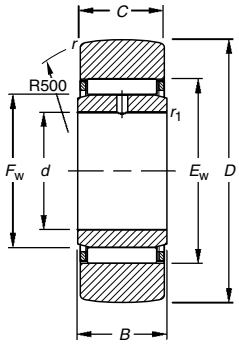
Outer Dia.	Dimensions						Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic	As a Bearing Static	As a Track Roller Dynamic	As a Track Roller Dynamic	As a Track Roller Static	Limiting Speed Grease	Wt. kg/lbs.
mm	D	B	C	F_w	E_w	r_s		C	C_o	C_w	$F_{r\ perm}$	$F_{Or\ perm}$	RPM	
16	16 0.6299	8 0.315	7.8 0.307	7 0.2756	10 0.394	0.3 0.012	RSTO5A.TN	2.74 616	2.44 549	2.49 560	2.97 668	2.44 549	19000	0.009 0.020
	16 0.6299	8 0.315	7.8 0.307	7 0.2756	10 0.394	0.3 0.012	RSTO5ADZ.TN	2.74 616	2.44 549	2.49 560	2.97 668	2.44 549	19000	0.009 0.020
19	19 0.7480	10 0.394	9.8 0.386	10 0.3937	13 0.512	0.3 0.012	RSTO6	5.40 1210	6.43 1450	4.15 933	4.04 908	5.63 1270	13000	0.014 0.031
	19 0.7480	10 0.394	9.8 0.386	10 0.3937	13 0.512	0.3 0.012	RSTO6DZ	5.40 1210	6.43 1450	4.15 933	4.04 908	5.63 1270	13000	0.014 0.031
	19 0.7480	10 0.394	9.8 0.386	10 0.3937	13 0.512	0.3 0.012	RSTO6TN	5.40 1210	6.43 1450	4.15 933	4.04 908	5.63 1270	13000	0.014 0.031
24	24 0.9449	10 0.394	9.8 0.386	12 0.4724	15 0.591	0.3 0.012	RSTO8	5.85 1320	7.51 1690	4.79 1080	6.67 1500	7.44 1670	10000	0.023 0.051
	24 0.9449	10 0.394	9.8 0.386	12 0.4724	15 0.591	0.3 0.012	RSTO8DZ	5.85 1320	7.51 1690	4.79 1080	6.67 1500	7.44 1670	10000	0.023 0.051
30	30 1.1811	12 0.472	11.8 0.465	14 0.5512	20 0.787	0.3 0.012	RSTO10	10.40 2340	10.6 2380	8.62 1940	7.69 1730	10.6 2380	9400	0.044 0.097
	30 1.1811	12 0.472	11.8 0.465	14 0.5512	20 0.787	0.3 0.012	RSTO10DZ	10.40 2340	10.6 2380	8.62 1940	7.69 1730	10.6 2380	9400	0.044 0.097
32	32 1.2598	12 0.472	11.8 0.465	16 0.6299	22 0.866	0.3 0.012	RSTO12	11.20 2520	11.9 2680	8.80 1980	7.65 1720	10.9 2450	8100	0.049 0.108
	32 1.2598	12 0.472	11.8 0.465	16 0.6299	22 0.866	0.3 0.012	RSTO12DZ	11.20 2520	11.9 2680	8.80 1980	7.65 1720	10.9 2450	8100	0.049 0.108
35	35 1.3780	12 0.472	11.8 0.465	20 0.7874	26 1.024	0.3 0.012	RSTO15	12.90 2900	15.3 3440	9.13 2050	6.95 1560	11.2 2520	6300	0.052 0.115
	35 1.3780	12 0.472	11.8 0.465	20 0.7874	26 1.024	0.3 0.012	RSTO15DZ	12.90 2900	15.3 3440	9.13 2050	6.95 1560	11.2 2520	6300	0.052 0.115

Continued on next page.

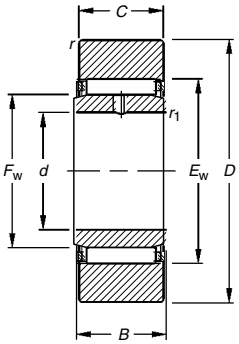
Outer Dia.	Dimensions						Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic	As a Bearing Static	As a Track Roller Dynamic	As a Track Roller	As a Track Roller Static	Limiting Speed Grease	Wt. kg/lbs.
mm	D	B	C	F_w	E_w	rs		C	C_o	C_w	$F_{r\ perm}$	$F_{Or\ perm}$	RPM	
40	40 1.5748	16 0.630	15.8 0.622	22 0.8661	29 1.142	0.3 0.012	RSTO17	19.00 4270	23.3 5240	13.8 3100	11.4 2560	18.2 4090	5800	0.095 0.209
	40 1.5748	16 0.630	15.8 0.622	22 0.8661	29 1.142	0.3 0.012	RSTO17DZ	19.00 4270	23.3 5240	13.8 3100	11.4 2560	18.2 4090	5800	0.095 0.209
47	47 1.8504	16 0.630	15.8 0.622	25 0.9843	32 1.260	0.3 0.012	RSTO20	20.00 4500	25.3 5690	15.3 3440	16.5 3710	22.2 4990	5000	0.134 0.295
	47 1.8504	16 0.630	15.8 0.622	25 0.9843	32 1.260	0.3 0.012	RSTO20DZ	20.00 4500	25.3 5690	15.3 3440	16.5 3710	22.2 4990	5000	0.134 0.295
52	52 2.0472	16 0.630	15.8 0.622	30 1.1811	37 1.457	0.3 0.012	RSTO25	22.40 5040	31.0 6970	16.0 3600	16.9 3800	23.7 5330	4100	0.155 0.342
	52 2.0472	16 0.630	15.8 0.622	30 1.1811	37 1.457	0.3 0.012	RSTO25DZ	22.30 5010	31.0 6970	16.0 3600	16.9 3800	23.7 5330	4100	0.155 0.342
62	62 2.4409	20 0.787	19.8 0.780	38 1.4961	46 1.811	0.6 0.024	RSTO30	33.30 7490	51.0 11470	22.3 5010	23.2 5220	34.2 7690	3200	0.258 0.569
	62 2.4409	20 0.787	19.8 0.780	38 1.4961	46 1.811	0.6 0.024	RSTO30DZ	33.30 7490	51.0 11470	22.3 5010	23.2 5220	34.2 7690	3200	0.258 0.569
72	72 2.8346	20 0.787	19.8 0.780	42 1.6535	50 1.969	0.6 0.024	RSTO35	35.20 7910	56.6 12720	25.2 5670	33.3 7490	43.0 9670	2900	0.37 0.816
	72 2.8346	20 0.787	19.8 0.780	42 1.6535	50 1.969	0.6 0.024	RSTO35DZ	35.20 7910	56.6 12720	25.2 5670	33.3 7490	43.0 9670	2900	0.370 0.816
80	80 3.1496	20 0.787	19.8 0.780	50 1.9685	58 2.283	0.6 0.024	RSTO40	38.80 8720	67.8 15240	25.9 5820	34.7 7800	45.0 10120	2400	0.430 0.948
	80 3.1496	20 0.787	19.8 0.780	50 1.9685	58 2.283	0.6 0.024	RSTO40DZ	38.80 8720	67.8 15240	25.9 5820	34.7 7800	45.0 10120	2400	0.430 0.948
85	85 3.3465	20 0.787	19.8 0.780	55 2.1654	63 2.480	0.6 0.024	RSTO45	40.30 9060	73.5 16520	26.0 5850	35.8 8050	45.5 10230	2200	0.447 0.985
90	90 3.5433	20 0.787	19.8 0.780	60 2.3622	68 2.677	0.6 0.024	RSTO50	41.80 9400	79.2 17800	26.0 5850	37.1 8340	45.8 10300	2000	0.495 1.091

CAGED, WITH INNER RING, NO END WASHERS YOKE TYPE (STO SERIES)

METRIC SERIES



STO



STO.DZ

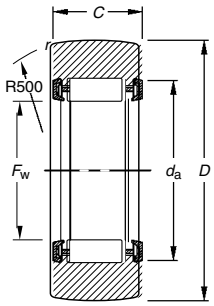
Outer Dia.	Dimensions								Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic	As a Bearing Static	As a Track Roller Dynamic	As a Track Roller Static		Limiting Speed Grease	Wt. kg/lbs.
mm	D	d	B	C	F_w	E_w	r_s	r_{1s}		C	C_o	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
19	**19** 0.7480	**6** 0.2362	**10** 0.394	**9.8** 0.386	**10** 0.3937	**13** 0.5118	**0.3** 0.012	**0.3** 0.012	**STO6**	**5.40** 1210	**6.43** 1450	**4.15** 933	**4.04** 908	**5.63** 1270	**9400**	**0.018** 0.040
	19 0.7480	**6** 0.2362	**10** 0.394	**9.8** 0.386	**10** 0.3937	**13** 0.5118	**0.3** 0.012	**0.3** 0.012	**STO6DZ**	**5.40** 1210	**6.43** 1450	**4.15** 933	**4.04** 908	**5.63** 1270	**9400**	**0.018** 0.040
24	**24** 0.9449	**8** 0.3150	**10** 0.394	**9.8** 0.386	**12** 0.4724	**15** 0.5906	**0.3** 0.012	**0.3** 0.012	**STO8**	**5.85** 1320	**7.51** 1690	**4.79** 1080	**6.67** 1500	**7.44** 1670	**8100**	**0.028** 0.062
	24 0.9449	**8** 0.3150	**10** 0.394	**9.8** 0.386	**12** 0.4724	**15** 0.5906	**0.3** 0.012	**0.3** 0.012	**STO8DZ**	**5.85** 1320	**7.51** 1690	**4.79** 1080	**6.67** 1500	**7.44** 1670	**8100**	**0.028** 0.062
30	**30** 1.1811	**10** 0.3937	**12** 0.472	**11.8** 0.465	**14** 0.5512	**20** 0.7874	**0.3** 0.012	**0.3** 0.012	**STO10**	**10.4** 2340	**10.6** 2380	**8.62** 1940	**7.69** 1730	**10.6** 2380	**6300**	**0.065** 0.143
	30 1.1811	**10** 0.3937	**12** 0.472	**11.8** 0.465	**14** 0.5512	**20** 0.7874	**0.3** 0.012	**0.3** 0.012	**STO10DZ**	**10.4** 2340	**10.6** 2380	**8.62** 1940	**7.69** 1730	**10.6** 2380	**6300**	**0.065** 0.143
32	**32** 1.2598	**12** 0.4724	**12** 0.472	**11.8** 0.465	**16** 0.6299	**22** 0.8661	**0.3** 0.012	**0.3** 0.012	**STO12**	**11.2** 2520	**11.9** 2680	**8.80** 1980	**7.65** 1720	**10.9** 2450	**5800**	**0.114** 0.251
	32 1.2598	**12** 0.4724	**12** 0.472	**11.8** 0.465	**16** 0.6299	**22** 0.8661	**0.3** 0.012	**0.3** 0.012	**STO12DZ**	**11.2** 2520	**11.9** 2680	**8.80** 1980	**7.65** 1720	**10.9** 2450	**5800**	**0.114** 0.251
35	**35** 1.3780	**15** 0.5906	**12** 0.472	**11.8** 0.465	**20** 0.7874	**26** 1.0236	**0.3** 0.012	**0.3** 0.012	**STO15**	**12.9** 2900	**15.3** 3440	**9.13** 2050	**6.95** 1560	**11.2** 2520	**5000**	**0.160** 0.353
	35 1.3780	**15** 0.5906	**12** 0.472	**11.8** 0.465	**20** 0.7874	**26** 1.0236	**0.3** 0.012	**0.3** 0.012	**STO15DZ**	**12.9** 2900	**15.3** 3440	**9.13** 2050	**6.95** 1560	**11.2** 2520	**5000**	**0.156** 0.344
40	**40** 1.5748	**17** 0.6693	**16** 0.630	**15.8** 0.622	**22** 0.8661	**29** 1.1417	**0.3** 0.012	**0.3** 0.012	**STO17**	**19.1** 4290	**23.3** 5240	**13.8** 3100	**11.4** 2560	**18.2** 4090	**4100**	**0.114** 0.251
	40 1.5748	**17** 0.6693	**16** 0.630	**15.8** 0.622	**22** 0.8661	**29** 1.1417	**0.3** 0.012	**0.3** 0.012	**STO17DZ**	**19.1** 4290	**23.3** 5240	**13.8** 3100	**11.4** 2560	**18.2** 4090	**4100**	**0.114** 0.251
47	**47** 1.8504	**20** 0.7874	**16** 0.630	**15.8** 0.622	**25** 0.9843	**32** 1.2598	**0.3** 0.012	**0.3** 0.012	**STO20**	**19.8** 4450	**25.3** 5690	**15.3** 3440	**16.5** 3710	**22.2** 4990	**3200**	**0.325** 0.717
	47 1.8504	**20** 0.7874	**16** 0.630	**15.8** 0.622	**25** 0.9843	**32** 1.2598	**0.3** 0.012	**0.3** 0.012	**STO20DZ**	**20.0** 4500	**25.3** 5690	**15.3** 3440	**16.5** 3710	**22.2** 4990	**3200**	**0.156** 0.344

Continued on next page.

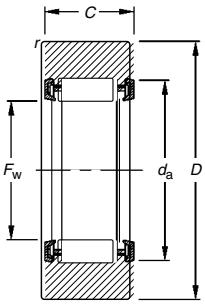
Outer Dia.	Dimensions								Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic		As a Track Roller Dynamic		Static	Limiting Speed Grease	Wt. kg/lbs.
mm	D	d	B	C	F_w	E_w	r_s	r_{1s}		C	C_o	C_w	$F_{r\ perm}$	$FO_{r\ perm}$	RPM	
52	52 2.0472	25 0.9843	16 0.630	15.8 0.622	30 1.1811	37 1.4567	0.3 0.012	0.3 0.012	STO25	22.4 5040	31.0 6970	16.0 3600	16.9 3800	23.7 5330	2900	0.435 0.959
	52 2.0472	25 0.9843	16 0.630	15.8 0.622	30 1.1811	37 1.4567	0.3 0.012	0.3 0.012	STO25DZ	22.4 5040	31.0 6970	16.0 3600	16.9 3800	23.7 5330	2900	0.435 0.959
62	62 2.4409	30 1.1811	20 0.787	19.8 0.780	38 1.4961	46 1.8110	0.6 0.024	0.6 0.024	STO30	33.3 7490	51.0 11470	22.3 5010	23.2 5220	34.2 7690	2400	0.325 0.717
	62 2.4409	30 1.1811	20 0.787	19.8 0.780	38 1.4961	46 1.8110	0.6 0.024	0.6 0.024	STO30DZ	33.3 7490	51.0 11470	22.3 5010	23.2 5220	34.2 7690	2400	0.325 0.717
72	72 2.8346	35 1.3780	20 0.787	19.8 0.780	42 1.6535	50 1.9685	0.6 0.024	0.6 0.024	STO35	35.2 7910	56.6 12720	25.2 5670	33.3 7490	43.0 9670	2200	0.435 0.959
	72 2.8346	35 1.3780	20 0.787	19.8 0.780	42 1.6535	50 1.9685	0.6 0.024	0.6 0.024	STO35DZ	35.2 7910	56.6 12720	25.2 5670	33.3 7490	43.0 9670	2200	0.435 0.959
80	80 3.1496	40 1.5748	20 0.787	19.8 0.780	50 1.9685	58 2.2835	0.6 0.024	1.0 0.039	STO40	38.8 8720	67.8 15240	25.9 5820	34.7 7800	45.0 10120	2000	0.540 1.190
	80 3.1496	40 1.5748	20 0.787	19.8 0.780	50 1.9685	58 2.2835	0.6 0.024	1.0 0.039	STO40DZ	38.8 8720	67.8 15240	25.9 5820	34.7 7800	45.0 10120	2000	0.540 1.190
85	85 3.3465	45 1.7717	20 0.787	19.8 0.780	55 2.1654	63 2.4803	0.6 0.024	1.0 0.039	STO45	40.3 9060	73.5 16520	26.0 5850	35.8 8050	45.5 10230	13000	0.580 1.279
	85 3.3465	45 1.7717	20 0.787	19.8 0.780	55 2.1654	63 2.4803	0.6 0.024	1.0 0.039	STO45DZ	40.3 9060	73.5 16520	26.0 5850	35.8 8050	45.5 10230	13000	0.580 1.279
90	90 3.5433	50 1.9685	20 0.787	19.8 0.780	60 2.3622	68 2.6772	0.6 0.024	1.0 0.039	STO50	41.8 9400	79.2 17800	26.0 5850	37.1 8340	45.8 10300	10000	0.650 1.433
	90 3.5433	50 1.9685	20 0.787	19.8 0.780	60 2.3622	68 2.6772	0.6 0.024	1.0 0.039	STO50DZ	41.8 9400	79.2 17800	26.0 5850	37.1 8340	45.8 10300	10000	0.650 1.433

CAGED, WITHOUT INNER RING, NO END WASHERS, SEALED, YOKE TYPE (RNA22 SERIES)

METRIC SERIES



RNA22.2RS



RNA22.2RS.DZ

C

Outer Dia.	Dimensions					Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic	As a Bearing Static	As a Track Roller Dynamic	As a Track Roller Static		Limiting Speed Grease	Wt kg/lbs.
mm	D	C	F_w	E_w	r_s		C	C_o	C_w	$F_{r\ perm}$	$F_{Or\ perm}$	RPM	
19	19 0.7480	11.8 0.465	10 0.3937	14 0.551	0.3 0.012	RNA22/6.2RS	4.70 1060	5.43 1220	4.13 928	3.06 688	4.59 1030	13000	0.014 0.031
	19 0.7480	11.8 0.465	10 0.3937	14 0.551	0.3 0.012	RNA22/6.2RS.DZ	4.70 1060	5.43 1220	4.13 928	3.06 688	4.59 1030	13000	0.014 0.031
24	24 0.9449	11.8 0.465	12 0.4724	18 0.709	0.3 0.012	RNA22/8.2RS	6.70 1510	6.08 1370	5.31 1190	3.37 758	5.22 1170	11000	0.025 0.055
	24 0.9449	11.8 0.465	12 0.4724	18 0.709	0.3 0.012	RNA22/8.2RS.DZ	6.70 1510	6.08 1370	5.31 1190	3.37 758	5.22 1170	11000	0.025 0.055
30	30 1.1811	13.8 0.543	14 0.5512	20 0.787	0.6 0.024	RNA2200.2RS	8.50 1910	9.45 2120	8.03 1810	7.85 1760	9.45 2120	9400	0.049 0.108
	30 1.1811	13.8 0.543	14 0.5512	20 0.787	0.6 0.024	RNA2200.2RS.DZ	8.50 1910	9.45 2120	8.03 1810	7.85 1760	9.45 2120	9400	0.049 0.108
32	32 1.2598	13.8 0.543	16 0.6299	22 0.866	0.6 0.024	RNA2201.2RS	9.00 2020	10.5 2360	8.2 1840	7.78 1750	10.1 2270	8100	0.053 0.117
	32 1.2598	13.8 0.543	16 0.6299	22 0.866	0.6 0.024	RNA2201.2RS.DZ	9.00 2020	10.5 2360	8.2 1840	7.78 1750	10.1 2270	8100	0.053 0.117
35	35 1.3780	13.8 0.543	20 0.7874	27 1.063	0.6 0.024	RNA2202.2RS	12.2 2740	14.5 3260	9.24 2080	6.00 1350	10.2 2290	6300	0.055 0.121
	35 1.3780	13.8 0.543	20 0.7874	27 1.063	0.6 0.024	RNA2202.2RS.DZ	12.2 2740	14.5 3260	9.24 2080	6.00 1350	10.2 2290	6300	0.055 0.121
40	40 1.5748	15.8 0.622	22 0.8661	30 1.181	1.0 0.039	RNA2203.2RS	16.3 3660	17.8 4000	11.9 2680	8.50 1910	13.7 3080	5900	0.090 0.198
	40 1.5748	15.8 0.622	22 0.8661	30 1.181	1.0 0.039	RNA2203.2RS.DZ	16.3 3660	17.8 4000	11.9 2680	8.50 1910	13.7 3080	5900	0.090 0.198
47	47 1.8504	17.8 0.701	25 0.9843	35 1.378	1.0 0.039	RNA2204.2RS	19.6 4410	20.2 4540	14.8 3330	11.0 2470	16.7 3750	5200	0.150 0.331
	47 1.8504	17.8 0.701	25 0.9843	35 1.378	1.0 0.039	RNA2204.2RS.DZ	19.6 4410	20.2 4540	14.8 3330	11.0 2470	16.7 3750	5200	0.150 0.331

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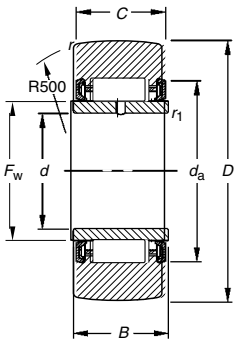
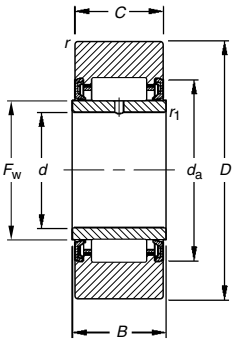
Outer Dia.	Dimensions					Bearing Designation	Load Ratings kN/lbf. As a Bearing		As a Track Roller			Limiting Speed Grease	Wt. kg/lbs.
							Dynamic	Static	Dynamic		Static		
mm	D	C	F_w	E_w	r_s		C	C_o	C_w	$F_{r\ perm}$	$F_{Or\ perm}$	RPM	
52	52 2.0472	17.8 0.701	30 1.1811	40 1.575	1.0 0.039	RNA2205.2RS	21.6 4860	24.3 5460	15.5 3480	11.3 2540	17.7 3980	4300	0.171 0.377
	52 2.0472	17.8 0.701	30 1.1811	40 1.575	1.0 0.039	RNA2205.2RS.DZ	21.6 4860	24.3 5460	15.5 3480	11.3 2540	17.7 3980	4300	0.171 0.377
62	62 2.4409	19.8 0.780	35 1.3780	47 1.850	1.0 0.039	RNA2206.2RS	29.0 6520	32.8 7370	21.2 4770	15.8 3550	24.8 5580	3700	0.285 0.628
	62 2.4409	19.8 0.780	35 1.3780	47 1.850	1.0 0.039	RNA2206.2RS.DZ	29.7 6680	32.8 7370	21.2 4770	15.8 3550	24.8 5580	3700	0.285 0.628
72	72 2.8346	22.8 0.898	42 1.6535	54 2.126	1.1 0.043	RNA2207.2RS	40.5 9100	52.5 11800	28.6 6430	24.2 5440	37.9 8520	3000	0.490 1.080
	72 2.8346	22.8 0.898	42 1.6535	54 2.126	1.1 0.043	RNA2207.2RS.DZ	40.5 9100	52.5 11800	28.6 6430	24.2 5440	37.9 8520	3000	0.420 0.926
80	80 3.1496	22.8 0.898	48 1.8898	60 2.362	1.1 0.043	RNA2208.2RS	44.0 9890	60.0 13490	30.4 6830	27.8 6250	42.0 9440	2600	0.515 1.135
	80 3.1496	22.8 0.898	48 1.8898	60 2.362	1.1 0.043	RNA2208.2RS.DZ	44.3 9960	60.0 13490	30.4 6830	27.8 6250	42.0 9440	2600	0.515 1.135
85	85 3.3465	22.8 0.898	52 2.0472	64 2.520	1.1 0.043	RNA2209.2RS	45.6 10250	63.9 14370	30.9 6950	29.7 6680	43.7 9820	2400	0.565 1.246
	85 3.3465	22.8 0.898	52 2.0472	64 2.520	1.1 0.043	RNA2209.2RS.DZ	45.6 10250	63.9 14370	30.9 6950	29.7 6680	43.7 9820	2400	0.565 1.246
90	90 3.5433	22.8 0.898	58 2.2835	70 2.756	1.1 0.043	RNA2210.2RS	48.5 10900	71.3 16030	31.0 6970	29.4 6610	43.4 9760	2100	0.590 1.301
	90 3.5433	22.8 0.898	58 2.2835	70 2.756	1.1 0.043	RNA2210.2RS.DZ	48.5 10900	71.3 16030	31.0 6970	29.4 6610	43.4 9760	2100	0.590 1.301

CAGED, WITH INNER RING, NO END WASHERS, SEALED, YOKE TYPE (NA SERIES)

METRIC SERIES



NA22.2RS



NA22.2RS.DZ

Outer Dia.	Dimensions								Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic	As a Bearing Static	As a Track Roller Dynamic	As a Track Roller Static		Speed Grease	Wt. kg/lbs.
mm	D	d	B	C	F_w	E_w	r_s	r_{1s}		C	C_0	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
19	19 0.7480	6 0.2362	12 0.472	11.8 0.465	10 0.3937	14 0.5512	0.3 0.012	0.3 0.012	NA22/6.2RS	4.70 1060	5.43 1220	4.13 928	3.06 688	4.59 1030	13000	0.018 0.040
	19 0.7480	6 0.2362	12 0.472	11.8 0.465	10 0.3937	14 0.5512	0.3 0.012	0.3 0.012	NA22/6.2RS.DZ	4.70 1060	4.55 1020	4.13 928	3.06 688	4.59 1030	13000	0.018 0.040
24	24 0.9449	8 0.3150	12 0.472	11.8 0.465	12 0.4724	18 0.7087	0.3 0.012	0.3 0.012	NA22/8.2RS	6.70 1510	6.08 1370	5.31 1190	3.37 758	5.22 1170	11000	0.031 0.068
	24 0.9449	8 0.3150	12 0.472	11.8 0.465	12 0.4724	18 0.7087	0.3 0.012	0.3 0.012	NA22/8.2RS.DZ	6.70 1510	6.08 1370	5.31 1190	3.37 758	5.22 1170	11000	0.031 0.068
30	30 1.1811	10 0.3937	14 0.551	13.8 0.543	14 0.5512	20 0.7874	0.6 0.024	0.3 0.012	NA2200.2RS	8.50 1910	9.45 2120	8.03 1810	7.85 1760	9.45 2120	9400	0.057 0.126
	30 1.1811	10 0.3937	14 0.551	13.8 0.543	14 0.5512	20 0.7874	0.6 0.024	0.3 0.012	NA2200.2RS.DZ	8.50 1910	9.45 2120	8.03 1810	7.85 1760	9.45 2120	9400	0.057 0.126
32	32 1.2598	12 0.4724	14 0.551	13.8 0.543	16 0.6299	22 0.8661	0.6 0.024	0.3 0.012	NA2201.2RS	9.00 2020	10.5 2360	8.20 1840	7.78 1750	10.1 2270	8100	0.063 0.139
	32 1.2598	12 0.4724	14 0.551	13.8 0.543	16 0.6299	22 0.8661	0.6 0.024	0.3 0.012	NA2201.2RS.DZ	9.00 2020	10.5 2360	8.20 1840	7.78 1750	10.1 2270	8100	0.063 0.139
35	35 1.3780	15 0.5906	14 0.551	13.8 0.543	20 0.7874	27 1.0630	0.6 0.024	0.3 0.012	NA2202.2RS	12.2 2740	14.5 3260	9.24 2080	6.00 1350	10.2 2290	6300	0.070 0.154
	35 1.3780	15 0.5906	14 0.551	13.8 0.543	20 0.7874	27 1.0630	0.6 0.024	0.3 0.012	NA2202.2RS.DZ	12.2 2740	14.5 3260	9.24 2080	6.00 1350	10.2 2290	6300	0.070 0.154
40	40 1.5748	17 0.6693	16 0.630	15.8 0.622	22 0.8661	30 1.1811	1.0 0.039	0.3 0.012	NA2203.2RS	16.3 3660	17.8 4000	11.9 2680	8.50 1910	13.7 3080	5900	0.107 0.236
	40 1.5748	17 0.6693	16 0.630	15.8 0.622	22 0.8661	30 1.1811	1.0 0.039	0.3 0.012	NA2203.2RS.DZ	16.3 3660	17.8 4000	11.9 2680	8.50 1910	13.7 3080	5900	0.107 0.236
47	47 1.8504	20 0.7874	18 0.709	17.8 0.701	25 0.9843	35 1.3780	1.0 0.039	0.3 0.012	NA2204.2RS	19.6 4410	20.2 4540	14.8 3330	11.0 2470	16.7 3750	5200	0.175 0.386
	47 1.8504	20 0.7874	18 0.709	17.8 0.701	25 0.9843	35 1.3780	1.0 0.039	0.3 0.012	NA2204.2RS.DZ	19.6 4410	20.2 4540	14.8 3330	11.0 2470	16.7 3750	5200	0.175 0.386

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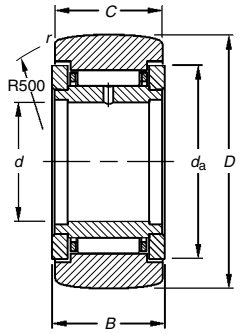
C

Outer Dia.	Dimensions								Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic	As a Bearing Static	As a Track Roller Dynamic		As a Track Roller Static	Speed Grease	Wt. kg/lbs.
mm	D	d	B	C	F_w	E_w	r_s	r_{1s}		C	C_0	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
52	52	25	18	17.8	30	40	1.0	0.3	NA2205.2RS	21.6	24.3	15.5	11.3	17.7	4300	0.202
	2.0472	0.9843	0.709	0.701	1.1811	1.5748	0.039	0.012		4860	5460	3480	2540	3980		0.445
	52	25	18	17.8	30	40	1.0	0.3	NA2205.2RS.DZ	21.6	24.3	15.5	11.3	17.7	4300	0.202
	2.0472	0.9843	0.709	0.701	1.1811	1.5748	0.039	0.012		4860	5460	3480	2540	3980		0.445
62	62	30	20	19.8	35	47	1.0	0.3	NA2206.2RS	29.0	32.8	21.2	15.8	24.8	3700	0.324
	2.4409	1.1811	0.787	0.780	1.3780	1.8504	0.039	0.012		6520	7370	4770	3550	5580		0.714
	62	30	20	19.8	35	47	1.0	0.3	NA2206.2RS.DZ	29.0	32.8	21.2	15.8	24.8	3700	0.324
	2.4409	1.1811	0.787	0.780	1.3780	1.8504	0.039	0.012		6520	7370	4770	3550	5580		0.714
72	72	35	23	22.8	42	54	1.1	0.6	NA2207.2RS	40.5	52.5	28.6	24.2	37.9	3000	0.490
	2.8346	1.3780	0.906	0.898	1.6535	2.1260	0.043	0.024		9100	11800	6430	5440	8520		1.080
	72	35	23	22.8	42	54	1.1	0.6	NA2207.2RS.DZ	40.5	52.5	28.6	24.2	37.9	3000	0.490
	2.8346	1.3780	0.906	0.898	1.6535	2.1260	0.043	0.024		9100	11800	6430	5440	8520		1.080
80	80	40	23	22.8	48	60	1.1	0.6	NA2208.2RS	44.0	60.0	30.4	27.8	42.0	2600	0.615
	3.1496	1.5748	0.906	0.898	1.8898	2.3622	0.043	0.024		9890	13500	6830	6250	9440		1.356
	80	40	23	22.8	48	60	1.1	0.6	NA2208.2RS.DZ	44.0	60.0	30.4	27.8	42.0	2600	0.615
	3.1496	1.5748	0.906	0.898	1.8898	2.3622	0.043	0.024		9890	13500	6830	6250	9440		1.356
85	85	45	23	22.8	52	64	1.1	0.6	NA2209.2RS	45.0	63.9	30.9	29.7	43.7	2400	0.661
	3.3465	1.7717	0.906	0.898	2.0472	2.5197	0.043	0.024		10100	14400	6950	6680	9820		1.457
	85	45	23	22.8	52	64	1.1	0.6	NA2209.2RS.DZ	45.0	63.9	30.9	29.7	43.7	2400	0.661
	3.3465	1.7717	0.906	0.898	2.0472	2.5197	0.043	0.024		10100	14400	6950	6680	9820		1.457
90	90	50	23	22.8	58	70	1.1	0.6	NA2210.2RS	48.0	71.3	31.0	29.4	43.4	2100	0.712
	3.5433	1.9685	0.906	0.898	2.2835	2.7559	0.043	0.024		10800	16000	6970	6610	9760		1.570
	90	50	23	22.8	58	70	1.1	0.6	NA2210.2RS.DZ	48.0	71.3	31.0	29.4	43.4	2100	0.712
	3.5433	1.9685	0.906	0.898	2.2835	2.7559	0.043	0.024		10800	16000	6970	6610	9760		1.570

CAGED, WITH INNER RING, WITH END WASHERS, YOKE TYPE (NATR, STO...ZZ SERIES)

METRIC SERIES



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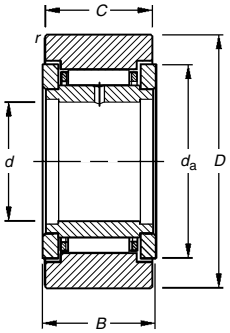

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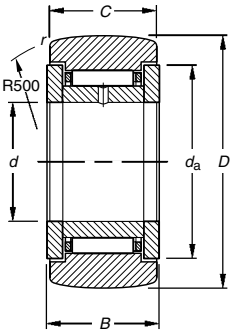
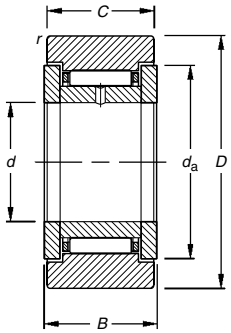


STO.ZZ



STO.ZZ.DZ

Outer Dia.	Dimensions						Bearing Designation	Load Ratings kN/lbf. As a Bearing		As a Track Roller			Limiting Speed Grease	Wt. kg/lbs.
								Dynamic	Static	Dynamic		Static		
mm	D	d	B	C	d_a	r_s		C	C_0	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
16	16 0.6299	5 0.1969	12 0.472	11.0 0.433	13 0.512	0.3 0.012	NATR5	4.62 1040	5.19 1170	3.34 751	2.62 589	4.01 901	13000	0.017 0.037
	16 0.6299	5 0.1969	12 0.472	11.0 0.433	13 0.512	0.3 0.012	NATR5DZ	4.62 1040	5.19 1170	3.34 751	2.62 589	4.01 901	13000	0.017 0.037
19	19 0.7480	6 0.2362	12 0.472	11.0 0.433	16 0.630	0.3 0.012	NATR6	4.84 1090	5.66 1270	3.84 863	4.28 962	5.28 1190	12000	0.022 0.049
	19 0.7480	6 0.2362	12 0.472	11.0 0.433	16 0.630	0.3 0.012	NATR6DZ	5.84 1310	6.66 1500	3.84 863	4.28 962	5.28 1190	12000	0.022 0.049
	19 0.7480	6 0.2362	14 0.551	13.8 0.543	15 0.591	0.3 0.012	STO6ZZ	5.37 1210	6.47 1450	4.31 969	5.23 1180	6.17 1390	12000	0.024 0.053
	19 0.7480	6 0.2362	14 0.551	13.8 0.543	15 0.591	0.3 0.012	STO6ZZ.DZ	5.37 1210	6.47 1450	4.31 969	5.23 1180	6.17 1390	12000	0.024 0.053
24	24 0.9449	8 0.3150	14 0.551	13.8 0.543	18 0.709	0.3 0.012	STO8ZZ	5.82 1310	7.54 1700	4.97 1120	7.54 1700	8.14 1830	9900	0.040 0.088
	24 0.9449	8 0.3150	14 0.551	13.8 0.543	18 0.709	0.3 0.012	STO8ZZ.DZ	5.82 1310	7.54 1700	4.97 1120	7.54 1700	8.14 1830	9900	0.040 0.088
	24 0.9449	8 0.3150	15 0.591	14.0 0.551	20 0.787	0.3 0.012	NATR8	8.39 1890	8.67 1950	6.66 1500	5.79 1300	8.08 1820	10000	0.043 0.095
	24 0.9449	8 0.3150	15 0.591	14.0 0.551	20 0.787	0.3 0.012	NATR8DZ	9.39 2110	9.67 2170	6.66 1500	5.79 1300	8.08 1820	10000	0.043 0.095
30	30 1.1811	10 0.3937	15 0.591	14.0 0.551	24 0.945	0.6 0.024	NATR10	9.57 2150	9.45 2120	8.15 1830	8.58 1930	10.1 2270	9400	0.068 0.150
	30 1.1811	10 0.3937	15 0.591	14.0 0.551	24 0.945	0.6 0.024	NATR10DZ	9.57 2150	9.45 2120	8.15 1830	8.58 1930	10.1 2270	9400	0.068 0.150
	30 1.1811	10 0.3937	16 0.630	15.8 0.622	23 0.906	0.3 0.012	STO10ZZ	10.4 2340	10.6 2380	8.94 2010	9.64 2170	11.4 2560	9400	0.071 0.157
	30 1.1811	10 0.3937	16 0.630	15.8 0.622	23 0.906	0.3 0.012	STO10ZZ.DZ	10.4 2340	10.6 2380	8.94 2010	9.64 2170	11.4 2560	9400	0.071 0.157
32	32 1.2598	12 0.4724	15 0.591	14.0 0.551	26 1.024	0.6 0.024	NATR12	10.2 2290	10.5 2360	8.32 1870	8.50 1910	10.4 2340	8100	0.075 0.165
	32 1.2598	12 0.4724	15 0.591	14.0 0.551	26 1.024	0.6 0.024	NATR12DZ	10.2 2290	10.5 2360	8.32 1870	8.50 1910	10.4 2340	8100	0.075 0.165
	32 1.2598	12 0.4724	16 0.630	15.8 0.622	25 0.984	0.3 0.012	STO12ZZ	11.2 2520	11.9 2680	9.13 2050	9.54 2140	11.7 2630	8100	0.078 0.172
	32 1.2598	12 0.4724	16 0.630	15.8 0.622	25 0.984	0.3 0.012	STO12ZZ.DZ	11.2 2520	11.9 2680	9.13 2050	9.54 2140	11.7 2630	8100	0.078 0.172

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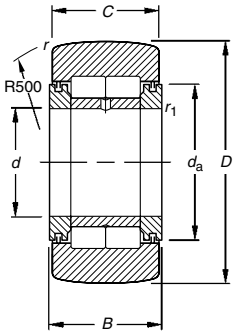
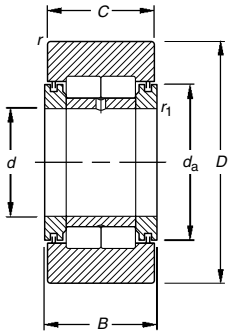
Outer Dia.	Dimensions						Bearing Designation	Load Ratings kN/lbf.					Limiting Speed Grease	Wt. kg/lbs.
								As a Bearing		As a Track Roller				
								Dynamic	Static	Dynamic		Static		
mm	D	d	B	C	d_a	r_s		C	C_o	C_w	$F_{r\ perm}$	$F_{Or\ perm}$	RPM	
35	35 1.3780	15 0.5906	16 0.630	15.8 0.622	30 1.181	0.3 0.012	STO15ZZ	12.9 2900	15.3 3440	9.47 2130	8.52 1920	12.1 2720	6300	0.089 0.196
	35 1.3780	15 0.5906	16 0.630	15.8 0.622	30 1.181	0.3 0.012	STO15ZZ.DZ	12.9 2900	15.3 3440	9.47 2130	8.52 1920	12.1 2720	6300	0.089 0.196
40	40 1.5748	17 0.6693	20 0.787	19.8 0.780	33 1.299	0.3 0.012	STO17ZZ	19.0 4270	23.3 5240	14.2 3190	13.4 3010	19.3 4340	5600	0.145 0.320
	40 1.5748	17 0.6693	20 0.787	19.8 0.780	33 1.299	0.3 0.012	STO17ZZ.DZ	19.0 4270	23.3 5240	14.2 3190	13.4 3010	19.3 4340	5600	0.145 0.320
47	47 1.8504	20 0.7874	20 0.787	19.8 0.780	37 1.457	0.3 0.012	STO20ZZ	20.0 4500	25.4 5710	15.7 3530	19.5 4380	23.5 5280	4900	0.200 0.441
	47 1.8504	20 0.7874	20 0.787	19.8 0.780	37 1.457	0.3 0.012	STO20ZZ.DZ	20.0 4500	25.4 5710	15.7 3530	19.5 4380	23.5 5280	4900	0.200 0.441
52	52 2.0472	25 0.9843	20 0.787	19.8 0.780	42 1.654	0.3 0.012	STO25ZZ	22.4 5040	31.1 6990	16.4 3690	19.8 4450	25.1 5640	4100	0.240 0.529
	52 2.0472	25 0.9843	20 0.787	19.8 0.780	42 1.654	0.3 0.012	STO25ZZ.DZ	22.4 5040	31.1 6990	16.4 3690	19.8 4450	25.1 5640	4100	0.240 0.529
62	62 2.4409	30 1.1811	25 0.984	24.8 0.976	52 2.047	0.6 0.024	STO30ZZ	33.3 7490	51.0 11500	23.0 5170	26.9 6050	36.2 8140	3200	0.412 0.908
	62 2.4409	30 1.1811	25 0.984	24.8 0.976	52 2.047	0.6 0.024	STO30ZZ.DZ	33.3 7490	51.0 11500	23.0 5170	26.9 6050	36.2 8140	3200	0.412 0.908
72	72 2.8346	35 1.3780	25 0.984	24.8 0.976	56 2.205	0.6 0.024	STO35ZZ	35.2 7910	56.6 12700	25.9 5820	39.2 8810	45.5 10200	2900	0.555 1.224
	72 2.8346	35 1.3780	25 0.984	24.8 0.976	56 2.205	0.6 0.024	STO35ZZ.DZ	35.2 7910	56.6 12700	25.9 5820	39.2 8810	45.5 10200	2900	0.555 1.224
80	80 3.1496	40 1.5748	26 1.024	25.8 1.016	64 2.520	0.6 0.024	STO40ZZ	38.8 8720	67.8 15200	26.8 6020	41.5 9330	48.1 10800	2400	0.700 1.543
	80 3.1496	40 1.5748	26 1.024	25.8 1.016	64 2.520	0.6 0.024	STO40ZZ.DZ	38.8 8720	67.8 15200	26.8 6020	41.5 9330	48.1 10800	2400	0.700 1.543
85	85 3.3465	45 1.7717	26 1.024	25.8 1.016	69 2.717	0.6 0.024	STO45ZZ	40.3 9060	73.5 16500	26.9 6050	42.4 9530	48.6 10900	2200	0.770 1.698
	85 3.3465	45 1.7717	26 1.024	25.8 1.016	69 2.717	0.6 0.024	STO45ZZ.DZ	40.3 9060	73.5 16500	26.9 6050	42.4 9530	48.6 10900	2200	0.770 1.698

FULL COMPLEMENT, WITH INNER RING, WITH END WASHERS, CYLINDRICAL ROLLERS, YOKE TYPE (NUTR SERIES)

METRIC SERIES



NUTR



NUTR.DZ

Outer Dia.	Dimensions							Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic	Static	As a Track Roller Dynamic		Static	Limiting Speed Grease	Wt. kg/lbs.
mm	D	d	B	C	d_a	r_s	r_{1s}		C	C_o	C_w	$F_{r\ perm}$	$F_{Or\ perm}$	RPM	
35	35 1.3780	15 0.5906	19 0.748	18 0.709	24 0.945	0.6 0.024	0.3 0.012	NUTR15	24.7 5550	29.3 6590	16.2 3640	10.1 2270	16.1 3620	6100	0.105 0.231
	35 1.3780	15 0.5906	19 0.748	18 0.709	24 0.945	0.6 0.024	0.3 0.012	NUTR15DZ	22.8 5130	29.4 6610	16.2 3640	10.1 2270	16.1 3620	6100	0.105 0.231
40	40 1.5748	17 0.6693	21 0.827	20 0.787	27 1.063	1.0 0.039	0.3 0.012	NUTR17	26.6 5980	33.4 7510	18.7 4200	15.0 3370	23.9 5370	5300	0.154 0.340
	40 1.5748	17 0.6693	21 0.827	20 0.787	27 1.063	1.0 0.039	0.3 0.012	NUTR17DZ	24.5 5510	33.3 7490	18.7 4200	15.0 3370	23.9 5370	5300	0.154 0.340
42	42 1.6535	15 0.5906	19 0.748	18 0.709	24 0.945	0.6 0.024	0.3 0.012	NUTR1542	22.8 5130	29.4 6610	20.0 4500	21.2 4770	28.4 6380	6100	0.166 0.366
	42 1.6535	15 0.5906	19 0.748	18 0.709	24 0.945	0.6 0.024	0.3 0.012	NUTR1542DZ	22.8 5130	29.4 6610	20.0 4500	21.2 4770	28.4 6380	6100	0.166 0.366
47	47 1.8504	17 0.6693	21 0.827	20 0.787	27 1.063	1.0 0.039	0.3 0.012	NUTR1747	24.5 5510	33.3 7490	22.0 4950	28.1 6320	33.6 7550	5300	0.230 0.507
	47 1.8504	17 0.6693	21 0.827	20 0.787	27 1.063	1.0 0.039	0.3 0.012	NUTR1747DZ	24.5 5510	33.3 7490	22.0 4950	28.1 6320	33.6 7550	5300	0.230 0.507
	47 1.8504	20 0.7874	25 0.984	24 0.945	32 1.260	1.0 0.039	0.3 0.012	NUTR20	39.0 8770	53.2 12000	28.1 6320	20.5 4610	32.7 7350	4500	0.254 0.560
	47 1.8504	20 0.7874	25 0.984	24 0.945	32 1.260	1.0 0.039	0.3 0.012	NUTR20DZ	39.0 8770	53.2 12000	28.1 6320	20.5 4610	32.7 7350	4500	0.254 0.560
52	52 2.0472	20 0.7874	25 0.984	24 0.945	32 1.260	1.0 0.039	0.3 0.012	NUTR2052	39.0 8770	53.2 12000	31.6 7100	31.0 6970	45.9 10300	4500	0.326 0.719
	52 2.0472	20 0.7874	25 0.984	24 0.945	32 1.260	1.0 0.039	0.3 0.012	NUTR2052DZ	39.0 8770	53.2 12000	31.6 7100	31.0 6970	45.9 10300	4500	0.326 0.719
	52 2.0472	25 0.9843	25 0.984	24 0.945	37 1.457	1.0 0.039	0.3 0.012	NUTR25	43.0 9670	63.1 14200	29.6 6650	22.2 4990	35.4 7960	3700	0.291 0.642
	52 2.0472	25 0.9843	25 0.984	24 0.945	37 1.457	1.0 0.039	0.3 0.012	NUTR25DZ	43.0 9670	63.1 14200	29.6 6650	22.2 4990	35.4 7960	3700	0.291 0.642
62	62 2.4409	25 0.9843	25 0.984	24 0.945	37 1.457	1.0 0.039	0.3 0.012	NUTR2562	43.0 9670	63.1 14200	36.0 8090	43.9 9870	57.8 13000	3700	0.460 1.014
	62 2.4409	25 0.9843	25 0.984	24 0.945	37 1.457	1.0 0.039	0.3 0.012	NUTR2562DZ	43.0 9670	63.1 14200	36.0 8090	43.9 9870	57.8 13000	3700	0.460 1.014
	62 2.4409	30 1.1811	29 1.142	28 1.102	44 1.732	1.0 0.039	0.3 0.012	NUTR30	60.0 13500	83.1 18700	40.8 9170	29.0 6520	46.2 10400	3200	0.480 1.058
	62 2.4409	30 1.1811	29 1.142	28 1.102	44 1.732	1.0 0.039	0.3 0.012	NUTR30DZ	60.0 13500	83.1 18700	40.8 9170	29.0 6520	46.2 10400	3200	0.480 1.058

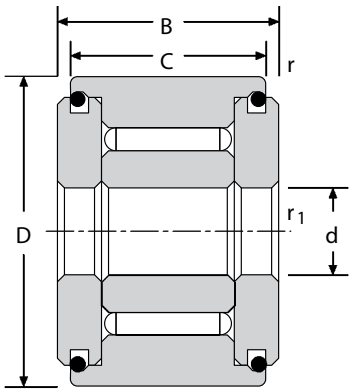
Continued on next page.

Outer Dia.	Dimensions							Bearing Designation	Load Ratings kN/lbf. As a Bearing Dynamic		As a Track Roller Dynamic			Limiting Speed Grease	Wt. kg/lbs.
									Static		Static				
mm	D	d	B	C	d_a	r_s	r_{ls}		C	C_o	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
72	72 2.8346	30 1.1811	29 1.142	28 1.102	44 1.732	1.0 0.039	0.3 0.012	NUTR3072	60.0 13500	83.1 18700	48.6 10900	53.2 12000	74.2 16700	3200	0.711 1.567
	72 2.8346	30 1.1811	29 1.142	28 1.102	44 1.732	1.0 0.039	0.3 0.012	NUTR3072DZ	60.0 13500	83.1 18700	48.6 10900	53.2 12000	74.2 16700	3200	0.711 1.567
	72 2.8346	35 1.3780	29 1.142	28 1.102	50 1.969	1.1 0.043	0.6 0.024	NUTR35	65.5 14700	97.8 22000	45.9 10300	38.7 8700	61.7 13900	2600	0.655 1.444
	72 2.8346	35 1.3780	29 1.142	28 1.102	50 1.969	1.1 0.043	0.6 0.024	NUTR35DZ	65.5 14700	97.8 22000	45.9 10300	38.7 8700	61.7 13900	2600	0.655 1.444
80	80 3.1496	35 1.3780	29 1.142	28 1.102	50 1.969	1.1 0.043	0.6 0.024	NUTR3580	65.5 14700	97.8 22000	51.7 11600	58.7 13200	81.9 18400	2600	0.865 1.907
	80 3.1496	35 1.3780	29 1.142	28 1.102	50 1.969	1.1 0.043	0.6 0.024	NUTR3580DZ	65.5 14700	97.8 22000	51.7 11600	58.7 13200	81.9 18400	2600	0.865 1.907
	80 3.1496	40 1.5748	32 1.260	30 1.181	55 2.165	1.1 0.043	0.6 0.024	NUTR40	88.0 19800	132 29700	60.6 13600	48.0 10800	76.5 17200	2500	0.848 1.870
	80 3.1496	40 1.5748	32 1.260	30 1.181	55 2.165	1.1 0.043	0.6 0.024	NUTR40DZ	88.0 19800	132 29700	60.6 13600	48.0 10800	76.5 17200	2500	0.848 1.870
85	85 3.3465	45 1.7717	32 1.260	30 1.181	60 2.362	1.1 0.043	0.6 0.024	NUTR45	93.0 20900	146 32800	62.0 13900	50.2 11300	80.0 18000	2200	0.917 2.022
	85 3.3465	45 1.7717	32 1.260	30 1.181	60 2.362	1.1 0.043	0.6 0.024	NUTR45DZ	93.0 20900	146 32800	62.0 13900	50.2 11300	80.0 18000	2200	0.917 2.022
90	90 3.5433	40 1.5748	32 1.260	30 1.181	55 2.165	1.1 0.043	0.6 0.024	NUTR4090	88.0 19800	132 29700	69.1 15500	75.4 17000	111 25000	2500	1.162 2.562
	90 3.5433	40 1.5748	32 1.260	30 1.181	55 2.165	1.1 0.043	0.6 0.024	NUTR4090DZ	88.0 19800	132 29700	69.1 15500	75.4 17000	111 25000	2500	1.162 2.562
	90 3.5433	50 1.9685	32 1.260	30 1.181	65 2.559	1.1 0.043	0.6 0.024	NUTR50	98.0 22000	160 36000	63.3 14200	52.9 11900	84.3 19000	2000	0.988 2.178
	90 3.5433	50 1.9685	32 1.260	30 1.181	65 2.559	1.1 0.043	0.6 0.024	NUTR50DZ	98.0 22000	160 36000	63.3 14200	52.9 11900	84.3 19000	2000	0.988 2.178
100	100 3.9370	45 1.7717	32 1.260	30 1.181	60 2.362	1.1 0.043	0.6 0.024	NUTR45100	93.0 20900	146 32800	74.3 16700	92.2 20700	127 28600	2200	1.412 3.113
	100 3.9370	45 1.7717	32 1.260	30 1.181	60 2.362	1.1 0.043	0.6 0.024	NUTR45100DZ	93.0 20900	146 32800	74.3 16700	92.2 20700	127 28600	2200	1.412 3.113
110	110 4.3307	50 1.9685	32 1.260	30 1.181	65 2.559	1.1 0.043	0.6 0.024	NUTR50110	98.0 22000	160 36000	79.0 17800	110 24700	141 31700	2000	1.727 3.807
	110 4.3307	50 1.9685	32 1.260	30 1.181	65 2.559	1.1 0.043	0.6 0.024	NUTR50110DZ	98.0 22000	160 36000	79.0 17800	110 24700	141 31700	2000	1.727 3.807

FULL COMPLEMENT, NON-SEPARABLE, SMALL SERIES, UNSEALED, YOKE TYPE (FP SERIES)

METRIC SERIES

FP: convex outer ring
FPL: cylindrical outer ring



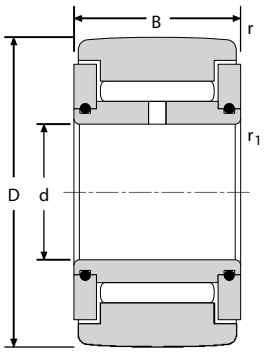
FP, FPL

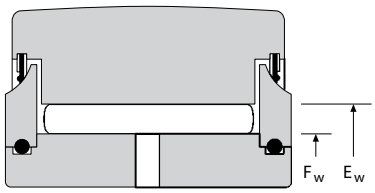
Outside Dia.	Dimensions mm/in.						Designation Profiled Track Roller	Designation Cylindrical Track Roller	Load Ratings kN/lbf. Dynamic		Load Ratings kN/lbf. Static	Limiting Speed Grease	Wt. kg/lbs.
mm	D	d	C	B	r_{smin}	r_{1smin}			C	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
10	10 0.3937	3 0.1181	8 0.315	8.7 0.343	0.2 0.008	0.15 0.006	FP 3 10	FPL 3 10	2.13 480	1.16 260	2.05 460	13800	0.004 0.009
12	12 0.4724	4 0.1575	9 0.354	9.7 0.382	0.2 0.008	0.15 0.006	FP 4 12	FPL 4 12	2.98 670	1.82 410	3.35 750	11400	0.006 0.013
13	13 0.5118	4 0.1575	9 0.354	9.7 0.382	0.2 0.008	0.15 0.006	FP 4 13	FPL 4 13	3.35 750	2.45 550	3.95 890	11400	0.008 0.018
14	14 0.5512	4 0.1575	9 0.354	10.2 0.402	0.3 0.012	0.15 0.006	FP 4 14		3.50 790	2.55 570	4.35 980	10100	0.010 0.022
15	15 0.5906	4 0.1575	9 0.354	10.2 0.402	0.3 0.012	0.15 0.006	FP 4 15		3.50 790	3.20 720	4.75 1070	10100	0.011 0.024

FULL COMPLEMENT, NON-SEPARABLE, SEALED OR UNSEALED, YOKE TYPE (FG SERIES)

METRIC SERIES

FG: convex outer ring
FGL: cylindrical outer ring





FG, FGL

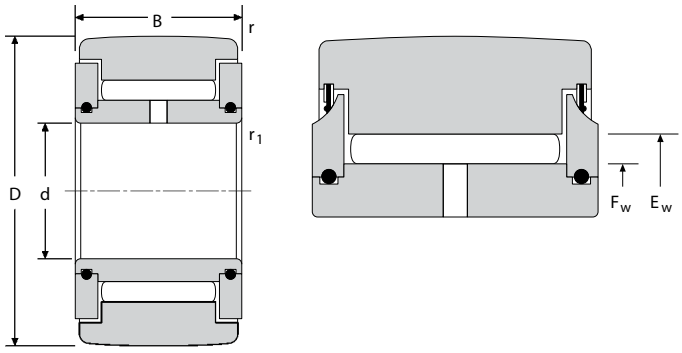
Outside Dia.	Dimensions mm/in.							Designation		Load Ratings kN/lbf.			Limiting Speed	Wt. kg/lbs.
								Profiled Track Roller	Cylindrical Track Roller	Dynamic		Static	Grease	
mm	D	d	B	F_w	E_w	r_{smin}	r_{1smin}			C	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
16	16 0.6299	5 0.1969	12 0.472	7.7 0.3031	10.7 0.4213	0.3 0.012	0.3 0.012	FG 5 16	FGL 5 16	5.05 1140	3.25 730	5.40 1210	9300	0.016 0.035
	16 0.6299	5 0.1969	12 0.472	7.7 0.3031	10.7 0.4213	0.3 0.012	0.3 0.012	FG 5 16 EE	FGL 5 16 EE	5.05 1140	3.25 730	5.40 1210	9300	0.016 0.035
	16 0.6299	5 0.1969	12 0.472	7.7 0.3031	10.7 0.4213	0.3 0.012	0.3 0.012	FG 5 16 EEM		5.05 1140	3.25 730	5.40 1210	9300	0.016 0.035
19	19 0.7480	6 0.2362	12 0.472	9.7 0.3819	12.7 0.5000	0.3 0.012	0.3 0.012	FG 6 19	FGL 6 19	5.80 1300	4.05 910	6.70 1510	7600	0.019 0.042
	19 0.7480	6 0.2362	12 0.472	9.7 0.3819	12.7 0.5000	0.3 0.012	0.3 0.012	FG 6 19 EE	FGL 6 19 EE	5.80 1300	4.05 910	6.70 1510	7600	0.019 0.042
	19 0.7480	6 0.2362	12 0.472	9.7 0.3819	12.7 0.5000	0.3 0.012	0.3 0.012	FG 6 19 EEM	FGL 6 19 EEM	5.80 1300	4.05 910	6.70 1510	7600	0.019 0.042
24	24 0.9449	8 0.3150	13 0.512	12.0 0.4724	15.0 0.5906	0.3 0.012	0.3 0.012	FG 8 24	FGL 8 24	6.90 1550	6.60 1480	9.20 2070	6300	0.037 0.082
	24 0.9449	8 0.3150	13 0.512	12.0 0.4724	15.0 0.5906	0.3 0.012	0.3 0.012	FG 8 24 EE	FGL 8 24 EE	6.90 1550	6.60 1480	9.20 2070	6300	0.037 0.082
	24 0.9449	8 0.3150	13 0.512	12.0 0.4724	15.0 0.5906	0.3 0.012	0.3 0.012	FG 8 24 EEM	FGL 8 24 EEM	6.90 1550	6.60 1480	9.20 2070	6300	0.037 0.082
	24 0.9449	8 0.3150	15 0.591	12.0 0.4724	15.0 0.5906	0.3 0.012	0.3 0.012	FG 8 24 15	FGL 8 24 15	8.70 1960	8.50 1910	12.3 2770	6300	0.044 0.097
	24 0.9449	8 0.3150	15 0.591	12.0 0.4724	15.0 0.5906	0.3 0.012	0.3 0.012	FG 8 24 15 EE	FGL 8 24 15 EE	8.70 1960	8.50 1910	12.3 2770	6300	0.044 0.097
	24 0.9449	8 0.3150	15 0.591	12.0 0.4724	15.0 0.5906	0.3 0.012	0.3 0.012	FG 8 24 15 EEM	FGL 8 24 15 EEM	8.70 1960	8.50 1910	12.3 2770	6300	0.044 0.097
30	30 1.1811	10 0.3937	15 0.591	15.2 0.5984	20.2 0.7953	0.6 0.024	0.3 0.012	FG 10 30	FGL 10 30	12.9 2900	8.50 1910	15.5 3480	4800	0.066 0.146
	30 1.1811	10 0.3937	15 0.591	15.2 0.5984	20.2 0.7953	0.6 0.024	0.3 0.012	FG 10 30 EE	FGL 10 30 EE	12.9 2900	8.50 1910	15.5 3480	4800	0.066 0.146
	30 1.1811	10 0.3937	15 0.591	15.2 0.5984	20.2 0.7953	0.6 0.024	0.3 0.012	FG 10 30 EEM	FGL 10 30 EEM	12.9 2900	8.50 1910	15.5 3480	4800	0.066 0.146
32	32 1.2598	12 0.4724	15 0.591	17.6 0.6929	22.6 0.8898	0.6 0.024	0.3 0.012	FG 12 32	FGL 12 32	12.9 2900	8.30 1870	16.2 3640	4200	0.077 0.170
	32 1.2598	12 0.4724	15 0.591	17.6 0.6929	22.6 0.8898	0.6 0.024	0.3 0.012	FG 12 32 EE	FGL 12 32 EE	12.9 2900	8.30 1870	16.2 3640	4200	0.077 0.170
	32 1.2598	12 0.4724	15 0.591	17.6 0.6929	22.6 0.8898	0.6 0.024	0.3 0.012	FG 12 32 EEM	FGL 12 32 EEM	12.9 2900	8.30 1870	16.2 3640	4200	0.077 0.170
35	35 1.3780	15 0.5906	19 0.748	20.1 0.7929	25.2 0.9921	0.6 0.024	0.3 0.012	FG 15 35	FGL 15 35	18.0 4050	12.2 2740	25.6 5760	3750	0.103 0.227
	35 1.3780	15 0.5906	19 0.748	20.1 0.7929	25.2 0.9921	0.6 0.024	0.3 0.012	FG 15 35 EE	FGL 15 35 EE	18.0 4050	12.2 2740	25.6 5760	3750	0.103 0.227
	35 1.3780	15 0.5906	19 0.748	20.1 0.7929	25.2 0.9921	0.6 0.024	0.3 0.012	FG 15 35 EEM	FGL 15 35 EEM	18.0 4050	12.2 2740	25.6 5760	3750	0.103 0.227

Continued on next page.

FULL COMPLEMENT, NON-SEPARABLE, SEALED OR UNSEALED, YOKE TYPE (FG SERIES) — *continued*

METRIC SERIES

FG: convex outer ring
FGL: cylindrical outer ring



FG, FGL

Outside Dia.	Dimensions mm/in.							Designation		Load Ratings kN/lbf.			Limiting Speed	Wt. kg/lbs.
								Profiled Track Roller	Cylindrical Track Roller	Dynamic		Static	Grease	
mm	D	d	B	F_w	E_w	r_{smin}	r_{1smin}			C	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
40	40 1.5748	17 0.6693	21 0.827	24.0 0.9449	30.0 1.1811	0.6 0.024	0.3 0.012	FG 17 40	FGL 17 40	22.3 5010	14.2 3190	31.0 6970	3150	0.155 0.342
	40 1.5748	17 0.6693	21 0.827	24.0 0.9449	30.0 1.1811	0.6 0.024	0.3 0.012	FG 17 40 EE	FGL 17 40 EE	22.3 5010	14.2 3190	31.0 6970	3150	0.155 0.342
	40 1.5748	17 0.6693	21 0.827	24.0 0.9449	30.0 1.1811	0.6 0.024	0.3 0.012	FG 17 40 EEM	FGL 17 40 EEM	22.3 5010	14.2 3190	31.0 6970	3150	0.155 0.342
47	47 1.8504	20 0.7874	25 0.984	28.7 1.1299	34.7 1.3661	1.0 0.039	0.3 0.012	FG 20 47	FGL 20 47	28.3 6360	21.4 4810	44.5 10000	2700	0.295 0.650
	47 1.8504	20 0.7874	25 0.984	28.7 1.1299	34.7 1.3661	1.0 0.039	0.3 0.012	FG 20 47 EE	FGL 20 47 EE	28.3 6360	21.4 4810	44.5 10000	2700	0.295 0.650
	47 1.8504	20 0.7874	25 0.984	28.7 1.1299	34.7 1.3661	1.0 0.039	0.3 0.012	FG 20 47 EEM	FGL 20 47 EEM	28.3 6360	21.4 4810	44.5 10000	2700	0.295 0.650
52	52 2.0472	25 0.9843	25 0.984	33.5 1.3189	39.5 1.5551	1.0 0.039	0.3 0.012	FG 25 52	FGL 25 52	29.0 6520	23.6 5310	48.0 10800	2330	0.310 0.683
	52 2.0472	25 0.9843	25 0.984	33.5 1.3189	39.5 1.5551	1.0 0.039	0.3 0.012	FG 25 52 EE	FGL 25 52 EE	29.0 6520	23.6 5310	48.0 10800	2330	0.310 0.683
	52 2.0472	25 0.9843	25 0.984	33.5 1.3189	39.5 1.5551	1.0 0.039	0.3 0.012	FG 25 52 EEM	FGL 25 52 EEM	29.0 6520	23.6 5310	48.0 10800	2330	0.310 0.683
62	62 2.4409	30 1.1811	29 1.142	38.2 1.5039	44.2 1.7402	1.0 0.039	0.3 0.012	FG 30 62	FGL 30 62	38.5 8660	38.0 8540	73.0 16400	2050	0.490 1.080
	62 2.4409	30 1.1811	29 1.142	38.2 1.5039	44.2 1.7402	1.0 0.039	0.3 0.012	FG 30 62 EE	FGL 30 62 EE	38.5 8660	38.0 8540	73.0 16400	2050	0.490 1.080
	62 2.4409	30 1.1811	29 1.142	38.2 1.5039	44.2 1.7402	1.0 0.039	0.3 0.012	FG 30 62 EEM		38.5 8660	38.0 8540	73.0 16400	2050	0.490 1.080
72	72 2.8346	35 1.3780	29 1.142	44.0 1.7323	50.0 1.9685	1.0 0.039	0.6 0.024	FG 35 72	FGL 35 72	43.5 9780	49.0 11000	90.0 20200	1800	0.670 1.477
	72 2.8346	35 1.3780	29 1.142	44.0 1.7323	50.0 1.9685	1.0 0.039	0.6 0.024	FG 35 72 EE	FGL 35 72 EE	43.5 9780	49.0 11000	90.0 20200	1800	0.670 1.477
	72 2.8346	35 1.3780	29 1.142	44.0 1.7323	50.0 1.9685	1.0 0.039	0.6 0.024	FG 35 72 EEM	FGL 35 72 EEM	43.5 9780	49.0 11000	90.0 20200	1800	0.670 1.477
80	80 3.1496	40 1.5748	32 1.260	49.7 1.9567	55.7 2.1929	1.0 0.039	0.6 0.024	FG 40 80		54.0 12100	66.0 14800	123 27700	1620	0.890 1.962
	80 3.1496	40 1.5748	32 1.260	49.7 1.9567	55.7 2.1929	1.0 0.039	0.6 0.024	FG 40 80 EE	FGL 40 80 EE	54.0 12100	66.0 14800	123 27700	1620	0.890 1.962
	80 3.1496	40 1.5748	32 1.260	49.7 1.9567	55.7 2.1929	1.0 0.039	0.6 0.024	FG 40 80 EEM	FGL 40 80 EEM	54.0 12100	66.0 14800	123 27700	1620	0.890 1.962
85	85 3.3465	45 1.7717	32 1.260	55.4 2.1811	61.4 2.4173	1.0 0.039	0.6 0.024	FG 45 85 EE		53.0 11900	69.0 15500	125 28100	1450	0.970 2.138
	85 3.3465	45 1.7717	32 1.260	55.4 2.1811	61.4 2.4173	1.0 0.039	0.6 0.024	FG 45 85 EEM	FGL 45 85 EEM	53.0 11900	69.0 15500	125 28100	1450	0.970 2.138
90	90 3.5433	50 1.9685	32 1.260	62.1 2.4449	68.1 2.6811	1.0 0.039	0.6 0.024	FG 50 90		51.0 11500	74.0 16600	123 27700	1300	1.04 2.293

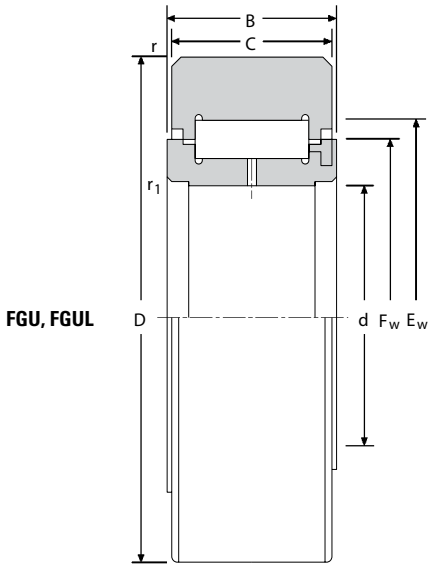
Continued on next page.

Outside Dia.	Dimensions mm/in.							Designation		Load Ratings kN/lbf.			Limiting Speed	Wt. kg/lbs.
								Profiled Track Roller	Cylindrical Track Roller	Dynamic		Static	Grease	
mm	D	B	C	F_w	E_w	r_{smin}	r_{1smin}			C	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
	90 3.5433	50 1.9685	32 1.260	62.1 2.4449	68.1 2.6811	1.0 0.039	0.6 0.024	FG 50 90 EE	FGL 50 90 EE	51.0 11500	74.0 16600	123 27700	1300	1.04 2.293
	90 3.5433	50 1.9685	32 1.260	62.1 2.4449	68.1 2.6811	1.0 0.039	0.6 0.024	FG 50 90 EEM	FGL 50 90 EEM	51.0 11500	74.0 16600	123 27700	1300	1.04 2.29
100	100 3.9370	55 2.1654	36 1.417	70.0 2.7559	77.0 3.0315	1.5 0.059	0.6 0.024	FG 55 100	FGL 55 100	60.0 13500	88.0 19800	142 31900	1150	1.35 2.976
	100 3.9370	55 2.1654	36 1.417	70.0 2.7559	77.0 3.0315	1.5 0.059	0.6 0.024	FG 55 100 EEM	FGL 55 100 EEM	60.0 13500	88.0 19800	142 31900	1150	1.35 2.976
110	110 4.3307	60 2.3622	36 1.417	75.0 2.9528	82.0 3.2283	1.5 0.059	0.6 0.024	FG 60 110		67.0 15100	102 22900	168 37800	1090	1.65 3.638
	110 4.3307	60 2.3622	36 1.417	75.0 2.9528	82.0 3.2283	1.5 0.059	0.6 0.024	FG 60 110 EEM	FGL 60 110 EEM	6 7.0 15100	102 22900	168 37800	1090	1.65 3.638
120	120 4.7244	65 2.5591	42 1.654	80.0 3.1496	87.0 3.4252	1.5 0.059	0.6 0.024	FG 65 120		83.0 18700	135 30300	223 50100	1020	2.35 5.181
	120 4.7244	65 2.5591	42 1.654	80.0 3.1496	87.0 3.4252	1.5 0.059	0.6 0.024	FG 65 120 EEM	FGL 65 120 EEM	83.0 18700	135 30300	223 50100	1020	2.35 5.181
125	125 4.9213	70 2.7559	42 1.654	85.0 3.3465	92.0 3.6220	1.5 0.059	0.6 0.024	FG 70 125 EEM	FGL 70 125 EEM	83.0 18700	144 32400	228 51300	960	2.50 5.512
130	130 5.1181	75 2.9528	42 1.654	90.0 3.5433	97.0 3.8189	1.5 0.059	0.6 0.024	FG 75 130 EEM		84.0 18900	155 34800	234 52600	910	2.65 5.842
140	140 5.5118	80 3.1496	48 1.890	100.0 3.9370	108.0 4.2520	2.0 0.079	1.0 0.039	FG 80 140		99.0 22300	197 44300	275 61800	820	3.40 7.496
	140 5.5118	80 3.1496	48 1.890	100.0 3.9370	108.0 4.2520	2.0 0.079	1.0 0.039	FG 80 140 EEM	FGL 80 140 EEM	99.0 22300	197 44300	275 61800	820	3.40 7.496
150	150 5.9055	85 3.3465	48 1.890	107.0 4.2126	115.0 4.5276	2.0 0.079	1.0 0.039	FG 85 150		105 23600	220 49500	300 67400	770	4.00 8.818
	150 5.9055	85 3.3465	48 1.890	107.0 4.2126	115.0 4.5276	2.0 0.079	1.0 0.039	FG 85 150 EEM		105 23600	220 49500	300 67400	770	4.00 8.818
160	160 6.2992	90 3.5433	54 2.126	115.0 4.5276	123.0 4.8425	2.0 0.079	1.0 0.039	FG 90 160 EEM		120 27000	288 64700	370 83200	710	5.30 11.7
170	170 6.6929	95 3.7402	54 2.126	120.0 4.7244	128.0 5.0394	2.0 0.079	1.0 0.039	FG 95 170 EEM		129 29000	302 67900	410 92200	690	6.00 13.2
180	180 7.0866	100 3.9370	65 2.559	126.0 4.9606	136.0 5.3543	2.0 0.079	1.5 0.059	FG 100 180		175 39300	353 79400	530 119100	650	8.05 17.8
	180 7.0866	100 3.9370	65 2.559	126.0 4.9606	136.0 5.3543	2.0 0.079	1.5 0.059	FG 100 180 EEM	FGL 100 180 EEM	175 39300	353 79400	530 119100	650	8.05 17.7
200	200 7.8740	110 4.3307	65 2.559	140.0 5.5118	150.0 5.9055	2.0 0.079	1.5 0.059	FG 110 200 EEM		189 42500	420 94400	600 134900	590	10.00 22.0
215	215 8.4646	120 4.7244	65 2.559	150.0 5.9055	160.0 6.2992	2.0 0.079	1.5 0.059	FG 120 215 EEM		199 44700	486 109300	660 148400	550	11.50 25.3
270	270 10.6299	150 5.9055	78 3.071	186.0 7.3228	198.0 7.7953	3.0 0.118	1.5 0.059	FG 150 270 EEM		290 65200	710 159600	1020 229300	440	22.00 48.5

FULL COMPLEMENT, NON-SEPARABLE, LIGHT SERIES, WITH METAL SEALS YOKE TYPE (FGU...MM SERIES)

METRIC SERIES

FGU: convex outer ring
FGUL: cylindrical outer ring



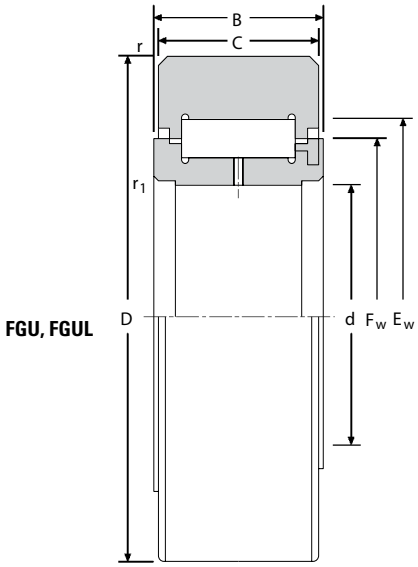
FGU, FGUL

Outside Dia.	Dimensions mm/in.								Designation		Load Ratings kN/lbf.			Limiting Speed	Wt.
									Profiled Track Roller	Cylindrical Track Roller	Dynamic		Static	Grease	kg/lbs.
mm	D	d	C	B	F_w	E_w	$r_{s\,min}$	$r_{1s\,min}$			C	$F_{r\,perm}$	$F_{0r\,perm}$	RPM	
35	35 1.3780	15 0.5906	18 0.709	19 0.748	20.4 0.8031	28.4 1.1181	0.6 0.024	0.3 0.012	FGU 15 35		7.80 1750	17.0 3820	17.0 3820	5700	0.096 0.212
	35 1.3780	15 0.5906	18 0.709	19 0.748	20.4 0.8031	28.4 1.1181	0.6 0.024	0.3 0.012	FGU 15 35 MM	FGUL 15 35 MM	7.80 1750	17.0 3820	17.0 3820	5700	0.096 0.212
40	40 1.5748	17 0.6693	20 0.787	21 0.827	23.0 0.9055	31.0 1.2205	0.6 0.024	0.3 0.012	FGU 17 40 MM		11.5 2590	20.0 4500	21.5 4830	5200	0.142 0.313
47	47 1.8504	20 0.7874	24 0.945	25 0.984	27.1 1.0669	37.1 1.4606	1.0 0.039	0.3 0.012	FGU 20 47 MM	FGUL 20 47 MM	15.5 3480	29.5 6630	32.3 7260	4400	0.235 0.518
52	52 2.0472	25 0.9843	24 0.945	25 0.984	31.8 1.2520	41.8 1.6457	1.0 0.039	0.3 0.012	FGU 25 52		17.3 3890	31.5 7080	36.0 8090	3800	0.268 0.591
	52 2.0472	25 0.9843	24 0.945	25 0.984	31.8 1.2520	41.8 1.6457	1.0 0.039	0.3 0.012	FGU 25 52 MM	FGUL 25 52 MM	17.3 3890	31.5 7080	36.0 8090	3800	0.268 0.591
62	62 2.4409	30 1.1811	28 1.102	29 1.142	38.2 1.5039	50.2 1.9764	1.0 0.039	0.3 0.012	FGU 30 62 MM		24.5 5510	44.5 10000	54.00 12100	3200	0.454 1.001
72	72 2.8346	35 1.3780	28 1.102	29 1.142	45.9 1.8071	57.9 2.2795	1.0 0.039	0.6 0.024	FGU 35 72 MM	FGUL 35 72 MM	31.3 7040	50.0 11200	66.0 14800	2700	0.611 1.347
80	80 3.1496	40 1.5748	30 1.181	32 1.260	51.6 2.0315	63.6 2.5039	1.0 0.039	0.6 0.024	FGU 40 80		40.6 9130	59.0 13300	84.0 18900	2400	0.822 1.812
	80 3.1496	40 1.5748	30 1.181	32 1.260	51.6 2.0315	63.6 2.5039	1.0 0.039	0.6 0.024	FGU 40 80 MM	FGUL 40 80 MM	40.6 9130	59.0 13300	84.0 18900	2400	0.822 1.812
110	110 4.3307	60 2.3622	34 1.339	36 1.417	71.2 2.8031	87.2 3.4331	1.5 0.059	0.6 0.024	FGU 60 110 MM		64.0 14400	88.0 19800	129 29000	1800	1.625 3.583
120	120 4.7244	65 2.5591	40 1.575	42 1.654	76.4 3.0079	92.4 3.6378	1.5 0.059	0.6 0.024	FGU 65 120		89.0 20000	110 24700	174 39100	1700	2.300 5.071
	120 4.7244	65 2.5591	40 1.575	42 1.654	76.4 3.0079	92.4 3.6378	1.5 0.059	0.6 0.024	FGU 65 120 MM		89.0 20000	110 24700	174 39100	1700	2.300 5.071
125	125 4.9213	70 2.7559	40 1.575	42 1.654	81.5 3.2087	97.5 3.8386	1.5 0.059	0.6 0.024	FGU 70 125 MM		93.0 20900	110 24700	180 40500	1600	2.070 4.564
140	140 5.5118	80 3.1496	46 1.811	48 1.890	91.7 3.6102	107.7 4.2402	2.0 0.079	1.0 0.039	FGU 80 140 MM		130 29200	138 31000	250 56200	1400	3.450 7.606
160	160 6.2992	90 3.5433	52 2.047	54 2.126	101.8 4.0079	121.8 4.7953	2.0 0.079	1.0 0.039	FGU 90 160 MM		166 37300	188 42300	327 73500	1300	5.185 11.431
170	170 6.6929	95 3.7402	52 2.047	54 2.126	108.2 4.2598	128.2 5.0472	2.0 0.079	1.0 0.039	FGU 95 170 MM		184 41400	198 44500	356 80000	1200	5.925 13.062
200	200 7.8740	110 4.3307	63 2.480	65 2.559	124.1 4.8858	144.1 5.6732	2.0 0.079	1.5 0.059	FGU 110 200 MM		310 69700	280 62900	590 132600	1100	10.200 22.487
215	215 8.4646	120 4.7244	63 2.480	65 2.559	133.6 5.2598	157.6 6.2047	2.0 0.079	1.5 0.059	FGU 120 215		310 69700	310 69700	600 134900	960	11.560 25.485

FULL COMPLEMENT, NON-SEPARABLE, HEAVY SERIES WITH METAL SEALS YOKE TYPE (FGU...MM SERIES)

METRIC SERIES

FGU: convex outer ring
FGUL: cylindrical outer ring



FGU, FGUL

C

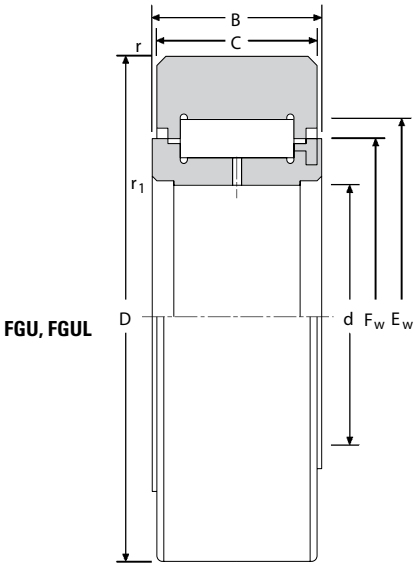
Outside Dia.	Dimensions mm/in.								Designation		Load Ratings kN/lbf.			Limiting Speed	Wt. kg/lbs.
									Profiled Track Roller	Cylindrical Track Roller	Dynamic		Static	Grease	
mm	D	d	C	B	F_w	E_w	r_{smin}	r_{1smin}			C	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
42	42 1.6535	15 0.5906	18 0.709	19 0.748	20.4 0.8031	28.4 1.1181	1.0 0.039	0.3 0.012	FGU 15 42	FGUL 15 42 MM	16.5 3710	24.0 5400	27.0 6070	5700	0.153 0.337
47	47 1.8504	17 0.6693	20 0.787	21 0.827	20.0 0.7874	28.0 1.1024	1.0 0.039	0.3 0.012		FGUL 17 47 MM	22.0 4950	26.7 6000	32.0 7190	5200	0.214 0.472
52	52 2.0472	20 0.7874	24 0.945	25 0.984	27.1 1.0669	37.1 1.4606	1.0 0.039	0.3 0.012		FGUL 20 52 MM	23.7 5330	36.5 8210	42.5 9550	4350	0.268 0.591
62	62 2.4409	25 0.9843	24 0.945	25 0.984	31.8 1.2520	41.8 1.6457	1.0 0.039	0.3 0.012	FGU 25 62 MM		34.4 7730	44.0 9890	57.0 12800	3800	0.435 0.959
72	72 2.8346	30 1.1811	28 1.102	29 1.142	38.2 1.5039	50.2 1.9764	1.0 0.039	0.3 0.012	FGU 30 72 MM	FGUL 30 72 MM	43.4 9760	60.0 13500	80.0 18000	3150	0.681 1.501
80	80 3.1496	35 1.3780	28 1.102	29 1.142	45.9 1.8071	57.9 2.2795	1.0 0.039	0.6 0.024	FGU 35 80	FGUL 35 80	45.6 10300	62.0 13900	88.0 19800	2700	0.82 1.808
	80 3.1496	35 1.3780	28 1.102	29 1.142	45.9 1.8071	57.9 2.2795	1.0 0.039	0.6 0.024	FGU 35 80 MM		45.6 10300	62.0 13900	88.0 19800	2700	0.82 1.808
90	90 3.5433	40 1.5748	30 1.181	32 1.260	51.6 2.0315	63.6 2.5039	1.0 0.039	0.6 0.024	FGU 40 90 MM		61.0 13700	75.0 16900	116 26100	2440	1.125 2.480
100	100 3.9370	45 1.7717	30 1.181	32 1.260	55.4 2.1811	67.4 2.6535	1.5 0.059	0.6 0.024	FGU 45 100 MM		78.0 17500	85.0 19100	138 31000	2290	1.395 3.075
110	110 4.3307	50 1.9685	30 1.181	32 1.260	61.1 2.4055	73.1 2.8780	1.5 0.059	0.6 0.024	FGU 50 110		91.0 20500	91.0 20500	157 35300	2100	1.683 3.710
	110 4.3307	50 1.9685	30 1.181	32 1.260	61.1 2.4055	73.1 2.8780	1.5 0.059	0.6 0.024	FGU 50 110 MM		91.0 20500	91.0 20500	157 35300	2100	1.683 3.710
120	120 4.7244	55 2.1654	34 1.339	36 1.417	66.1 2.6024	82.1 3.2323	1.5 0.059	0.6 0.024	FGU 55 120		98.0 22000	113 25400	176 39600	1900	2.235 4.927
	120 4.7244	55 2.1654	34 1.339	36 1.417	66.1 2.6024	82.1 3.2323	1.5 0.059	0.6 0.024	FGU 55 120 MM	FGUL 55 120 MM	98.0 22000	113 25400	176 39600	1900	2.235 4.927
130	130 5.1181	60 2.3622	34 1.339	36 1.417	71.2 2.8031	87.2 3.4331	1.5 0.059	0.6 0.024	FGU 60 130 MM		114 25600	121 27200	197 44300	1770	2.62 5.776
140	140 5.5118	65 2.5591	40 1.575	42 1.654	76.4 3.0079	92.4 3.6378	2.0 0.079	0.6 0.024	FGU 65 140 MM		153 34400	145 32600	254 57100	1650	3.56 7.848
150	150 5.9055	70 2.7559	40 1.575	42 1.654	81.5 3.2087	97.5 3.8386	2.0 0.079	0.6 0.024	FGU 70 150 MM		172 38700	153 34400	277 62300	1570	4.09 9.017
160	160 6.2992	75 2.9528	40 1.575	42 1.654	86.6 3.4094	102.6 4.0394	2.0 0.079	0.6 0.024	FGU 75 160		193 43400	160 36000	300 67400	1480	4.65 10.3
	160 6.2992	75 2.9528	40 1.575	42 1.654	86.6 3.4094	102.6 4.0394	2.0 0.079	0.6 0.024	FGU 75 160 MM		193 43400	160 36000	300 67400	1480	4.65 10.3

Continued on next page.

FULL COMPLEMENT, NON-SEPARABLE, HEAVY SERIES WITH METAL SEALS YOKE TYPE (FGU...MM SERIES) – *continued*

METRIC SERIES

FGU: convex outer ring
FGUL: cylindrical outer ring



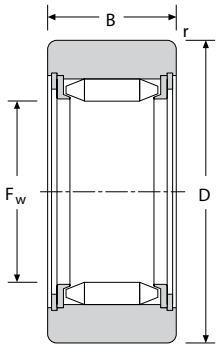
FGU, FGUL

Outside Dia.	Dimensions mm/in.								Designation		Load Ratings kN/lbf.			Limiting Speed	Wt. kg/lbs.
									Profiled Track Roller	Cylindrical Track Roller	Dynamic		Static	Grease	
mm	D	d	C	B	F_w	E_w	r_{smin}	r_{1smin}			C	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	
170	170 6.6929	80 3.1496	46 1.811	48 1.890	91.7 3.6102	107.7 4.2402	2.0 0.079	1.0 0.039	FGU 80 170		247 55500	190 42700	380 85400	1400	6.07 13.4
	170 6.6929	80 3.1496	46 1.811	48 1.890	91.7 3.6102	107.7 4.2402	2.0 0.079	1.0 0.039	FGU 80 170 MM		247 55500	190 42700	380 85400	1400	6.07 13.4
180	180 7.0866	85 3.3465	46 1.811	48 1.890	95.5 3.7598	115.5 4.5472	2.0 0.079	1.0 0.039	FGU 85 180		243 54600	215 48300	390 87700	1330	6.724 14.8
	180 7.0866	85 3.3465	46 1.811	48 1.890	95.5 3.7598	115.5 4.5472	2.0 0.079	1.0 0.039	FGU 85 180 MM	FGUL 85 180 MM	243 54600	215 48300	390 87700	1330	6.724 14.8
190	190 7.4803	90 3.5433	52 2.047	54 2.126	101.8 4.0079	121.8 4.7953	2.0 0.079	1.0 0.039	FGU 90 190 MM		297 66800	250 56200	480 108000	1250	8.515 18.8
260	260 10.2362	120 4.7244	63 2.480	65 2.559	133.6 5.2598	157.6 6.2047	3.0 0.118	1.5 0.059	FGU 120 260 MM		570 128000	395 88800	830 187000	960	19.750 43.6
300	300 11.8110	140 5.5118	75 2.953	78 3.071	152.6 6.0079	176.6 6.9528	3.0 0.118	1.5 0.059	FGU 140 300 MM		860 193000	500 112000	1 160 261000	850	31.265 68.9

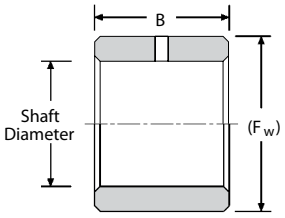
FULL COMPLEMENT, WITHOUT INNER RING, UNSEALED, YOKE TYPE (RNA...B6, RNAB, RNAL SERIES)

SEPARATE INNER RINGS (BIC SERIES)

METRIC SERIES



RNA...B6



BIC

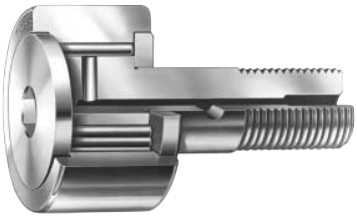
RNA...B6: Convex outer ring to maximum slope of 0.15%. Tolerance h9 on dim. D.
RNAB: Convex outer ring to maximum slope of 1.5%. Tolerance h9 on dim. D.
RNAL: Cylindrical outer ring. Tolerance h7 on dim. D.

Outside Dia.	Dimensions mm/in.						Bearing Designation Series			Load Ratings kN/lbf.			Limiting Speed	Wt. kg/lbs.	Inner Ring Designation	Shaft Dia.
										Dynamic		Static	Grease			
mm	D	d	B	F_w	E_w	r_{smin}	RNA..B6	RNAB	RNAL	C	$F_{r\,perm}$	$F_{0r\,perm}$	RPM			
19	19 0.7480	7.3 0.2874	12 0.472	7.3 0.287	12.3 0.484	0.35 0.014	RNA 11005 B6	RNAB 11005		5.10 1150	4.05 910	4.05 910	8700	0.019 0.042		
22	22 0.8661	9.7 0.3819	12 0.472	9.7 0.382	14.7 0.579	0.35 0.014	RNA 11007 B6	RNAB 11007	RNAL 11007	6.00 1350	5.10 1150	5.20 1170	7000	0.022 0.049		
28	28 1.1024	12.1 0.4764	12 0.472	12.1 0.476	17.1 0.673	0.35 0.014	RNA 11009 B6	RNAB 11009	RNAL 11009	7.40 1660	7.10 1600	7.10 1600	5800	0.028 0.062		
32	32 1.2598	17.6 0.6929	15 0.591	17.6 0.693	22.6 0.890	0.35 0.014	RNA 11012 B6	RNAB 11012	RNAL 11012	10.8 2430	9.10 2050	12.7 2860	4200	0.032 0.071	BIC 1012	12
35	35 1.3780	20.8 0.8189	15 0.591	20.8 0.819	25.8 1.016	0.65 0.026	RNA 11015 B6	RNAB 11015		10.8 2430	9.10 2050	13.4 3010	3650	0.035 0.077	BIC 1015	15
42	42 1.6535	23.9 0.9409	15 0.591	23.9 0.941	28.9 1.138	0.65 0.026	RNA 11017 B6	RNAB 11017	RNAL 11017	13.4 3010	13.9 3120	18.5 4160	3200	0.042 0.093	BIC 1017	17
47	47 1.8504	28.7 1.1299	18 0.709	28.7 1.130	34.7 1.366	0.65 0.026	RNA 11020 B6	RNAB 11020	RNAL 11020	16.8 3780	15.4 3460	23.0 5170	2700	0.047 0.104	BIC 2020	20
52	52 2.0472	33.5 1.3189	18 0.709	33.5 1.319	39.5 1.555	0.65 0.026	RNA 11025 B6	RNAB 11025		17.2 3870	16.5 3710	24.7 5550	2330	0.052 0.115	BIC 1025	25
62	62 2.4409	38.2 1.5039	22 0.866	38.2 1.504	44.2 1.740	0.65 0.026	RNA 11030 B6	RNAB 11030		28.5 6410	31.5 7080	49.5 11100	2050	0.062 0.137	BIC 2030	30
72	72 2.8346	44.0 1.7323	22 0.866	44.0 1.732	50.0 1.969	0.65 0.026	RNA 11035 B6			32.0 7190	41.0 9220	61.0 13700	1800	0.072 0.159	BIC 2035	35
80	80 3.1496	49.7 1.9567	22 0.866	49.7 1.957	55.7 2.193	0.85 0.033		RNAB 11040		34.0 7640	47.0 10600	68.0 15300	1620	0.080 0.176	BIC 2040	40
90	90 3.5433	62.1 2.4449	24 0.945	62.1 2.445	68.1 2.681	0.85 0.033	RNA 11050 B6			32.5 7310	51.0 11500	68.0 15300	1300	0.090 0.198	BIC 11050	50

STUD TYPE AND YOKE TYPE TRACK ROLLERS

INCH SERIES

Inch series track rollers listed in this catalog have been designed with the outer rings of large radial cross section to withstand heavy rolling or shock loads on track type or cam-controlled equipment.



CR with Stud

REFERENCE STANDARD:

- **ANSI/ABMA Std. 18.2** – Needle roller bearings – radial, inch design.

Before selecting specific inch series track rollers, the engineering section of this catalog should be reviewed.

YCR for Yoke Mounting

IDENTIFICATION

The type, special construction features, and size are designated by an identification code consisting of prefix letters followed by a dash and suffix numbers.

The initial prefix letters denote the type of track roller/cam follower. Additional prefix letters are used when it is necessary to denote special construction features. The suffix numbers following the prefix letters denote the size of the track roller. See Table 1.

The basic types are listed below:

CR - regular stud type, full complement needle rollers, inch series

YCR - yoke type, full complement needle rollers, inch series

Construction feature code letters for inch series track rollers are used as required, in the following order:

S - seals with internal thrust washers

B - hexagonal wrench socket in stud head (stud type only)

C - profiled outer ring

E - eccentric stud (stud type only)

Descriptions of typical examples, with complete letter codes combining basic type of bearing and construction features follow. See Table 2.

Since the entire identification code might not appear on the bearing itself, the manufacturer's parts list or another reliable source should always be consulted when ordering bearings for field or service replacement, to make certain that the correct unit with the correct lubricant is specified.

TABLE 1 – IDENTIFICATION CODE – INCH SERIES

Prefix Letters			Suffix Numbers			Complete
type	plus	construction features	plus size	O.D.	equals	Designation
CR	plus	SBE	plus	-16	equals	CRSBE-16
CR	plus			-16	equals	CR-16

TABLE 2 – CODE DESCRIPTION – INCH SERIES

Stud Types	
Description	**Prefix Code**
with seals and internal thrust washers	CRS
with seals, internal thrust washers and profiled outer ring	CRSC
with seals, internal thrust washers, hex socket and profiled outer ring	CRSBC
with seals, internal thrust washers, hex socket, profiled outer ring and eccentric stud	CRSBCE
Yoke Types	
with seals and internal thrust washers	YCRS
with seals, internal thrust washers and profiled outer ring	YCRSC

CONSTRUCTION

Timken products listed on the following pages have been designed with the outer ring of large radial cross section to withstand heavy rolling and shock loads on track type or cam-controlled equipment.

Regular stud type (CR) are designed with integral studs for cantilever mounting. When a regular stud type track roller is used within the permissible dynamic load ($F_{r\ perm}$) given in the tabular data, the ductile core of the stud provides the necessary toughness for and resistance to shock loads. A screwdriver slot or a hexagonal wrench socket in the head of the stud facilitates mounting.

Yoke type (YCR) are designed for straddle mounting. Each type is available with a full complement of needle rollers.

All inch series track roller have a black-oxide finish on all external surfaces.

SEALED TRACK ROLLERS – INCH SERIES

Inch series sealed track rollers contain a lip type seal and an internal thrust washer. On some sizes of track rollers, the thrust washer and seal have been incorporated into a single component. Regardless of configuration, the thrust washer fits between the shoulders of the outer ring and inside faces of the steel retaining washer and flange of the stud. These washers reduce sliding friction and serve to increase the life of the bearing, particularly when it is infrequently relubricated or where misalignment occurs. In all cases, the external dimensions of the sealed bearings are the same as the unsealed bearings. The seals are thermally stable in a temperature range between -25° F and +225° F.

PROFILED TRACK ROLLERS

These units are available with cylindrical or profiled outer rings.

Track rollers are designed with a profiled outer ring to alleviate the uneven bearing loading resulting from deflection, bending or misalignment in mounting.

To specify a profiled ring for any inch series track roller having a cylindrical outer ring, add the letter "C" at the end of the prefix code. For example:

prefix CR – regular stud type, full complement of needle rollers and cylindrical outer ring

prefix CRC – same as above, but with profiled outer ring.

The O.D. tolerance of profiled track rollers is +0.000 - 0.002 inch. The profile radii are listed in Table 3.

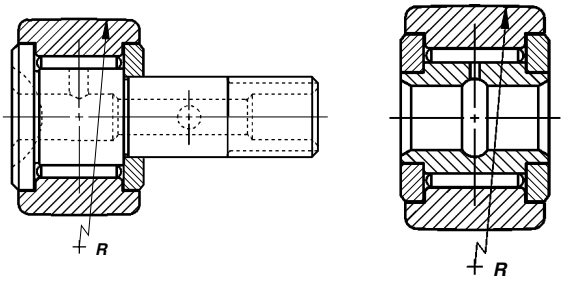
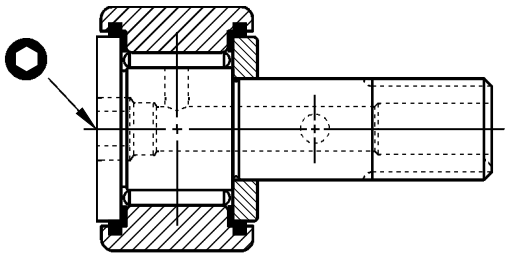


TABLE 3 – PROFILE RADIUS
FOR TYPES CRC, CRSC, CRSBC, YCRC, YCRSC

Size Designation (suffix)	R Profile Radius (approx.) inch	Size Designation (suffix)	R Profile Radius (approx.) inch
-8	6	-28	20
-8-1	7	-30	20
-10	7	-32	24
-10-1	8	-36	24
-12	10	-40	30
-14	10	-44	30
-16	12	-48	30
-18	12	-52	30
-20	14	-56	30
-22	14	-64	30
-24	20		
-26	20		

HEXAGONAL SOCKETS

Smaller sizes of regular inch series stud type units have a screwdriver slot or a hexagonal socket in the flanged end of the stud to facilitate mounting. Larger sizes have a socket to accommodate a hexagonal wrench. Wrench sizes are listed in Table 4.

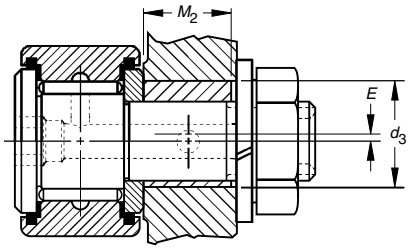


ECCENTRIC STUDS

To provide radial adjustment of the outer ring toward the track or cam surface at the time of installation, the regular inch series stud types are available with eccentric studs which are specified by adding the letter "E" to the construction feature code:

prefix CRSBE – regular stud type track roller with full complement of needle rollers, two seals, with internal thrust washers, hexagonal wrench socket in stud head, and eccentric stud.

Pertinent dimensions of the eccentric stud are listed in Table 5.



Since a track roller with an eccentric stud is usually adjusted upon installation by turning the stud in the mounting hole, a close clearance fit between the outside diameter of the bushing and the mounting hole is necessary. For turning the stud, a hexagonal wrench is generally more convenient than a screwdriver, and an option for a hexagonal wrench socket in the head of the stud should be exercised.

Some applications may require more secure positioning than provided by the tightened stud nut. If so, it is suggested that the housing and eccentric bushing be drilled at the time of installation to accept a locating dowel pin.

TABLE 4 – HEXAGONAL WRENCH SIZES – INCH SERIES

Size Designation (suffix)	Wrench Size Inch	Size Designation (suffix)	Wrench Size Inch
-8	1/8	-28	5/16
-8-1	1/8	-30	5/16
-10	1/8	-32	7/16
-10-1	1/8	-36	7/16
-12	3/16	-40	1/2
-14	3/16	-44	1/2
-16	1/4	-48	3/4
-18	1/4	-52	3/4
-20	1/4	-56	3/4
-22	1/4	-64	3/4
-24	5/16		
-26	5/16		

TABLE 5 – ECCENTRIC BUSHING DIMENSIONS
REGULAR STUD TYPE (TYPE CR)

Size Designation (suffix)	Bushing Outside Diameter +0.001 -0.001	Inch Bushing Width +0.000 -0.010	Eccentricity
	D_e	B_e	e
-8-1	0.250	0.375	0.010
-10-1	0.375	0.437	0.015
-12	0.500	0.500	0.015
-14	0.500	0.500	0.015
-16	0.625	0.500	0.030
-18	0.625	0.500	0.030
-20	0.687	0.625	0.030
-22	0.687	0.625	0.030
-24	0.875	0.750	0.030
-26	0.875	0.750	0.030
-28	1.000	0.875	0.030
-30	1.000	0.875	0.030
-32	1.187	1.000	0.030
-36	1.187	1.000	0.030
-40	1.375	1.125	0.030
-44	1.375	1.125	0.030
-48	1.750	1.250	0.060
-52	1.750	1.250	0.060
-56	1.812	1.375	0.060
-64	2.000	2.000	0.060

* To ensure proper clamping of the stud, the housing should be slightly wider than the maximum width of the eccentric bushing.

LOAD RATINGS

DYNAMIC LOADING AS A TRACK ROLLER

When the outer ring of a stud type or yoke type track roller runs on a track, the contact under a radial load causes elastic (oval) deformation of the outer ring. As a result, a smaller zone of the raceway is loaded and the load is distributed on fewer needle rollers. This in turn affects the track roller's dynamic and static load ratings. Also, this deformation generates bending stress in the outer ring which must not exceed the maximum permitted for the material of the outer ring. The maximum permissible dynamic ($F_{r\,perm}$) radial load condition is determined by this requirement.

The rating life of a stud type or yoke type track roller should be calculated using the dynamic load ratings C_w shown in the tables. The tables also show the maximum permissible radial load, $F_{r\,perm}$ that can be dynamically applied on the stud type or yoke type track rollers. However, to calculate the L_{10} life of a track roller, the applied radial load must not be greater than $C_w/4$ based on ideal operating conditions of alignment, lubrication, temperature, speed and accelerations.

STATIC LOADING

In addition to the basic static load rating C_0, the tables also list the maximum permissible static radial load $F_{0r\ perm}$ that may be applied to a stud type or yoke type track roller. The values of $F_{0r\ perm}$ result in a minimum static factor f_s of 0.7 for the worst condition of internal load distribution in inch series track roller operation. The $F_{0r\ perm}$ values must not be exceeded. The static factor f_s can be calculated using the following formula:

$$f_s \geq 0.7 \bullet \frac{F_{0r\ perm}}{P_{0r}}$$

where

$F_{0r\ perm}$ = Maximum permissible static radial load

P_{0r} = Equivalent static load
$P_{0r} = F_{0r}$ for yoke type track rollers

F_{0r} = Static radial load

f_s = Static factor whose valves should not be smaller than those suggested in table 6

TABLE 6 – SUGGESTED VALUES FOR STATIC FACTORS F_S FOR INCH SERIES TRACK ROLLERS

Requirements For Yoke Type Track Rollers And Stud Type Track Rollers	Suggested f_s Values
High shock-type loads	
Quiet running	1.5...2.5
Normal loading	
Normal quietness of running	1...1.5
Minor impact loads and rotary motion particularly quiet running not required	0.7...1

MOUNTING

The surface of the hole in the machine element, which supports the stud or the mounting shaft, must not deform under the expected load, and the support should be sufficiently rigid to resist bending loads.

Deformation and bending will cause uneven loading of the outer ring.

In mounting the stud type track roller, the retaining washer must be firmly backed up by a flat shoulder which is square with the stud center line. The shoulder diameter must be no smaller than the minimum clamping diameter (d_a) listed in the tabular data.

The maximum inherent strength of the stud is obtained when the unit is supported as close as possible to the retaining washer, which minimizes the bending moment. For this reason, the edge of the housing which supports the stud shank should be kept as sharp as possible, but free from burrs.

To minimize deflection in mounted stud type track rollers, the stud shank should be housed with the fit (d_b) shown in the tabular data. The clamping nut should not be tightened with a torque value higher than the maximum listed. A screwdriver slot or hexagonal socket in the end of the stud is provided for a tool to prevent the stud from turning when the nut is being tightened. Since the bottom of the screwdriver slot is not flat, it is helpful to put a radius on the tip of the screwdriver being used to hold the stud more securely.

When the stud shank is housed with an interference fit, installation force should be applied only to the center portion of the flanged end of the stud, preferably with an arbor press.

When the loads are high, the yoke type track rollers should be mounted on a high strength bolt or shaft with the tight transition fit listed in the tabular data. The bearing should be clamped between flat and parallel faces at right angles to the axis to prevent the retaining washers from coming off under load. If the bearing cannot be clamped, a close axial fit in the yoke is required.

When the applied loads are light to moderate, the inner ring of a yoke type track roller may be mounted on an unhardened shaft or bolt with the loose transition fit listed in the tabular data. Again, the retaining washers should be backed up axially to prevent their coming off under load.

LUBRICATION

All inch series stud type track rollers with a screwdriver slot in the flanged end of the stud have provisions for lubrication through the flanged end of the stud. The 12 and larger sizes of inch series stud type track rollers with screwdriver slots have provisions for relubrication through either end of the stud and through a cross-drilled hole in the shank. The ends of the axial holes are counterbored to accept drive type grease lubrication fittings. Hole diameters for these grease fittings are listed in the tables of dimensions.

Sizes 8 through 10-1 of the inch series stud type track rollers with a hexagonal socket in the flanged end of the stud cannot be relubricated. Size 12 and up have relubrication provisions in the threaded end of the stud and a cross-drilled hole in the shank. At the threaded end of the stud, the axial hole is counterbored to receive a drive type grease fitting. Sizes 12 through 22 and 48 through 64 of inch series stud type track rollers with hexagonal sockets also have provisions for relubrication through the hex socket in the flanged end of the stud. Sizes 48 through 64 are supplied with lubrication fittings which may be installed in the axial hole in the bottom of the hexagonal slot in the head end of the stud, at a depth which allows the hexagonal wrench to be inserted in the wrench socket without damaging the grease fitting.

Plugs are furnished with stud type track rollers to close off unused holes. If the cross-drilled hole in the stud shank is not used, it will be covered when the track roller is installed properly.

Most inch series yoke type track rollers are produced with lubrication holes and grooves in the inner ring bores so they can be relubricated through axially and radially drilled holes in the supporting shaft or bolt.

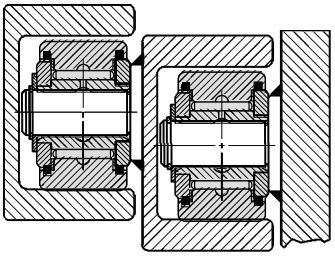
Oil is the preferred lubricant for all types. Use continuous oil lubrication or frequent grease lubrication for steady rotating conditions. Applications involving slow, intermittent oscillation are not as critical, and longer intervals between relubrication are permissible. Both stud and yoke type track rollers are normally supplied with medium temperature grease lubrication.

SPECIAL TRACK ROLLERS/ CAM FOLLOWERS

Track rollers can be obtained with dimensions different from those in the tabular data, if the quantities permit economical production. For these and other modifications please consult your Timken representative.

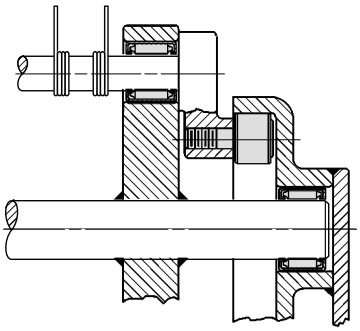
FORKLIFT TRUCK

Yoke type sealed units serve as high capacity and rugged guide rollers for lift trucks. Their design permits them to be mounted on studs welded to the structure. The seals exclude foreign matter and extend the time between relubrication periods.



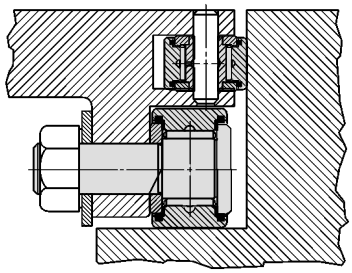
HAY BALER

Stud types are important components on many different types of farm equipment because of their required long service life under punishing loads and severe operating conditions. Needle bearings provide dependable and economical operation in the windrow pickup of hay balers.



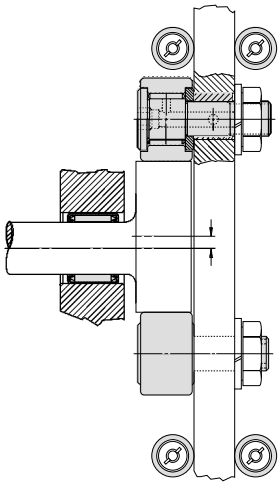
MACHINE WAY

Heavily loaded machine tool tables must travel freely and accurately. Stud and yoke type sealed units, in combination, support and guide such tables under the most severe conditions. The high capacity and the very low wear rate permit heavy loads to be carried without impairing the accuracy of the table's travel. The seals exclude dirt and chips and make the need for relubrication infrequent.



RECIPROCATING SLIDE

Stud types find wide application in feeding and advancing mechanisms on metalworking presses. The rotary motion of an eccentric cam rotating between two cam followers mounted on a slide imparts reciprocating linear motion to the slide. Dwell periods as well as accuracy in both rapid and slow linear actuation of the slide are made possible.

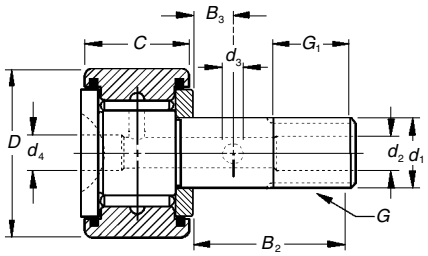


STUD TYPE TRACK ROLLERS
CR, CRS SERIES

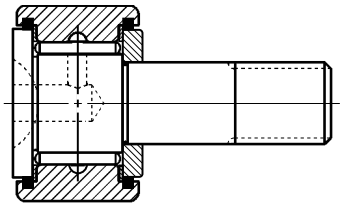
INCH SERIES

- Screwdriver slot in head facilitates mounting.
- Nonseparable, sealed unit with outer ring, full complement of needle rollers, stud seals, self-lubricating resin internal thrust washers, and stud-fastened retaining washer.
- Seals help retain lubricant and exclude foreign matter (CRS Series).
- Relubrication via axially drilled hole through stud with cross-drilled holes in stud raceway and shank.
- Recessed axial hole accepts standard nominal inch drive-type grease lubrication fitting.
- Lubrication fitting plugs furnished to close off unused holes.
- Tolerance limits for outside diameters of stud and outer ring refer to "single mean diameter" (see engineering section).
- A close fit between stud and hole required for mounting.
- Bore dimensions given below result in varying fit (0.0010 in. tight to 0.0005 in. loose).
- Retaining washer should be firmly backed up by flat housing shoulder (perpendicular to the stud axis).
- Shoulder diameter should be at least same size as minimum clamping diameter listed.
- May be mounted with two thin lock nuts or nut and lock washer.

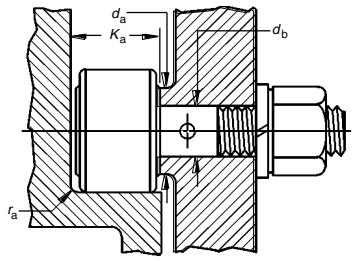
Outside Diameter	Dimensions mm/in.									Track Roller Designation	
	+0.25 -0 +0.0010 -0.0000	+0 -.025 +0.000 -0.001	+0 -.13 +0.000 -0.005	(nom.)	Min.				UNF	Without Seals	With Seals And Internal Thrust Washers
in.	d_1	D	C	B_2	B_3	G_1	d_4, d_2	d_3	G		
1/2	**4.826** 0.1900	**12.70** 0.500	**8.74** 0.344	**12.70** 0.500	—	**6.35** 0.250	**3.18** .125*	—	10-32	**CR-8**	**CRS-8**
	4.826 0.1900	**12.70** 0.500	**9.53** 0.375	**15.88** 0.625	—	**6.35** 0.250	**3.18** .125*	—	10-32	**CR-8-1**	**CRS-8-1**
5/8	**6.350** 0.2500	**15.88** 0.625	**10.31** 0.406	**15.88** 0.625	—	**7.92** 0.312	**3.18** .125*	—	1/4-28	**CR-10**	**CRS-10**
	6.350 0.2500	**15.88** 0.625	**11.13** 0.438	**19.05** 0.750	—	**7.92** 0.312	**3.18** .125*	—	1/4-28	**CR-10-1**	**CRS-10-1**
3/4	**9.525** 0.3750	**19.05** 0.750	**12.70** 0.500	**22.23** 0.875	**6.35** 0.250	**9.53** 0.375	**3.18** 0.188	0.094	3/8-24	**CR-12**	**CRS-12**
7/8	**9.525** 0.3750	**22.23** 0.875	**12.70** 0.500	**22.23** 0.875	**6.35** 0.250	**9.53** 0.375	**3.18** 0.188	**2.39** 0.094	3/8-24	**CR-14**	**CRS-14**
1	**11.113** 0.4375	**25.40** 1.000	**15.88** 0.625	**25.40** 1.000	**6.35** 0.250	**12.70** 0.500	**3.18** 0.188	**3.18** 0.125	7/16-20	**CR-16**	**CRS-16**
1 1/8	**11.113** 0.4375	**28.58** 1.125	**15.88** 0.625	**25.40** 1.000	**6.35** 0.250	**12.70** 0.500	**3.18** 0.188	**3.18** 0.125	7/16-20	**CR-18**	**CRS-18**
1 1/4	**12.700** 0.5000	**31.75** 1.250	**19.05** 0.750	**31.75** 1.250	**7.92** 0.312	**15.88** 0.625	**3.18** 0.188	**3.18** 0.125	1/2-20	**CR-20**	**CRS-20**
1 3/8	**12.700** 0.5000	**34.93** 1.375	**19.05** 0.750	**31.75** 1.250	**7.92** 0.312	**15.88** 0.625	**3.18** 0.188	**3.18** 0.125	1/2-20	**CR-22**	**CRS-22**
1 1/2	**15.875** 0.6250	**38.10** 1.500	**22.23** 0.875	**38.10** 1.500	**9.53** 0.375	**19.05** 0.750	**3.18** 0.188	**2.39** 0.094	5/8-18	**CR-24**	**CRS-24**
1 5/8	**15.875** 0.6250	**41.28** 1.625	**22.23** 0.875	**38.10** 1.500	**9.53** 0.375	**19.05** 0.750	**3.18** 0.188	**2.39** 0.094	5/8-18	**CR-26**	**CRS-26**
1 3/4	**19.050** 0.7500	**44.45** 1.750	**25.40** 1.000	**44.45** 1.750	**11.13** 0.438	**22.23** 0.875	**3.18** 0.188	**2.39** 0.094	3/4-16	**CR-28**	**CRS-28**
1 7/8	**19.050** 0.7500	**47.63** 1.875	**25.40** 1.000	**44.45** 1.750	**11.13** 0.438	**22.23** 0.875	**3.18** 0.188	**2.39** 0.094	3/4-16	**CR-30**	**CRS-30**
2	**22.225** 0.8750	**50.80** 2.000	**31.75** 1.250	**50.80** 2.000	**12.70** 0.500	**25.40** 1.000	**3.18** 0.188	**3.18** 0.125	7/8-14	**CR-32**	**CRS-32**
2 1/4	**22.225** 0.8750	**57.15** 2.250	**31.75** 1.250	**50.80** 2.000	**12.70** 0.500	**25.40** 1.000	**3.18** 0.188	**3.18** 0.125	7/8-14	**CR-36**	**CRS-36**



CR and CRS -12 to -64



CR and CRS -8 to -10-1



Note: Clamping torque is based on lubricated threads. If threads are dry, the torque values listed below may be doubled.

C

Load Rating kN/lbf.						Mounting Dimensions mm/in.					
As a Bearing		As a Track Roller									
Dynamic	Static	Dynamic		Static	Limiting Speed	Bore Dia. for Stud +.013 +0.0005 -0 -0.0000	Max.	Min.	Min.	Clamping Torque N*m/lbf. • in.	Wt. kg/lbs. Approx.
C	C_0	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	d_b	$r_{as\ max}$	K_a	d_a		
4.44 999	4.94 1110	3.01 677	1.04 233	2.49 560	7000	4.826 0.1900	0.25 0.010	10.41 0.41	7.52 0.296	0.90 8	0.010 0.022
4.98 1120	5.69 1280	3.38 759	1.21 272	2.90 652	7000	4.826 0.1900	0.25 0.010	11.18 0.44	7.52 0.296	0.90 8	0.010 0.023
6.05 1360	7.87 1770	4.37 982	2.26 508	5.43 1220	5500	6.350 0.2500	0.38 0.015	11.94 0.47	9.12 0.359	2.26 20	0.019 0.041
6.58 1480	8.76 1970	4.76 1070	2.53 569	6.09 1370	5500	6.350 0.2500	0.38 0.015	12.70 0.50	9.12 0.359	2.26 20	0.020 0.045
10.4 2330	15.2 3410	6.45 1450	2.88 647	6.89 1550	3900	9.525 0.3750	0.38 0.015	14.22 0.56	12.70 0.500	6.21 55	0.034 0.076
10.4 2330	15.2 3410	7.56 1700	4.80 1080	11.5 2590	3900	9.525 0.3750	0.38 0.015	14.22 0.56	12.70 0.500	6.21 55	0.044 0.097
13.3 2980	22.3 5010	8.94 2010	6.05 1360	14.5 3260	3000	11.113 0.4375	0.76 0.030	17.53 0.69	15.09 0.594	16.95 150	0.073 0.161
13.3 2980	22.3 5010	9.88 2220	8.67 1950	18.3 4120	3000	11.113 0.4375	0.76 0.030	17.53 0.69	15.09 0.594	16.95 150	0.089 0.197
21.5 4840	33.18 7460	15.1 3400	9.30 2090	24.3 5470	2600	12.700 0.5000	0.76 0.030	20.57 0.81	19.05 0.750	23.16 205	0.137 0.301
21.5 4840	33.2 7460	16.4 3680	12.6 2840	28.6 6420	2600	12.700 0.5000	0.76 0.030	20.57 0.81	19.05 0.750	23.16 205	0.161 0.354
28.4 6380	40.8 9160	20.1 4520	10.8 2440	26.0 5850	2300	15.875 0.6250	0.76 0.030	23.88 0.94	22.63 0.891	44.06 390	0.239 0.528
28.4 6380	40.8 9160	21.5 4840	14.1 3170	33.8 7610	2300	15.875 0.6250	0.76 0.030	23.88 0.94	22.63 0.891	44.06 390	0.274 0.605
35.8 8040	56.9 12800	25.9 5830	17.7 3980	42.5 9560	1900	19.050 0.7500	1.02 0.040	26.92 1.06	26.59 1.047	84.74 750	0.385 0.848
35.8 8040	56.9 12800	27.4 6150	22.0 4940	49.4 11100	1900	19.050 0.7500	1.02 0.040	26.92 1.06	26.59 1.047	84.74 750	0.430 0.947
43.5 9770	76.1 17100	31.8 7160	26.0 5850	60.5 13600	1700	22.225 0.8750	1.27 0.050	33.78 1.33	30.56 1.203	101.69 900	0.621 1.37
43.5 9770	76.1 17100	34.6 7770	36.7 8250	71.2 16000	1700	22.225 0.8750	1.27 0.050	33.78 1.33	30.56 1.203	101.69 900	0.757 1.67

* No lubrication hole in threaded end.
§ UNS instead of UNF threads.

Continued on next page.

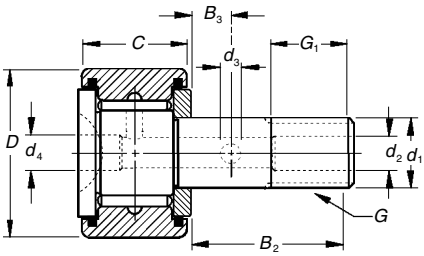
STUD TYPE TRACK ROLLERS
CR, CRS SERIES – *continued*

INCH SERIES

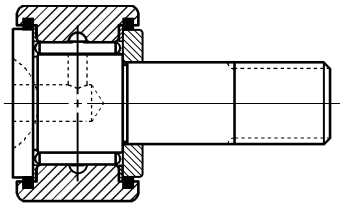
- Screwdriver slot in head facilitates mounting.
- Nonseparable, sealed unit with outer ring, full complement of needle rollers, stud seals, self-lubricating resin internal thrust washers, and stud-fastened retaining washer.
- Seals help retain lubricant and exclude foreign matter (CRS Series).
- Relubrication via axially drilled hole through stud with cross-drilled holes in stud raceway and shank.
- Recessed axial hole accepts standard nominal inch drive-type grease lubrication fitting.
- Lubrication fitting plugs furnished to close off unused holes.
- Tolerance limits for outside diameters of stud and outer ring refer to "single mean diameter" (see engineering section).
- A close fit between stud and hole required for mounting.
- Bore dimensions given below result in varying fit (0.0010 in. tight to 0.0005 in. loose).
- Retaining washer should be firmly backed up by flat housing shoulder (perpendicular to the stud axis).
- Shoulder diameter should be at least same size as minimum clamping diameter listed.
- May be mounted with two thin lock nuts or nut and lock washer.

Outside Diameter	Dimensions mm/in.									Track Roller Designation	
	+0.25 -0 +0.0010 -0.0000	+0 -.025 +0.000 -0.001	+0 -.13 +0.000 -0.005	(nom.)	Min.				UNF	Without Seals	With Seals And Internal Thrust Washers
in.	d_1	D	C	B_2	B_3	G_1	d_4, d_2	d_3	G		
2 1/2	**25.400** 1.0000	**63.50** 2.500	**38.10** 1.500	**57.15** 2.250	**14.27** 0.562	**28.58** 1.125	**3.18** 0.188	**3.18** 0.125	1-14§	**CR-40**	**CRS-40**
2 3/4	**25.400** 1.0000	**69.85** 2.750	**38.10** 1.500	**57.15** 2.250	**14.27** 0.562	**28.58** 1.125	**3.18** 0.188	**3.18** 0.125	1-14§	**CR-44**	**CRS-44**
3	**31.750** 1.2500	**76.20** 3.000	**44.45** 1.750	**63.50** 2.500	**15.88** 0.625	**31.75** 1.250	**3.18** 0.250	**3.18** 0.125	1 1/4-12	**CR-48**	**CRS-48**
3 1/4	**31.750** 1.2500	**82.55** 3.250	**44.45** 1.750	**63.50** 2.500	**15.88** 0.625	**31.75** 1.250	**3.18** 0.250	**3.18** 0.125	1 1/4-12	**CR-52**	**CRS-52**
3 1/2	**34.925** 1.3750	**88.90** 3.500	**50.80** 2.000	**69.85** 2.750	**17.48** 0.688	**34.93** 1.375	**3.18** 0.250	**3.18** 0.125	1 3/8-12	**CR-56**	**CRS-56**
4	**38.100** 1.5000	**101.60** 4.000	**57.15** 2.250	**88.90** 3.500	**19.05** 0.750	**38.10** 1.500	**3.18** 0.250	**3.18** 0.125	1 1/2-12	**CR-64**	**CRS-64**

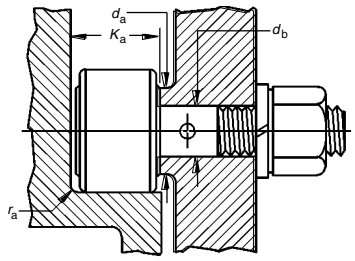
§ UNS instead of UNF threads.



CR and CRS -12 to -64



CR and CRS -8 to -10-1



Note: Clamping torque is based on lubricated threads. If threads are dry, the torque values listed below may be doubled.

C

Load Rating kN/lbf.					Limiting Speed	Mounting Dimensions mm/in.				Clamping Torque	Wt. kg/lbs.
As a Bearing		As a Track Roller									
Dynamic	Static	Dynamic		Static	Grease	Bore Dia. for Stud +.013 +0.0005 -0 -0.0000	Max.	Min.	Min.	N*m/lbf. • in.	Approx.
C	C_0	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	d_b	$r_{as\ max}$	K_a	d_a		
58.7 13200	**118** 26600	**44.5** 10000	**51.6** 11600	**101** 22700	**1400**	**25.400** 1.0000	**2.29** 0.090	**40.13** 1.58	**34.93** 1.375	**152.53** 1 350	**1.134** 2.50
58.7 13200	**118** 26600	**47.2** 10600	**66.7** 15000	**113** 25500	**1400**	**25.400** 1.0000	**2.29** 0.090	**40.13** 1.58	**34.93** 1.375	**152.53** 1 350	**1.329** 2.93
74.7 16800	**179** 40200	**51.6** 11600	**64.0** 14400	**127** 28600	**990**	**31.750** 1.2500	**2.29** 0.090	**46.48** 1.83	**44.45** 1.750	**231.62** 2 050	**1.905** 4.20
74.7 16800	**179** 40200	**54.7** 12300	**80.1** 18000	**143** 32100	**990**	**31.750** 1.2500	**2.29** 0.090	**46.48** 1.83	**44.45** 1.750	**231.62** 2 050	**2.182** 4.81
111 24900	**227** 51000	**82.3** 18500	**89.8** 20200	**187** 42000	**950**	**34.925** 1.3750	**2.29** 0.090	**52.83** 2.08	**48.82** 1.922	**282.46** 2 500	**2.912** 6.42
138 31100	**321** 72200	**99.2** 22300	**121** 27200	**245** 55000	**780**	**38.100** 1.5000	**2.29** 0.090	**59.18** 2.33	**57.94** 2.281	**338.95** 3 000	**4.291** 9.46

STUD TYPE TRACK ROLLERS
CRSB SERIES

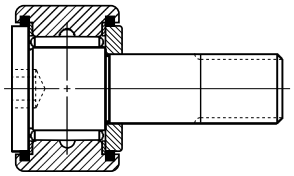
INCH SERIES

- Nonseparable, sealed unit with outer ring, full complement of needle rollers, stud seals, self-lubricating resin internal thrust washers, and stud-fastened retaining washer.
- Seals help retain lubricant and exclude foreign matter (CRS Series).
- Hexagonal wrench socket in stud head for mounting
- Relubrication via axially drilled hole through stud with cross-drilled holes in stud raceway and shank.
- Recessed axial hole accepts standard nominal inch drive-type grease lubrication fitting.
- Lubrication fitting plugs furnished to close off unused holes.
- Tolerance limits for outside diameters of stud and outer ring refer to "single mean diameter" (see engineering section).
- A close fit between stud and hole required for mounting.
- Bore dimensions given below result in varying fit (0.0010 in. tight to 0.0005 in. loose).
- Retaining washer should be firmly backed up by flat housing shoulder (perpendicular to the stud axis).
- Shoulder diameter should be at least same size as minimum clamping diameter listed.
- May be mounted with two thin lock nuts or nut and lock washer.

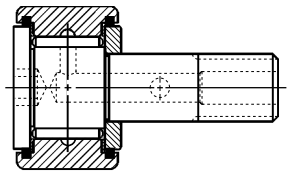
Outside Diameter	Dimensions mm/in.										Bearing Designation
	+0.25 -0 +0.0010 -0.0000	+0 -.025 +0.000 -0.001	+0 -.13 +0.000 -0.005	(nom.)		Min.				UNF	
in.	d_1	D	C	B_2	B_3	G_1	d_4	d_2	d_3	G	
1/2	4.826 0.1900	12.70 0.500	8.74 0.344	12.70 0.500	—	6.35 0.250	—	—	—	10-32	CRSB-8
	4.826 0.1900	12.70 0.500	9.53 0.375	15.88 0.625	—	6.35 0.250	—	—	—	10-32	CRSB-8-1
5/8	6.350 0.2500	15.88 0.625	10.31 0.406	15.88 0.625	—	7.92 0.312	—	—	—	1/4-28	CRSB-10
	6.350 0.2500	15.88 0.625	11.13 0.438	19.05 0.750	—	7.92 0.312	—	—	—	1/4-28	CRSB-10-1
3/4	9.525 0.3750	19.05 0.750	12.70 0.500	22.23 0.875	6.35 0.250	9.53 0.375	4.78 0.188	4.78 0.188	2.39 0.094	3/8-24	CRSB-12
7/8	9.525 0.3750	22.23 0.875	12.70 0.500	22.23 0.875	6.35 0.250	9.53 0.375	4.78 0.188	4.78 0.188	2.39 0.094	3/8-24	CRSB-14
1	11.113 0.4375	25.40 1.000	15.88 0.625	25.40 1.000	6.35 0.250	12.70 0.500	6.35 0.250	4.78 0.188	3.18 0.125	7/16-20	CRSB-16
1 1/8	11.113 0.4375	28.58 1.125	15.88 0.625	25.40 1.000	6.35 0.250	12.70 0.500	6.35 0.250	4.78 0.188	3.18 0.125	7/16-20	CRSB-18
1 1/4	12.700 0.5000	31.75 1.250	19.05 0.750	31.75 1.250	7.92 0.312	15.88 0.625	6.35 0.250	4.78 0.188	3.18 0.125	1/2-20	CRSB-20
1 3/8	12.700 0.5000	34.93 1.375	19.05 0.750	31.75 1.250	7.92 0.312	15.88 0.625	6.35 0.250	4.78 0.188	3.18 0.125	1/2-20	CRSB-22
1 1/2	15.875 0.6250	38.10 1.500	22.23 0.875	38.10 1.500	9.53 0.375	19.05 0.750	—	4.78 0.188	2.39 0.094	5/8-18	CRSB-24
1 5/8	15.875 0.6250	41.28 1.625	22.23 0.875	38.10 1.500	9.53 0.375	19.05 0.750	—	4.78 0.188	2.39 0.094	5/8-18	CRSB-26
1 3/4	19.050 0.7500	44.45 1.750	25.40 1.000	44.45 1.750	11.13 0.438	22.23 0.875	—	4.78 0.188	2.39 0.094	3/4-16	CRSB-28
1 7/8	19.050 0.7500	47.63 1.875	25.40 1.000	44.45 1.750	11.13 0.438	22.23 0.875	—	4.78 0.188	2.39 0.094	3/4-16	CRSB-30
2	22.225 0.8750	50.80 2.000	31.75 1.250	50.80 2.000	12.70 0.500	25.40 1.000	—	4.78 0.188	3.18 0.125	7/8-14	CRSB-32
2 1/4	22.225 0.8750	57.15 2.250	31.75 1.250	50.80 2.000	12.70 0.500	25.40 1.000	—	4.78 0.188	3.18 0.125	7/8-14	CRSB-36
2 1/2	25.400 1.0000	63.50 2.500	38.10 1.500	63.50 2.500	14.27 0.562	28.58 1.125	—	4.78 0.188	3.18 0.125	1-14§	CRSB-40

§ UNS instead of UNF threads.

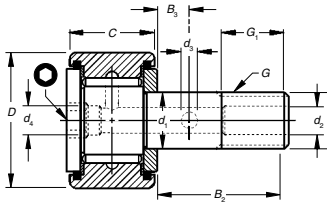
For hexagonal wrench sizes, see page C210.



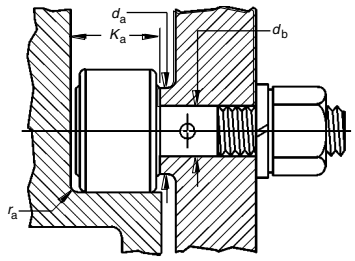
CRSB -8 to -10-1



CRSB -24 to -44



CRSB -12 to -22
CRSB -48 to -64



Note: Clamping torque is based on lubricated threads. If threads are dry, the torque values listed below may be doubled.

C

Load Rating kN/lbf.						Mounting Dimensions mm/in.					
As a Bearing		As a Track Roller			Limiting Speed	Bore Dia. for Stud +.013 +0.0005 -0 -0.0000				Clamping Torque	Wt. kg/lbs. Approx.
Dynamic	Static	Dynamic		Static	Grease		Max.	Min.	Min.	N*m/lbf. • in.	
C	C_0	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	d_b	$r_{as\ max}$	K_a	d_a		
4.44	**4.94**	**3.01**	**1.04**	**2.49**	**7000**	**4.826**	**0.25**	**10.4**	**7.54**	**0.90**	**0.010**
999	1110	677	233	560		0.1900	0.010	0.41	0.297	8.00	0.022
4.98	**5.69**	**3.38**	**1.21**	**2.90**	**7000**	**4.826**	**0.25**	**11.2**	**7.54**	**0.90**	**0.010**
1120	1280	759	272	652		0.1900	0.010	0.44	0.297	8.00	0.023
6.05	**7.87**	**4.37**	**2.26**	**5.43**	**5500**	**6.350**	**0.38**	**11.9**	**9.12**	**2.26**	**0.019**
1360	1770	982	508	1220		0.2500	0.015	0.47	0.359	20.0	0.041
6.58	**8.76**	**4.76**	**2.53**	**6.09**	**5500**	**6.350**	**0.38**	**12.7**	**9.12**	**2.26**	**0.020**
1480	1970	1070	569	1370		0.2500	0.015	0.50	0.359	20.0	0.045
10.4	**15.2**	**6.45**	**2.88**	**6.89**	**3900**	**9.525**	**0.38**	**14.2**	**12.70**	**6.21**	**0.034**
2330	3410	1450	647	1550		0.3750	0.015	0.56	0.500	55.0	0.076
10.4	**15.2**	**7.56**	**4.80**	**11.5**	**3900**	**9.525**	**0.38**	**17.5**	**12.70**	**6.21**	**0.044**
2330	3410	1700	1080	2590		0.3750	0.015	0.69	0.500	55.0	0.097
13.3	**22.3**	**8.94**	**6.05**	**14.5**	**3000**	**11.113**	**0.76**	**17.5**	**15.09**	**16.95**	**0.073**
2980	5010	2010	1360	3260		0.4375	0.030	0.69	0.594	150	0.161
13.3	**22.3**	**9.88**	**8.67**	**18.3**	**3000**	**11.113**	**0.76**	**20.6**	**15.09**	**16.95**	**0.089**
2980	5010	2220	1950	4120		0.4375	0.030	0.81	0.594	150	0.197
21.5	**33.2**	**15.1**	**9.30**	**24.3**	**2600**	**12.700**	**0.76**	**20.6**	**19.05**	**23.16**	**0.137**
4840	7460	3400	2090	5470		0.5000	0.030	0.81	0.750	205	0.301
21.5	**33.2**	**16.4**	**12.6**	**28.6**	**2600**	**12.700**	**0.76**	**23.9**	**19.05**	**23.16**	**0.161**
4840	7460	3680	2840	6420		0.5000	0.030	0.94	0.750	205	0.354
4 840	**7 460**	**3 680**	**2 840**	**6 420**		**0.5000**	**0.030**	**0.94**	**0.750**	**205**	**0.354**
6380	9160	4520	2440	5850		0.6250	0.030	0.94	0.891	390	0.528
28.4	**40.8**	**21.5**	**14.1**	**33.8**	**2300**	**15.875**	**0.76**	**26.9**	**22.63**	**44.06**	**0.274**
6380	9160	4840	3170	7610		0.6250	0.030	1.06	0.891	390	0.605
35.8	**56.94**	**25.9**	**17.7**	**42.5**	**1900**	**19.050**	**1.02**	**26.9**	**26.59**	**84.74**	**0.385**
8040	12800	5830	3980	9560		0.7500	0.040	1.06	1.047	750	0.848
35.8	**56.94**	**27.4**	**22.0**	**49.4**	**1900**	**19.050**	**1.02**	**33.8**	**26.59**	**84.74**	**0.430**
8040	12800	6150	4940	11100		0.7500	0.040	1.33	1.047	750	0.947
43.5	**76.06**	**31.8**	**26.0**	**60.5**	**1700**	**22.225**	**1.27**	**33.8**	**30.56**	**101.69**	**0.621**
9770	17100	7160	5850	13600		0.8750	0.050	1.33	1.203	900	1.370
43.5	**76.06**	**34.6**	**36.7**	**71.2**	**1700**	**22.225**	**1.27**	**40.1**	**30.56**	**101.69**	**0.757**
9770	17100	7770	8250	16000		0.8750	0.050	1.58	1.203	900	1.670
58.7	**118.32**	**44.5**	**51.6**	**101**	**1400**	**25.400**	**2.29**	**40.1**	**34.93**	**152.53**	**1.134**
13200	26600	10000	11600	22700		1.0000	0.090	1.58	1.375	1 350	2.500

Continued on next page.

STUD TYPE TRACK ROLLERS
CRSB SERIES – *continued*

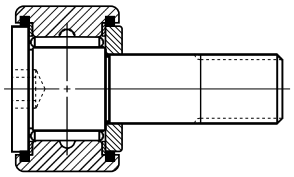
INCH SERIES

- Nonseparable, sealed unit with outer ring, full complement of needle rollers, stud seals, self-lubricating resin internal thrust washers, and stud-fastened retaining washer.
- Seals help retain lubricant and exclude foreign matter (CRS Series).
- Hexagonal wrench socket in stud head for mounting
- Relubrication via axially drilled hole through stud with cross-drilled holes in stud raceway and shank.
- Recessed axial hole accepts standard nominal inch drive-type grease lubrication fitting.
- Lubrication fitting plugs furnished to close off unused holes.
- Tolerance limits for outside diameters of stud and outer ring refer to "single mean diameter" (see engineering section).
- A close fit between stud and hole required for mounting.
- Bore dimensions given below result in varying fit (0.0010 in. tight to 0.0005 in. loose).
- Retaining washer should be firmly backed up by flat housing shoulder (perpendicular to the stud axis).
- Shoulder diameter should be at least same size as minimum clamping diameter listed.
- May be mounted with two thin lock nuts or nut and lock washer.

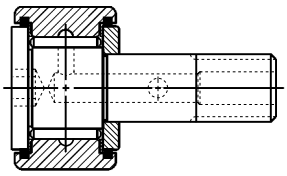
Outside Diameter	Dimensions mm/in.										Bearing Designation
	+0.25 -0 +0.0010 -0.0000	+0 -.025 +0.000 -0.001	+0 -.13 +0.000 -0.005	(nom.)		Min.				UNF	
in.	d_1	D	C	B_2	B_3	G_1	d_4	d_2	d_3	G	
2 3/4	**25.400** 1.0000	**69.85** 2.750	**38.10** 1.500	**63.50** 2.500	**14.27** 0.562	**28.58** 1.125	——	**4.78** 0.188	**3.18** 0.125	1-14§	**CRSB-44**
3	**31.750** 1.2500	**76.20** 3.000	**44.45** 1.750	**63.50** 2.500	**15.88** 0.625	**31.75** 1.250	**6.35** 0.250	**6.35** 0.250	**3.18** 0.125	1 1/4-12	**CRSB-48**
3 1/4	**31.750** 1.2500	**82.55** 3.250	**44.45** 1.750	**63.50** 2.500	**15.88** 0.625	**31.75** 1.250	**6.35** 0.250	**6.35** 0.250	**3.18** 0.125	1 1/4-12	**CRSB-52**
3 1/2	**34.925** 1.3750	**88.90** 3.500	**50.80** 2.000	**69.85** 2.75	**17.48** 0.688	**34.93** 1.375	**6.35** 0.250	**6.35** 0.250	**3.18** 0.125	1 3/8-12	**CRSB-56**
4	**38.100** 1.5000	**101.60** 4.000	**57.15** 2.250	**88.90** 3.500	**19.05** 0.750	**38.10** 1.500	**6.35** 0.250	**6.35** 0.250	**3.18** 0.125	1 1/2-12	**CRSB-64**

§ UNS instead of UNF threads.

For hexagonal wrench sizes, see page C208.



CRSB -8 to -10-1



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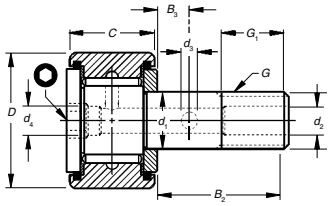
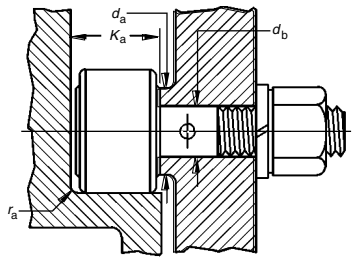


CRSB -12 to -22
CRSB -48 to -64



Note: Clamping torque is based on lubricated threads. If threads are dry, the torque values listed below may be doubled.

C

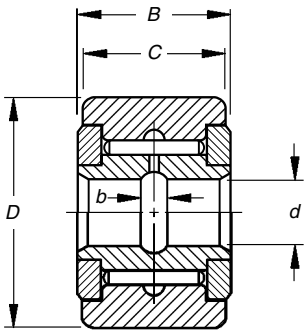
Load Rating kN/lbf.					Limiting Speed	Mounting Dimensions mm/in.				Clamping Torque	Wt. kg/lbs.
As a Bearing		As a Track Roller				Bore Dia. for Stud +.013 +0.0005 -0 -0.0000	Max.	Min.	Min.	N*m/lbf. • in.	Approx.
Dynamic	Static	Dynamic		Static	Grease						
C	C_0	C_w	$F_{r\ perm}$	$F_{0r\ perm}$	RPM	d_b	$r_{as\ max}$	K_a	d_a		
58.7 13200	**118.32** 26600	**47.2** 10600	**66.7** 15000	**113** 25500	**1400**	**25.400** 1.0000	**2.29** 0.090	**44.5** 1.75	**34.93** 1.375	**152.53** 1 350	**1.329** 2.930
74.7 16800	**178.82** 40200	**51.6** 11600	**64.0** 14400	**127** 28600	**990**	**31.750** 1.2500	**2.29** 0.090	**46.5** 1.83	**44.45** 1.750	**231.62** 2 050	**1.905** 4.200
74.7 16800	**178.82** 40200	**54.7** 12300	**80.1** 18000	**143** 32100	**990**	**31.750** 1.2500	**2.29** 0.090	**46.5** 1.83	**44.45** 1.750	**231.62** 2 050	**2.182** 4.810
110.8 24900	**226.86** 51000	**82.3** 18500	**89.8** 20200	**187** 42000	**950**	**34.925** 1.3750	**2.29** 0.090	**52.8** 2.08	**48.82** 1.922	**282.46** 2 500	**2.912** 6.420
138.3 31100	**321.16** 72200	**99.2** 22300	**121** 27200	**245** 55000	**780**	**38.100** 1.5000	**2.29** 0.090	**59.2** 2.33	**57.94** 2.281	**338.95** 3 000	**4.291** 9.460

YOKE TYPE TRACK ROLLERS
YCR, YCRS SERIES

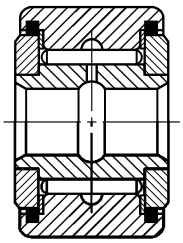
INCH SERIES

- Non-separable unit with outer ring, a full complement of needle rollers, inner ring, self-lubricating resin internal thrust washers, and two retaining washers securely fastened to the inner ring.
- Seals in counterbores of outer ring seal against the retaining washers; retain lubricant and exclude foreign matter (YCRS Series).
- Dimensions shown are for unplated finished unit.
- Tolerance limits for outside diameters of stud and outer ring refer to "single mean diameter" (see engineering section).
- A close fit between stud and hole required for mounting bore dimensions given below result in varying fit (0.0010" tight to 0.0005" loose).
- Machine element must be sufficicently rigid in area of mounting bolt holes to resist local crushing under the applied load and resist bending causing uneven loading of rollers.
- Unit should be clamped endwise between parallel faces (perpendicular to axis) to prevent retaining washers from coming off under load.
- If the unit cannot be clamped, yoke requires a close axial fit.

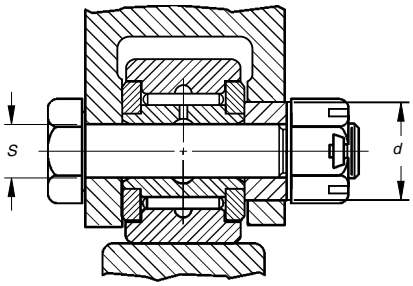
Outside Diameter	Dimensions mm/in.						Track Roller Designation	
	+0 +0.000 -0.03 -0.001	Max.	Min.	+.130 +0.0050 -0.250 -0.0100	+0 +0.000 -.13 -0.005	(nom.)	Without Seals	With Seals and Internal Thrust Washers
in.	D	d		B	C	b		
3/4	19.05 0.75	6.355 0.2502	6.34 0.2496	14.288 0.5625	12.7 0.5	3.18 0.125	YCR-12	YCRS-12
7/8	22.23 0.875	6.355 0.2502	6.34 0.2496	14.288 0.5625	12.7 0.5	3.18 0.125	YCR-14	YCRS-14
1	25.4 1	7.943 0.3127	7.927 0.3121	17.463 0.6875	15.88 0.625	3.18 0.125	YCR-16	YCRS-16
1 1/8	28.58 1.125	7.943 0.3127	7.927 0.3121	17.463 0.6875	15.88 0.625	3.18 0.125	YCR-18	YCRS-18
1 1/4	31.75 1.25	9.53 0.3752	9.515 0.3746	20.638 0.8125	19.05 0.75	4.78 0.188	YCR-20	YCRS-20
1 3/8	34.93 1.375	9.53 0.3752	9.515 0.3746	20.638 0.8125	19.05 0.75	4.78 0.188	YCR-22	YCRS-22
1 1/2	38.1 1.5	11.118 0.4377	11.102 0.4371	23.813 0.9375	22.23 0.875	3.18 0.125	YCR-24	YCRS-24
1 5/8	41.28 1.625	11.118 0.4377	11.102 0.4371	23.813 0.9375	22.23 0.875	3.18 0.125	YCR-26	YCRS-26
1 3/4	44.45 1.75	12.705 0.5002	12.69 0.4996	26.988 1.0625	25.4 1	3.18 0.125	YCR-28	YCRS-28
1 7/8	47.63 1.875	12.705 0.5002	12.69 0.4996	26.988 1.0625	25.4 1	3.18 0.125	YCR-30	YCRS-30
2	50.8 2	15.88 0.6252	15.865 0.6246	33.338 1.3125	31.75 1.25	3.18 0.125	YCR-32	YCRS-32
2 1/4	57.15 2.25	15.88 0.6252	15.865 0.6246	33.338 1.3125	31.75 1.25	3.18 0.125	YCR-36	YCRS-36
2 1/2	63.5 2.5	19.055 0.7502	19.04 0.7496	39.688 1.5625	38.1 1.5	3.68 0.145	YCR-40	YCRS-40
2 3/4	69.85 2.75	19.055 0.7502	19.04 0.7496	39.688 1.5625	38.1 1.5	3.68 0.145	YCR-44	YCRS-44
3	76.2 3	25.403 1.0001	25.387 0.9995	46.038 1.8125	44.45 1.75	3.68 0.145	YCR-48	YCRS-48
3 1/4	82.55 3.25	25.403 1.0001	25.387 0.9995	46.038 1.8125	44.45 1.75	3.68 0.145	YCR-52	YCRS-52
3 1/2	88.9 3.5	28.578 1.1251	28.562 1.1245	52.388 2.0625	50.8 2	3.68 0.145	YCR-56	YCRS-56
4	101.6 4	31.753 1.2501	31.737 1.2495	58.738 2.3125	57.15 2.25	3.68 0.145	YCR-64	YCRS-64



YCR



YCRS



C

Load Ratings kN/lbf.					Limiting Speed	Mounting Dimensions mm/in.					
As a Bearing		As a Track Roller				Shaft Bolt diameter				Clamping Diameter	Wt. Approx. kg/lbs.
						Loose Fit (f7)		Tight Fit (h6)			
Dynamic	Static	Dynamic		Static	Grease	Max.	Min.	Max.	Min.		
C	C_0	C_w	$F_{r\ perm}$	$F_{0\ perm}$	RPM	S				d_a	
10.4 2330	**15.2** 3410	**6.45** 1450	**2.88** 647	**6.89** 1550	**3900**	**6.342** 0.2497	**6.332** 0.2493	**6.363** 0.2505	**6.353** 0.2501	**0.06** 0.5	**0.027** 0.06
10.4 2330	**15.2** 3410	**7.56** 1700	**4.8** 1080	**11.5** 2590	**3900**	**6.342** 0.2497	**6.332** 0.2493	**6.363** 0.2505	**6.353** 0.2501	**0.06** 0.5	**0.036** 0.08
13.3 2980	**22.3** 5010	**8.94** 2010	**6.05** 1360	**14.5** 3260	**3000**	**7.93** 0.3122	**7.92** 0.3118	**7.95** 0.313	**7.94** 0.3126	**0.07** 0.594	**0.068** 0.15
13.3 2980	**22.3** 5010	**9.88** 2220	**8.67** 1950	**18.3** 4120	**3000**	**7.93** 0.3122	**7.92** 0.3118	**7.95** 0.313	**7.94** 0.3126	**0.07** 0.594	**0.077** 0.17
21.5 4840	**33.2** 7460	**15.1** 3400	**9.3** 2090	**24.3** 5470	**2600**	**9.517** 0.3747	**9.507** 0.3743	**9.538** 0.3755	**9.528** 0.3751	**0.08** 0.75	**0.109** 0.24
21.5 4840	**33.2** 7460	**16.4** 3680	**12.6** 2840	**28.6** 6420	**2600**	**9.517** 0.3747	**9.507** 0.3743	**9.538** 0.3755	**9.528** 0.3751	**0.08** 0.75	**0.136** 0.3
28.4 6380	**40.7** 9160	**20.1** 4520	**10.8** 2440	**26** 5850	**2300**	**11.105** 0.4372	**11.095** 0.4368	**11.125** 0.438	**11.115** 0.4376	**0.1** 0.891	**0.186** 0.41
28.4 6380	**40.7** 9160	**21.5** 4840	**14.1** 3170	**33.8** 7610	**2300**	**11.105** 0.4372	**11.095** 0.4368	**11.125** 0.438	**11.115** 0.4376	**0.1** 0.891	**0.227** 0.5
35.8 8040	**56.9** 12800	**25.9** 5830	**17.7** 3980	**42.5** 9560	**1900**	**12.692** 0.4997	**12.682** 0.4993	**12.718** 0.5007	**12.708** 0.5003	**0.12** 1.047	**0.29** 0.64
35.8 8040	**56.9** 12800	**27.4** 6150	**22** 4940	**49.4** 11100	**1900**	**12.692** 0.4997	**12.682** 0.4993	**12.718** 0.5007	**12.708** 0.5003	**0.12** 1.047	**0.363** 0.8
43.5 9770	**76.1** 17100	**31.8** 7160	**26** 5850	**60.5** 13600	**1700**	**15.867** 0.6247	**15.857** 0.6243	**15.893** 0.6257	**15.883** 0.6253	**0.14** 1.203	**0.476** 1.05
43.5 9770	**76.1** 17100	**34.6** 7770	**36.7** 8250	**71.2** 16000	**1700**	**15.867** 0.6247	**15.857** 0.6243	**15.893** 0.6257	**15.883** 0.6253	**0.14** 1.203	**0.599** 1.32
58.7 13200	**118** 26600	**44.5** 10000	**51.6** 11600	**100** 22700	**1400**	**19.042** 0.7497	**19.032** 0.7493	**19.068** 0.7507	**19.058** 0.7503	**0.16** 1.375	**0.816** 1.8
58.7 13200	**118** 26600	**47.2** 10600	**66.7** 15000	**113** 25500	**1400**	**19.042** 0.7497	**19.032** 0.7493	**19.068** 0.7507	**19.058** 0.7503	**0.16** 1.375	**1.021** 2.25
74.7 16800	**179** 40200	**51.6** 11600	**64** 14400	**127** 28600	**990**	**25.39** 0.9996	**25.377** 0.9991	**25.42** 1.0008	**25.408** 1.0003	**0.2** 1.75	**1.406** 3.1
74.7 16800	**179** 40200	**54.7** 12300	**80.1** 18000	**143** 32100	**990**	**25.39** 0.9996	**25.377** 0.9991	**25.42** 1.0008	**25.408** 1.0003	**0.2** 1.75	**1.642** 3.62
111 24900	**227** 51000	**82.3** 18500	**89.8** 20200	**187** 42000	**950**	**28.565** 1.1246	**28.552** 1.1241	**28.595** 1.1258	**28.583** 1.1253	**0.22** 1.922	**2.245** 4.95
138 31100	**321** 72200	**99.2** 22300	**121** 27200	**245** 55000	**780**	**31.74** 1.2496	**31.727** 1.2491	**31.77** 1.2508	**31.758** 1.2503	**0.26** 2.281	**3.198** 7.05

NOTES

THRUST BEARINGS, ASSEMBLIES, WASHERS

Overview: Needle roller and cage thrust assemblies are complements of small diameter needle rollers arranged in a spoke-like configuration. Needle rollers are equally spaced by means of a cage whose web section separates the rollers and provides guidance to keep them tracking in an orbital path. The purpose of these assemblies is to transmit a thrust load between two relatively rotating objects while greatly reducing friction.

Needle roller and cage thrust assemblies can also be unitized with lipped washers which service as raceway surfaces for the needle rollers. Washers can be supplied separately or can be mechanically unitized to the needle roller thrust assemblies for ease of handling.

- **Sizes:** 6 mm - 140 mm (0.2362 in. - 5.5118 in.).
- **Markets:** Automotive automatic and manual transmissions, automotive accessories (compressors, steering gears, etc.) agricultural and construction equipment.
- **Features:** One-way fool-proof assembly features, anti-rotation locking features and lubrication flow enhancements.
- **Benefits:** High-speed performance and application flexibility.

Needle Roller Thrust Bearings – Metric Nominal Dimensions

Prefix
AXK needle roller and cage thrust assembly with two washers retained with a steel ring
FNT needle roller and cage thrust assembly (two piece cage design)
AX needle roller and cage thrust assembly with one unitized thin or thick washer
AR cylindrical roller and cage thrust assembly with one unitized light and heavy series washers
AXZ needle roller and cage thrust assembly with two washers retained with a ring
ARZ cylindrical roller and cage trust assembly with two washers retained with a steel ring

Width (for X or AR bearings) over 3 mm
3.5 = 3.5 mm

Bore*
60 = 60 mm
* thick AX series and heavy AR(Z) series has same bore but larger O.D. dimension

Outer Diameter
85 = 85 mm

AXZ **3.5** **60** **85**

Prefix
K.811 cylindrical roller thrust bearing
K.812 cylindrical roller thrust bearing

Bore Diameter
02 = 15 mm
03 = 17 mm
(for bore ≥ 20 mm): bore code x 5 = bore diameter
04 = 4 x 5 = 20 mm

Suffix
TVP molded, reinforced polymer window-type cage
LPB machined, light metal window-type cage

K.811 **04** **TVP**

Thrust Washers – Metric Nominal Dimensions

Prefix
AS thin thrust washer
LS heavy thrust washer
CP thin and thick series thrust washer for AX and AR series
CPR heavy series thrust washer for AR series
CPN precision series thrust washer for AX series

Width (for CP and CPR washers over 1 mm thick)
8 = 8 mm

Bore
40 = 40 mm

Outer Diameter
60 = 60 mm

LS **8** **40** **60**

Prefix
GS.811, GS.812 housing washer
WS.812, WS.812 shaft washer

Bore Diameter

for WS.811, WS.812:
02 = 15 mm
03 = 17 mm
(for bore ≥ 20 mm):
bore code x 5 = bore diameter
04 = 4 x 5 = 20 mm

for GS.811:
02 = 16 mm
03 = 18 mm
04 = 21 mm
05 = 26 mm
(for bore ≥ 30 mm):
[bore code x 5]+2 = bore diameter
06 = [6 x 5] +2 = 32 mm

for GS.812:
02 = 16 mm
03 = 17mm
04 = 21 mm
05 = 26 mm
(for bore ≥ 30 mm):
[bore code x 5]+2 = bore diameter
06 = [6 x 5] +2 = 32 mm
(for bore > 85 mm):
[bore code x 5]+3 = bore diameter
17 = [17 x 5] +3 = 88 mm

GS.811 **04**

Thrust Bearings – Inch Nominal Dimensions

NT cage assembly

Bore
16 = $^{16}/_{16}$ in. = 1 in.

NT **A** **16** **25**

Cage Design
A needle roller
C needle roller
H cylindrical roller

Outside Diameter
25 = $^{25}/_{16}$ in. = $1^{9}/_{16}$ in.

Thrust Washers – Inch Nominal Dimensions

TR thrust washer, inch

Bore
16 = $^{16}/_{16}$ in. =1 in.
10 = $^{10}/_{16}$ in. = $^{5}/_{8}$ in.

TR **B** **10** **18**

A, B, C, etc. washer thickness, inch
I & J bore piloted washers
ID, JD outside diameter piloted washers

Outside Diameter
18 = $^{18}/_{16}$ in. = 1 $^{1}/_{8}$ in.

C

Thrust Bearings, Assemblies and Washers

C

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES AND THRUST WASHERS –

METRIC SERIES

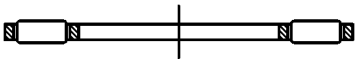
Needle roller and cage thrust assemblies are available in a variety of sizes. They all have very small cross-sections. This catalog includes the most popular, standardized and non-standard designs. If back up surface cannot be used as a raceway, hardened washers are available.

REFERENCE STANDARDS ARE:

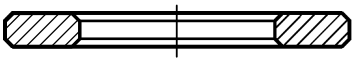
- **ISO 3031** – Rolling bearings – Needle roller and cage thrust assemblies, thrust washers – Dimensions and tolerances
- **DIN 5405 Part 2** – Rolling bearings – Needle bearings – Thrust needle roller and cage assemblies.
- **DIN 5405 Part 3** – Rolling bearings – Needle bearings – Thrust washers
- **ANSI/ABMA Std. 21.1-1988** – Thrust needle roller and cage assemblies and thrust washers – Metric design.

Before selecting specific needle roller and cage thrust assemblies, the engineering section of this catalog should be reviewed.

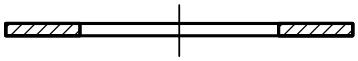
TYPES OF METRIC SERIES NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES AND THRUST WASHERS



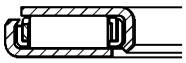
AXK, FNT
Needle roller & cage thrust assembly



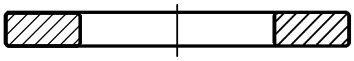
LS
Heavy thrust washer



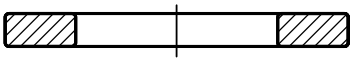
AS
Thin thrust washer



FNTKF (FNTK, FNTF)
Unitized thrust bearing assembly



WS.811
Shaft piloted washer



GS.811
Housing piloted washer

CONSTRUCTION

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

The needle roller and cage thrust assembly (Series FNT) has a two piece steel cage and through hardened needle rollers which are precision finished to close tolerances for optimum load distribution. The cage is comprised of two mating pieces that are securely fastened together.

Series AXK needle roller and cage thrust assembly, which can be used interchangeably with the FNT assembly, has a one piece cage. The cage is similar in design to the successful profiled radial steel cages.

These cage assemblies have a very thin section and when they must run directly against the back up surface raceways their section may be 2 to 5 mm (0.08 to 0.20 in.) which is equivalent to the diameter of the needle rollers used.

When the back up surfaces cannot be hardened and ground, hardened washers of different thicknesses are available.

UNITIZED THRUST BEARING ASSEMBLIES

Thrust bearing assemblies of the FNTK, FNTF and FNTKF Series have been specially designed for use in applications where a unitized assembly allows for ease of installation and eliminates the need for heat treatment and precision finishing of one or both thrust bearing backup surfaces.

Each FNTK, FNTF or FNTKF assembly consists of a FNT needle roller and cage thrust assembly with one or two special lipped washers that snap over the cage to produce a unitized thrust bearing assembly. The FNTK and FNTF assembly has one such washer, the FNTKF assembly has a washer on each side of the bearing.

The backup surfaces for these unitized thrust bearing assemblies should meet the limits of permissible out-of-squareness and coning or dishing as shown in figures 1 and 2 on C232. Oil is the preferred lubricant for these assemblies, however they are also available pregreased for applications that do not allow for oil lubrication.

The rolling elements of the AX Series thrust bearings are retained and guided in radial pockets within the cage. The cage is retained in relation to the thrust washer by means of a retaining cap. The design of a one-piece steel cage employs a special curvature that guides the rolling elements by their ends along their centerlines.

In addition, this special curvature gives the steel cage great rigidity while providing maximum lubricant space. This unitized assembly of components facilitates installation and provides a high axial load capacity while occupying only minimal space. Note that the AX Series is not interchangeable with the AXK Series or FNT Series needle roller and cage thrust assemblies.

Standard AX Series needle thrust bearings combined with a thick washer provide rotational accuracy and axial run-out to Class 6 levels according to ISO Standard 199 for ball thrust bearings. They can be supplied in High Precision "HP" quality, providing a precision grade above Class 5. AX Series needle thrust bearings with a thin washer are of minimal thickness and provide excellent economy. They should be considered whenever the degree of support and rotational accuracy requirement allow.

THRUST WASHERS

Ideally, a thrust washer should be stationary with respect to, and piloted by, its supporting or backing member, whether or not this is an integral part of the shaft or housing. There should be no rubbing action between the thrust washer and any other machine member. Some thrust washers are designed for bore piloting others may be piloted by their outside diameter.

THIN THRUST WASHERS (AS)

The metric series thin thrust washers are made of hardened spring steel. They may be out of flat due to heat treatment, but will flatten under load. Thin washers are used when the supporting or backing members cannot be adequately prepared as raceways for the needle rollers. These washers are only 1 mm (0.04 in.) thick (dimensions) and provide a very compact and cost-effective bearing arrangement. Although they are usually guided on the shaft, they may be housing-guided when required by application.

HEAVY THRUST WASHERS (LS)

These metric series thrust washers are made of bearing quality steel, hardened and precision ground on the flat raceway surfaces. Their bores and outside diameters are not ground but provide satisfactory surfaces for shaft piloting or housing piloting arrangements.

SHAFT PILOTED WASHERS (WS.811) AND HOUSING PILOTED WASHERS (GS.811)

These shaft piloted and housing piloted metric series thrust washers are primarily for use with metric series cylindrical roller thrust bearings of Series 811. They are made of bearing quality steel with, hardened and precision ground and lapped flat raceway surfaces. The tolerances of the thrust bearing bore and outside diameter shown in the engineering section apply to shaft and housing piloted washers.

THIN (CP) AND THICK (CPR) THRUST WASHERS

The washer incorporated in the AX Series thrust bearing is made from hardened bearing steel and forms one of the reaceways for the rolling elements. The opposing raceway is generally provided by a separate thrust washer of similar design supplied by Timken. When the AX Series thrust bearing is piloted by the revolving part, the thrust washer must be piloted by the stationary part and vice versa. If the revolving part and the stationary part are noticeably eccentric to each other, the thrust bearing with integral washer must, without exception, be piloted by the revolving part.

The second raceway for the rolling elements may also be formed by the face of a shoulder or an inserted washer, provided these have the correct hardness and geometric dimensions.

DIMENSIONAL ACCURACY

TOLERANCES FOR NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

Pages C234 to C237 list the nominal outside diameter, bore diameter and needle roller diameter for the FNT and AXK Series of needle roller and cage thrust assemblies and also the nominal outside diameter and bore diameter of the series AS, LS, WS and GS thrust washers. Thickness tolerances for the AS and LS thrust washers are also included.

Tolerances for the outside and bore diameters of series FNT and AXK needle roller and cage thrust assemblies are given in Table 1. The needle rollers in any one assembly have a group tolerance of 2 µm (80 µin.).

C

TABLE 1 –
TOLERANCES FOR OUTSIDE DIAMETER (D_C) AND BORE DIAMETER (D_{C1}) OF SERIES FNT AND AXK NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

D_c mm		Deviations of max. outside dia. (c12) µm		D_{c1} mm		Deviations of min. bore dia. (E11) µm	
>	≤	high	low	>	≤	low	high
18	30	-110	-320	3	6	+20	+95
30	40	-120	-370	6	10	+25	+115
40	50	-130	-380	10	18	+32	+142
50	65	-140	-440	18	30	+40	+170
65	80	-150	-450	30	50	+50	+210
80	100	-170	-520	50	80	+60	+250
100	120	-180	-530	80	120	+72	+292
120	140	-200	-600				

TABLE 1B -
AX SERIES THICKNESS AND AXIAL RUN-OUT TOLERANCES

	Bore Dc1 mm	Thickness Tolerance µm	Axial run-out µm		
Needle thrust bearings (thin)	≤ 60	+30 / -40(1)	20		
	60 < Dc_1 ≤ 90	+50 / -60(2)	25		
	90 < Dc_1 ≤ 120	+50 / -60(2)	30		
Needle thrust bearings (thick)	Dc_1 ≤ 60	+30 / -30(1)	20	Quality	
	60 < Dc_1 ≤ 90	+50/ -50(2)	25	HP	HSP
	90 < Dc_1 ≤ 120	+50/ -50(2)	30	2	1
Thrust washers (thin) [thick]	Dc_1 ≤ 120	+50 / -60[-50]	5*	3	1.5
	120 < Dc_1 ≤ 180	+50 / -110[-100]	7*	4	2
	180 < Dc_1 ≤ 250	+30 / -160[-150]	10*		

*HP Quality

(1) Under min. load of 150 N

(2) Under min. load of 250 N

BORE INSPECTION PROCEDURE FOR ASSEMBLY

If an inspection of the bore diameter is desired, the bore diameter (D_{c1}) of the assembly should be checked with "go" and "no go" plug gages. The "go" plug gage size is the minimum bore diameter of the assembly. The "no go" plug gage size is the maximum bore diameter of the assembly.

The assembly, under its own weight, must fall freely from the "go" plug gage. The "no go" plug gage must not enter the bore. Where the "no go" plug gage can be forced through the bore, the assembly must not fall from the gage under its own weight.

TOLERANCES FOR THRUST WASHERS

Tolerances for the bore diameters of series WS, shaft piloted thrust washers are given in the engineering section. Tolerances for the outside diameters of Series GS, housing piloted thrust washers are given in the engineering section.

Tolerances for the outside and bore diameters of Series AS thrust washers are given in Table 2. Thickness tolerance for Series AS thrust washers is ±0.05 mm (±0.002 in.).

BORE INSPECTION PROCEDURE FOR SERIES AS AND LS THRUST WASHERS

If an inspection of the thrust washer bore diameter (d) is desired, it should be checked with "go" and "no go" plug gages. The "go" plug gage size is the minimum bore diameter of the thrust washer. The "no go" plug gage size is the maximum bore diameter of the thrust washer.

The thrust washer, under its own weight, must fall freely from the "go" plug gage. The "no go" plug gage must not enter the bore. Where the "no go" plug gage can be forced through the bore, the thrust washer must not fall from the gage under its own weight.

TABLE 2 –
TOLERANCES FOR OUTSIDE DIAMETER (d_1) AND BORE DIAMETER (d) OF SERIES AS THRUST WASHERS.

d_1 mm		Deviations of max. outside dia. (e13) µm		d mm		Deviations of min. bore dia. (E12) µm	
>	≤	high	low	>	≤	low	high
18	30	-40	-370	3	6	+20	+140
30	50	-50	-440	6	10	+25	+175
50	80	-60	-520	10	18	+32	+212
80	120	-72	-612	18	30	+40	+250
120	180	-85	-715	30	50	+50	+300
180	250	-100	-820	50	80	+60	+360
				80	120	+72	+422
				120	180	+85	+485

Tolerances for the outside and bore diameters of series LS heavy thrust washers are given in Table 3. Thickness tolerances for series LS heavy thrust washers are given in tabular pages.

TABLE 3 –
TOLERANCES FOR OUTSIDE DIAMETER (d_1) AND BORE DIAMETER (d) OF SERIES LS HEAVY THRUST WASHERS.

d_1 mm		Deviations of max. outside dia. (a12) µm		d mm		Deviations of min. bore dia. (E12) µm	
>	≤	high	low	>	≤	low	high
18	30	-300	-510	3	6	+20	+140
30	40	-310	-560	6	10	+25	+175
40	50	-320	-570	10	18	+32	+212
50	65	-340	-640	18	30	+40	+250
65	80	-360	-660	30	50	+50	+300
80	100	-380	-730	50	80	+60	+360
100	120	-410	-760	80	120	+72	+422
120	140	-460	-860	120	180	+85	+485
140	160	-520	-920				
160	180	-580	-980				
180	200	-660	-1120				

TABLE 4 –
MOUNTING TOLERANCES FOR SHAFTS AND HOUSINGS FOR METRIC SERIES COMPONENTS.

Bearing Components	Shaft Tolerance (shaft piloting)	Housing Tolerance (housing piloting)	Piloting Member
Cylindrical roller & needle roller cage thrust assembly Types: AXK, FNT, K.811 and K.812	h8	H10	shaft
Cylindrical roller & needle roller cage thrust assembly Types: AX, AR, AXZ, and ARZ	h10	H10	shaft
Thin thrust washer Type: AS	h10	H11	shaft
Heavy thrust washer Type: LS	h10	H11	shaft
Shaft piloted thrust washer Type: WS.811	h6 (j6)	clearance	shaft
Housing piloted thrust washer Type: GS.811	Clearance	H7 (K7)	housing
Thick, thin and heavy series thrust washers Types: CP and CPR	h10	H10	as required

MOUNTING TOLERANCES

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES – METRIC SERIES

On FNT and AXK Series needle roller and cage thrust assemblies, the cage bore has a closer tolerance than the outside diameter, therefore bore piloting is preferred for these assemblies. To reduce wear it is suggested that the piloting surface for the cage be hardened to an equivalent of at least 55 HRC. Where design requirements prevent bore piloting, the FNT or AXK Series needle roller and cage thrust assemblies may be piloted on the outside diameters. For such cases, suitable O.D. piloting dimensions should be determined. Mounting tolerances are given in Table 4.

THRUST WASHERS

The mounting tolerances for series AS, LS, WS and GS thrust washers for use with needle roller and cage thrust assemblies are given in Table 4.

As for the FNT and AXK Series thrust assemblies, to reduce wear, the piloting surface for the thrust washers should also be hardened to an equivalent of at least 55 HRC.

BACK UP SURFACES

In some applications, it is desirable to use the back up surfaces as raceways for the needle rollers of the needle roller and cage thrust assemblies. In such designs these surfaces should be parallel and must be hardened to at least 58 HRC. If this hardness cannot be achieved, and thrust washers cannot be used, the load ratings must be reduced, as explained in the engineering section.

Thrust raceway surfaces must be ground to a surface finish of 0.2 µm R_a (79 µin R_a). When this requirement cannot be met, thrust washers must be used.

The raceways against which the needle rollers operate, or the surface against which the thrust washers bear must be square with the axis of the shaft. Equally important, the raceway, or surface backing the thrust washer, must not be dished or coned. The permissible limits of out-of-squareness and dishing or coning are shown in Figures 1 and 2.

Raceway contact dimensions E_a and E_b are given in the tabular pages. For the thin series AS thrust washers, full back up between the dimensions E_a and E_b should be provided.

For AX Series thrust bearings, the maximum out of square must be of no more than 0.0005 mm (maximum angle no more than 1 min. 43 sec.), see Figure 1.

Thin series needle thrust bearings and thin thrust washers must be supported on a flat, rigid, and continuous face throughout the area of circulation of the needles bounded by dimensions E_b and E_a.

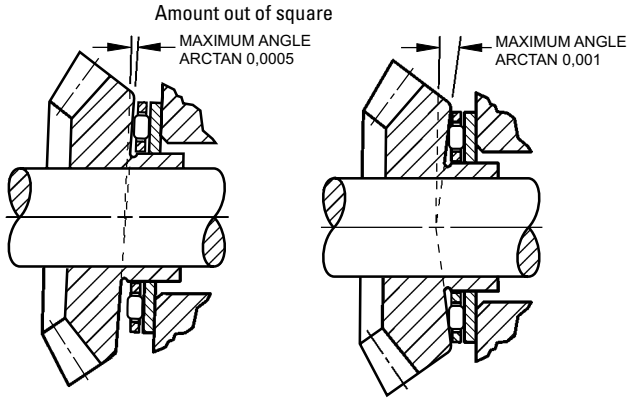
Thick series needle thrust bearings and thick thrust washers can be supported on a more restricted or discontinuous shoulder, provided that the deflection of the washer under load does not impede the smooth operation of the thrust bearing or the required axial run-out.

When an application does not involve the use of a thrust washer, the surface forming the second raceway must:

- extend at least across the whole area of circulation of the rolling elements between dimensions E_b and E_a, and,
- posess a suitable surface finish ($\leq$ 0.2 µm R_a or $\leq$ 79 µin R_a) and sufficient hardness in relation to the load to be supported. A hardness of 58 HRC (min.) enables thrust bearings to carry their full load capacity. Lower hardness values reduce the capacities shown in the tables of dimensions (see tabulated sizes).

TOLERANCES FOR PILOTING SURFACES (AX SERIES)

- Piloting on the shaft : h10 on dimensions D_{c1} for thrust bearings or dimension d for thrust washers.
- Piloting in the housing : H10 on dimensions D for thrust bearings or dimension d_1 for thrust washers.



Out of Square Surface
Figure 1

Dished or Coned Surface
Figure 2

LOAD RATINGS

MINIMUM AXIAL LOAD

Slippage can occur if the applied axial load is too light and the operating speed of the needle roller and cage thrust assembly is high, particularly if accompanied by inadequate lubrication. For satisfactory operation, a certain minimum load must be applied to a needle roller and cage thrust assembly which can be calculated from:

$$F_{a\ min} = C_0/2200\ [kN]$$

where

C_0 - static load rating [kN]
$F_{a\ min}$ - minimum axial load [kN]

COEFFICIENT OF FRICTION

In general, the coefficient of friction of a thrust bearing (consisting of a needle roller and cage thrust assembly and thrust washers) is defined as the friction torque divided by the product of the applied load and the bearing pitch radius. This coefficient of friction is not a constant value but will vary considerably with load, speed and lubricant. Generally the coefficient of friction becomes smaller as the load is increased and larger as the speed is increased. It is suggested that a value of 0.003 to 0.004 be used for needle thrust bearings and 0.004 to 0.005 be used for roller thrust bearings as a conservative estimate.

LUBRICATION

Oil is the preferred lubricant for needle roller and cage thrust assemblies and an ample oil flow is absolutely necessary for high speeds, or for moderate speeds when the load is relatively high.

When the application must utilize grease lubrication the needle roller and cage thrust assembly should be ordered pregreased. When the speeds are low, and rotation is not continuous, the initial charge of grease may be suitable for the life of the application. When the speeds are moderate, however, the designer must provide for frequent regreasing. Since the needle rollers tend to expel the lubricant radially outward, relubrication passages should be directed to the bore of the cage whether oil or grease is used as the lubricant.

SPECIAL DESIGNS

Needle roller and cage thrust assemblies and thrust washers are also made to special dimensions and configurations, as well as from special materials, when quantities permit economical manufacture.

Needle roller and cage thrust assemblies are particularly adaptable to low cost integral combination with special thrust washers. When the use of such special designs is considered, the following pages should be reviewed for evaluation of proposed arrangements.

TYPE AXJ BEARINGS

Needle thrust bearings type AXJ have been developed by Timken to run at very high rotational speed. They comprise two rows of needles retained and guided in hardened steel cages. These assemblies are retained on either side of a common washer by inserted retaining caps which serve to center them with adequate clearance in relation to the washer.

The special feature of these thrust bearings is the self-piloting action to which each rotating ring of needles is submitted. This self-piloting is transmitted to the washer which is “floating” in relation to the shaft. For this reason, the relative speed of each ring of needles relative to its raceway and the speed of the washer relative to the rotating shaft are reduced by about half.

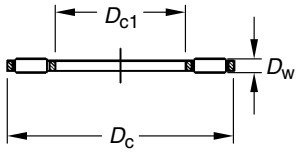
With a well-designed oil circulation, type AXJ thrust bearings permit speeds approximately twice that achieved with nomal thrust bearings.

To ensure the axial position of a shaft in both directions, two AXJ thrust bearings should be mounted on either side of an intermediate washer with oil hole (type PMH), piloted in the housing. Please consult your Timken representative for applications involving the use of these special thrust bearings.

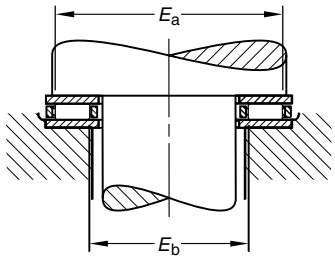
NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES, THRUST WASHERS

METRIC SERIES

- Dimensions for bore and O.D. of thrust assemblies and washers are nominal.
- See page C232 for details on piloting and backup surfaces.
- Thrust washers burnished at least one-quarter of bore area (remainder is rough breakaway finish).
- O.D. finish of washers will be as blanked.
- Thinner washers may be out of flat due to distortion in hardening in the free state (expected to flatten out under load).

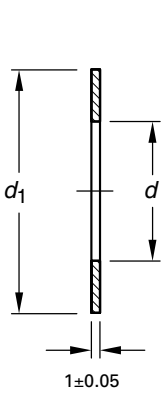


FNT, AXK

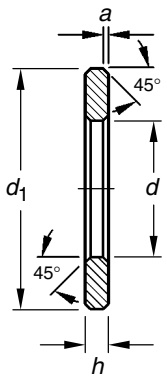


Raceway contact dimensions

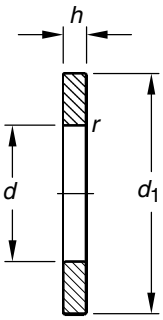
Shaft Diameter	Dimensions mm/in.						Assembly Designation	Wt. kg/lbs.	Load Ratings kN/lbf.		Limiting Speed Oil
									Dynamic	Static	
mm	d_{c1}	D_c	D_w	E_b	E_a	$r_{as\ max}$			C	C_o	RPM
8	8 0.3150	21 0.8268	2 0.0787	9.6 0.378	18.6 0.732	0.3 0.012	AXK0821TN	0.001 0.002	8.34 1870	21.1 4740	20000
10	10 0.3937	24 0.9449	2 0.0787	11.0 0.433	22.5 0.886	0.3 0.012	AXK1024	0.003 0.007	9.32 2100	25.9 5820	17000
12	12 0.4724	26 1.0236	2 0.0787	13.0 0.512	24.5 0.965	0.3 0.012	AXK1226	0.004 0.009	10.8 2430	32.3 7260	15000
15	15 0.5906	28 1.1024	2 0.0787	17.0 0.669	27.0 1.063	0.3 0.012	AXK1528	0.004 0.009	11.1 2500	35.2 7910	15000
17	17 0.6693	30 1.1811	2 0.0787	22.0 0.866	34.0 1.339	0.3 0.012	AXK1730TN	0.004 0.009	11.7 2630	38.7 8700	14000
20	20 0.7874	35 1.3780	2 0.0787	22.0 0.866	34.0 1.339	0.3 0.012	AXK2035	0.001 0.001	12.8 2880	45.4 10200	12000
25	25 0.9843	42 1.6535	2 0.0787	29.0 1.142	41.0 1.614	0.6 0.024	AXK2542	0.007 0.015	14.3 3210	56.8 12800	10000
30	30 1.1811	47 1.8504	2 0.0787	35.0 1.378	46.0 1.811	0.6 0.024	AXK3047	0.009 0.020	16.0 3600	68.1 15300	9000
35	35 1.3780	52 2.0472	2 0.0787	40.0 1.575	51.0 2.008	0.6 0.024	AXK3552	0.010 0.022	17.4 3910	79.5 17900	8100
40	40 1.5748	60 2.3622	3 0.1181	45.0 1.772	58.0 2.283	0.6 0.024	AXK4060	0.016 0.035	27.1 6090	110.0 24700	7000
45	45 1.7717	65 2.5591	3 0.1181	50.0 1.969	63.0 2.480	0.6 0.024	AXK4565	0.020 0.044	29.0 6520	124.0 27900	6500
50	50 1.9685	70 2.7559	3 0.1181	55.0 2.165	68.0 2.677	0.6 0.024	AXK5070	0.020 0.044	30.8 6920	137.0 30800	6000
55	55 2.1654	78 3.0709	3 0.1181	60.0 2.362	76.0 2.992	0.6 0.024	AXK5578	0.026 0.057	39.4 8860	195.0 43800	5300
60	60 2.3622	85 3.3465	3 0.1181	65.0 2.559	83.0 3.268	0.6 0.024	AXK6085	0.035 0.077	44.5 10000	234.0 52600	4900
65	65 2.5591	90 3.5433	3 0.1181	70.0 2.756	88.0 3.465	0.6 0.024	AXK6590	0.036 0.079	46.7 10500	254 57100	4600



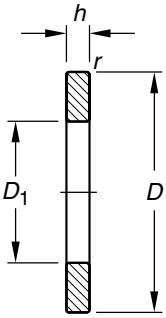
AS



LS



WS.811



GS.811

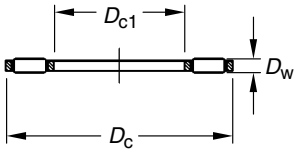
Dimensions mm/in.				Washer Designation	Wt. kg/lbs.	Washer Designation	mm/in. Chamfer	Wt. kg/lbs.	Washer Designation Shaft Piloted	Washer Designation Housing Piloted	Radius mm/in.	Wt. kg/lbs.
d	D, d_1	D_1	h	Thin		Heavy	a				$r_{s\ min}$	
8 0.3150	**21** 0.8268		**2.75** 0.108	**AS0821**	**0.002** 0.004	**LS0821**	**0.30** 0.012	**0.004** 0.009				
10 0.3937	**24** 0.9449		**2.75** 0.108	**AS1024**	**0.003** 0.007	**LS1024**	**0.50** 0.020	**0.008** 0.018				
12 0.4724	**26** 1.0236		**2.75** 0.108	**AS1226**	**0.003** 0.007	**LS1226**	**0.50** 0.020	**0.009** 0.020				
15 0.5906	**28** 1.1024	**16** 0.6299	**2.75** 0.108	**AS1528**	**0.003** 0.007	**LS1528**	**0.50** 0.020	**0.010** 0.022	**WS.81102**	**GS.81102**	**0.30** 0.012	**0.010** 0.022
17 0.6693	**30** 1.1811	**18** 0.7087	**2.75** 0.108	**AS1730**	**0.003** 0.007	**LS1730**	**0.50** 0.020	**0.011** 0.024	**WS.81103**	**GS.81103**	**0.30** 0.012	**0.011** 0.024
20 0.7874	**35** 1.3780	**21** 0.8268	**2.75** 0.108	**AS2035**	**0.005** 0.011	**LS2035**	**0.50** 0.020	**0.014** 0.031	**WS.81104**	**GS.81104**	**0.30** 0.012	**0.014** 0.031
25 0.9843	**42** 1.6535	**26** 1.0236	**3.00** 0.118	**AS2542**	**0.007** 0.015	**LS2542**	**1.00** 0.039	**0.021** 0.046	**WS.81105**	**GS.81105**	**0.60** 0.024	**0.021** 0.046
30 1.1811	**47** 1.8504	**32** 1.2598	**3.00** 0.118	**AS3047**	**0.008** 0.018	**LS3047**	**1.00** 0.039	**0.023** 0.051	**WS.81106**	**GS.81106**	**0.60** 0.024	**0.023** 0.051
35 1.3780	**52** 2.0472	**37** 1.4567	**3.50** 0.138	**AS3552**	**0.009** 0.020	**LS3552**	**1.00** 0.039	**0.030** 0.066	**WS.81107**	**GS.81107**	**0.60** 0.024	**0.032** 0.071
40 1.5748	**60** 2.3622	**42** 1.6535	**3.50** 0.138	**AS4060**	**0.012** 0.026	**LS4060**	**1.00** 0.039	**0.041** 0.090	**WS.81108**	**GS.81108**	**0.60** 0.024	**0.043** 0.095
45 1.7717	**65** 2.5591	**47** 1.8504	**4.00** 0.157	**AS4565**	**0.013** 0.029	**LS4565**	**1.00** 0.039	**0.052** 0.115	**WS.81109**	**GS.81109**	**0.60** 0.024	**0.054** 0.119
50 1.9685	**70** 2.7559	**52** 2.0472	**4.00** 0.157	**AS5070**	**0.014** 0.031	**LS5070**	**1.00** 0.039	**0.056** 0.123	**WS.81110**	**GS.81110**	**0.60** 0.024	**0.059** 0.130
55 2.1654	**78** 3.0709	**57** 2.2441	**5.00** 0.197	**AS5578**	**0.018** 0.040	**LS5578**	**1.00** 0.039	**0.091** 0.201	**WS.81111**	**GS.81111**	**0.60** 0.024	**0.094** 0.207
60 2.3622	**85** 3.3465	**62** 2.4409	**4.75** 0.187	**AS6085**	**0.022** 0.049	**LS6085**	**1.50** 0.059	**0.102** 0.225	**WS.81112**	**GS.81112**	**1.00** 0.039	**0.106** 0.234
65 2.5591	**90** 3.5433	**67** 2.6378	**5.25** 0.207	**AS6590**	**0.023** 0.051	**LS6590**	**1.50** 0.059	**0.121** 0.267	**WS.81113**	**GS.81113**	**1.00** 0.039	**0.125** 0.276

Continued on next page.

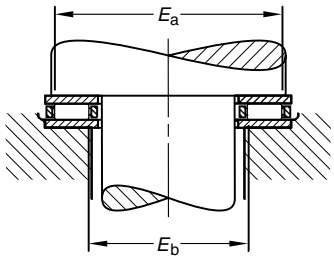
NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES, THRUST WASHERS - *continued*

METRIC SERIES

- Dimensions for bore and O.D. of thrust assemblies and washers are nominal.
- See page C232 for details on piloting and backup surfaces.
- Thrust washers burnished at least one-quarter of bore area (remainder is rough breakaway finish).
- O.D. finish of washers will be as blanked.
- Thinner washers may be out of flat due to distortion in hardening in the free state (expected to flatten out under load).

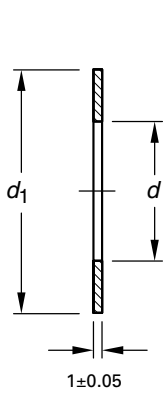


FNT, AXK



Raceway contact dimensions

Shaft Diameter	Dimensions mm/in.						Assembly Designation	Wt. kg/lbs.	Load Ratings kN/lbf.		Limiting Speed Oil
									Dynamic	Static	
mm	d_{c1}	D_c	D_w	E_b	E_a	$r_{as\ max}$			C	C_o	RPM
70	70 2.7559	95 3.7402	4 0.1575	74.0 2.913	93.0 3.661	0.6 0.024	AXK7095	0.055 0.121	53.8 12100	253 56900	4400
75	75 2.9528	100 3.9370	4 0.1575	79.0 3.110	98.0 3.858	0.6 0.024	AXK75100	0.058 0.128	55.1 12400	266 59800	4200
80	80 3.1496	105 4.1339	4 0.1575	84.0 3.307	103.0 4.055	0.6 0.024	AXK80105	0.092 0.203	56.4 12700	279 62700	4000
85	85 3.3465	110 4.3307	4 0.1575	89.0 3.504	108.0 4.252	0.6 0.024	AXK85110	0.063 0.139	57.6 12900	291 65400	3800
90	90 3.5433	120 4.7244	4 0.1575	94.0 3.701	118.0 4.646	0.6 0.024	AXK90120	0.081 0.179	72.9 16400	405 91000	3500
100	100 3.9370	135 5.3150	4 0.1575	105.0 4.134	133.0 5.236	0.6 0.024	AXK100135	0.106 0.234	90.2 20300	552 124000	3100
110	110 4.3307	145 5.7087	4 0.1575	115.0 4.528	143.0 5.630	0.6 0.024	AXK110145	0.117 0.258	93.2 21000	591 133000	2800
120	120 4.7244	155 6.1024	4 0.1575	125.0 4.921	153.0 6.024	0.6 0.024	AXK120155	0.126 0.278	98.5 22100	650 146000	2700
130	130 5.1181	170 6.6929	5 0.1969	136.0 5.354	167.0 6.575	0.6 0.024	AXK130170	0.198 0.437	132 29700	829 186000	2400
140	140 5.5118	180 7.0866	5 0.1969	146.0 5.748	177.0 6.969	0.6 0.024	AXK140180	0.221 0.487	136 30600	887 199000	2300
150	150 5.9055	190 7.4803	5 0.1969	156.0 6.142	187.0 7.362	0.6 0.024	AXK150190	0.225 0.496	141 31700	944 212000	2200
160	160 6.2992	200 7.8740	5 0.1969	166.0 6.535	197.0 7.756	0.6 0.024	AXK160200	0.249 0.549	146 32800	1000 225000	2100



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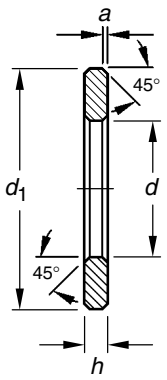

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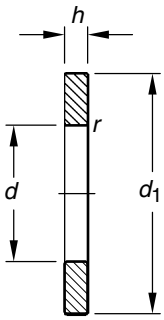
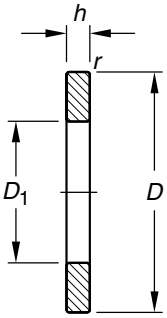


WS.811



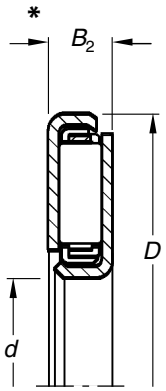
GS.811

Dimensions mm/in.				Washer Desig-nation	Wt. kg/lbs.	Washer Desig-nation	mm/in. Chamfer	Wt. kg/lbs.	Washer Designation Shaft Piloted	Washer Designation Housing Piloted	Radius mm/in.	Wt. kg/lbs.
d	**D, d_1**	**D_1**	**h**	**Thin**		**Heavy**	**a**				**$r_{s\ min}$**	
70 2.7559	**95** 3.7402	**72** 2.8346	**5.25** 0.207	**AS7095**	**0.025** 0.055	**LS7095**	**1.50** 0.059	**0.128** 0.282	**WS.81114**	**GS.81114**	**1.00** 0.039	**0.133** 0.293
75 2.9528	**100** 3.9370	**77** 3.0315	**5.75** 0.226	**AS75100**	**0.027** 0.060	**LS75100**	**1.50** 0.059	**0.150** 0.331	**WS.81115**	**GS.81115**	**1.00** 0.039	**0.155** 0.342
80 3.1496	**105** 4.1339	**82** 3.2283	**5.75** 0.226	**AS80105**	**0.028** 0.062	**LS80105**	**1.50** 0.059	**0.158** 0.348	**WS.81116**	**GS.81116**	**1.00** 0.039	**0.165** 0.364
85 3.3465	**110** 4.3307	**87** 3.4252	**5.75** 0.226	**AS85110**	**0.028** 0.062	**LS85110**	**1.50** 0.059	**0.166** 0.366	**WS.81117**	**GS.81117**	**1.00** 0.039	**0.173** 0.381
90 3.5433	**120** 4.7244	**92** 3.6220	**6.50** 0.256	**AS90120**	**0.038** 0.084	**LS90120**	**1.50** 0.059	**0.245** 0.540	**WS.81118**	**GS.81118**	**1.00** 0.039	**0.253** 0.558
100 3.9370	**135** 5.3150			**AS100135**	**0.050** 0.110							
110 4.3307	**145** 5.7087		**7.00** 0.276	**AS110145**	**0.055** 0.121	**LS110145**	**1.50** 0.059	**0.373** 0.822				
120 4.7244	**155** 6.1024			**AS120155**	**0.059** 0.130							
130 5.1181	**170** 6.6929		**9.00** 0.354	**AS130170**	**0.074** 0.163	**LS130170**	**1.50** 0.059	**0.065** 0.143				
140 5.5118	**180** 7.0866			**AS140180**	**0.078** 0.172							
150 5.9055	**190** 7.4803			**AS150190**	**0.083** 0.183							
160 6.2992	**200** 7.8740			**AS160200**	**0.089** 0.196							

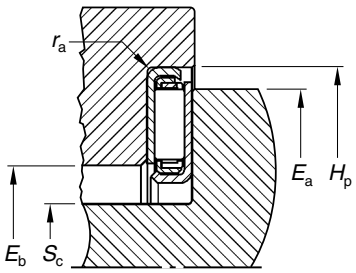
UNITIZED THRUST BEARING TYPE FNTKF

METRIC SERIES

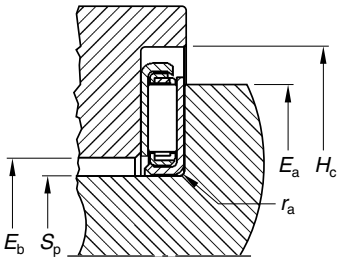
- Combines low friction and thin cross-section with the convenience of complete packaged assembly.
- Used where both thrust backup surfaces are not suitably hardened or ground.
- Backup surfaces should meet limits of permissible out-of-squareness, dishing or coning (see Figures 1 and 2 on page C232).
- Assembly can be either shaft or housing piloted, but not both (see mounting dimensions shown on the opposite page).
- Many special sizes available – contact your Timken representative.
- Call for availability.



FNTKF



FNTKF Housing Piloting



FNTKF Shaft Piloting

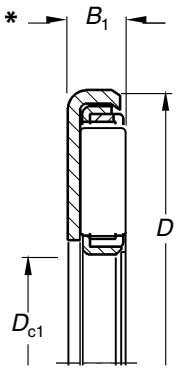
Shaft Diameter	Dimensions mm/in.			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Oil	Mounting Dimensions mm/in. Housing Piloting		Shaft Piloting		Nominal	
	E13	e13	-0.2, -.002		Dynamic	Static		H10	Max.	h10	Min.		
mm	d	D	B_2*		C	C_o	RPM	H	S_c	S_p	H_c	E_a	E_b
10	10 0.3937	28 1.1024	3.7 0.146	FNTKF-1028	9.88 2220	29.0 6520	16000	28 1.102	8 0.31496	10 0.394	30 1.181	25 0.984	14 0.551
13	13 0.5118	30 1.1811	3.7 0.146	FNTKF-1330	10.1 2270	31.3 7040	15000	30 1.181	11 0.433	13 0.512	32 1.260	27 1.063	17 0.669
15	15 0.5906	32 1.2598	3.7 0.146	FNTKF-1532	10.8 2430	34.8 7820	14000	32 1.260	13 0.512	15 0.591	34 1.339	29 1.142	19 0.748
18	18 0.7087	37 1.4567	3.7 0.146	FNTKF-1837	13.8 3100	50.3 11300	12000	37 1.457	16 0.630	18 0.709	39 1.535	34 1.339	22 0.866
23	23 0.9055	44 1.7323	3.7 0.146	FNTKF-2344	18.0 4050	75.3 16900	9700	44 1.732	21 0.827	23 0.906	46 1.811	41 1.614	27 1.063
28	28 1.1024	49 1.9291	3.7 0.146	FNTKF-2849	18.6 4180	82.4 18500	8900	49 1.929	26 1.024	28 1.102	51 2.008	46 1.811	32 1.260
33	33 1.2992	54 2.126	3.7 0.146	FNTKF-3354	21.6 4860	104 23400	7900	54 2.126	31 1.220	33 1.299	56 2.205	51 2.008	37 1.457
38	38 1.4961	62 2.4409	4.7 0.185	FNTKF-3862	31.4 7060	132 29700	7100	62 2.441	36 1.417	38 1.496	64 2.520	57 2.244	43 1.693
43	43 1.6929	67 2.6378	4.7 0.185	FNTKF-4367	37.8 8500	173 38900	6400	67 2.638	41 1.614	43 1.693	69 2.717	63 2.480	47 1.850
48	48 1.890	72 2.8346	4.7 0.185	FNTKF-4872	37.9 8520	179 40200	5900	72 2.835	46 1.811	48 1.890	74 2.913	68 2.677	52 2.047
53	53 2.0866	80 3.150	4.7 0.185	FNTKF-5380	48.5 10900	254 57100	5300	80 3.150	51 2.008	53 2.087	82 3.228	76 2.992	57 2.244

* To be measured under a 1.5 kN (0.34 lb.) load.

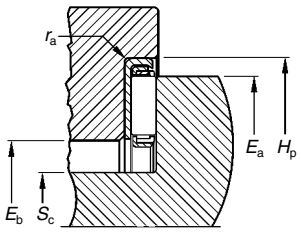
UNITIZED THRUST BEARING TYPE FNTK

METRIC SERIES

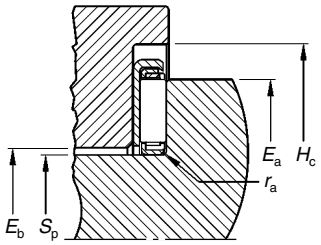
- Combine low friction and thin cross-section with the convenience of complete packaged assembly.
- Integral washer allows use where one thrust backup surfaces is not suitably hardened or ground.
- Backup surface should meet limits of permissible out-of-squareness, dishing or coning (see Figures 1 and 2 on page C232).
- Backup surface finish of 0.2 µm R_a (min.) or 8.0 µin R_a (min.) required.
- Assembly can be either shaft or housing piloted, but not both (see mounting dimensions shown on the opposite page).
- Many special sizes available – contact your Timken representative.
- Call for availability.



FNTK



FNTK Housing Piloting



FNTK Shaft Piloting

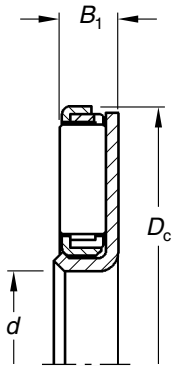
Shaft Diameter	Dimensions mm/in.			Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Oil	Mounting Dimensions mm/in. Housing Piloting		Shaft Piloting		Nominal	
	E13	e13	-0.2, -.002		Dynamic	Static		H10	Max.	h10	Min.		
mm	d	D	B_2		C	C_o	RPM	H	S_c	S_p	H_c	E_a	E_b
12	12 0.4724	28 1.1024	2.85 0.1122	FNTK-1228	9.88 2220	29.0 6520	16000	28 1.102	10.5 0.413	12 0.4724	29.5 1.161	25 0.9843	14 0.5512
15	15 0.5906	30 1.1811	2.85 0.1122	FNTK-1530	10.1 2270	31.3 7040	15000	30 1.181	13.5 0.531	15 0.5906	31.5 1.240	27 1.063	17 0.6693
17	17 0.6693	32 1.260	2.85 0.1122	FNTK-1732	10.8 2430	34.8 7820	14000	32 1.260	15.5 0.610	17 0.6693	33.5 1.319	29 1.1417	19 0.748
20	20 0.7874	37 1.4567	2.85 0.1122	FNTK-2037	13.8 3100	50.3 11300	12000	37 1.457	18.5 0.728	20 0.7874	38.5 1.516	34 1.3386	22 0.8661
25	25 0.9843	44 1.7323	2.85 0.1122	FNTK-2544	18.0 4050	75.3 16900	9700	44 1.732	23.5 0.925	25 0.9843	45.5 1.791	41 1.6142	27 1.063
30	30 1.1811	49 1.9291	2.85 0.1122	FNTK-3049	18.6 4180	82.4 18500	8900	49 1.929	28.5 1.122	30 1.1811	50.5 1.988	46 1.811	32 1.260
35	35 1.378	54 2.126	2.85 0.1122	FNTK-3554	21.6 4860	104 23400	7900	54 2.126	33.5 1.319	35 1.378	55.5 2.185	51 2.0079	37 1.4567
40	40 1.5748	62 2.4409	3.85 0.1516	FNTK-4062	31.4 7060	132 29700	7100	62 2.441	38.5 1.516	40 1.5748	63.5 2.500	57 2.2441	43 1.6929
45	45 1.7717	67 2.6378	3.85 0.1516	FNTK-4567	37.8 8500	173 38900	6400	67 2.638	43.5 1.713	45 1.7717	68.5 2.697	63 2.480	47 1.850
50	50 1.9685	72 2.8346	3.85 0.1516	FNTK-5072	37.9 8520	179 40200	5900	72 2.835	48.5 1.909	50 1.9685	73.5 2.894	68 2.6772	52 2.0472
55	55 2.1654	80 3.150	3.85 0.1516	FNTK-5580	48.5 10900	254 57100	5300	80 3.150	53.5 2.106	55 2.1654	81.5 3.209	76 2.9921	57 2.2441

* To be measured under a 1.5 kN (0.34 lb.) load.

UNITIZED THRUST BEARING ASSEMBLIES

METRIC SERIES

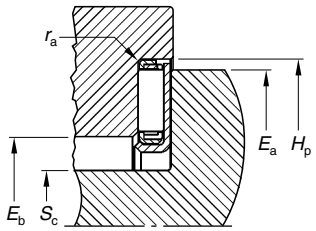
- Combine low friction and thin cross-section with the convenience of complete packaged assembly.
- Integral washer allows use where one thrust backup surfaces is not suitably hardened or ground.
- Backup surface should meet limits of permissible out-of-squareness, dishing or coning (see Figures 1 and 2 on page C232).
- Backup surface finish of 0.2 µm R_a (min.) or 8.0 µin R_a (min.) required.
- Assembly can be either shaft or housing piloted, but not both (see mounting dimensions shown on the opposite page).
- Many special sizes available – contact your Timken representative.



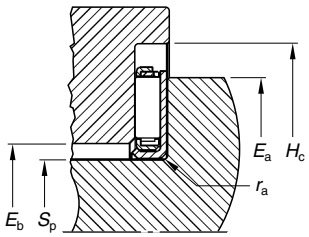
FNTF

Shaft Diameter	Dimensions mm/in. (E13)	(C12)	(-0.1)	Assembly Designation	Load Ratings kN/lbf Dynamic	Static	Limiting Speed Oil
mm	d	D_c	B_1*		C	C_0	RPM
10	10 0.394	26 1.024	2.85 0.112	FNTF-1026	9.88 2220	29.0 6520	16000
13	13 0.512	28 1.102	2.85 0.112	FNTF-1328	10.1 2270	31.3 7040	15000
15	15 0.591	30 1.181	2.85 0.112	FNTF-1530	10.8 2430	34.8 7820	14000
18	18 0.709	35 1.378	2.85 0.112	FNTF-1835	13.8 3100	50.3 11300	12000
23	23 0.906	42 1.654	2.85 0.112	FNTF-2342	18.0 4050	75.3 16900	9700
28	28 1.102	47 1.850	2.85 0.112	FNTF-2847	18.6 4180	82.4 18500	8900
33	33 1.299	52 2.047	2.85 0.112	FNTF-3352	21.6 4860	104 23400	7900
38	38 1.496	60 2.362	3.85 0.152	FNTF-3860	31.4 7060	132 29700	7100
43	43 1.693	65 2.559	3.85 0.152	FNTF-4365	37.8 8500	173 38900	6400
48	48 1.890	70 2.756	3.85 0.152	FNTF-4870	37.9 8520	179 40200	5900
53	53 2.087	78 3.071	3.85 0.152	FNTF-5378	48.5 10900	254 57100	5300

* To be measured under a 1.5 kN (0.34 lb.) load.
Timken manufactures many special sizes of Unitized Needle Roller Thrust Bearing Assemblies.
Please contact your Timken representative for availability.



FNTF Housing Piloting



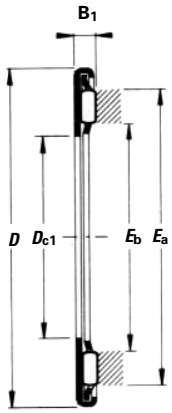
FNTF Shaft Piloting

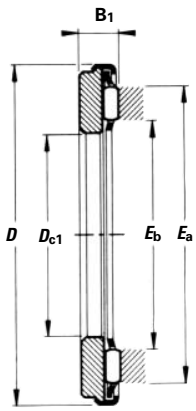
Mounting Dimensions mm/in.					
Housing Piloting		Shaft Piloting			
(H10)	(Max.)	(h10)	(Min.)	(Nom.)	(Nom.)
H_p	S_c	S_p	H_c	E_a	E_b
26 1.024	**8.5** 0.335	**10** 0.394	**27.5** 1.083	**25** 0.984	**14** 0.551
28 1.102	**11.5** 0.453	**13** 0.512	**29.5** 1.161	**27** 1.063	**17** 0.669
30 1.181	**13.5** 0.531	**15** 0.591	**31.5** 1.240	**29** 1.142	**19** 0.748
35 1.378	**16.5** 0.650	**18** 0.709	**36.5** 1.437	**34** 1.339	**22** 0.866
42 1.654	**21.5** 0.846	**23** 0.906	**43.5** 1.713	**41** 1.614	**27** 1.063
47 1.850	**26.5** 1.043	**28** 1.102	**48.5** 1.909	**46** 1.811	**32** 1.260
52 2.047	**31.5** 1.240	**33** 1.299	**53.5** 2.106	**51** 2.008	**37** 1.457
60 2.362	**36.5** 1.437	**38** 1.496	**61.5** 2.421	**57** 2.244	**43** 1.693
65 2.559	**41.5** 1.634	**43** 1.693	**66.5** 2.618	**63** 2.480	**47** 1.850
70 2.756	**46.5** 1.831	**48** 1.890	**71.5** 2.815	**68** 2.677	**52** 2.047
78 3.071	**51.5** 2.028	**53** 2.087	**79.5** 3.130	**76** 2.992	**57** 2.244

r_{as} = 1.0 mm max. (0.039 in. max.)

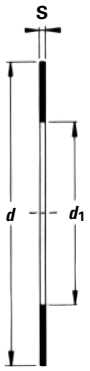
UNITIZED THRUST BEARINGS

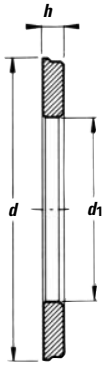
METRIC SERIES





Shaft Diameter	Dimensions mm/in.					Bearing Designation		Wt. kg/lbs.	Load Ratings kN/lbf.		Limiting Speed Oil
						Thin Series	Thick Series		Dynamic	Static	
mm	D_{C1}	D	E_a	E_b	B_1				C	C_o	RPM
5	5 0.205	13 0.513	10.9 0.43	6.3 0.25	2.3 0.090	AX 5 13		1.3 0.003	3.00 670	5.70 1280	25000
5	13 0.205	10.9 0.513	6.3 0.43	3.5 0.25	 0.138	AX 3,5 5 13		2.3 0.005	3.00 670	5.70 1280	25000
6	6 0.244	14 0.553	11.9 0.47	7.3 0.29	2.3 0.090	AX 6 14		1.4 0.003	3.15 710	6.35 1430	22000
	6 0.243	14 0.553	11.9 0.47	7.3 0.29	3.5 0.138		AX 3,5 6 14	2.4 0.005	3.15 710	6.35 1430	22000
7	7 0.283	15 0.592	12.9 0.51	8.3 0.33	2.3 0.090	AX 7 15		1.7 0.004	3.55 800	7.60 1710	22000
	7 0.282	15 0.592	12.9 0.51	8.3 0.33	3.5 0.138		AX 3,5 7 15	2.9 0.006	3.55 800	7.60 1710	22000
8	8 0.323	16 0.631	13.9 0.55	9.3 0.37	2.3 0.090	AX 8 16		1.7 0.004	3.70 830	8.30 1870	22000
	8 0.321	16 0.631	13.9 0.55	9.3 0.37	3.5 0.138		AX 3,5 8 16	3 0.007	3.70 830	8.30 1870	22000
9	9 0.362	17 0.671	14.9 0.59	10.3 0.41	2.3 0.090	AX 9 17		2.1 0.005	4.05 910	9.50 2140	19000
	9 0.361	17 0.671	14.9 0.59	10.3 0.41	3.5 0.138		AX 3,5 9 17	3.6 0.008	4.05 910	9.50 2140	19000
10	10 0.400	22 0.868	18.6 0.73	12.0 0.47	4.0 0.157		AX 4 10 22	6.6 0.015	5.00 1120	10.90 2450	15500
12	12 0.481	26 1.025	22.6 0.89	15.0 0.59	2.8 0.110	AX 12 26		6 0.013	6.90 1550	17.70 3980	13000
	12 0.479	26 1.025	22.6 0.89	15.0 0.59	4.0 0.157		AX 4 12 26	10 0.022	6.90 1550	17.70 3980	13000
13	13 0.521	26 1.025	22.6 0.89	15.0 0.59	2.8 0.110	AX 13 26		6 0.013	6.90 1550	17.70 3980	13000
	13 0.519	26 1.025	22.6 0.89	15.0 0.59	4.0 0.157		AX 4 13 26	9.8 0.022	6.90 1550	17.70 3980	13000
14											
15	15 0.600	28 1.104	24.6 0.97	17.0 0.67	2.8 0.110	AX 15 28		6.9 0.015	7.40 1660	20.00 4500	11500
	15 0.598	28 1.104	24.6 0.97	17.0 0.67	4.0 0.157		AX 4 15 28	9 0.020	7.40 1660	20.00 4500	11500





Dimensions mm/in.			Thin Wt. kg/lbs.	Washer Designation		mm/in.	Thick Wt. kg/lbs.	Washer Designation Precision	mm/in.	Precision Wt. kg/lbs.	Shaft
				Thin	Thick						
d	d_1	s				h			l²		mm
5 0.201	12.4 0.488	0.8 0.031	0.001 0.001	CP 5 13							5
					CP 2 5 13	2.0 0.079	0.002 0.004				
6 0.240	13.4 0.528	0.8 0.031	0.001 0.002	CP 6 14							6
					CP 2 6 14	2.0 0.079	0.002 0.004				
7 0.280	14.4 0.567	0.8 0.031	0.001 0.002	CP 7 15							7
					CP 2 7 15	2.0 0.079	0.002 0.004				
8 0.319	15.4 0.606	0.8 0.031	0.001 0.002	CP 8 16							8
					CP 2 8 16	2.0 0.079	0.002 0.005				
9 0.358	16.4 0.646	0.8 0.031	0.001 0.002	CP 9 17							9
					CP 2 9 17	2.0 0.079	0.002 0.005				
10 0.396	21.2 0.836				CP 2 10 22	2.0 0.079	0.002 0.004				10
12 0.474	25.5 1.003	0.8 0.031	0.003 0.006	CP 12 26				CPN 2 12 26	2.0 0.079	0.006 0.013	12
					CP 2 12 26	2.0 0.079	0.006 0.014				
13 0.514	25.5 1.003	0.8 0.031	0.002 0.005	CP 13 26							13
					CP 2 13 26	2.0 0.079	0.006 0.013				
14 0.553	25.5 1.003	0.8 0.031	0.002 0.005	CP 14 26							
					CP 2 14 26	2.0 0.079	0.006 0.012				
15 0.593	27.5 1.081	0.8 0.031	0.003 0.006	CP 15 28				CPN 2 15 28	2.0 0.079	0.006 0.013	15
					CP 2 15 28	2.0 0.079	0.006 0.013				

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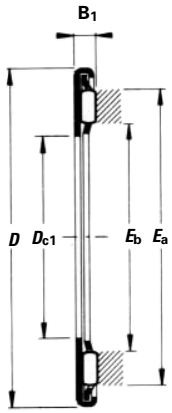
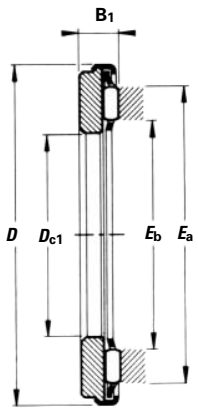
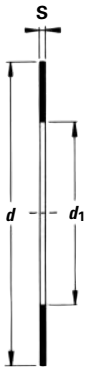
UNITIZED THRUST BEARINGS – *continued*

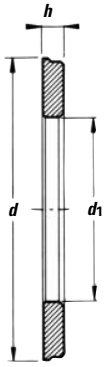
METRIC SERIES





Shaft Diameter	Dimensions mm/in.					Bearing Designation		Wt. kg/lbs.	Load Ratings kN/lbf.		Limiting Speed Oil
						Thin Series	Thick Series		Dynamic	Static	
mm	D_{C1}	D	E_a	E_b	B_1				C	C_o	RPM
17	17 0.678	30 1.183	26.6 1.05	19.0 0.75	2.8 0.110	AX 17 30		7.6 0.017	7.80 1750	22.00 4950	10500
	17 0.677	30 1.183	26.6 1.05	19.0 0.75	4.0 0.157		AX 4 17 30	10 0.022	7.80 1750	22.00 4950	10500
18											
19	19 0.757	32 1.261	28.6 1.13	21.0 0.83	2.8 0.110	AX 19 32		8.6 0.019	8.00 1800	23.30 5240	10000
	19 0.756	32 1.261	28.6 1.13	21.0 0.83	4.0 0.157		AX 4 19 32	13 0.029	8.00 1800	23.30 5240	10000
20	20 0.795	35 1.379	31.6 1.24	22.0 0.87	5.0 0.197		AX 5 20 35	18 0.040	11.80 2650	39.00 8770	9000
25	25 0.994	42 1.655	37.4 1.47	27.7 1.09	2.8 0.110	AX 25 42		11.5 0.025	13.30 2990	49.00 11000	7500
	25 0.992	42 1.655	37.4 1.47	27.7 1.09	5.0 0.197		AX 5 25 42	25 0.055	13.30 2990	49.00 11000	7500
27	27 1.073	44 1.734	39.6 1.56	30.0 1.18	2.8 0.110	AX 27 44		12.1 0.027	13.70 3080	52.00 11690	7200
30	30 1.193	47 1.852	42.4 1.67	32.7 1.29	2.8 0.110	AX 30 47		13.7 0.030	14.50 3260	57.00 12800	6500
	30 1.189	47 1.852	42.4 1.67	32.7 1.29	5.0 0.197		AX 5 30 47	29 0.064	14.50 3260	57.00 12800	6500
31	35 1.385	52 2.048	49.0 1.93	37.2 1.46	2.8 0.110	AX 35 52		18.5 0.041	18.90 4250	84.00 18900	5500
35	35 1.386	52 2.048	49.0 1.93	37.2 1.46	5.0 0.197		AX 5 35 52	35 0.077	18.90 4250	84.00 18900	5500
	35 1.390	53 2.088	49.0 1.93	37.2 1.46	2.8 0.110	AX 35 53		19.3 0.043	18.90 4250	84.00 18900	5500
	35 1.386	53 2.088	49.0 1.93	37.2 1.46	5.0 0.197		AX 5 35 53	36 0.079	18.90 4250	84.00 18900	5500
40	40 1.587	60 2.363	54.9 2.16	43.0 1.69	2.8 0.110	AX 40 60		23.9 0.053	20.40 4590	96.00 21600	5000
	40 1.583	60 2.363	54.9 2.16	43.0 1.69	5.0 0.197		AX 5 40 60	46 0.101	20.40 4590	96.00 21600	5000





Dimensions mm/in.			Thin Wt. kg/lbs.	Washer Designation		mm/in.	Thick Wt. kg/lbs.	Washer Designation Precision	mm/in.	Precision Wt. kg/lbs.	Shaft
				Thin	Thick						
d	d_1	s				h			l^2		mm
17 0.671	**29.5** 1.160	**0.8** 0.031	**0.003** 0.006	**CP 17 30**				**CPN 7 17 30**	**7.0** 0.276	**0.025** 0.055	**17**
					CP 2 17 30	**2.0** 0.079	**0.007** 0.015				
18 0.711	**29.5** 1.160	**0.8** 0.031	**0.003** 0.006	**CP 18 30**							
					CP 2 18 30	**2.0** 0.079	**0.007** 0.015				
19 0.750	**31.5** 1.239	**0.8** 0.031	**0.004** 0.008	**CP 19 32**							**19**
					CP 2 19 32	**2.0** 0.079	**0.009** 0.020				
20 0.789	**34.5** 1.357				**CP 3 20 35**	**3.0** 0.118	**0.013** 0.029	**CPN 3 20 35**	**3.0** 0.118	**0.013** 0.029	**20**
25 0.988	**41.5** 1.634	**0.8** 0.031	**0.005** 0.012	**CP 25 42**				**CPN 3 25 42**	**3.0** 0.118	**0.019** 0.042	**25**
					CP 3 25 42	**3.0** 0.118	**0.019** 0.042				
27 1.065	**43.7** 1.719	**0.8** 0.031	**0.006** 0.013	**CP 27 44**							**27**
30 1.183	**46.5** 1.830	**0.8** 0.031	**0.006** 0.013	**CP 30 47**				**CPN 5 30 47**	**5.0** 0.197	**0.037** 0.082	**30**
					CP 3 30 47	**3.0** 0.118	**0.022** 0.049				
35 1.380	**51.5** 2.026	**0.8** 0.031	**0.007** 0.015	**CP 35 52**				**CPN 3 35 52**	**3.0** 0.118	**0.027** 0.060	**31**
					CP 3 35 52	**3.0** 0.118	**0.026** 0.057				**35**
		0.8 0.031	**0.007** 0.016	**CP 35 53**							
					CP 3 35 53	**3.0** 0.118	**0.027** 0.060				
40 1.577	**59.5** 2.341	**0.8** 0.031	**0.009** 0.021	**CP 40 60**				**CPN 3 40 60**	**3.0** 0.118	**0.034** 0.075	**40**

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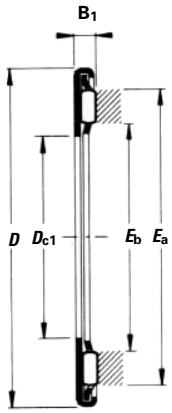
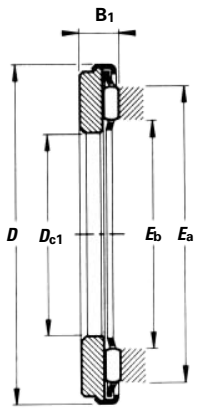
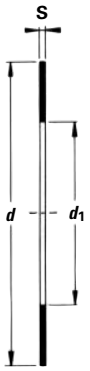
UNITIZED THRUST BEARINGS – *continued*

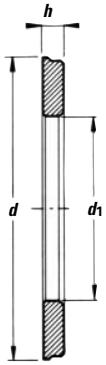
METRIC SERIES





Shaft Diameter	Dimensions mm/in.					Bearing Designation		Wt. kg/lbs.	Load Ratings kN/lbf.		Limiting Speed Oil
						Thin Series	Thick Series		Dynamic	Static	
mm	D_{C1}	D	E_a	E_b	B_1				C	C_o	RPM
45	45 1.783	65 2.560	59.9 2.36	48.0 1.89	2.8 0.110	AX 45 65		24.7 0.054	21.80 4900	109 24500	4500
	45 1.780	65 2.560	59.9 2.36	48.0 1.89	5.0 0.197		AX 5 45 65	50 0.110	21.80 4900	109 24500	4500
50	50 1.982	70 2.757	65.7 2.59	53.3 2.10	2.8 0.110	AX 50 70		25.5 0.056	22.50 5060	118 26500	4000
	50 1.976	70 2.757	65.7 2.59	53.3 2.10	5.0 0.197		AX 5 50 70	55 0.121	22.50 5060	118 26500	4000
55	55 2.179	78 3.072	72.5 2.85	58.4 2.30	2.8 0.110	AX 55 78		34 0.075	28.50 6410	164 36900	3800
	55 2.174	78 3.072	72.5 2.85	58.4 2.30	6.0 0.236		AX 6 55 78	89 0.196	28.50 6410	164 36900	3800
60	60 2.371	85 3.347	79.2 3.12	63.5 2.50	6.0 0.236		AX 6 60 85	106 0.234	31.50 7080	193 43400	3500
65	65 2.573	90 3.544	84.2 3.31	68.5 2.70	3.5 0.138	AX 3,5 65 90		59 0.130	33.50 7530	210 47200	3200
	65 2.568	90 3.544	84.2 3.31	68.5 2.70	6.0 0.236		AX 6 65 90	114 0.251	33.50 7530	210 47200	3200
70	70 2.770	95 3.741	89.2 3.51	73.5 2.89	3.5 0.138	AX 3,5 70 95		61 0.134	34.50 7760	223 50100	3000
	70 2.765	95 3.741	89.2 3.51	73.5 2.89	6.0 0.236		AX 6 70 95	120 0.265	34.50 7760	223 50100	3000
75	75 2.967	100 3.938	94.2 3.71	78.5 3.09	3.5 0.138	AX 3,5 75 100		65 0.143	36.00 8090	240 54000	2900
	75 2.961	100 3.938	94.2 3.71	78.5 3.09	6.0 0.236		AX 6 75 100	127 0.280	36.00 8090	240 54000	2900
80	80 3.165	105 4.135	99.2 3.91	83.5 3.29	3.5 0.138	AX 3,5 80 105		69 0.152	36.50 8210	253 56900	2700
	80 3.158	105 4.135	99.2 3.91	83.5 3.29	6.0 0.236		AX 6 80 105	134 0.295	36.50 8210	253 56900	2700
85	85 3.362	110 4.332	104.2 4.10	88.5 3.48	3.5 0.138	AX 3,5 85 110		78 0.172	38.00 8540	270 60700	2600
	85 3.356	110 4.332	104.2 4.10	88.5 3.48	6.0 0.236		AX 6 85 110	142 0.313	38.00 8540	270 60700	2600
90	90 3.559	120 4.725	112.9 4.44	94.2 3.71	4.5 0.177	AX 4,5 90 120		117 0.258	59.00 13300	360 80900	2400
	90 3.553	120 4.725	112.9 4.44	94.2 3.71	8.0 0.315		AX 8 90 120	238 0.525	59.00 13300	360 80900	2400



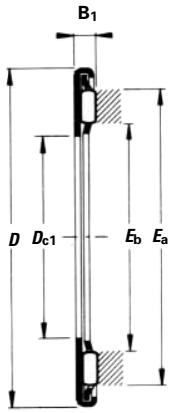


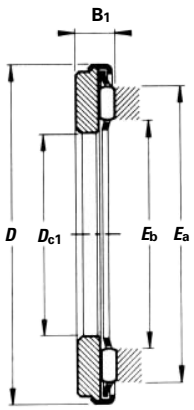
Dimensions mm/in.			Thin Wt. kg/lbs.	Washer Designation		mm/in.	Thick Wt. kg/lbs.	Washer Designation Precision	mm/in.	Precision Wt. kg/lbs.	Shaft
				Thin	Thick						
d	d_1	s				h			l^2		mm
					CP 3 40 60	3.0 0.118	0.034 0.075				
45 1.774	64.3 2.533	0.8 0.031	0.010 0.022	CP 45 65				CPN 3 45 65	3.0 0.118	0.037 0.082	45
				CP 3 45 65	3.0	0.037 0.118	0.082				
50 1.970	69.4 2.731	0.8 0.031	0.011 0.024	CP 50 70							50
				CP 3 50 70	3.0	0.040 0.118	0.088				
55 2.167	77.4 3.046	0.8 0.031	0.014 0.031	CP 55 78							55
				CP 4 55 78		4.0 0.157	0.069 0.152				
60 2.366	84.3 3.318			CP 4 60 85	4.0	0.083 0.157	0.183			60	
65 2.563	89.3 3.515	1.5 0.059	0.033 0.073	CP 1,5 65 90							65
					CP 4 65 90	4.0 0.157	0.088 0.194				
70 2.760	94.3 3.711	1.5 0.059	0.034 0.076	CP 1,5 70 95				CPN 4 70 95	4.0 0.157	0.093 0.205	70
					CP 4 70 95	4.0 0.157	0.093 0.205				
75 2.961	99 3.901	1.5 0.059	0.037 0.082	CP 1,5 75 100							75
					CP 4 75 100	4.0 0.157	0.099 0.218				
80 3.157	104 4.098	1.5 0.059	0.039 0.086	CP 1,5 80 105							80
					CP 4 80 105	4.0 0.157	0.104 0.229				
85 3.350	109 4.302	1.5 0.059	0.047 0.103	CP 1,5 85 110							85
					CP 4 85 110	4.0 0.157	0.111 0.245				
90 3.544	119 4.676	1.5 0.059	0.052 0.115	CP 1,5 90 120							90

Continued on next page.

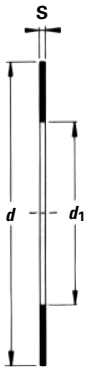
UNITIZED THRUST BEARINGS – *continued*

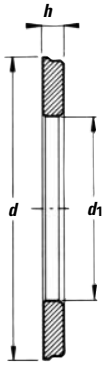
METRIC SERIES





Shaft Diameter	Dimensions mm/in.					Bearing Designation		Wt. kg/lbs.	Load Ratings kN/lbf.		Limiting Speed Oil
						Thin Series	Thick Series		Dynamic	Static	
mm	D_{C1}	D	E_a	E_b	B_1				C	C_o	RPM
100	100 3.947	135 5.316	127.3 5.01	104.2 4.10	9.0 0.354		AX 9 100 135	364 0.802	73.00 16400	490 110000	2100
110	110 4.346	145 5.709	137.3 5.41	114.2 4.50	4.5 0.177	AX 4,5 110 145		168 0.370	77.00 17300	550 124000	2000
	110 4.341	145 5.709	137.3 5.41	114.2 4.50	9.0 0.354		AX 9 110 145	393 0.866	77.00 17300	550 124000	2000
120	120 4.740	155 6.103	147.3 5.80	124.2 4.89	4.5 0.177	AX 4,5 120 155		182 0.401	80.00 18000	590 133000	1800
	120 4.734	155 6.103	147.3 5.80	124.2 4.89	9.0 0.354		AX 9 120 155	424 0.935	80.00 18000	590 133000	1800
130	130 5.129	170 6.694	161.0 6.34	135.0 5.31	11.0 0.432		AX 11 130 170	660 1.455	106 23800	710 160000	1700
140	140 5.522	180 7.087	171.0 6.73	145.0 5.71	9.0 0.353		AX 11 140 180	670 1.477	111 25000	770 173000	1600
150	150 5.916	190 7.481	181.0 7.13	155.0 6.10	9.0 0.353		AX 11 150 190	710 1.565	115 25900	830 187000	1500
160	160 6.310	200 7.874	191.0 7.52	165.0 6.50	9.0 0.353		AX 11 160 200	760 1.676	118 26500	870 196000	1400
170	170 6.704	215 8.465	207.0 8.15	175.0 6.89	12.0 0.471		AX 12 170 215	1000 2.205	165 37100	1160 261000	1300
180	180 7.097	225 8.859	217.0 8.54	185.0 7.28	12.0 0.471		AX 12 180 225	1050 2.315	173 38900	1250 281000	1200
190	190 7.493	240 9.449	232.0 9.13	196.0 7.72	13.9 0.549		AX 14 190 240	1400 3.086	230 51700	1650 371000	1200
200	200 7.886	250 9.843	242.0 9.53	206.0 8.11	13.9 0.549		AX 14 200 250	1500 3.307	239 53700	1730 389000	1100
220	220 8.674	270 10.630	262.0 10.31	226.0 8.90	13.9 0.549		AX 14 220 270	1600 3.527	248 55800	1850 416000	1000
240	240 9.461	300 11.811	286.0 11.26	246.0 9.69	14.9 0.588		AX 15 240 300	2300 5.071	280 62900	2240 504000	900





Dimensions mm/in.			Thin Wt. kg/lbs.	Washer Designation		mm/in.	Thick Wt. kg/lbs.	Washer Designation Precision	mm/in.	Precision Wt. kg/lbs.	Shaft
				Thin	Thick						
d	d_1	s				h			l^2		mm
					CP 5 90 120	5.0 0.197	0.173 0.381				
100 3.938	133.8 5.266				CP 6 100 135	6.0 0.236	0.277 0.611				100
110 4.333	143.8 5.660	1.5 0.059	0.075 0.165	CP 1,5 110 145							110
					CP 6 110 145	6.0 0.236	0.300 0.661				
120 4.726	153.8 6.054	1.5 0.059	0.081 0.179	CP 1,5 120 155							120
					CP 6 120 155	6.0 0.236	0.323 0.712				
130 5.122	168.7 6.640				CP 7 130 170	7.0 0.276	0.480 1.058				130
140 5.516	178.7 7.034				CP 7 140 180	7.0 0.276	0.500 1.102				140
150 5.909	188.7 7.428				CP 7 150 190	7.0 0.276	0.530 1.168				150
160 6.303	198.7 7.821				CP 7 160 200	7.0 0.276	0.560 1.235				160
170 6.697	213.5 8.404				CP 7 170 215	7.0 0.276	0.700 1.543				170
180 7.091	223.5 8.798				CP 7 180 225	7.0 0.276	0.735 1.620				180
190 7.484	238.3 9.380				CP 8 190 240	8.0 0.315	0.950 2.094				190
200 7.878	248.3 9.774				CP 8 200 250	8.0 0.315	1.000 2.205				200
220 8.665	268.3 10.563				CP 8 220 270	8.0 0.315	1.100 2.425				220

CYLINDRICAL ROLLER THRUST BEARINGS AND THEIR COMPONENTS

METRIC SERIES

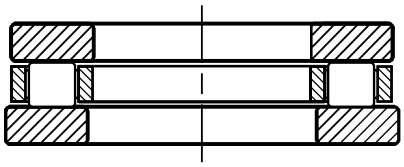
Cylindrical roller thrust bearings provide rolling bearing arrangements which can accommodate high dynamic axial loads as well as shock loads. The simple geometry of the bearing components allows the use of many design arrangements. As an example, for less demanding applications it is possible to combine metric series cylindrical roller and cage thrust assemblies with the metric series heavy thrust washers (LS,CPR) and even metric series thin thrust washers (AS, CP). These two thrust washer types are more commonly used with needle roller and cage thrust assemblies. Cylindrical roller and cage thrust assemblies can also be used without bearing thrust washers if the adjacent machine components can be prepared to serve as suitable raceways.

Cylindrical roller thrust bearings may be used where the load carrying capability of needle roller and cage thrust assemblies is insufficient. Also the bearings can accommodate high dynamic and static axial loads in one direction but they are not suitable to transmit radial loads.

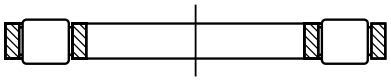
REFERENCE STANDARDS ARE:

- **ISO 104** – Rolling bearings – Thrust Bearings – Boundary dimensions, general plan.
- **ISO 199** – Rolling bearings – Thrust ball bearings – Tolerances.
- **DIN 616** – Rolling bearings – General Plans of Boundary Dimensions
- **DIN 722** – Single direction thrust cylindrical roller bearings

TYPES OF METRIC SERIES CYLINDRICAL ROLLER THRUST BEARINGS AND THEIR COMPONENTS.

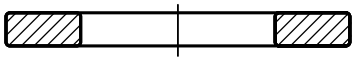


811, 812 Series
Cylindrical roller thrust bearings

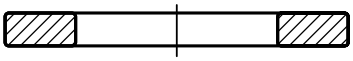


K.811, K.812
Cylindrical roller and cage thrust assemblies

ARZ Series
Unitized cylindrical roller thrust bearing



WS.811, WS.812
Shaft washers



GS.811, GS.812
Housing washers

Suffixes	
LPB	machined light metal window type cage.
TVP	molded window type cage of glass reinforced nylon.

CONSTRUCTION

BASIC DESIGNS

Cylindrical roller thrust bearings of dimension Series 811 and 812 comprise of a cylindrical roller and cage thrust assembly (K), a shaft washer (WS) and a housing washer (GS). Providing the back up surfaces can be hardened and ground they can be used as raceways for the cylindrical rollers of the cylindrical roller and cage thrust assembly, resulting in a compact bearing arrangement.

Series AR are available with thin or thick CP washers or heavy CPR thrust washers.

THRUST BEARINGS WITH TWO THRUST WASHERS

Thrust bearing type AXZ and ARZ each have two thrust washers retained by an integral cap, giving protection against the entry of dirt and metal particles while helping to retain the lubricant.

CAGE DESIGNS

Metric series 811 and 812 cylindrical roller thrust bearings use molded cages of glass fiber reinforced nylon 6/6 (suffix TVP), or machined cages of light metal (suffix LPB). The cages are designed to be piloted on the shaft. The reinforced nylon cages can be used at temperatures up to 120° C (250° F) continuously for extended periods. When lubricating these bearings with oil it should be ensured that the oil does not contain additives detrimental to the cage over extended life at operating temperatures higher than 100° C (212° F). Also, care should be exercised that oil change intervals are observed as old oil may reduce cage life at such temperatures.

The rolling elements of the AR Series thrust bearings are retained and guided in radial pockets within the cage. The cage is retained in relation to the thrust washer by means of a retaining cap. The design of a one-piece steel cage employs a special curvature that guides the rolling elements by their ends along their centerlines.

In addition, this special curvature gives the steel cage great rigidity while providing maximum lubricant space. This unitized assembly of components facilitates installation and provides a high axial load capacity while occupying only minimal space.

AR Series needle thrust bearings with a thin washer are of minimal thickness and provide excellent economy. They should be considered whenever the degree of support and rotational accuracy requirement allow.

BEARING THRUST WASHERS

SHAFT WASHERS AND HOUSING WASHERS

Shaft washers of types WS.811 and WS.812 as well as housing washers of types GS.811 and GS.812 are components of the metric series cylindrical roller thrust bearings of series 811 and 812. They are made of bearing quality steel, with hardened and precision ground and lapped flat raceway surfaces. The tolerances of the thrust bearing bore and outside diameter shown in the engineering section apply to shaft and housing piloted metric series washers.

HEAVY THRUST WASHERS (LS), THIN THRUST WASHERS (AS)

These thrust washers, more frequently used with needle roller and cage thrust assemblies of metric series FNT or AXK, are also suitable for use with the cylindrical roller and cage thrust assemblies K.811. The heavy thrust washer of series LS are made of bearing quality steel, hardened and precision ground on the flat raceway surfaces. The bore and outside diameters of the heavy thrust washers are not ground, therefore, when used with K.811 type assemblies they are only suggested where accurate centering is not required. The thin thrust washers of series AS may be used in applications where the loads are light. Both types of these washers are listed in the tabular part of the metric series needle roller and cage thrust assemblies section.

THIN (CP) AND THICK (CPR) THRUST WASHERS

The washer incorporated in the AR Series thrust bearing is made from hardened bearing steel and forms one of the raceways for the rolling elements. The opposing raceway is generally provided by a separate thrust washer of similar design supplied by Timken. When the AR Series thrust bearing is piloted by the revolving part, the thrust washer must be piloted by the stationary part and vice versa. If the revolving part and the stationary part are noticeably eccentric to each other, the thrust bearing with integral washer must, without exception, be piloted by the revolving part.

The second raceway for the rolling elements may also be formed by the face of a shoulder or an inserted washer, provided these have the correct hardness and geometrical dimensions.

DIMENSIONAL ACCURACY

The tolerances for the metric series cylindrical roller thrust bearing bore and outside diameter shown in the engineering section apply to shaft piloted washers of series WS.811 and WS.812 as well as housing piloted washers of series GS.811 and GS.812. Tolerances for the bore diameter of series K.811 and K.812 thrust assemblies are given on tabular page C254.

The tolerances for the bore and outside diameter of series AS thrust washers are shown in Table 2 below. The tolerances for the bore and outside diameter of series LS thrust washers are given in Table 3. Bore inspection procedures for thin thrust washers (AS) and heavy thrust washers (LS) are given on page C230.

TABLE 2 –
TOLERANCES FOR OUTSIDE DIAMETER (d_1) AND BORE DIAMETER (d) OF SERIES AS THRUST WASHERS.

d_1 mm		Deviations of max. outside dia. (e13) µm		d mm		Deviations of min. bore dia. (E12) µm	
>	≤	high	low	>	≤	low	high
18	30	-40	-370	3	6	+20	+140
30	50	-50	-440	6	10	+25	+175
50	80	-60	-520	10	18	+32	+212
80	120	-72	-612	18	30	+40	+250
120	180	-85	-715	30	50	+50	+300
180	250	-100	-820	50	80	+60	+360
				80	120	+72	+422
				120	180	+85	+485

Tolerances for the outside and bore diameters of series LS heavy thrust washers are given in Table 3. Thickness tolerances for series LS heavy thrust washers are given in tabular pages.

TABLE 3 –
TOLERANCES FOR OUTSIDE DIAMETER (d_1) AND BORE DIAMETER (d) OF SERIES LS HEAVY THRUST WASHERS.

d_1 mm		Deviations of max. outside dia. (a12) µm		d mm		Deviations of min. bore dia. (E12) µm	
>	≤	high	low	>	≤	low	high
18	30	-300	-510	3	6	+20	+140
30	40	-310	-560	6	10	+25	+175
40	50	-320	-570	10	18	+32	+212
50	65	-340	-640	18	30	+40	+250
65	80	-360	-660	30	50	+50	+300
80	100	-380	-730	50	80	+60	+360
100	120	-410	-760	80	120	+72	+422
120	140	-460	-860	120	180	+85	+485
140	160	-520	-920				
160	180	-580	-980				
180	200	-660	-1120				

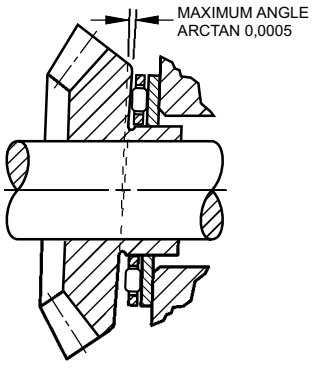
MOUNTING TOLERANCES

Shaft and housing tolerances for mounting metric series cylindrical roller and cage thrust assemblies are given in Table 4 shown below. If the cylindrical rollers of the cylindrical roller and cage thrust assemblies are to run directly on the adjacent support surfaces, these must be hardened to at least 58 HRC. Raceway contact dimensions E_a and E_b must be observed.

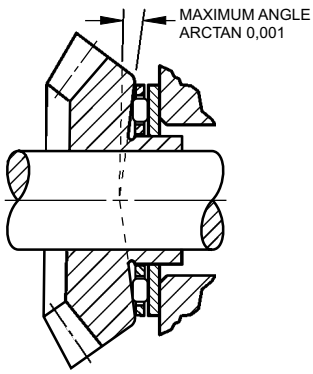
TABLE 4 –
MOUNTING TOLERANCES FOR SHAFTS AND HOUSINGS FOR METRIC SERIES COMPONENTS.

Bearing Components	Shaft Tolerance (shaft piloting)	Housing Tolerance (housing piloting)	Piloting Member
Cylindrical roller & needle roller cage thrust assembly Types: AXK, FNT, K.811 and K.812	h8	H10	shaft
Cylindrical roller & needle roller cage thrust assembly Types: AX, AR, AXZ, and ARZ	h10	H10	shaft
Thin thrust washer Type: AS	h10	H11	shaft
Heavy thrust washer Type: LS	h10	H11	shaft
Shaft piloted thrust washer Type: WS.811	h6 (j6)	clearance	shaft
Housing piloted thrust washer Type: GS.811	Clearance	H7 (K7)	housing
Thick, thin and heavy series thrust washers Types: CP and CPR	h10	H10	as required

The backup surfaces for the shaft washers WS.811 and WS.812 as well as the housing washers GS.811 and GS.812 of cylindrical roller thrust bearings must be square with the axis of the shaft. Equally important, the raceway or the surface backing the thrust washer, must not be dished or coned. The permissible limits of the squareness and dishing or coning are shown in figures 1 and 2. When using the thin (AS) thrust washers the cylindrical rollers of the thrust cage assembly must be supported over their entire length.



Out of Square Surface
Figure 1



Dished or Coned Surface
Figure 2

Bearing thrust washers should make close contact with the shaft or housing shoulder and must not touch the fillet radius. Therefore the maximum fillet radius $r_{as\ max}$ must be no greater than the minimum chamfer $r_{s\ min}$ of the shaft washer (WS) and the housing washer (GS). See tabular page C255.

Since roller thrust bearings generally run under considerable loads, their incorporated washer (and thrust washer) should be supported on a shoulder covering the whole area of circulation of the rollers bounded by dimensions E_b and E_a.

LOAD RATINGS

MINIMUM AXIAL LOAD

To prevent slippage a cylindrical roller thrust bearing must always be axially loaded. For satisfactory operation a certain minimum load must be applied between the cylindrical rollers and their raceways. This can be calculated from:

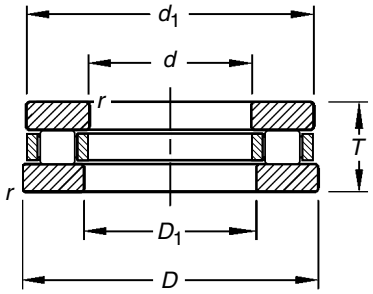
$$F_{a\ min} = 0.1 \bullet C_0/2200 \quad (kN)$$

where

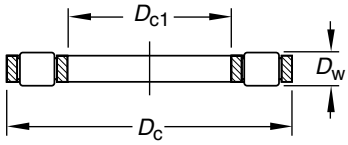
C_0 – static load rating (kN)
$F_{a\ min}$ – minimum axial load (kN)

C

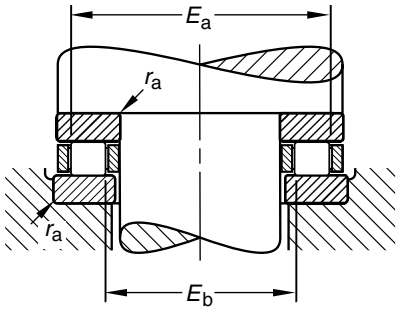
CYLINDRICAL ROLLER THRUST BEARINGS
CYLINDRICAL ROLLER AND CAGE THRUST ASSEMBLIES
METRIC SERIES



811, 812

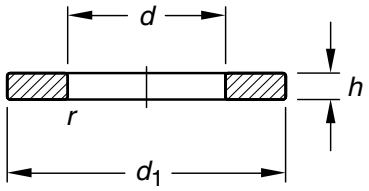


K811, K812

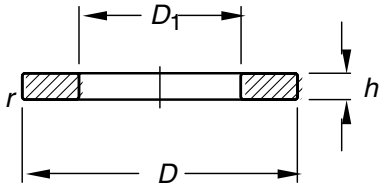


Raceway contact dimensions

Shaft Diameter	Dimensions mm/in. E11	a13					Assembly Designation	Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Oil	Wt. kg/lbs.
mm	D_{c1}	D_c	D_w	E_b	E_a	$r_{as\ max}$		C	C_o	RPM	
15	15 0.5906	28 1.1024	3.5 0.1378	18 0.709	25 0.984	0.3 0.012	K.81102LPB	12.8 2880	28.6 6430	12000	0.006 0.013
	15 0.5906	28 1.1024	3.5 0.1378	18 0.709	25 0.984	0.3 0.012	K.81102TVP	12.8 2880	28.6 6430	12000	0.006 0.013
17	17 0.6693	30 1.1811	3.5 0.1378	20 0.787	27 1.063	0.3 0.012	K.81103LPB	14.2 3190	33.4 7510	11000	0.008 0.018
	17 0.6693	30 1.1811	3.5 0.1378	20 0.787	27 1.063	0.3 0.012	K.81103TVP	14.2 3190	33.4 7510	11000	0.008 0.018
20	20 0.7874	35 1.3780	4.5 0.1772	23 0.906	32 1.260	0.3 0.012	K.81104TVP	23.6 5310	56.8 12800	9500	0.009 0.020
25	25 0.9843	42 1.6535	5.0 0.1969	28 1.102	39 1.535	0.6 0.024	K.81105TVP	31.2 7010	81.0 18200	8000	0.014 0.031
30	30 1.1811	47 1.8504	5.0 0.1969	33 1.299	44 1.732	0.6 0.024	K.81106LPB	33.0 7420	91.1 20500	6700	0.026 0.057
	30 1.1811	47 1.8504	5.0 0.1969	33 1.299	44 1.732	0.6 0.024	K.81106TVP	33.0 7420	91.1 20500	6700	0.016 0.035
	30 1.1811	52 2.0472	7.5 0.2953	33 1.299	49 1.929	0.6 0.024	K.81206LPB	56.9 12800	141 31700	6300	0.052 0.115
	30 1.1811	52 2.0472	7.5 0.2953	33 1.299	49 1.929	0.6 0.024	K.81206TVP	56.9 12800	141 31700	6300	0.034 0.075
35	35 1.3780	52 2.0472	5.0 0.1969	38 1.496	49 1.929	0.6 0.024	K.81107LPB	34.8 7820	101 22700	6000	0.025 0.055
	35 1.3780	52 2.0472	5.0 0.1969	38 1.496	49 1.929	0.6 0.024	K.81107TVP	34.8 7820	101 22700	6000	0.020 0.044
	35 1.3780	62 2.4409	7.5 0.2953	41 1.614	56 2.205	1.0 0.039	K.81207LPB	61.6 13800	164 36900	5300	0.073 0.161
	35 1.3780	62 2.4409	7.5 0.2953	41 1.614	56 2.205	1.0 0.039	K.81207TVP	61.6 13800	164 36900	5300	0.055 0.121
40	40 1.5748	60 2.3622	6.0 0.2362	44 1.732	56 2.205	0.6 0.024	K.81108LPB	49.8 11200	148 33300	5300	0.044 0.097
	40 1.5748	60 2.3622	6.0 0.2362	44 1.732	56 2.205	0.6 0.024	K.81108TVP	49.8 11200	148 33300	5300	0.031 0.068
	40 1.5748	68 2.6772	9.0 0.3543	45 1.772	63 2.480	1.0 0.039	K.81208TVP	86.8 19500	233 52400	4800	0.076 0.168
45	45 1.7717	65 2.5591	6.0 0.2362	49 1.929	61 2.402	0.6 0.024	K.81109LPB	52.3 11800	163 36600	4800	0.035 0.077
	45 1.7717	65 2.5591	6.0 0.2362	49 1.929	61 2.402	0.6 0.024	K.81109TVP	52.3 11800	163 36600	4800	0.035 0.077
	45 1.7717	73 2.8740	9.0 0.3543	50 1.969	68 2.677	1.0 0.039	K.81209TVP	94.2 21200	266 59800	4500	0.083 0.183



WS.811, WS.812



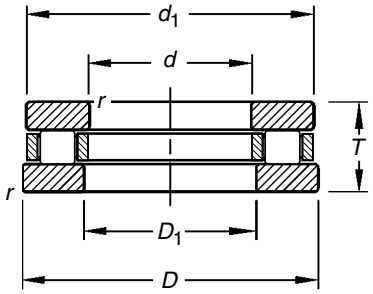
GS.811, GS.812

Dimensions mm/in.			Max.	Min.		Asembly Designation		Wt. kg/lbs.	Shaft Diameter
d	D_1	D_1 d_1	h		$r_{s\ min}$				mm
15 0.591	**16** 0.630	**28** 1.102	**2.75** 0.108	**2.64** 0.104	**0.3** 0.012	**WS.81102**	**GS.81102**	**0.010** 0.022	**15**
15 0.591	**16** 0.630	**28** 1.102	**2.75** 0.108	**2.64** 0.104	**0.3** 0.012	**WS.81102**	**GS.81102**	**0.010** 0.022	
17 0.669	**18** 0.709	**30** 1.181	**2.75** 0.108	**2.64** 0.104	**0.3** 0.012	**WS.81103**	**GS.81103**	**0.011** 0.024	**17**
17 0.669	**18** 0.709	**30** 1.181	**2.75** 0.108	**2.64** 0.104	**0.3** 0.012	**WS.81103**	**GS.81103**	**0.011** 0.024	
20 0.787	**21** 0.827	**35** 1.378	**2.75** 0.108	**2.62** 0.103	**0.3** 0.012	**WS.81104**	**GS.81104**	**0.014** 0.031	**20**
25 0.984	**26** 1.024	**42** 1.654	**3.00** 0.118	**2.87** 0.113	**0.6** 0.024	**WS.81105**	**GS.81105**	**0.021** 0.046	**25**
30 1.181	**32** 1.260	**47** 1.850	**3.00** 0.118	**2.87** 0.113	**0.6** 0.024	**WS.81106**	**GS.81106**	**0.023** 0.051	**30**
30 1.181	**32** 1.260	**47** 1.850	**3.00** 0.118	**2.87** 0.113	**0.6** 0.024	**WS.81106**	**GS.81106**	**0.023** 0.051	
30 1.181	**32** 1.260	**52** 2.047	**4.25** 0.167	**4.12** 0.162	**0.6** 0.024	**WS.81206**	**GS.81206**	**0.047** 0.104	
30 1.181	**32** 1.260	**52** 2.047	**4.25** 0.167	**4.12** 0.162	**0.6** 0.024	**WS.81206**	**GS.81206**	**0.047** 0.104	
35 1.378	**37** 1.457	**52** 2.047	**3.50** 0.138	**3.34** 0.131	**0.6** 0.024	**WS.81107**	**GS.81107**	**0.032** 0.071	**35**
35 1.378	**37** 1.457	**52** 2.047	**3.50** 0.138	**3.34** 0.131	**0.6** 0.024	**WS.81107**	**GS.81107**	**0.032** 0.071	
35 1.378	**37** 1.457	**62** 2.441	**5.25** 0.207	**5.09** 0.200	**1.0** 0.039	**WS.81207**	**GS.81207**	**0.085** 0.187	
35 1.378	**37** 1.457	**62** 2.441	**5.25** 0.207	**5.09** 0.200	**1.0** 0.039	**WS.81207**	**GS.81207**	**0.085** 0.187	
40 1.575	**42** 1.654	**60** 2.362	**3.50** 0.138	**3.34** 0.131	**0.6** 0.024	**WS.81108**	**GS.81108**	**0.043** 0.095	**40**
40 1.575	**42** 1.654	**60** 2.362	**3.50** 0.138	**3.34** 0.131	**0.6** 0.024	**WS.81108**	**GS.81108**	**0.043** 0.095	
40 1.575	**42** 1.654	**68** 2.677	**5.00** 0.197	**4.84** 0.191	**1.0** 0.039	**WS.81208**	**GS.81208**	**0.093** 0.205	
45 1.772	**47** 1.850	**65** 2.559	**4.00** 0.157	**3.84** 0.151	**0.6** 0.024	**WS.81109**	**GS.81109**	**0.054** 0.119	**45**
45 1.772	**47** 1.850	**65** 2.559	**4.00** 0.157	**3.84** 0.151	**0.6** 0.024	**WS.81109**	**GS.81109**	**0.054** 0.119	
45 1.772	**47** 1.850	**73** 2.874	**5.50** 0.217	**5.34** 0.210	**1.0** 0.039	**WS.81209**	**GS.81209**	**0.112** 0.247	

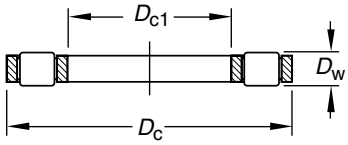
Continued on next page.

CYLINDRICAL ROLLER THRUST BEARINGS
CYLINDRICAL ROLLER AND CAGE THRUST ASSEMBLIES – *continued*

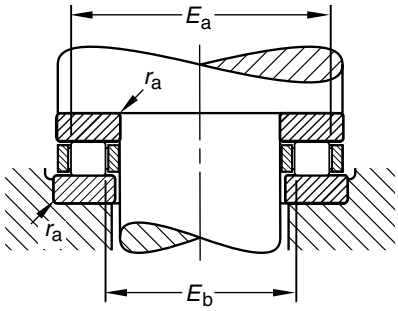
METRIC SERIES



811, 812

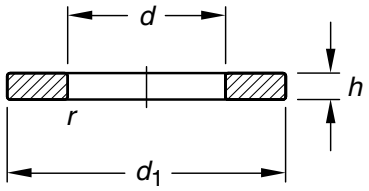


K811, K812

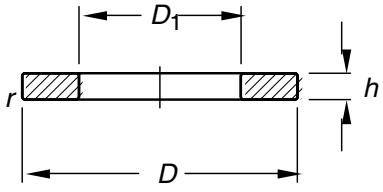


Raceway contact dimensions

Shaft Diameter	Dimensions mm/in. E11	a13					Assembly Designation	Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Oil	Wt. kg/lbs.
mm	D_{c1}	D_c	D_w	E_b	E_a	$r_{as\ max}$		C	C_o	RPM	
50	50 1.9685	70 2.7559	6.0 0.2362	54 2.126	66 2.598	0.6 0.024	K.81110LPB	54.8 12300	177 39800	4300	0.052 0.115
	50 1.9685	70 2.7559	6.0 0.2362	54 2.126	66 2.598	0.6 0.024	K.81110TVP	54.8 12300	177 39800	4300	0.042 0.093
	50 1.9685	78 3.0709	9.0 0.3543	55 2.165	73 2.874	1.0 0.039	K.81210TVP	101 22700	299 67200	4000	0.089 0.196
55	55 2.1654	78 3.0709	6.0 0.2362	60 2.362	73 2.874	0.6 0.024	K.81111TVP	60.3 13600	207 46500	4000	0.066 0.146
	55 2.1654	90 3.5433	11.0 0.4331	61 2.402	84 3.307	1.0 0.039	K.81211LPB	138 31000	403 90600	3600	0.156 0.344
	55 2.1654	90 3.5433	11.0 0.4331	61 2.402	84 3.307	1.0 0.039	K.81211TVP	138 31000	403 90600	3600	0.140 0.309
60	60 2.3622	85 3.3465	7.5 0.2953	65 2.559	80 3.150	1.0 0.039	K.81112TVP	84.4 19000	281 63200	3600	0.103 0.227
	60 2.3622	95 3.7402	11.0 0.4331	66 2.598	89 3.504	1.0 0.039	K.81212LPB	129 29000	378 85000	3400	0.166 0.366
65	65 2.5591	90 3.5433	7.5 0.2953	70 2.756	85 3.346	1.0 0.039	K.81113TVP	88.3 19900	305 68600	3400	0.109 0.240
	65 2.5591	100 3.9370	11.0 0.4331	71 2.795	94 3.701	1.0 0.039	K.81213LPB	134 30100	403 90600	3200	0.176 0.388
70	70 2.7559	95 3.7402	7.5 0.2953	75 2.953	90 3.543	1.0 0.039	K.81114TVP	92.1 20700	328 73700	3200	0.056 0.123
	70 2.7559	105 4.1339	11.0 0.4331	76 2.992	99 3.898	1.0 0.039	K.81214LPB	138 31000	428 96200	3000	0.186 0.410
75	75 2.9528	100 3.9370	7.5 0.2953	80 3.150	95 3.740	1.0 0.039	K.81115LPB	86.1 19400	305 68600	3000	0.091 0.201
	75 2.9528	110 4.3307	11.0 0.4331	81 3.189	104 4.094	1.0 0.039	K.81215LPB	143 32100	453 101800	2800	0.197 0.434
80	80 3.1496	105 4.1339	7.5 0.2953	85 3.346	100 3.937	1.0 0.039	K.81116LPB	87.5 19700	316 71000	2800	0.103 0.227
	80 3.1496	115 4.5276	11.0 0.4331	86 3.386	109 4.291	1.0 0.039	K.81216LPB	147 33000	478 107500	2600	0.208 0.459
85	85 3.3465	110 4.3307	7.5 0.2953	90 3.543	105 4.134	1.0 0.039	K.81117LPB	88.9 20000	328 73700	2600	0.108 0.238
	85 3.3465	125 4.9213	12.0 0.4724	93 3.661	117 4.606	1.0 0.039	K.81217LPB	174 39100	572 128600	2400	0.376 0.829
90	90 3.5433	120 4.7244	9.0 0.3543	96 3.780	114 4.488	1.0 0.039	K.81118LPB	119 26800	432 97100	2400	0.156 0.344
	90 3.5433	135 5.3150	14.0 0.5512	98 3.858	127 5.000	1.0 0.039	K.81218LPB	215 48300	691 155300	2400	0.540 1.190



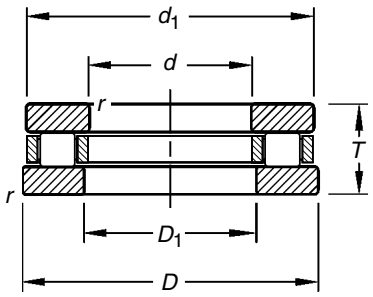
WS.811, WS.812



GS.811, GS.812

Dimensions mm/in.			Max.	Min.		Asembly Designation		Wt. kg/lbs.	Shaft Diameter
d	D_1	D_1 d_1	h		$r_{s\ min}$				mm
50 1.969	52 2.047	70 2.756	4.00 0.157	3.84 0.151	0.6 0.024	WS.81110	GS.81110	0.059 0.130	50
50 1.969	52 2.047	70 2.756	4.00 0.157	3.84 0.151	0.6 0.024	WS.81110	GS.81110	0.059 0.130	
50 1.969	52 2.047	78 3.071	6.5 0.256	6.34 0.250	1.0 0.039	WS.81210	GS.81210	0.144 0.317	55
55 2.165	57 2.244	78 3.071	5.00 0.197	4.81 0.189	0.6 0.024	WS.81111	GS.81111	0.094 0.207	
55 2.165	57 2.244	90 3.543	7.00 0.276	6.81 0.268	1.0 0.039	WS.81211	GS.81211	0.219 0.483	
55 2.165	57 2.244	90 3.543	7.00 0.276	6.81 0.268	1.0 0.039	WS.81211	GS.81211	0.219 0.483	
60 2.362	62 2.441	85 3.346	4.75 0.187	4.56 0.180	1.0 0.039	WS.81112	GS.81112	0.106 0.234	60
60 2.362	62 2.441	95 3.740	7.50 0.295	7.31 0.288	1.0 0.039	WS.81212	GS.81212	0.251 0.553	
65 2.559	67 2.638	90 3.543	5.25 0.207	5.06 0.199	1.0 0.039	WS.81113	GS.81113	0.125 0.276	65
65 2.559	67 2.638	100 3.937	8.00 0.315	7.81 0.307	1.0 0.039	WS.81213	GS.81213	0.285 0.628	
70 2.756	72 2.835	95 3.740	5.25 0.207	5.06 0.199	1.0 0.039	WS.81114	GS.81114	0.133 0.293	70
70 2.756	72 2.835	105 4.134	8.00 0.315	7.81 0.307	1.0 0.039	WS.81214	GS.81214	0.302 0.666	
75 2.953	77 3.031	100 3.937	5.75 0.226	5.56 0.219	1.0 0.039	WS.81115	GS.81115	0.155 0.342	75
75 2.953	77 3.031	110 4.331	8.00 0.315	7.81 0.307	1.0 0.039	WS.81215	GS.81215	0.319 0.703	
80 3.150	82 3.228	105 4.134	5.75 0.226	5.56 0.219	1.0 0.039	WS.81116	GS.81116	0.165 0.364	80
80 3.150	82 3.228	115 4.528	8.50 0.335	8.31 0.327	1.0 0.039	WS.81216	GS.81216	0.357 0.787	
85 3.346	87 3.425	110 4.331	5.75 0.226	5.53 0.218	1.0 0.039	WS.81117	GS.81117	0.173 0.381	85
85 3.346	88 3.465	125 4.921	9.50 0.374	9.28 0.365	1.0 0.039	WS.81217	GS.81217	0.492 1.085	
90 3.543	92 3.622	120 4.724	6.50 0.256	6.28 0.247	1.0 0.039	WS.81118	GS.81118	0.253 0.558	90
90 3.543	93 3.661	135 5.315	10.50 0.413	10.28 0.405	1.1 0.043	WS.81218	GS.81218	0.655 1.444	

CYLINDRICAL ROLLER THRUST BEARINGS
CYLINDRICAL ROLLER AND CAGE THRUST ASSEMBLIES
METRIC SERIES



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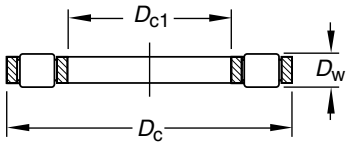

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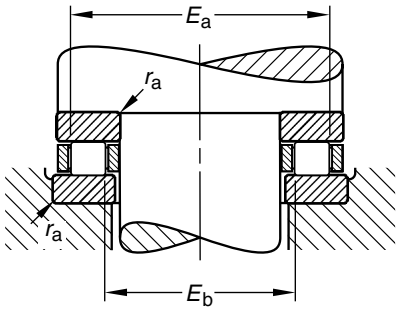


Raceway contact dimensions

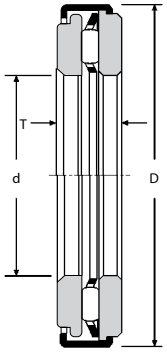
Shaft Diameter	Dimensions mm/in.							Bearing Designation	Load Ratings N/lbf. Dynamic	Load Ratings N/lbf. Static	Limiting Speed Oil	Wt. kg/lbs.
mm	d	D	D_w	T	E_b	E_a	$r_{as\ max}$		C	C_o	RPM	
15	15 0.5906	28 1.1024	3.5 0.1378	9 0.354	18 0.709	25 0.984	0.3 0.012	81102LPB	12.8 2880	28.6 6430	12000	0.029 0.064
	15 0.5906	28 1.1024	3.5 0.1378	9 0.354	18 0.709	25 0.984	0.3 0.012	81102TVP	12.8 2880	28.6 6430	12000	0.022 0.049
17	17 0.6693	30 1.1811	3.5 0.1378	9 0.354	20 0.787	27 1.063	0.3 0.012	81103TVP	14.2 3190	33.4 7510	11000	0.000 0.000
20	20 0.7874	35 1.3780	4.5 0.1772	10 0.394	23 0.906	32 1.260	0.3 0.012	81104TVP	23.6 5310	56.8 12800	9500	0.040 0.088
25	25 0.9843	42 1.6535	5.0 0.1969	11 0.433	28 1.102	39 1.535	0.6 0.024	81105TVP	31.2 7010	81.0 18200	8000	0.070 0.154
30	30 1.1811	47 1.8504	5.0 0.1969	11 0.433	33 1.299	44 1.732	0.6 0.024	81106TVP	33.0 7420	91.1 20500	6700	0.060 0.132
	30 1.1811	52 2.0472	7.5 0.2953	16 0.630	33 1.299	49 1.929	0.6 0.024	81206TVP	56.9 12800	141 31700	6300	0.128 0.282
35	35 1.3780	52 2.0472	5.0 0.1969	12 0.472	38 1.496	49 1.929	0.6 0.024	81107TVP	34.8 7820	101 22700	6000	0.081 0.179
	35 1.3780	62 2.4409	7.5 0.2953	18 0.709	41 1.614	56 2.205	1.0 0.039	81207TVP	61.6 13800	164 36900	5300	0.250 0.551
40	40 1.5748	60 2.3622	6.0 0.2362	13 0.512	44 1.732	56 2.205	0.6 0.024	81108TVP	49.8 11200	148 33300	5300	0.100 0.220
	40 1.5748	68 2.6772	9.0 0.3543	19 0.748	45 1.772	63 2.480	1.0 0.039	81208TVP	86.8 19500	233 52400	4800	0.266 0.586
45	45 1.7717	65 2.5591	6.0 0.2362	14 0.551	49 1.929	61 2.402	0.6 0.024	81109TVP	52.3 11800	163 36600	4800	0.141 0.311
50	50 1.9685	70 2.7559	6.0 0.2362	14 0.551	54 2.126	66 2.598	0.6 0.024	81110LPB	54.8 12300	177 39800	4300	0.152 0.335
	50 1.9685	70 2.7559	6.0 0.2362	14 0.551	54 2.126	66 2.598	0.6 0.024	81110TVP	54.8 12300	177 39800	4300	0.160 0.353
	50 1.9685	78 3.0709	9.0 0.3543	22 0.866	55 2.165	73 2.874	1.0 0.039	81210TVP	101 22700	299 67200	4000	0.437 0.963
55	55 2.1654	78 3.0709	6.0 0.2362	16 0.630	60 2.362	73 2.874	0.6 0.024	81111TVP	60.3 13600	207 46500	4000	0.233 0.514
	55 2.1654	90 3.5433	11.0 0.4331	25 0.984	61 2.402	84 3.307	1.0 0.039	81211TVP	138 31000	403 90600	3600	0.584 1.287

C

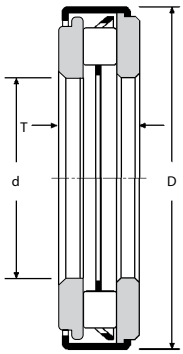
Shaft Diameter	Dimensions mm/in.							Bearing Designation	Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speed Oil	Wt. kg/lbs.
mm	d	D	D_w	T	E_b	E_a	$r_{as\ max}$		C	C_o	RPM	
60	60 2.3622	85 3.3465	7.5 0.2953	17 0.669	65 2.559	80 3.150	1.0 0.039	81112TVP	84.4 19000	281 63200	3600	0.315 0.694
	60 2.3622	95 3.7402	11.0 0.4331	26 1.024	66 2.598	89 3.504	1.0 0.039	81212LPB	129 29000	378 85000	3400	0.770 1.698
65	65 2.5591	90 3.5433	7.5 0.2953	18 0.709	70 2.756	85 3.346	1.0 0.039	81113TVP	88.3 19900	305 68600	3400	0.360 0.794
	65 2.5591	100 3.9370	11.0 0.4331	27 1.063	71 2.795	94 3.701	1.0 0.039	81213LPB	134 30100	403 90600	3200	0.805 1.775
70	70 2.7559	95 3.7402	7.5 0.2953	18 0.709	75 2.953	90 3.543	1.0 0.039	81114TVP	92.1 20700	328 73700	3200	0.352 0.776
	70 2.7559	105 4.1339	11.0 0.4331	27 1.063	76 2.992	99 3.898	1.0 0.039	81214LPB	138 31000	428 96200	3000	0.868 1.914
75	75 2.9528	100 3.9370	7.5 0.2953	19 0.748	80 3.150	95 3.740	1.0 0.039	81115LPB	86.1 19400	305 68600	3000	0.405 0.893
	75 2.9528	110 4.3307	11.0 0.4331	27 1.063	81 3.189	104 4.094	1.0 0.039	81215LPB	143 32100	453 102000	2800	0.780 1.720
80	80 3.1496	105 4.1339	7.5 0.2953	19 0.748	85 3.346	100 3.937	1.0 0.039	81116LPB	87.5 19700	316 71000	2800	0.412 0.908
	80 3.1496	115 4.5276	11.0 0.4331	28 1.102	86 3.386	109 4.291	1.0 0.039	81216LPB	147 33000	478 107000	2600	1.080 2.381
85	85 3.3465	110 4.3307	7.5 0.2953	19 0.748	90 3.543	105 4.134	1.0 0.039	81117LPB	88.9 20000	328 73700	2600	0.480 1.058
	85 3.3465	125 4.9213	12.0 0.4724	31 1.220	93 3.661	117 4.606	1.0 0.039	81217LPB	174 39100	572 129000	2400	1.360 2.998
90	90 3.5433	120 4.7244	9.0 0.3543	22 0.866	96 3.780	114 4.488	1.0 0.039	81118LPB	119 26800	432 97100	2400	0.710 1.565
	90 3.5433	135 5.3150	14.0 0.5512	35 1.378	98 3.858	127 5.000	1.0 0.039	81218LPB	215 48300	691 155000	2400	1.850 4.079

NEEDLE OR ROLLER THRUST BEARINGS

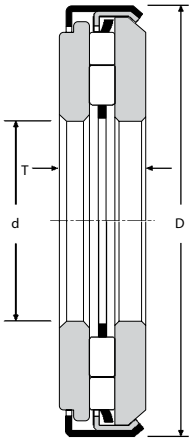
METRIC SERIES



AXZ



ARZ LIGHT



ARZ HEAVY

Shaft Diameter	mm/in.			AXZ	ARZ Light	ARZ Heavy	Load Ratings kN/lbf.		Limiting Speed Oil	Wt. kg/lbs.
mm	d	D	T				C	C_0	RPM	
5	5 0.197	13 0.512	5.5 0.217	AXZ 5,5 5 13			3.00 670	5.70 1300	25000	0.004 0.008
6	6 0.236	14 0.551	5.5 0.217	AXZ 5,5 6 14			3.15 710	6.35 1400	22000	0.004 0.009
7	7 0.276	15 0.591	5.5 0.217	AXZ 5,5 7 15			3.55 800	7.60 1700	22000	0.005 0.010
8	8 0.315	16 0.630	5.5 0.217	AXZ 5,5 8 16			3.70 830	8.30 1900	22000	0.005 0.011
9	9 0.354	17 0.669	5.5 0.217	AXZ 5,5 9 17			4.05 910	9.50 2100	19000	0.005 0.012
10	10 0.394	22.4 0.882	6.5 0.256		ARZ 6,5 10 22,4		8.20 1840	17.9 4000	15500	0.012 0.026
	10 0.394	22.4 0.882	6 0.236	AXZ 6 10 22,4			5.00 1120	10.9 2500	15500	0.011 0.025
12	12 0.472	26.4 1.039	6 0.236	AXZ 6 12 26,4			6.90 1550	17.7 4000	13000	0.017 0.037
	12 0.472	26.4 1.039	7 0.275		ARZ 7 12 26,4		12.7 2860	29.5 6600	13000	0.017 0.037
15	15 0.591	28.4 1.118	6 0.236	AXZ 6 15 28,4			7.40 1660	20.0 4500	11500	0.016 0.034
	15 0.591	28.4 1.118	7 0.275		ARZ 7 15 28,4		14.0 3150	34.0 7600	11500	0.019 0.042
17	17 0.669	30 1.197	6 0.236	AXZ 6 17 30,4			7.80 1750	22.0 4900	10500	0.018 0.039
	17 0.669	30.4 1.197	7 0.275		ARZ 7 17 30,4		15.0 3370	39.0 8800	10500	0.022 0.049
20	20 0.787	35 1.394	8 0.315	AXZ 8 20 35,4			11.80 2650	39.0 8800	9000	0.033 0.072
	20 0.787	35.4 1.394	10 0.394		ARZ 10 20 35,4		22.0 4950	54.0 12100	9000	0.038 0.084
25	25 0.984	43 1.693	8 0.315	AXZ 8 25 43			13.30 2990	49.0 11000	7500	0.047 0.104
	25 0.984	43 1.693	10 0.394		ARZ 10 25 43		25.5 5730	70.0 15700	7500	0.057 0.126
	25 0.984	53 2.087	11 0.433			ARZ 11 25 53	32.5 7310	122 27400	6500	0.122 0.269
30	30 1.181	48 1.890	8 0.315	AXZ 8 30 48			14.50 3260	57.0 12800	6500	0.054 0.119
	30 1.181	48 1.890	10 0.394		ARZ 10 30 48		26.5 5960	77.0 17300	6500	0.065 0.143
	30 1.181	61 2.402	14 0.551			ARZ 14 30 61	46.0 10340	162 36400	5600	0.196 0.432
35	35 1.378	54 2.126	8 0.315	AXZ 8 35 54			18.90 4250	84.0 18900	5500	0.066 0.146
	35 1.378	54 2.126	11 0.433		ARZ 11 35 54		33.8 7600	94.0 21100	5500	0.087 0.192
	35 1.378	69 2.717	14 0.551			ARZ 14 35 69	51.0 11470	194.0 43600	4900	0.246 0.542

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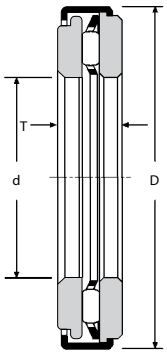
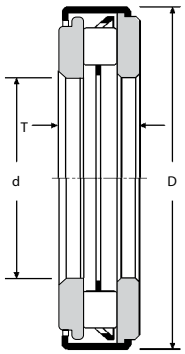
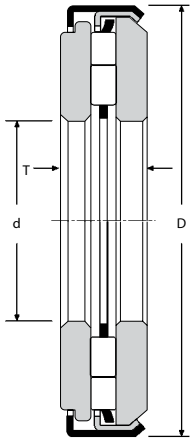


AXZ



ARZ LIGHT

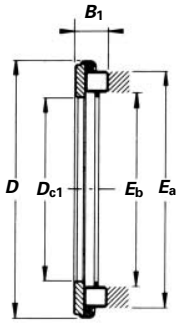


ARZ HEAVY

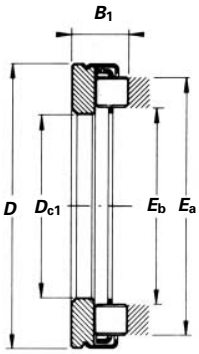
Shaft Diameter	mm/in.			AXZ	ARZ Light	ARZ Heavy	Load Ratings kN/lbf		Limiting Speed Oil	Wt. kg/lbs.
mm	d	D	T				C	C_0	RPM	
40	40 1.575	61 2.402	8 0.315	AXZ 8 40 61			20.40 4590	96.0 21600	5000	0.084 0.185
	40 1.575	61 2.402	12 0.472		ARZ 12 40 61		46.0 10340	129 29000	5000	0.114 0.251
	40 1.575	79 3.110	17 0.669			ARZ 17 40 79	71.0 15960	265 59600	4200	0.387 0.853
45	45 1.772	66 2.598	8 0.315	AXZ 8 45 66			21.80 4900	109 24500	4500	0.092 0.203
	45 1.772	66 2.598	12 0.472		ARZ 12 45 66		49.0 11000	143 32100	4500	0.126 0.278
	45 1.772	86 3.386	22 0.866			ARZ 22 45 86	92.0 20700	340 76400	3800	0.595 1.312
50	50 1.969	71 2.795	8 0.315	AXZ 8 50 71			22.50 5100	118 26500	4000	0.100 0.220
	50 1.969	71 2.795	12 0.472		ARZ 12 50 71		51.0 11500	157 35300	4000	0.137 0.302
	50 1.969	96 3.780	22 0.866			ARZ 22 50 96	108.0 24300	430 96700	3400	0.756 1.66
55	55 2.165	106 4.173	22 0.866			ARZ 22 55 106	125.0 28100	530 119100	3100	0.917 2.022
60	60 2.362	86 3.386	10 0.394	AXZ 10 60 86			31.50 7100	193 43400	3500	0.194 0.428
	60 2.362	86 3.386	14 0.551		ARZ 14 60 86		71.0 16000	255 57300	3500	0.246 0.542
	60 2.362	111 4.370	22 0.866			ARZ 22 60 111	130.0 29200	580 130400	2900	0.977 2.15
65	65 2.559	116 4.567	22 0.866			ARZ 22 65 116	135.0 30300	620 139400	2800	1.040 2.29
70	70 2.756	96 3.780	10 0.394	AXZ 10 70 96			34.50 7800	223 50100	3000	0.220 0.485
	70 2.756	96 3.780	14 0.551		ARZ 14 70 96		77.0 17300	295 66300	3000	0.279 0.615
80	80 3.150	106 4.173	10 0.394	AXZ 10 80 106			36.50 8200	253 56900	2700	0.256 0.564
	80 3.150	106 4.173	14 0.551		ARZ 14 80 106		82.0 18400	330 74200	2700	0.312 0.688

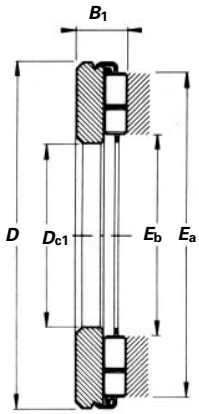
UNITIZED ROLLER THRUST BEARING ASSEMBLIES

METRIC SERIES



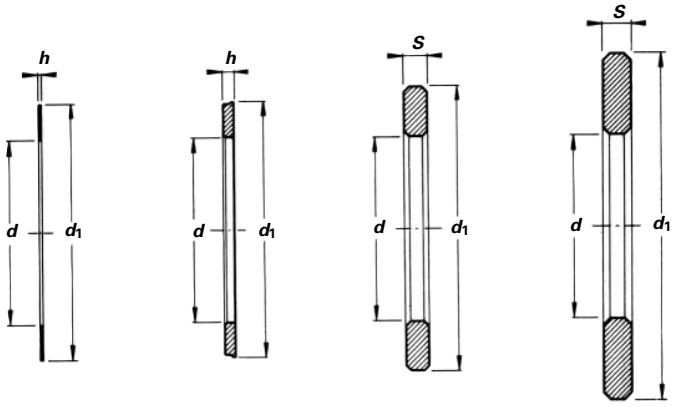
AR Light





AR Heavy

Shaft Diameter	mm/in.					Light Series	Heavy Series	Wt. kg/lbs.	Load Ratings kN/lbf.		Limiting Speed Oil
mm	D_{c1}	D	B_1	E_a	E_b	AR	AR		Dynamic C	Static C_0	RPM
10	10 0.394	22 0.866	4.5 0.177	18.5 0.73	12.2 0.48	AR 4,5 10 22		0.007 0.016	8.2 1840	17.9 4020	15500
12	12 0.472	26 1.024	5 0.197	22.9 0.90	14.8 0.58	AR 5 12 26		0.011 0.024	12.7 2860	29.5 6630	13000
15	15 0.591	28 1.103	5 0.197	24.9 0.98	16.8 0.66	AR 5 15 28		0.011 0.024	14.0 3150	34.0 7640	11500
17	17 0.669	30 1.181	5 0.197	26.9 1.06	18.8 0.74	AR 5 17 30		0.013 0.028	15.0 3370	39.0 8770	10500
20	20 0.787	35 1.378	7 0.276	31.6 1.24	22.0 0.87	AR 7 20 35		0.022 0.049	22.0 4950	54.0 12100	9000
25	25 0.984	42 1.654	7 0.276	37.3 1.47	27.7 1.09	AR 7 25 42		0.031 0.068	25.5 5730	70.0 15700	7500
	25 0.984	52 2.047	7 0.276	47.0 1.85	29.0 1.14		AR 7 25 52	0.070 0.154	32.5 7310	122.0 27400	6500
30	30 1.181	47 1.851	7 0.276	42.3 1.67	32.7 1.29	AR 7 30 47		0.036 0.079	26.5 5960	77.0 17300	6500
	30 1.181	60 2.362	9 0.354	53.5 2.11	33.5 1.32		AR 9 30 60	0.113 0.249	46.0 10340	162.0 36400	5600
35	35 1.378	53 2.103	8 0.315	47.8 1.88	37.8 1.49	AR 8 35 53,4		0.052 0.115	33.8 7600	94.0 21100	5500
	35 1.378	68 2.677	9 0.354	60.6 2.39	39.0 1.54		AR 9 35 68	0.144 0.317	51.0 11500	194.0 43600	4900
40	40 1.575	60 2.378	9 0.354	54.8 2.16	42.8 1.69	AR 9 40 60,4		0.070 0.154	46.0 10300	129.0 29000	5000
	40 1.575	78 3.071	11 0.433	70.0 2.76	44.0 1.73		AR 11 40 78	0.225 0.496	71.0 16000	265.0 59600	4200
45	45 1.772	65 2.575	9 0.354	59.8 2.35	47.8 1.88	AR 9 45 65,4		0.077 0.170	49.0 11000	143.0 32100	4500
	45 1.772	85 3.347	14 0.551	77.0 3.03	49.0 1.93		AR 14 45 85	0.350 0.772	92.0 20700	340.0 76400	3800
50	50 1.968	70 2.772	9 0.354	64.8 2.55	52.8 2.08	AR 9 50 70,4		0.082 0.181	51.0 11500	15 7.0 35300	4000
	50 1.968	95 3.740	14 0.551	86.0 3.39	54.0 2.13		AR 14 50 95	0.448 0.988	108.0 24300	430.0 96700	3400
55	55 2.165	78 3.087	10 0.394	72.5 2.85	58.5 2.30	AR 10 55 78,4		0.125 0.276	61.0 13700	203.0 45600	3800
	55 2.165	105 4.134	14 0.551	96.2 3.79	60.2 2.37		AR 14 55 105	0.537 1.184	125.0 28100	530.0 119100	3100



CP Thin CP Thick CP Heavy

mm/in.		Thin Series	mm/in.	Wt. kg/lbs.	Thick Series	mm/in.	Wt.	Heavy Series	mm/in.	Wt. kg/lbs.	Shaft Diameter
d	d_1		S^1			h^2			h^2		mm
10 0.396	**22** 0.846	**CP 10 22**	**0.8** 0.031	**0.004** 0.009	**CP 2 10 22**	**2** 0.079	**0.002** 0.004				**10**
12 0.474	**25** 1.003	**CP 12 26**	**0.8** 0.031	**0.003** 0.006	**CP 2 12 26**	**2** 0.079	**0.006** 0.014				**12**
15 0.593	**27** 1.081	**CP 15 28**	**0.8** 0.031	**0.003** 0.006	**CP 2 15 28**	**2** 0.079	**0.006** 0.013				**15**
17 0.671	**29** 1.160	**CP 17 30**	**0.8** 0.031	**0.003** 0.006	**CP 2 17 30**	**2** 0.079	**0.007** 0.015				**17**
20 0.789	**34** 1.357	**CP 20 35**	**0.8** 0.031	**0.004** 0.008	**CP 3 20 35**	**3** 0.118	**0.013** 0.029				**20**
25 0.988	**42** 1.634	**CP 25 42**	**0.8** 0.031	**0.005** 0.012	**CP 3 25 42**	**3** 0.118	**0.019** 0.042				**25**
25 0.992	**52** 2.045							**CPR 4 25 52**	**4** 0.157	**0.052** 0.115	**25**
30 1.183	**46** 1.830	**CP 30 47**	**0.8** 0.031	**0.006** 0.013	**CP 3 30 47**	**3** 0.118	**0.022** 0.049				**30**
30 1.189	**60** 2.360							**CPR 5 30 60**	**5** 0.197	**0.083** 0.183	
35 1.380	**51** 2.026	**CP 35 52**	**0.8** 0.031	**0.007** 0.015	**CP 3 35 52**	**3** 0.118	**0.026** 0.057				**35**
35 1.386	**68** 2.675							**CPR 5 35 68**	**5** 0.197	**0.102** 0.225	
40 1.577	**59** 2.341	**CP 40 60**	**0.8** 0.031	**0.009** 0.021	**CP 3 40 60**	**3** 0.118	**0.034** 0.075				**40**
40 1.583	**78** 3.069							**CPR 6 40 78**	**6** 0.236	**0.162** 0.357	
45 1.774	**64** 2.533	**CP 45 65**	**0.8** 0.031	**0.010** 0.022	**CP 3 45 65**	**3** 0.118	**0.037** 0.082				**45**
45 1.780	**85** 3.344							**CPR 8 45 85**	**8** 0.315	**0.245** 0.540	
50 1.970	**69** 2.731	**CP 50 70**	**0.8** 0.031	**0.011** 0.024	**CP 3 50 70**	**3** 0.118	**0.040** 0.088				**50**
50 1.970	**95** 2.731		0.031	0.024		0.118	0.088	**CPR 8 50 95**	**8** 0.315	**0.308** 0.679	
55 2.167	**77** 3.046	**CP 55 78**	**0.8** 0.031	**0.014** 0.031	**CP 4 55 78**	**4** 0.157	**0.069** 0.152				**55**
55 2.174	**105** 4.131							**CPR 8 55 105**	**8** 0.315	**0.380** 0.838	

(1) ±0.03 mm (±0.0012") under 150 N (34 lbs.) load

(2) ±0.05 mm (±0.0020") under 250 N (56 lbs.) load

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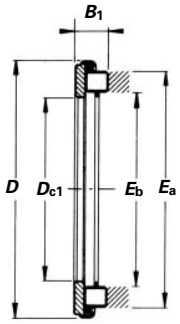
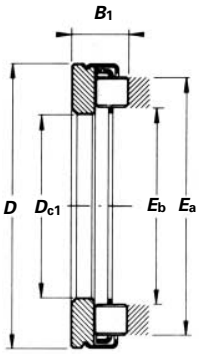
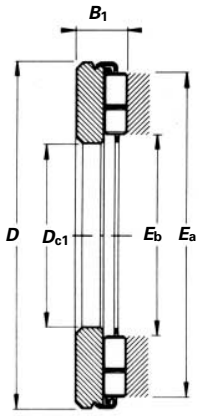
UNITIZED ROLLER THRUST BEARING ASSEMBLIES – *continued*

METRIC SERIES



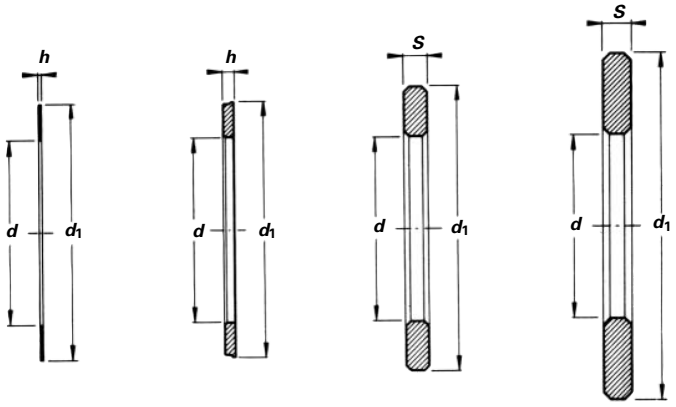
AR Light





AR Heavy

Shaft Diameter	mm/in.					Light Series	Heavy Series	Wt. kg/lbs.	Load Ratings kN/lbf.		Limiting Speed Oil
mm	D_{c1}	D	B_1	E_a	E_b	AR	AR		Dynamic C	Static C_0	RPM
60	60 2.362	85 3.362	10 0.394	79.5 3.13	63.5 2.50	AR 10 60 85,4		0.150 0.331	71.0 16000	255.0 57300	3500
	60 2.362	110 4.331	14 0.551	101.2 3.98	65.2 2.57		AR 14 60 110	0.572 1.261	130.0 29200	580.0 130400	2900
65	65 2.559	90 3.559	10 0.394	84.5 3.33	68.5 2.70	AR 10 65 90,4		0.160 0.353	74.0 16600	275.0 61800	3200
	65 2.559	115 4.528	14 0.551	106.2 4.18	70.2 2.76		AR 14 65 115	0.610 1.345	135.0 30300	620.0 139400	2800
70	70 2.756	95 3.756	10 0.394	89.5 3.52	73.5 2.89	AR 10 70 95,4		0.170 0.375	77.0 17300	295.0 66300	3000
	70 2.756	125 4.921	16 0.630	116.0 4.57	76.0 2.99		AR 16 70 125	0.775 1.709	174.0 39100	710.0 159600	2600
75	75 2.953	100 3.938	10 0.394	94.5 3.72	78.5 3.09	AR 10 75 100,4		0.180 0.397	80.0 18000	313.0 70400	2800
	75 2.953	135 5.315	16 0.630	126.0 4.96	82.0 3.23		AR 16 75 135	0.893 1.969	198.0 44500	860.0 193300	2400
80	80 3.150	105 4.150	10 0.394	99.5 3.92	83.5 3.29	AR 10 80 105,4		0.190 0.419	82.0 18400	330.0 74200	2700
	80 3.150	140 5.512	16 0.630	131.0 5.16	87.0 3.43		AR 16 80 140	0.960 2.116	208.0 46800	940.0 211300	2300
85	85 3.346	150 5.906	18 0.709	138.0 5.43	92.0 3.62		AR 18 85 150	1.256 2.769	230.0 51700	1010.0 227100	2100
90	90 3.550	155 6.103	18 0.709	143.0 5.63	97.0 3.82	AR 18 90 155		1.330 2.932	245.0 55100	1090.0 245000	2000
100	100 3.937	170 6.693	20 0.787	157.0 6.18	109.0 4.29		AR 20 100 170	1.740 3.836	280.0 62900	1250.0 281000	1800
110	110 4.331	190 7.481	24 0.945	178.0 7.01	118.0 4.65		AR 24 110 190	2.500 5.512	365.0 82100	1600.0 359700	1700
120	120 4.724	210 8.268	24 0.945	199.0 7.83	127.0 5.00		AR 24 120 210	3.200 7.055	470.0 105700	2300.0 517100	1500
130	130 5.118	225 8.858	24 0.945	214.0 8.43	138.0 5.43		AR 24 130 225	3.600 7.937	510.0 114700	2640.0 593500	1400
140											



CP Thin **CP Thick** **CP Heavy**

mm/in.		Thin Series	mm/in.		Thick Series	mm/in.		Heavy Series	mm/in.		Shaft Diameter
				Wt. kg/lbs.			Wt.			Wt. kg/lbs.	
d	d_1		S^1			h^2			h^2		mm
60 2.366	**84** 3.318	**CP 60 85**	**0.8** 0.031	**0.017** 0.037	**CP 4 60 85**	**4** 0.157	**0.083** 0.183				**60**
60 2.371	**110** 4.328							**CPR 8 60 110**	**8** 0.315	**0.405** 0.893	
65 2.563	**89** 3.515	**CP 1,5 65 90**	**1.5** 0.059	**0.033** 0.073	**CP 4 65 90**	**4** 0.157	**0.088** 0.194				**65**
65 2.568	**115** 4.525							**CPR 8 65 115**	**8** 0.315	**0.430** 0.948	
70 2.760	**94** 3.711	**CP 1,5 70 95**	**1.5** 0.059	**0.034** 0.076	**CP 4 70 95**	**4** 0.157	**0.093** 0.205				**70**
70 2.765	**125** 4.918							**CPR 8 70 125**	**8** 0.315	**0.510** 1.12	
75 2.967	**99** 3.894	**CP 1,5 75 100**	**1.5** 0.059	**0.037** 0.082	**CP 4 75 100**	**4** 0.157	**0.099** 0.218				**75**
75 2.961	**135** 5.312							**CPR 8 75 135**	**8** 0.315	**0.595** 1.31	
80 3.163	**104** 4.091	**CP 1,5 80 105**	**1.5** 0.059	**0.039** 0.086	**CP 4 80 105**	**4** 0.157	**0.104** 0.229				**80**
80 3.159	**140** 5.508							**CPR 8 80 140**	**8** 0.315	**0.630** 1.39	
85 3.356	**150** 5.902							**CPR 9 85 150**	**9** 0.354	**0.815** 1.80	**85**
90 3.553	**155** 6.099							**CPR 9 90 155**	**9** 0.354	**0.840** 1.85	**90**
100 3.946	**170** 6.690							**CPR 10 100 170**	**10** 0.394	**1.13** 2.49	**100**
110 4.340	**190** 7.476							**CPR 12 110 190**	**12** 0.472	**1.70** 3.75	**110**
120 4.735	**210** 8.264							**CPR 12 120 210**	**12** 0.472	**2.10** 4.63	**120**
130 5.128	**225** 8.854							**CPR 12 130 225**	**12** 0.472	**2.40** 5.29	**130**
140 5.522	**240** 9.445							**CPR 14 140 240**	**14** 0.550	**3.20** 7.05	**140**

(1) ±0.03 mm (±0.0012") under 150 N (34 lbs.) load

(2) ±0.05 mm (±0.0020") under 250 N (56 lbs.) load

THRUST ASSEMBLIES AND THRUST BEARINGS – INCH SERIES

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES CYLINDRICAL ROLLER AND CAGE THRUST ASSEMBLIES CYLINDRICAL ROLLER THRUST BEARINGS THRUST WASHERS

Thrust assemblies and thrust bearings of inch series are available in a variety of sizes. This catalog includes the most popular, standardized designs. If the back up surfaces cannot be used as raceways, hardened thrust washers are available.

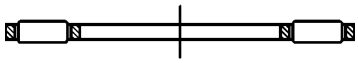
REFERENCE STANDARDS ARE:

- **ANSI/ABMA Std. 21.2** – Thrust needle roller and case assemblies and thrust washers - Inch design
- **ANSI/ABMA Std. 24.2** – Thrust bearings of ball and cylindrical roller types - Inch design.

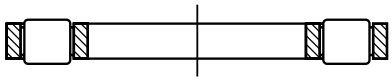
Before selecting specific thrust assemblies or thrust bearings, the engineering section of the catalog should be reviewed.

C

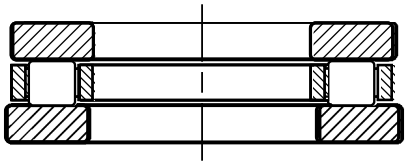
TYPES OF INCH SERIES THRUST ASSEMBLIES, THRUST BEARINGS AND THRUST WASHERS.



NTA
Needle roller and cage thrust assembly



NTH
Cylindrical roller and cage thrust assembly



NTHA
Cylindrical roller thrust bearing

TRA…TRD
Thrust washers

IDENTIFICATION

NTA is the complete prefix code for a needle roller and cage thrust assembly with inch nominal dimensions using needle rollers of the smallest practical diameter.

Cylindrical roller and cage thrust assemblies with inch nominal dimensions are identified by the prefix letters NTH. They use large diameter cylindrical rollers providing higher load ratings.

Thrust washers of inch nominal dimensions are identified by the prefix letters TR, followed by another letter such as A, B, or C etc. indicating washer thickness. TRA is the complete prefix code for the thinnest thrust washer made to inch nominal dimensions.

Most thrust washers are intended to be piloted on their bores. Some washers, however, are designed to be piloted on their outside diameters. Such washers are identified by the letter D following the thickness code letter. Thus TRJD is the complete prefix code for a thrust washer with inch nominal dimensions of J thickness and designed to be piloted by its outside diameter.

Cylindrical roller thrust bearings with prefix code NTHA are made up of one NTH assembly, one TRI or TRJ bore piloted washer and one TRID or TRJD outside diameter piloted washer.

Since the bearing designation for thrust assemblies does not appear on the bearing itself, the manufacturer's parts list or another reliable source should always be consulted when ordering bearings for service or field replacement, to make certain that the correct bearing with the correct lubricant is used.

CONSTRUCTION

Needle roller and cage thrust assemblies (NTA) and cylindrical roller and cage thrust assemblies (NTH) have hardened cages and through hardened, precision ground rollers. The cages are securely fastened assemblies of two mating pieces. This construction minimizes cage stress and assures that the roller retaining function of the cage is unaffected by normal wear. The needle rollers and the cylindrical rollers are precision ground and lapped to close tolerance for optimum load distribution.

Thrust washers for the needle roller and cage thrust assemblies are designed for bore piloting. The thinner thrust washers are tumble burnished and may be out of flat due to heat treatment, but will flatten under load. The raceway surfaces of thick thrust washers are ground and lapped.

Thrust washers for the cylindrical roller and cage thrust assemblies are available in both bore piloted and outside diameter piloted types. Their piloting surfaces are ground and raceway surfaces are ground and lapped.

DIMENSIONAL ACCURACY

TOLERANCES FOR NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

Pages C270-C278 list the nominal outside diameter, bore diameter and the needle roller diameter for the inch needle roller and cage thrust assemblies and their corresponding thrust washers appear in the tabular data.

Tolerances for the bore diameters and outside diameters of inch thrust assemblies are given in Table 1.

TABLE 1 –
TOLERANCES FOR BORE (D_{C1}) AND OUTSIDE (D_C) DIAMETERS OF NOMINAL INCH (NTA) NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

Needle Roller Diameter (D_w) (nominal)		Deviations							
		Bore Diameter (D_{c1})				Outside Diameter (D_c)			
		low		high		low		high	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
1.984	0.0781	+0.05	+0.002	+0.18	+0.007	-0.25	-0.010	0.50	-0.020
2.175	0.1250	+0.05	+0.002	+0.25	+0.010	-0.25	-0.010	0.63	-0.025

BORE INSPECTION PROCEDURE FOR ASSEMBLY

The bore diameter (D_{c1}) of the assembly should be checked with "go" and "no go" plug gages. The "go" plug gage size is the minimum bore diameter of the assembly. The "no go" plug gage size is the maximum bore diameter of the assembly.

The assembly, under its own free weight, must fall freely from the "go" plug gage. The "no go" plug gage must not enter the bore. Where the "no go" plug gage can be forced through the bore, the assembly must not fall from the gage under its own weight.

TOLERANCES FOR THRUST WASHERS

Tolerances for the outside diameters and bore diameters of nominal inch thrust washers are given in Tables 2 and 2A.

TABLE 2 –
TOLERANCES FOR OUTSIDE DIAMETER (d_1) OF NOMINAL INCH (TRA, TRB ETC.) THRUST WASHERS.

Nominal o.d.				Deviations			
>		≤		high		low	
mm	inch	mm	inch	mm	inch	mm	inch
6.0	0.24	133.4	5.25	-.025	-0.010	-0.76	-0.030

TABLE 2A –
TOLERANCES FOR BORE DIAMETER (d) OF NOMINAL INCH (TRA, TRB, ETC.) THRUST WASHERS.

Nominal Bore Diameter				Deviations			
>		≤		high		low	
mm	inch	mm	inch	mm	inch	mm	inch
6.0	0.24	57.2	2.25	0.05	+0.002	+0.30	+0.012
57.2	2.25	133.4	5.25	+0.05	+0.002	+0.43	+0.017

BORE INSPECTION PROCEDURE FOR THRUST WASHER

The bore diameter (d) of the thrust washer should be checked with "go" and "no go"" plug gages. The "go" plug gage size is the minimum bore diameter of the thrust washer. The "no go" plug gage size is the maximum bore diameter of the thrust washer.

The thrust washer, under its own weight, must fall freely from the "go" plug gage. The "no go" plug gage must not enter the bore. Where the "no go" plug gage can be forced through the bore, the thrust washer must not fall from the gage under its own weight.

TOLERANCES FOR CYLINDRICAL ROLLER THRUST BEARINGS

The tolerances for inch series cylindrical roller thrust bearings, cylindrical roller cage and thrust assemblies and their corresponding component thrust washers appear in the tabular data.

MOUNTING TOLERANCES

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

On NTA inch type needle roller and cage thrust assemblies the cage bore has a larger contact area and a closer tolerance than the outside diameter. Therefore, bore piloting is preferred for these assemblies. To reduce wear it is suggested that the piloting surface for the cage be hardened to an equivalent of at least 55 HRC.

Where design requirements prevent bore piloting, the NTA needle roller and cage thrust assemblies may be piloted on the outside diameters. It should be noted that the "diameter to clear washer O.D." given in the tabular data is not suitable for outside diameter piloting. For such cases suitable O.D. piloting dimensions should be determined in consultation with your Timken representative.

THRUST WASHERS FOR USE WITH NTA NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES

Ideally, a thrust washer should be stationary with respect to, and piloted by, its supporting or backing member, whether or not this is an integral part of the shaft or housing. There should be no rubbing action between the thrust washer and any other machine member. The economics of design, however, often preclude these ideal conditions and thrust washers must be employed in another manner. In such cases design details should be determined in consultation with your Timken representative.

CYLINDRICAL ROLLER AND CAGE THRUST ASSEMBLIES

Type NTH assembly cage has a relatively large contact area on both the bore and the outside diameter. Thus these assemblies can be piloted by either the shaft or the housing. To reduce wear it is suggested that the piloting surface for the cage be hardened to an equivalent of at least 55 HRC.

When the shaft is used as the piloting surface, the outside diameter of the cage must clear the housing under all conditions. Conversely, when the housing is the piloting surface, the shaft must clear the cage bore under all conditions. It will be noted that the mounting dimensions are given in the tabular data for both shaft and housing piloting. Bore inspection procedure for the assembly given on page C267 should be used for checking the bore of NTH assemblies.

THRUST WASHERS FOR USE WITH CYLINDRICAL ROLLER AND CAGE THRUST ASSEMBLIES

Types TRID and TRJD thrust washers for use with cylindrical roller and cage thrust assemblies are designed to pilot from the housing and to clear the shaft. Types TRI and TRJ thrust washers are designed to pilot from the shaft and clear the housing. The thrust washers should be stationary with respect to their piloting (or locating) machine members. There should be no rubbing action between the washer and any other machine member.

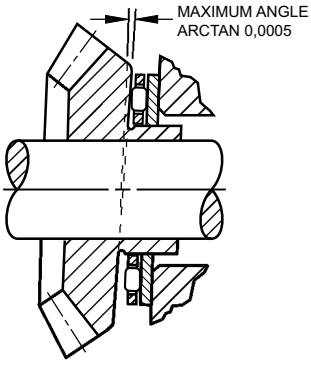
BACKUP SURFACES

In some applications it is desirable to use the back up surfaces as raceways for the rollers of the thrust assemblies. When this is done, these surfaces must be hardened to an equivalent of at least 58 HRC. If this hardness cannot be achieved and thrust washers cannot be used, the load ratings must be reduced as explained in the engineering section of this catalog.

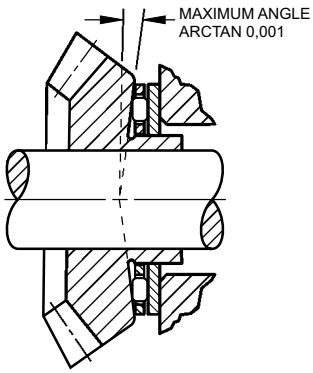
Thrust raceway surfaces must be ground to a surface of 8 µin R_a (0.20 µm R_a). When this requirement cannot be met, thrust washers must be used.

The raceways against which the rollers operate, or the surfaces against which the thrust washers bear, must be square with the axis of the shaft. Equally important, the raceway, or surface backing the thrust washer, must not be dished or coned. The permissible limits of out-of-squareness and dishing or coning are shown in figures below.

Amount Out of Square



Dished or Coned Surface



TYPE NTHA CYLINDRICAL ROLLER THRUST BEARING

The NTHA cylindrical roller thrust bearing consists of the NTH cylindrical roller and cage thrust assembly and two thrust washers. This bearing is sold as a unit.

A typical mounting of the thrust bearing when the shaft rotates is shown in Figure a. The bore of the rotating, shaft supported thrust washer is ground for an accurate fit on the shaft. The outside diameter of the stationary, housing supported thrust washer is ground for a proper fit in the housing.

The NTHA cylindrical roller thrust bearing cage is normally shaft piloted. In the event it is necessary to pilot the cage by the housing, Figure b illustrates a possible mounting arrangement. When other mounting arrangements are dictated by the application they should be determined in consultation with your Timken representative.

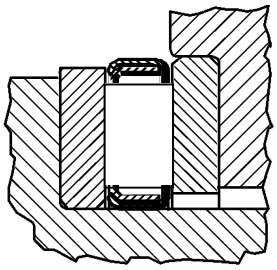


Figure a

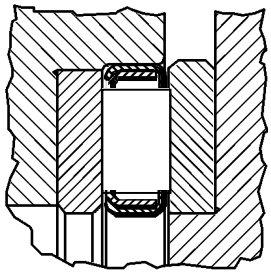


Figure b

LOAD RATINGS

MINIMUM AXIAL LOAD

Slippage can occur if the applied axial load is too light and the operating speed of the needle roller and cage thrust assembly is high, particularly if accompanied by inadequate lubrication. For satisfactory operation a certain minimum load must be applied to a needle roller and cage thrust assembly which can be calculated from:

$$F_{amin} = C_0/2200 \text{ [lbf]}$$

where

C_0 – static load rating [lbf]
F_{amin} – minimum axial load [lbf]

Coefficient Of Friction

In general, the coefficient of friction of a thrust bearing (consisting of a needle roller or a cylindrical roller and cage thrust assembly and thrust washers) is defined as the friction torque divided by the product of the applied load and the bearing pitch radius. This coefficient of friction is not a constant value, but will vary considerably with load, speed and lubricant. Generally, the coefficient of friction becomes smaller as the load is increased and larger as the speed is increased. It is suggested that a value of 0.004 to 0.005 be used as a conservative estimate.

LUBRICATION

Oil is the preferred lubricant for needle roller or cylindrical roller and cage thrust assemblies and an ample oil flow is absolutely necessary for high speeds, or for moderate speeds when the load is relatively high.

When the application must utilize grease lubrication the needle roller and cage thrust assembly should be ordered pregreased. When the speeds are low and rotation is not continuous, the initial charge of grease may be suitable for the life of the application. When the speeds are moderate, however, the designer must provide for frequent regreasing. Since the rollers tend to expel the lubricant radially outward, relubrication passages should be directed to the bore of the cage whether oil or grease is used as the lubricant.

SPECIAL DESIGNS

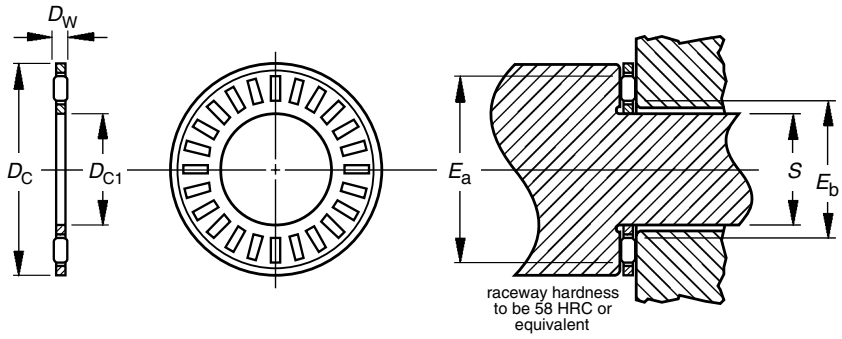
Needle roller and cage thrust assemblies and thrust washers are also made to special dimensions and configurations, as well as from special materials, when quantities permit economical manufacture.

Needle roller and cage thrust assemblies are particularly adaptable to low cost integral combinations with special thrust washers. When the use of such special designs are considered, the following pages should be reviewed for evaluation of proposed arrangements.

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES, THRUST WASHERS

METRIC AND INCH SERIES

- Dimensions for bore and O.D. of thrust assemblies and washers are nominal.
- See page C268 for details on piloting and backup surfaces.
- Thrust washers burnished at least one-quarter of bore area (remainder is rough breakaway finish).
- O.D. finish of washers will be as blanked.
- Thinner washers may be out of flat due to distortion in hardening in the free state (expected to flatten out under load).

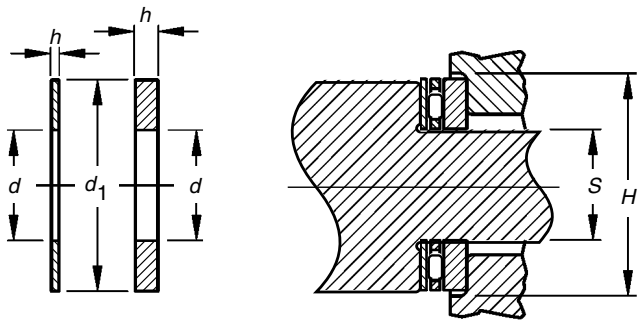


NTA

Shaft Diameter	Dimensions mm/in.					Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Oil	Wt. kg/lbs.
							Dynamic	Static		
in.	D_{c1}	D_c	D_w	E_b	E_a		C	C_o	RPM	
1/4	6.35 0.250	17.45 0.687	1.984 0.0781	8.636 0.340	14.732 0.580	NTA-411	5.12 1150	10.76 2420	26000	0.001 0.003
5/16	7.92 0.312	19.05 0.75	1.984 0.0781	10.16 0.400	16.256 0.640	NTA-512	5.83 1310	13.17 2 960	24000	0.002 0.004
3/8	9.53 0.375	20.625 0.812	1.984 0.0781	11.68 0.460	18.034 0.710	NTA-613	6.05 1360	14.32 3220	22000	0.002 0.004
1/2	12.70 0.500	23.80 0.937	1.984 0.0781	14.99 0.590	21.08 0.830	NTA-815	7.16 1610	19.13 4300	19000	0.002 0.005
9/16	14.275 0.562	25.40 1.000	1.9837 0.0781	16.51 0.650	22.606 0.890	NTA-916	7.70 1730	21.53 4840	18000	0.003 0.006
5/8	15.88 0.625	28.575 1.125	1.9837 0.0781	18.03 0.710	25.908 1.020	NTA-1018	9.79 2200	30.38 6830	15000	0.003 0.007
3/4	19.05 0.750	31.75 1.250	1.9837 0.0781	21.34 0.840	28.956 1.140	NTA-1220	10.90 2450	36.48 8200	14000	0.004 0.009

Limiting speeds listed are based on adequate oil lubrication. See page C269 for lubrication information.

Suggestions for an application requiring O.D. piloting should be determined in consultation with your Timken representative.



Thrust Washer Designation	Dimensions mm/in.						Dia. To Clear O.D.	Washer Wt. kg/lbs.	Shaft Diameter
			Min.	Max.	Piloting Dimensions Min.	Max.			
	d	d_1	h		S		H		in.
TRA-411	6.35 0.250	17.45 0.687	0.76 0.030	0.81 0.032	6.27 0.247	6.35 0.250	18.26 0.719	0.001 0.003	1/4
TRB-411			1.52 0.060	1.60 0.063				0.002 0.005	
TRC-411			2.34 0.092	2.41 0.095				0.004 0.008	
TRA-512	7.92 0.312	19.05 0.750	0.76 0.030	0.81 0.032	7.85 0.309	7.92 0.312	19.84 0.781	0.001 0.003	5/16
TRB-512			1.52 0.060	1.60 0.063				0.003 0.006	
TRA-613	9.53 0.375	20.62 0.812	0.76 0.030	0.81 0.032	9.45 0.372	9.53 0.375	21.44 0.844	0.001 0.003	3/8
TRB-613			1.52 0.060	1.60 0.063				0.003 0.006	
TRC-613			2.34 0.092	2.41 0.095				0.004 0.009	
TRA-815	12.70 0.500	23.80 0.937	0.76 0.030	0.81 0.032	12.62 0.497	12.70 0.500	24.61 0.969	0.002 0.004	1/2
TRB-815			1.52 0.060	1.60 0.063				0.004 0.008	
TRC-815			2.34 0.092	2.41 0.095				0.005 0.012	
TRA-916	14.27 0.562	25.40 1.000	0.76 0.030	0.81 0.032	14.20 0.559	14.27 0.562	26.19 1.031	0.002 0.005	9/16
TRB-916			1.52 0.060	1.60 0.063				0.004 0.008	
TRC-916			2.34 0.092	2.41 0.095				0.006 0.013	
TRA-1018	15.88 0.625	28.58 1.125	0.76 0.030	0.81 0.032	15.80 0.622	15.88 0.625	29.36 1.156	0.003 0.006	5/8
TRB-1018			1.52 0.060	1.60 0.063				0.005 0.012	
TRC-1018			2.34 0.092	2.41 0.095				0.008 0.018	
TRD-1018			3.12 0.123	3.20 0.126				0.011 0.024	
TRE-1018			3.91 0.154	3.99 0.157				0.013 0.029	
TRA-1220	19.05 0.750	31.75 1.250	0.76 0.030	0.81 0.032	18.97 0.747	19.05 0.750	32.54 1.281	0.003 0.007	3/4

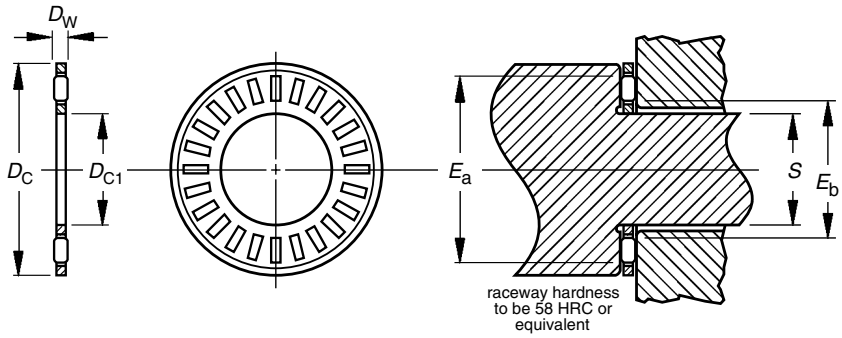
Δ If the shaft and the housing adjacent to the bearing O.D. are not concentric, the T.I.R. between the shaft and housing should be added to this dimension.

Continued on next page.

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES, THRUST WASHERS – *continued*

METRIC AND INCH SERIES

- Dimensions for bore and O.D. of thrust assemblies and washers are nominal.
- See page C270 for details on piloting and backup surfaces.
- Thrust washers burnished at least one-quarter of bore area (remainder is rough breakaway finish).
- O.D. finish of washers will be as blanked.
- Thinner washers may be out of flat due to distortion in hardening in the free state (expected to flatten out under load).

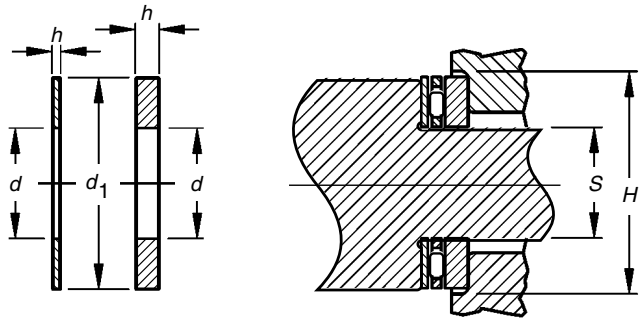


NTA

Shaft Diameter	Dimensions mm/in.					Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Oil	Wt. kg/lbs.
							Dynamic	Static		
in.	D_{c1}	D_c	D_w	E_b	E_a		C	C_o	RPM	
7/8	**22.23** 0.875	**36.50** 1.437	**1.984** 0.0781	**24.38** 0.960	**33.782** 1.330	**NTA-1423**	**13.43** 3020	**49.82** 11200	**12000**	**0.005** 0.011
	22.23 0.875	**42.85** 1.687	**1.984** 0.0781	**25.91** 1.020	**39.878** 1.570	**NTC-1427**	**18.46** 4150	**78.29** 17600	**9800**	**0.008** 0.017
1	**25.40** 1.000	**39.675** 1.562	**1.984** 0.0781	**27.69** 1.090	**36.83** 1.450	**NTA-1625**	**13.83** 3110	**53.82** 12100	**11000**	**0.006** 0.013
1 1/8	**28.58** 1.125	**44.45** 1.75	**1.9837** 0.0781	**30.73** 1.210	**41.656** 1.640	**NTA-1828**	**16.68** 3750	**71.17** 16000	**9600**	**0.009** 0.019
1 1/4	**31.75** 1.250	**49.20** 1.937	**1.9837** 0.0781	**34.04** 1.340	**46.228** 1.820	**NTA-2031**	**20.15** 4530	**93.41** 21000	**8600**	**0.010** 0.021

Limiting speeds listed are based on adequate oil lubrication. See page C269 for lubrication information.

Suggestions for an application requiring O.D. piloting should be determined in consultation with your Timken representative.



Thrust Washer Designation	Dimensions mm/in.				Piloting Dimensions		Dia. To Clear O.D.	Washer Wt. kg/lbs.	Shaft Diameter
			Min.	Max.	Min.	Max.			
	d	d_1	h		S		H		in.
TRB-1220			1.52 0.060	1.60 0.063				0.006 0.013	
TRC-1220			2.34 0.092	2.41 0.095				0.010 0.021	
TRD-1220			3.12 0.123	3.20 0.126				0.012 0.026	
TRE-1220			3.91 0.154	3.99 0.157				0.015 0.033	
TRA-1423	22.23 0.875	36.50 1.437	0.76 0.030	0.81 0.032	22.15 0.872	22.23 0.875	37.31 1.469	0.004 0.009	7/8
TRB-1423			1.52 0.060	1.60 0.063				0.008 0.017	
TRC-1423			2.34 0.092	2.41 0.095				0.012 0.026	
TRD-1423			3.12 0.123	3.20 0.126				0.015 0.034	
TRB-1427			1.52 0.060	1.60 0.063				0.013 0.029	
TRC-1427			2.34 0.092	2.41 0.095				0.020 0.044	
TRD-1427			3.12 0.123	3.20 0.126				0.026 0.057	
TRA-1625	25.40 1.000	39.67 1.562	0.76 0.030	0.81 0.032	25.32 0.997	25.40 1.000	40.49 1.594	0.005 0.010	1
TRB-1625			1.52 0.060	1.60 0.063				0.009 0.019	
TRD-1625			3.12 0.123	3.20 0.126				0.017 0.038	
TRE-1625			3.91 0.154	3.99 0.157				0.021 0.047	
TRA-1828	28.58 1.125	44.45 1.750	0.76 0.030	0.81 0.032	28.50 1.122	28.58 1.125	45.24 1.781	0.006 0.013	1 1/8
TRB-1828			1.52 0.060	1.60 0.063				0.011 0.024	
TRC-1828			2.34 0.092	2.41 0.095				0.017 0.037	
TRD-1828			3.12 0.123	3.20 0.126				0.022 0.048	
TRA-2031	31.75 1.250	49.20 1.937	0.76 0.030	0.81 0.032	31.67 1.247	31.75 1.250	50.01 1.969	0.007 0.015	1 1/4

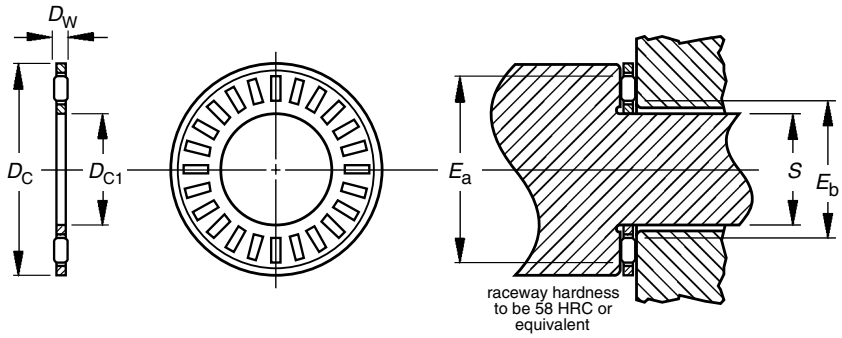
Δ If the shaft and the housing adjacent to the bearing O.D. are not concentric, the T.I.R. between the shaft and housing should be added to this dimension.

Continued on next page.

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES, THRUST WASHERS – *continued*

METRIC AND INCH SERIES

- Dimensions for bore and O.D. of thrust assemblies and washers are nominal.
- See page C268 for details on piloting and backup surfaces.
- Thrust washers burnished at least one-quarter of bore area (remainder is rough breakaway finish).
- O.D. finish of washers will be as blanked.
- Thinner washers may be out of flat due to distortion in hardening in the free state (expected to flatten out under load).

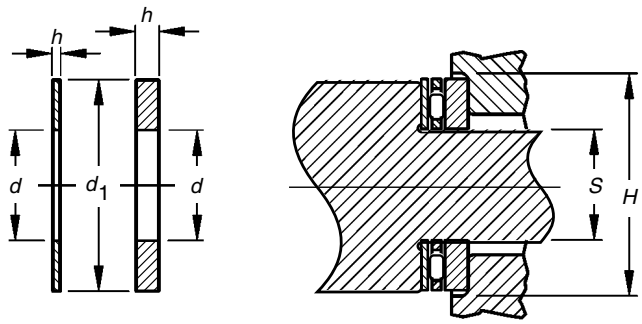


NTA

Shaft Diameter	Dimensions mm/in.					Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Oil	Wt. kg/lbs.
							Dynamic	Static		
in.	D_{c1}	D_c	D_w	E_b	E_a		C	C_o	RPM	
1 3/8	34.93 1.375	52.375 2.062	1.9837 0.0781	37.08 1.460	49.53 1.950	NTA-2233	21.35 4800	103.20 23200	8000	0.010 0.023
1 1/2	38.10 1.500	55.55 2.187	1.9837 0.0781	40.39 1.590	52.578 2.070	NTA-2435	23.22 5220	117.88 26500	7600	0.011 0.025
1 3/4	44.45 1.750	63.50 2.500	1.984 0.0781	46.74 1.840	58.928 2.320	NTA-2840	25.31 5690	137.45 30900	6800	0.014 0.031

Limiting speeds listed are based on adequate oil lubrication. See page C269 for lubrication information.

Recommendation for an application requiring O.D. piloting should be determined in consultation with your Timken representative.



Thrust Washer Designation	Dimensions mm/in.				Piloting Dimensions		Dia. To Clear O.D.	Washer Wt. kg/lbs.	Shaft Diameter
			Min.	Max.	Min.	Max.			
	d	d_1	h		S		H		in.
TRB-2031			1.52 0.060	1.60 0.063				0.014 0.030	
TRC-2031			2.34 0.092	2.41 0.095				0.020 0.044	
TRD-2031			3.12 0.123	3.20 0.126				0.026 0.058	
TRF-2031			4.70 0.185	4.78 0.188				0.041 0.090	
TRA-2233	34.93 1.375	52.37 2.062	0.76 0.030	0.81 0.032	34.85 1.372	34.93 1.375	53.19 2.094	0.007 0.016	1 3/8
TRB-2233			1.52 0.060	1.60 0.063				0.015 0.033	
TRC-2233			2.34 0.092	2.41 0.095				0.018 0.040	
TRD-2233			3.12 0.123	3.20 0.126				0.029 0.065	
TRE-2233			3.91 0.154	3.99 0.157				0.037 0.081	
TRF-2233			4.70 0.185	4.78 0.188				0.044 0.097	
TRA-2435	38.10 1.500	55.55 2.187	0.76 0.030	0.81 0.032	38.02 1.497	38.10 1.500	56.36 2.219	0.008 0.017	1 1/2
TRB-2435			1.52 0.060	1.60 0.063				0.015 0.034	
TRC-2435			2.34 0.092	2.41 0.095				0.023 0.050	
TRD-2435			3.12 0.123	3.20 0.126				0.030 0.067	
TRF-2435			4.70 0.185	4.78 0.188				0.045 0.100	
TRA-2840	44.45 1.750	63.50 2.500	0.76 0.030	0.81 0.032	44.37 1.747	44.45 1.750	64.29 2.531	0.010 0.021	1 3/4
TRB-2840			1.52 0.060	1.60 0.063				0.020 0.044	
TRC-2840			2.34 0.092	2.41 0.095				0.029 0.063	
TRD-2840			3.12 0.123	3.20 0.126				0.038 0.084	
TRF-2840			4.70 0.185	4.78 0.188				0.057 0.126	

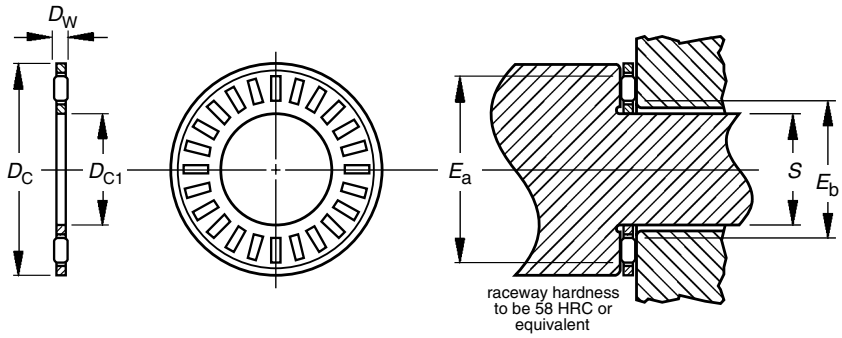
Δ If the shaft and the housing adjacent to the bearing O.D. are not concentric, the T.I.R. between the shaft and housing should be added to this dimension.

Continued on next page.

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES, THRUST WASHERS – *continued*

METRIC AND INCH SERIES

- Dimensions for bore and O.D. of thrust assemblies and washers are nominal.
- See page C268 for details on piloting and backup surfaces.
- Thrust washers burnished at least one-quarter of bore area (remainder is rough breakaway finish).
- O.D. finish of washers will be as blanked.
- Thinner washers may be out of flat due to distortion in hardening in the free state (expected to flatten out under load).

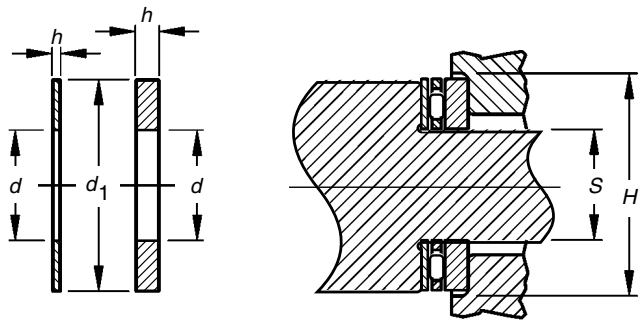


NTA

Shaft Diameter	Dimensions mm/in.					Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Oil	Wt. kg/lbs.
							Dynamic	Static		
in.	D_{c1}	D_c	D_w	E_b	E_a		C	C_o	RPM	
2	50.80 2.000	69.85 2.750	1.9837 0.0781	53.09 2.090	65.278 2.570	NTA-3244	24.02 5400	132.56 29800	6100	0.015 0.033
2 1/8	53.98 2.125	73.025 2.875	1.984 0.0781	56.39 2.220	68.58 2.700	NTA-3446	24.42 5490	137.45 30900	5800	0.016 0.036
2 1/4	57.15 2.250	76.20 3.000	1.984 0.0781	59.44 2.340	71.628 2.820	NTA-3648	24.78 5570	142.34 32000	5600	0.017 0.038
2 1/4	57.15 2.250	79.375 3.125	3.175 0.1250	59.94 2.360	75.184 2.960	NTA-3650	37.68 8470	177.04 39800	5300	0.029 0.064
2 1/2	63.50 2.500	82.55 3.250	1.9837 0.0781	65.79 2.590	77.978 3.070	NTA-4052	25.53 5740	152.13 34200	5100	0.019 0.041
2 3/4	69.85 2.750	92.075 3.625	3.175 0.1250	72.64 2.860	87.884 3.460	NTA-4458	47.60 10700	255.8 57500	4600	0.037 0.082

Limiting speeds listed are based on adequate oil lubrication. See page C269 for lubrication information.

Suggestions for an application requiring O.D. piloting should be determined in consultation with your Timken representative.



Thrust Washer Designation	Dimensions mm/in.						Dia. To Clear O.D.	Washer Wt. kg/lbs.	Shaft Diameter
			Min.	Max.	Piloting Dimensions Min.	Max.			
	d	d_1	h		S		H		in.
TRA-3244	50.80 2.000	69.85 2.750	0.76 0.030	0.81 0.032	50.72 1.997	50.80 2.000	70.64 2.781	0.011 0.024	2
TRB-3244			1.52 0.060	1.60 0.063				0.022 0.048	
TRC-3244			2.34 0.092	2.41 0.095				0.033 0.072	
TRD-3244			3.12 0.123	3.20 0.126				0.044 0.096	
TRF-3244			4.70 0.185	4.78 0.188				0.066 0.145	
TRA-3446	53.98 2.125	73.03 2.875	0.76 0.030	0.81 0.032	53.90 2.122	53.98 2.125	73.81 2.906	0.012 0.026	2 1/8
TRB-3446			1.52 0.060	1.60 0.063				0.024 0.052	
TRC-3446			2.34 0.092	2.41 0.095				0.035 0.078	
TRD-3446			3.12 0.123	3.20 0.126				0.047 0.103	
TRA-3648	57.15 2.250	76.20 3.000	0.76 0.030	0.81 0.032	57.07 2.247	57.15 2.250	76.99 3.031	0.012 0.026	2 1/4
TRB-3648			1.52 0.060	1.60 0.063				0.022 0.048	
TRC-3648			2.34 0.092	2.41 0.095				0.037 0.081	
TRD-3648			3.12 0.123	3.20 0.126				0.048 0.105	
TRF-3648			4.70 0.185	4.78 0.188				0.071 0.157	
— —	—	—	—	2.247	2.250	3.156			2 1/4
TRA-4052	63.50 2.500	82.55 3.250	0.76 0.030	0.81 0.032	63.42 2.497	63.50 2.500	83.34 3.281	0.013 0.029	2 1/2
TRB-4052			1.52 0.060	1.60 0.063				0.027 0.059	
TRC-4052			2.34 0.092	2.41 0.095				0.041 0.09	
TRC-4052			3.12 0.123	3.20 0.126				0.054 0.119	
TRA-4458	69.85 2.750	92.08 3.625	0.76 0.030	0.81 0.032	69.77 2.747	69.85 2.750	92.86 3.656	0.018 0.039	2 3/4

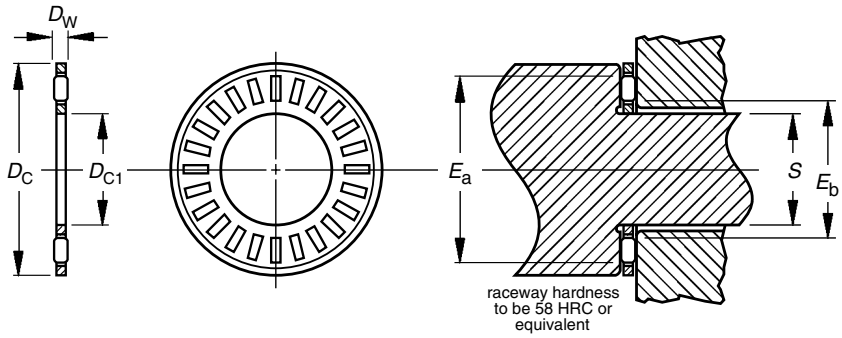
Δ If the shaft and the housing adjacent to the bearing O.D. are not concentric, the T.I.R. between the shaft and housing should be added to this dimension.

Continued on next page.

NEEDLE ROLLER AND CAGE THRUST ASSEMBLIES, THRUST WASHERS – *continued*

METRIC AND INCH SERIES

- Dimensions for bore and O.D. of thrust assemblies and washers are nominal.
- See page C268 for details on piloting and backup surfaces.
- Thrust washers burnished at least one-quarter of bore area (remainder is rough breakaway finish).
- O.D. finish of washers will be as blanked.
- Thinner washers may be out of flat due to distortion in hardening in the free state (expected to flatten out under load).

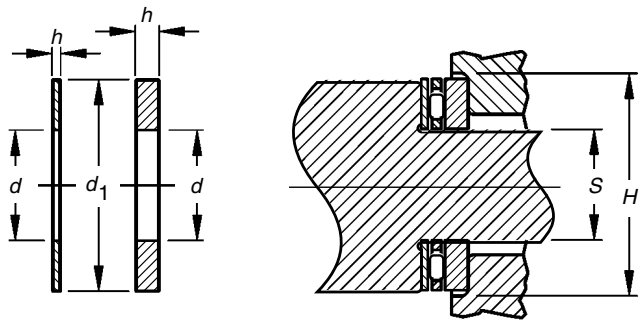


NTA

Shaft Diameter	Dimensions mm/in.					Assembly Designation	Load Ratings kN/lbf.		Limiting Speed Oil	Wt. kg/lbs.
							Dynamic	Static		
in.	D_{c1}	D_c	D_w	E_b	E_a		C	C_o	RPM	
3	76.20 3.000	95.25 3.750	1.9837 0.0781	78.49 3.090	90.678 3.570	NTA-4860	26.96 6060	172.1 38700	4400	0.022 0.048
3 1/4	82.55 3.250	104.78 4.125	3.175 0.1250	85.34 3.360	100.58 3.960	NTA-5266	51.60 11600	294.9 66300	4000	0.042 0.092
3 3/4	95.25 3.750	117.48 4.625	3.175 0.1250	98.04 3.860	113.28 4.460	NTA-6074	56.05 12600	344.3 77400	3500	0.050 0.11
4 1/8	104.78 4.125	128.57 5.062	3.175 0.125	107.44 4.230	124.46 4.900	NTA-6681	63.61 14300	414.6 93200	3200	0.062 0.136

Limiting speeds listed are based on adequate oil lubrication. See page C269 for lubrication information.

Suggestions for an application requiring O.D. piloting should be determined in consultation with your Timken representative.

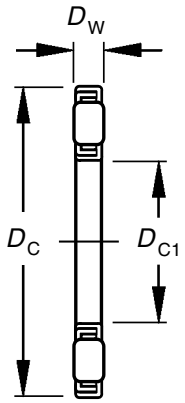


Thrust Washer Designation	Dimensions mm/in.						Dia. To Clear O.D.	Washer Wt. kg/lbs.	Shaft Diameter
			Min.	Max.	Piloting Dimensions Min.	Max.			
	d	d_1	h		S		H		in.
TRB-4458			**1.52** 0.060	**1.60** 0.063				**0.035** 0.077	
TRC-4458			**2.34** 0.092	**2.41** 0.095				**0.051** 0.113	
TRD-4458			**3.12** 0.123	**3.20** 0.126				**0.069** 0.152	
TRF-4458			**4.70** 0.185	**4.78** 0.188				**0.104** 0.229	
TRA-4860	**76.20** 3.000	**95.25** 3.750	**0.76** 0.030	**0.81** 0.032	**76.12** 2.997	**76.20** 3.000	**96.04** 3.781	**0.015** 0.034	**3**
TRB-4860			**1.52** 0.060	**1.60** 0.063				**0.032** 0.07	
TRD-4860			**3.12** 0.123	**3.20** 0.126				**0.061** 0.135	
TRA-5266	**82.55** 3.250	**104.78** 4.125	**0.76** 0.030	**0.81** 0.032	**82.47** 3.247	**82.55** 3.250	**105.56** 4.156	**0.020** 0.044	**3 1/4**
TRD-5266			**3.12** 0.123	**3.20** 0.126				**0.080** 0.176	
TRA-6074 3.750	**95.25** 4.625	**117.48** 0.030	**0.76** 0.032	**0.81** 3.747	**95.17** 3.750	**95.25** 4.656	**118.26** 0.05	**0.023**	**3 3/4**
TRB-6074			**1.52** 0.060	**1.60** 0.063				**0.046** 0.101	
TRC-6074			**2.34** 0.092	**2.41** 0.095				**0.069** 0.152	
TRD-6074			**3.12** 0.123	**3.20** 0.126				**0.092** 0.202	
TRA-6681	**104.78** 4.125	**128.57** 5.062	**0.76** 0.030	**0.81** 0.032	**104.70** 4.122	**104.78** 4.125	**129.39** 5.094	**0.027** 0.059	**4 1/8**
TRC-6681			**2.34** 0.092	**2.41** 0.095				**0.081** 0.178	
TRD-6681			**3.12** 0.123	**3.20** 0.126				**0.109** 0.24	
TRF-6681			**4.70** 0.185	**4.78** 0.188				**0.161** 0.354	

Δ If the shaft and the housing adjacent to the bearing O.D. are not concentric, the T.I.R. between the shaft and housing should be added to this dimension.

CYLINDRICAL ROLLER AND CAGE THRUST ASSEMBLIES

INCH SERIES



NTH

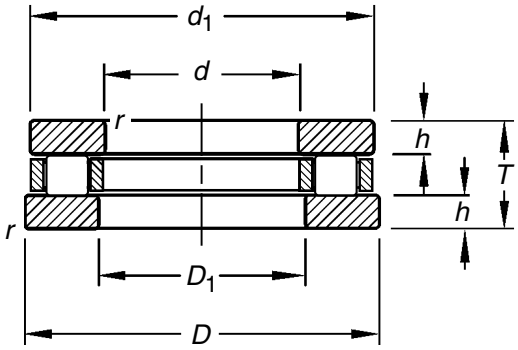
Shaft Diameter	Dimensions mm/in. +.38, -0.015 -0, -0	-.13, -0.005 -.51, -0.020	+0, +0.000 -.005, -0.0002	Bearing Designation	Load Ratings kN/lbf. Dynamic	Static	Limiting Speed Oil
in.	D_{c1}	d_c	D_w		C	C_o	RPM
1 1/2	**38.15** 1.502	**75.44** 2.970	**6.35** 0.250	**NTH-2448**	**81.8** 18400	**280** 62900	**5700**
2	**50.85** 2.002	**91.31** 3.595	**9.53** 0.375	**NTH-3258**	**129** 29000	**407** 91600	**4700**
2 1/8	**54.03** 2.127	**94.49** 3.720	**9.53** 0.375	**NTH-3460**	**133** 30000	**433** 97400	**4500**
2 1/4	**57.20** 2.252	**97.66** 3.845	**9.53** 0.375	**NTH-3662**	**138** 31100	**458** 103000	**4400**
2 3/8	**60.38** 2.377	**100.84** 3.970	**9.53** 0.375	**NTH-3864**	**143** 32100	**484.9** 109000	**4200**
2 1/2	**63.55** 2.502	**104.01** 4.095	**9.53** 0.375	**NTH-4066**	**147** 33000	**511** 115000	**4100**
2 5/8	**66.73** 2.627	**109.60** 4.315	**9.53** 0.375	**NTH-4270**	**156** 35100	**556** 125000	**3900**
2 3/4	**69.98** 2.755	**112.78** 4.440	**9.53** 0.375	**NTH-4472**	**161** 36100	**587** 132000	**3800**
3	**76.33** 3.005	**119.13** 4.690	**9.53** 0.375	**NTH-4876**	**169** 38000	**641** 144000	**3600**
3 1/4	**82.68** 3.255	**125.48** 4.940	**9.53** 0.375	**NTH-5280**	**178** 39900	**698** 157000	**3400**
3 1/2	**89.03** 3.505	**132.26** 5.207	**9.53** 0.375	**NTH-5684**	**180.** 40500	**725** 163000	**3200**

Limiting speeds listed are based on adequate oil lubrication.
See page C269 for lubrication information.

Assembly Wt. kg/lbs.	Shaft Piloting +0, +0.000 -.13, -0.005		Piloting Dimensions mm/in. Housing Piloting	-.13, -0.005 -0, -0.000	Raceway Contact		Shaft Diameter
		Min.	Max.				
	S_p	H_c	S_c	H_p	E_b	E_a	in.
0.10 0.23	**38.10** 1.500	**76.96** 3.030	**36.63** 1.442	**75.57** 2.975	**44.70** 1.760	**68.83** 2.710	**1 1/2**
0.21 0.47	**50.80** 2.000	**92.84** 3.655	**49.33** 1.942	**91.44** 3.600	**57.40** 2.260	**84.33** 3.320	**2**
0.22 0.49	**53.98** 2.125	**96.01** 3.780	**52.5** 2.067	**94.62** 3.725	**60.71** 2.390	**87.38** 3.440	**2 1/8**
0.24 0.52	**57.15** 2.250	**99.19** 3.905	**55.68** 2.192	**97.79** 3.850	**63.75** 2.510	**90.68** 3.570	**2 1/4**
0.24 0.54	**60.33** 2.375	**102.36** 4.030	**58.85** 2.317	**100.97** 3.975	**67.06** 2.640	**93.73** 3.690	**2 3/8**
0.26 0.57	**63.50** 2.500	**105.54** 4.155	**62.03** 2.442	**104.14** 4.100	**70.10** 2.760	**97.03** 3.820	**2 1/2**
0.28 0.62	**66.68** 2.625	**111.13** 4.375	**65.2** 2.567	**109.73** 4.320	**73.41** 2.890	**102.36** 4.030	**2 5/8**
0.29 0.64	**69.85** 2.750	**114.30** 4.500	**68.45** 2.695	**112.90** 4.445	**76.45** 3.010	**105.66** 4.160	**2 3/4**
0.31 0.69	**76.20** 3.000	**120.65** 4.750	**74.8** 2.945	**119.25** 4.695	**82.80** 3.260	**112.01** 4.410	**3**
0.34 0.75	**82.55** 3.250	**127.00** 5.000	**81.15** 3.195	**125.60** 4.945	**89.15** 3.510	**118.36** 4.660	**3 1/4**
0.37 0.81	**88.90** 3.500	**133.78** 5.267	**87.5** 3.445	**132.38** 5.212	**95.76** 3.770	**125.73** 4.950	**3 1/2**

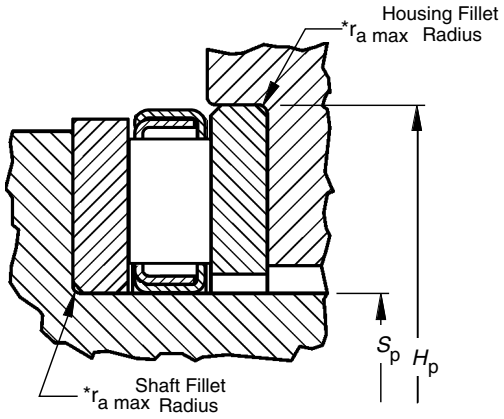
CYLINDRICAL ROLLER THRUST BEARINGS

- Check for availability.
- The NTHA thrust cylindrical roller bearing consists of an NTH cage and roller assembly, one bore piloted washer and one O.D. piloted washer. The NTHA bearing is identified and sold as a unit, and is manufactured to inch nominal dimensions only.
- Load ratings given are identical to the corresponding NTH thrust cylindrical roller and cage assembly.
- It is suggested that the cage and roller assembly be bore piloted when applying NTHA bearings. When different arrangements of piloting are required, please contact your Timken representative.
- Back-up sufaces should be flat and square with the center line of the shaft.
- To order individual thrust washers see washer designation below.



NTHA

Shaft Diameter	Dimensions mm/in. Shaft Piloted Washer Min.	Max.	Nom.	Housing Piloted Washer Max.	Min.	Nom.		Bearing Designation	Bearing Wt. kg/lbs.
in.	d		d_1	D		D_1	T		
1 1/2	38.082 1.4993	38.100 1.5000	74.613 2 15/16	76.218 3.0007	76.200 3.0000	39.688 1 9/16	20.62 0.812	NTHA-2448	0.47 1.03
2	50.775 1.9990	50.800 2.0000	90.488 3 9/16	92.098 3.6259	92.075 3.6250	52.388 2 1/16	25.40 1.000	NTHA-3258	0.76 1.68
2 1/8	53.950 2.1240	53.975 2.1250	93.663 3 11/16	95.278 3.7511	95.250 3.7500	55.563 2 3/16	25.40 1.000	NTHA-3460	0.80 1.76
2 1/4	57.122 2.2489	57.150 2.2500	96.838 3 13/16	98.453 3.8761	98.425 3.8750	58.738 2 5/16	25.40 1.000	NTHA-3662	0.83 1.84
2 3/8	60.297 2.3739	60.325 2.3750	100.013 3 15/16	101.628 4.0011	101.600 4.0000	61.913 2 7/16	25.40 1.000	NTHA-3864	0.87 1.91
2 1/2	63.472 2.4989	63.500 2.5000	103.188 4 1/16	104.808 4.1263	104.775 4.1250	65.088 2 9/16	25.40 1.000	NTHA-4066	0.90 1.99
2 5/8	66.645 2.6238	66.675 2.6250	108.744 4 9/32	110.345 4.3443	110.312 4.3430	68.263 2 11/16	25.40 1.000	NTHA-4270	1.01 2.22
2 3/4	69.820 2.7488	69.850 2.7500	111.919 4 13/32	113.520 4.4693	113.487 4.4680	71.438 2 13/16	25.40 1.000	NTHA-4472	1.04 2.29
3	76.170 2.9988	76.200 3.0000	118.269 4 21/32	119.875 4.7195	119.837 4.7180	77.788 3 1/16	25.40 1.000	NTHA-4876	1.12 2.46
3 1/4	82.517 3.2487	82.550 3.2500	124.619 4 29/32	126.225 4.9695	126.187 4.9680	84.138 3 5/16	25.40 1.000	NTHA-5280	1.19 2.62
3 1/2	88.867 3.4987	88.900 3.5000	130.969 5 5/32	132.575 5.2195	132.537 5.2180	90.488 3 9/16	25.40 1.000	NTHA-5684	1.27 2.80



Load Ratings kN/lbf. Dynamic	Load Ratings kN/lbf. Static	Limiting Speed Oil	Dimensions mm/in. +0, +0.000 -.127, -0.0050	+.127, +0.0050 -0, -0.000		+0, +0.000 -.076, -0.0030	Bore Piloted Washer	Washer Wt. kg/lbs.	O.D. Piloted Washer	Washer Wt. kg/lbs.	Shaft Diameter
C	C_o	RPM	S_p	H_p	$r_{s\ min}$	h					in.
81.8 18400	**280** 62900	**5700**	**38.082** 1.4993	**76.218** 3.0007	**0.81** 0.032	**7.137** 0.2810	**TRI-2448**	**9.91** 0.39	**TRID-2448**	**9.91** 0.39	**1 1/2**
129 29000	**408** 91600	**4700**	**50.775** 1.9990	**92.098** 3.6259	**1.57** 0.062	**7.938** 0.3125	**TRJ-3258**	**14.48** 0.57	**TRJD-3258**	**14.99** 0.59	**2**
133 30000	**433** 97400	**4500**	**53.950** 2.1240	**95.278** 3.7511	**1.57** 0.062	**7.938** 0.3125	**TRJ-3460**	**15.24** 0.60	**TRJD-3460**	**15.49** 0.61	**2 1/8**
138 31100	**458** 103000	**4400**	**57.122** 2.2489	**98.453** 3.8761	**1.57** 0.062	**7.938** 0.3125	**TRJ-3662**	**15.75** 0.62	**TRJD-3662**	**16.26** 0.64	**2 1/4**
143 32100	**485** 109000	**4200**	**60.297** 2.3739	**101.628** 4.0011	**1.57** 0.062	**7.938** 0.3125	**TRJ-3864**	**16.51** 0.65	**TRJD-3864**	**16.76** 0.66	**2 3/8**
147 33000	**512** 115000	**4100**	**63.472** 2.4989	**104.808** 4.1263	**1.57** 0.062	**7.938** 0.3125	**TRJ-4066**	**17.02** 0.67	**TRJD-4066**	**17.53** 0.69	**2 1/2**
156 35100	**556** 125000	**3900**	**66.645** 2.6238	**110.345** 4.3443	**1.57** 0.062	**7.938** 0.3125	**TRJ-4270**	**19.05** 0.75	**TRJD-4270**	**19.56** 0.77	**2 5/8**
161 36100	**587** 132000	**3800**	**69.820** 2.7488	**113.520** 4.4693	**1.57** 0.062	**7.938** 0.3125	**TRJ-4472**	**19.81** 0.78	**TRJD-4472**	**20.32** 0.80	**2 3/4**
169 38000	**641** 144000	**3600**	**76.170** 2.9988	**119.875** 4.7195	**1.57** 0.062	**7.938** 0.3125	**TRJ-4876**	**21.08** 0.83	**TRJD-4876**	**21.59** 0.85	**3**
177 39900	**698** 157000	**3400**	**82.517** 3.2487	**126.225** 4.9695	**1.57** 0.062	**7.938** 0.3125	**TRJ-5280**	**22.61** 0.89	**TRJD-5280**	**23.11**	**3 1/4**
180 40500	**725** 163000	**3200**	**88.867** 3.4987	**132.575** 5.2195	**1.57** 0.062	**7.938** 0.3125	**TRJ-5684**		**TRJD-5284**	**23.88** 0.94	**3 1/2**

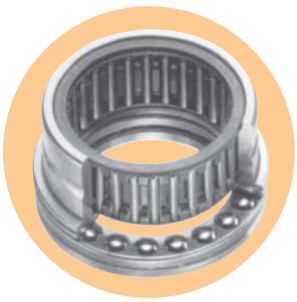
* $r_{as\ max}$ is equal to minimum washer chamfer $r_{s\ min}$.

NOTES

COMBINATION BEARINGS

Overview: Combined bearings incorporate a radial needle roller bearing and a thrust roller bearing into a convenient unitized package.

- **Sizes:** 5 mm - 70 mm (0.197 in. - 2.756 in.) bore.
- **Markets:** Industrial applications, machine tools, and automotive transmissions.
- **Features:** Available with needle roller or cylindrical roller thrust component, machined and drawn outer rings are available, some sizes available with integral dust caps.
- **Benefits:** An effective alternative to separate radial and thrust bearings.



Combined Needle Roller Bearings - Metric Nominal Dimensions

Prefix
RAX radial needle roller and thrust needle (or cylindrical) roller bearing without inner ring or thrust washer
RAXF closed end drawn cup design radial needle roller and needle thrust roller bearing without inner ring or thrust washer
RAXZ unitized machined outer ring thrust cylindrical roller and radial needle roller bearing

RAXF **7** **15** **TC**

Suffix
TB radial play under rollers set to lower half of F6 tolerance
TC radial play under rollers set to upper half of F6 tolerance

NAXR **20** **Z.TN**

Suffix
TN molded polymer retainer
Z thrust washer retaining dust cap

Bore diameter
20 = 20 mm

Series
NAXR machined outer ring thrust cylindrical roller and radial needle roller bearing without inner ring
700 drawn cup design radial needle roller and needle thrust roller bearing without inner ring or thrust washer
400 machined ring radial needle roller and thrust needle roller bearing without inner ring or thrust washer
500 machined ring radial needle roller and thrust cylindrical roller bearing

Inner rings for Combined Needle Roller Bearings - Metric Nominal Dimensions

Prefix
JR inner ring for use with NAXR series bearings

JR **25** x **30** x **18**

IM **10** **14** **16** **P**

Bore diameter
25 = 25 mm

Width
18 = 18 mm

Outside diameter
14 = 14 mm

Prefix
IM inner ring for use non-NAXR series bearings

Suffix
P ISO 492 toleranced inner ring

Thrust Washers for Combined Needle Roller Bearings - Metric Nominal Dimensions

Prefix
CP thrust washer for metric needle roller bearings

CP **15** **28** Thin Washer designation

CP **2** **15** **28** Thick Washer designation

Thickness
2 = 2 mm

Outside diameter
28 = 28 mm

Bore diameter
15 = 15 mm

Combined Needle Roller Bearings

C

COMBINED BEARINGS –
METRIC SERIES

Timken® Torrington® combined bearings consist of a radial bearing (needle roller bearing) and a thrust bearing (roller or needle bearing). The thrust roller bearing is usually a cylindrical roller thrust bearing.

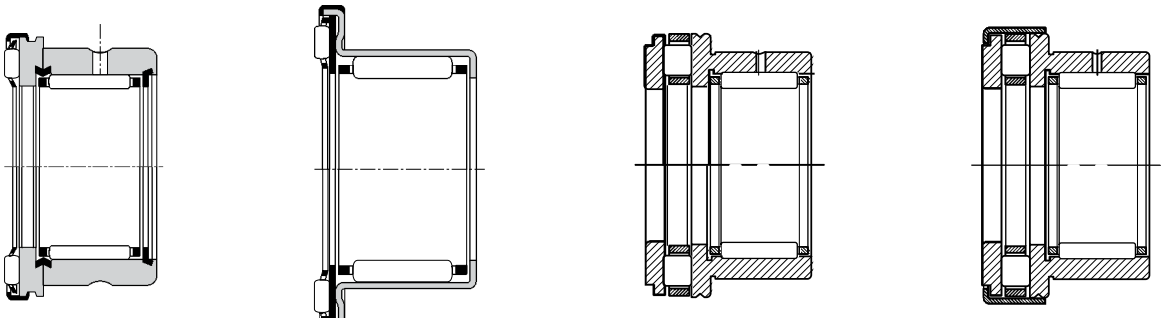
Combined bearings make an effective alternative in place of two separate bearings in terms of cost, handling and packaging. Combined bearings are possible to use with or without matching inner rings and thrust washers, though these are listed opposite the bearing part numbers, where possible, in the following pages of tables, for convenience.

REFERENCE STANDARDS ARE:

- **DIN 5429, Part 1** – Needle roller – thrust cylindrical roller bearings, series NAXR, NAXR.Z
- **ISO 1206** – Needle roller bearings – light and medium series – dimensions and tolerances

TYPES OF METRIC SERIES COMBINED BEARINGS

Needle roller-cylindrical roller thrust bearings



RAX 400 **RAX 700** **RAX 500** **NAXR.Z**

Suffixes	
TN	molded cage of reinforced engineered polymer
Z	retained with a dust cap
Z.TN	retained with a dust cap, molded cage of reinforced engineered polymer
TB	radial play under rollers set to lower half of F6 tolerance limits
TC	radial play under rollers set to upper half of F6 tolerance limits

CONSTRUCTION

Needle roller – cylindrical roller thrust bearings of series NAXR and RAXZ 500 are available with dust caps. They have the highest axial load carrying capability of all combined bearings.

Combined bearings of series RAX 700 use a thin, one-piece outer ring design similar in construction to metric drawn cups. The RAX 700 Series is available with an open or closed (RAXF) design, as are standard drawn cups. These bearings use needle rollers for both their radial and thrust complements.

The RAX 400 Series uses needle rollers for both their radial and thrust complements, as with the RAX 700 Series, but are constructed from two separate machined rings joined with a strong metal insert. The RAX 500 Series, fabricated like the 400 Series, uses heavier cylindrical rollers for their thrust complement. Both series are available with matching thrust washers and inner rings and should be considered for applications requiring higher load capacity and running accuracy.

Each of the previous two bearing types may be best used without inner rings because the radial internal clearances are smaller if the needle roller and cage assemblies operate directly on a hardened and ground shaft. Tolerance class F6 is the normal specification for the needle roller complement bore diameters of the unmounted bearings.

RAX 400 and 500 Series (without inner rings) can be supplied with a smaller radial clearance if desired. Refer to the suffix options TB and TC as listed in the chart above.

Quality requirements for shafts when used as a bearing raceway are given in the engineering section of this catalog. When it becomes impractical to meet the shaft raceway design requirements, standard inner rings may be used with these bearings.

DIMENSIONAL ACCURACY

TOLERANCES

Metric series combined bearings (except Series RAX 700) are manufactured to the normal tolerances which apply to the metric series radial bearings and standard thrust bearings as shown in the engineering section. The only exceptions are: the diameter tolerances of the shaft piloted washer and the bearing width tolerances shown in cross-sectional views listed on the tables in the pages provided.

Because of the nature of the RAX 700 Series design, these bearings must be inspected with suitable plug (GO and NO GO) and ring gages corresponding to metric drawn cups of equivalent bore and O.D. sizes.

The matching thrust washer thickness tolerances may be found in the metric unitized thrust bearing section of this catalog.

BEARING MOUNTING

MOUNTING DIMENSIONS

Simple, through-bored housings are adequate for combined bearings. The mounting tolerances for the mechanical ring combined bearings are provided in Table 1.

The shaft piloted washers of combined bearings must be supported at least over half their width. Other quality requirements for shafts and housings are given in the engineering section of this catalog. Requirements for fillets, recesses and shoulder heights are the same as for needle roller bearings as shown in "Mounting dimensions" paragraph on pages C102-C103.

When mounting these bearings in their housings with a tight fit, relatively high press-in forces will be required which may brinell the raceways of the thrust bearing arrangements. Particular care should be exercised when installing needle roller - cylindrical roller thrust bearings with dust caps and where the roller assembly of the thrust bearings cannot be removed. In order to avoid brinelling of the thrust bearing raceways the bearings should be installed with uniform, continuous pressure against the installation tool, avoiding sudden impact forces. At times it may even be desirable to heat the housing before bearing mounting.

TABLE 1 – MOUNTING TOLERANCES

Rotation Conditions	ISO tolerance zone for housing	Nominal shaft diameter, d mm		ISO tolerance zone for shaft	
		>	≤	With Inner Ring	Without Inner Ring
Load Stationary Relative to Housing	K6 (M6)[1]	10 40	40 70	k6 m6	h6 h6
Load Rotates Relative to Housing	M6 (N6)[1]	all diameters		g6	f6
RAX 700 RAXF 700	H6 (H7)	all diameters		k5	h5 (h6)

[1] Tighter fit for more secure arrangement

LUBRICATION

When the applied axial loads are relatively high and the application allows the use of oil as the desired method of lubrication, bearing types NAXR and NAXK should be given consideration. Combined bearings with a dust cap may use oil lubrication although their design makes them better suited for use with grease lubrication.

Combined bearings are typically shipped protected with a corrosion-preventive compound which is not a lubricant. The bearings may be used in oil or grease lubricated applications without removal of the corrosion preventive compound, although to avoid subsequent recognition problems it may be advisable to remove the corrosion preventive compound before packing the bearings with a suitable grease.

LOAD RATINGS

Minimum axial load for combined bearings excluding RAX700:

The minimum axial load $F_{amin} = C_0 / 2200$ (kN)

where C_0 = static load rating (kN)

DYNAMIC EQUIVALENT LOAD

Combined bearings can accommodate radial and axial loads.

Radial needle roller complement

$P = F_r$ (kN)

Cylindrical or needle roller thrust complement

$P_a = F_a$ (kN)

STATIC EQUIVALENT LOAD

For all combined bearings series:

Radial needle roller complement

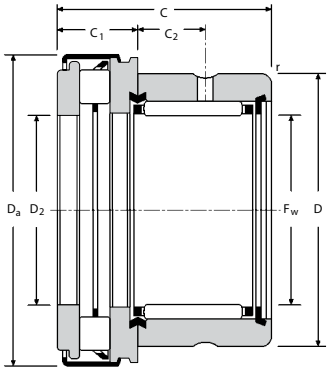
$P_0 = F_r$ (kN)

Cylindrical or needle roller thrust complement

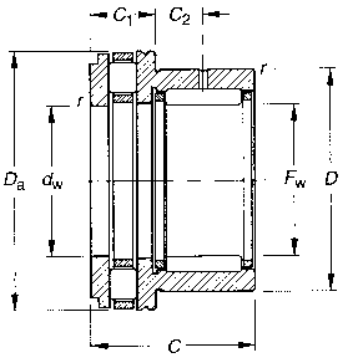
$P_{0a} = F_a$ (kN)

CYLINDRICAL ROLLER THRUST SERIES

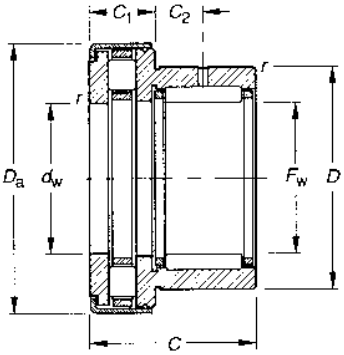
METRIC SERIES



RAXZ500



NAXR



NAXR.Z

Outside Dia.	Dimensions mm/in.							
				E7		+0 +0.000 -0.2 -0.008		
mm	F_w	D	C	d_w	D_a	C_1	C_2	r_{smin}
10	10 0.394	19 0.748	21.5 0.846	14 0.551	22.4 0.882	7.5 0.295	6 0.236	0.35 0.014
12	12 0.472	21 0.827	22 0.866	14 0.551	26.4 1.039	8 0.315	6 0.236	0.35 0.014
15	15 0.591	24 0.945	23 0.906	15 0.591	28 1.102	9 0.354	6.5 0.256	0.3 0.012
	15 0.591	24 0.945	23 0.906	15 0.591	29 1.142	9 0.354	6.5 0.256	0.3 0.012
	15 0.591	24 0.945	22 0.866	14 0.551	28.4 1.118	8 0.315	6 0.236	0.35 0.014
17	17 0.669	26 1.024	25 0.984	17 0.669	30 1.181	9 0.354	8.0 0.315	0.3 0.012
	17 0.669	26 1.024	25 0.984	17 0.669	31 1.220	9 0.354	8.0 0.315	0.3 0.012
	17 0.669	26 1.024	24 0.945	16 0.630	30.4 1.197	8 0.315	8 0.315	0.65 0.026
20	20 0.787	30 1.181	30 1.181	20 0.787	35 1.378	10 0.394	10.5 0.413	0.3 0.012
	20 0.787	30 1.181	30 1.181	20 0.787	36 1.417	10 0.394	10.5 0.413	0.3 0.012
	20 0.787	30 1.181	29 1.142	18 0.709	35.4 1.394	11 0.433	9 0.354	0.85 0.033
25	25 0.984	37 1.457	30 1.181	25 0.984	42 1.654	11 0.433	9.5 0.374	0.6 0.024
	25 0.984	37 1.457	30 1.181	25 0.984	43 1.693	11 0.433	9.5 0.374	0.6 0.024
	25 0.984	37 1.457	29 1.142	18 0.709	43 1.693	11 0.433	9 0.354	0.85 0.033
30	30 1.181	42 1.654	30 1.181	30 1.181	47 1.850	11 0.433	9.5 0.374	0.6 0.024
	30 1.181	42 1.654	30 1.181	30 1.181	48 1.890	11 0.433	9.5 0.374	0.6 0.024
	30 1.181	42 1.654	29 1.142	18 0.709	48 1.890	11 0.433	9 0.354	0.85 0.033
35	35 1.378	47 1.850	30 1.181	35 1.378	52 2.047	12 0.472	9.0 0.354	0.6 0.024
	35 1.378	47 1.850	30 1.181	35 1.378	53 2.087	12 0.472	9.0 0.354	0.6 0.024
	35 1.378	47 1.850	30 1.181	18 0.709	54 2.126	12 0.472	9 0.354	0.85 0.033
40	40 1.575	52 2.047	32 1.260	40 1.575	60 2.362	13 0.512	10.0 0.394	0.6 0.024
	40 1.575	52 2.047	32 1.260	40 1.575	61 2.402	13 0.512	10.0 0.394	0.6 0.024
	40 1.575	52 2.047	31 1.220	18 0.709	61 2.402	13 0.512	9 0.354	0.85 0.033

Bearing Designation			Limiting Speed Oil	Load Ratings kN/lbs.				Wt. kg/lbs.	Matching Inner Ring Designation	Shaft Dia.
				Radial		Thrust				
RAXZ	NAXR	NAXR.Z		Dynamic	Static	Dynamic	Static			
			RPM	C	C_0	C	C_0			mm
RAXZ 510			15500	5.9 1330	7.2 1610	8.2 1840	17.9 4020	0.026 0.057	IM 7 10 16 P	10
RAXZ 512			13000	6.8 1520	9.0 2030	12.7 2860	29.5 6630	0.033 0.073	IM 9 12 16 P	12
	NAXR15		12000	9.7 2180	12.6 2830	12.1 2720	26.3 5910	0.032 0.071	JR12x15x16	15
		NAXR15.Z	12000	9.7 2180	12.6 2830	12.1 2720	26.3 5910	0.035 0.077	JR12x15x16	
RAXZ 515			11500	9.7 2170	12.6 2830	14.0 3150	34.0 7640	0.036 0.079	IM 12 15 16 P	
	NAXR17		11000	11.4 2560	16.1 3620	12.6 2830	28.6 6430	0.050 0.110	JR14x17x17	17
		NAXR17.Z	11000	11.4 2560	16.1 3620	12.6 2830	28.6 6430	0.053 0.117	JR14x17x17	
RAXZ 517			10500	11.8 2650	16.3 3660	15.0 3370	39.0 8770	0.044 0.097	IM 14 17 17 P	
	NAXR20TN		9500	14.8 3330	23.7 5330	23.6 5310	56.8 12800	0.090 0.198	JR17x20x20	20
		NAXR20Z.TN	9500	14.8 3330	23.7 5330	23.6 5310	56.8 12800	0.095 0.209	JR17x20x20	
RAXZ 520			9000	14.8 3330	23.7 5330	22.0 4950	54.0 12100	0.070 0.154	IM 15 20 20 P	
	NAXR25TN		8000	18.8 4230	29.8 6700	31.2 7010	81.0 18200	0.146 0.322	JR20x25x20	25
		NAXR25Z.TN	8000	18.8 4230	29.8 6700	31.2 7010	81.0 18200	0.152 0.335	JR20x25x20	
RAXZ 525			7500	15.1 3390	26.2 5890	25.5 5730	70.0 15700	0.105 0.231	IM 20 25 20 P	
	NAXR30TN		6700	20.2 4540	34.6 7780	33.0 7420	91.1 20500	0.162 0.357	JR25x30x20	30
		NAXR30Z.TN	6700	20.2 4540	34.6 7780	33.0 7420	91.1 20500	0.169 0.373	JR25x30x20	
RAXZ 530			6500	20.2 4540	34.6 7780	26.5 5960	77.0 17300	0.118 0.260	IM 25 30 20 P	
	NAXR35		6000	22.1 4970	40.8 9170	30.9 6950	86.0 19300	0.186 0.410	JR30x35x20	35
		NAXR35.Z	6000	22.1 4970	40.8 9170	30.9 6950	86.0 19300	0.195 0.430	JR30x35x20	
RAXZ 535			5500	22.1 4970	40.8 9170	33.8 7600	94.0 21100	0.146 0.322	IM 30 35 20 P	
	NAXR40		5300	23.8 5350	47.0 10600	44.5 10000	126.0 28300	0.288 0.635	JR35x40x20	40
		NAXR40.Z	5300	23.8 5350	47.0 10600	44.5 10000	126.0 28300	0.299 0.659	JR35x40x20	
RAXZ 540			5000	23.8 5350	47.0 10600	46.0 10300	129.0 29000	0.174 0.384	IM 35 40 20 P	

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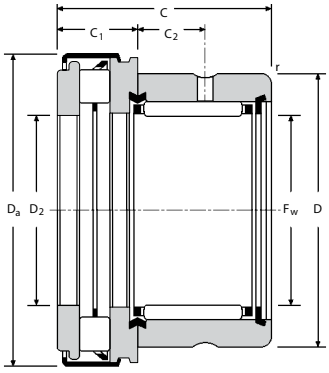
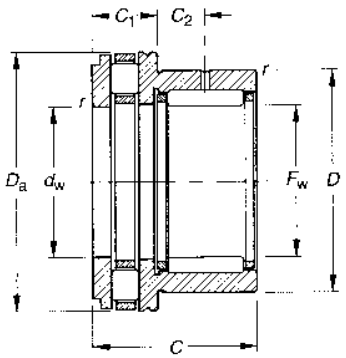
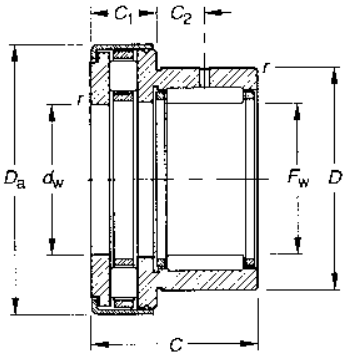
CYLINDRICAL ROLLER THRUST SERIES – *continued*



RAXZ500



NAXR



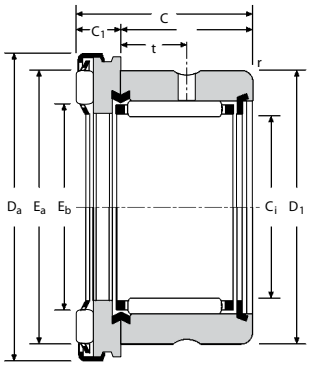
NAXR.Z

Outside Dia.	Dimensions mm/in.							
				E_7		+0 +0.000 -0.2 -0.008		
mm	F_w	D	C	d_w	D_a	C_1	C_2	r_{smin}
45	45 1.772	58 2.283	32 1.260	45 1.772	65 2.559	14 0.551	9.0 0.354	0.6 0.024
	45 1.772	58 2.283	32 1.260	45 1.772	66 2.598	14 0.551	9.0 0.354	0.6 0.024
	45 1.772	58 2.283	31 1.220	18 0.709	66 2.598	13 0.512	9 0.354	0.85 0.033
50	50 1.969	62 2.441	35 1.378	50 1.969	70 2.756	14 0.551	10.0 0.394	0.6 0.024
	50 1.969	62 2.441	35 1.378	50 1.969	71 2.795	14 0.551	10.0 0.394	0.6 0.024
	50 1.969	62 2.441	34 1.339	21 0.827	71 2.795	13 0.512	11 0.433	1.3 0.051
60	60 2.362	72 2.835	36 1.417	21 0.827	86 3.386	15 0.591	11 0.433	1.3 0.051
70	70 2.756	85 3.346	36 1.417	21 0.827	96 3.780	15 0.591	11 0.433	1.3 0.051

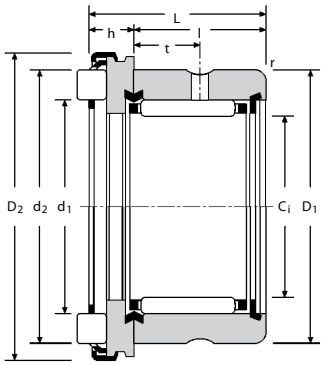
Bearing Designation			Limiting Speed Oil	Load Ratings kN/lbs.				Wt. kg/lbs.	Matching Inner Ring Designation	Shaft Dia.
				Radial		Thrust				
RAXZ	NAXR	NAXR.Z		Dynamic	Static	Dynamic	Static			
			RPM	C	C_0	C	C_0			mm
	NAXR45TN		4800	24.9 5600	51.8 11600	47.0 10600	140.0 31500	0.360 0.794	JR40x45x20	45
		NAXR45Z.TN	4800	24.9 5600	51.8 11600	47.0 10600	140.0 31500	0.370 0.816	JR40x45x20	
RAXZ 545			4500	24.9 5600	51.8 11600	49.0 11000	143.0 32100	0.206 0.454	IM 40 45 20 P	
	NAXR50		4300	30.2 6790	68.5 15400	49.7 11200	155.0 34800	0.432 0.952	JR45x50x25	50
		NAXR50.Z	4300	30.2 6790	68.5 15400	49.7 11200	155.0 34800	0.452 0.996	JR45x50x25	
RAXZ 550			4000	30.2 6790	68.5 15400	51.0 11500	157.0 35300	0.232 0.511	IM 45 50 25 P	
RAXZ 560			3500	31.9 7170	78.1 17600	71.0 16000	255.0 57300	0.327 0.721	IM 55 60 25 P	60
RAXZ 570			3000	36.1 8120	84.7 19000	77.0 17300	295.0 66300	0.435 0.959	IM 60 70 25 P	70

NEEDLE ROLLER AND CYLINDRICAL ROLLER THRUST SERIES

METRIC SERIES



RAX 400



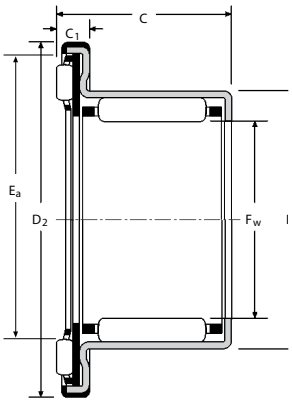
RAX 500

Outside Dia.	Dimensions mm/in.							
		-.1 -0.004 -.2 -0.008		E7			+.05 +0.0019 -.06 -0.0024	
mm	F_w	C	D	d_a	E_b	E_a	C_1	C_2
10	10 0.3937	19 0.748	19 0.7480	22 0.8661	12 0.47	18.6 0.73	5 0.197	6 0.236
	10 0.3937	19.5 0.768	19 0.7480	22 0.8661	12.2 0.48	18.5 0.73	5.5 0.217	6 0.236
12	12 0.4724	19 0.748	21 0.8268	26 1.0236	15 0.59	22.6 0.89	5 0.197	6 0.236
15	15 0.5906	19 0.748	24 0.9449	28 1.1024	17 0.67	24.6 0.97	5 0.197	6 0.236
	15 0.5906	20 0.787	24 0.9449	28 1.1024	16.8 0.66	24.9 0.98	6 0.236	6 0.236
17	17 0.6693	21 0.827	26 1.0236	30 1.1811	19 0.75	26.6 1.05	5 0.197	8 0.315
	17 0.6693	22 0.866	26 1.0236	30 1.1811	18.8 0.74	26.9 1.06	6 0.236	8 0.315
20	20 0.7874	24 0.945	30 1.1811	35 1.3780	22 0.87	31.6 1.24	6 0.236	9 0.354
	20 0.7874	26 1.024	30 1.1811	35 1.3780	22 0.87	31.6 1.24	8 0.315	9 0.354
25	25 0.9843	24 0.945	37 1.4567	42 1.6535	27.7 1.09	37.4 1.47	6 0.236	9 0.354
	25 0.9843	26 1.024	37 1.4567	42 1.6535	27.7 1.09	37.4 1.47	8 0.315	9 0.354
30	30 1.1811	24 0.945	42 1.6535	47 1.8504	32.7 1.29	42.4 1.67	6 0.236	9 0.354
	30 1.1811	26 1.024	42 1.6535	47 1.8504	32.7 1.29	42.3 1.67	8 0.315	9 0.354
35	35 1.3780	24 0.945	47 1.8504	53 2.0866	37.2 1.46	49 1.93	6 0.236	9 0.354
	35 1.3780	27 1.063	47 1.8504	53.4 2.1024	37.8 1.49	47.8 1.88	9 0.354	9 0.354
40	40 1.5748	24 0.945	52 2.0472	60 2.3622	43 1.69	54.9 2.16	6 0.236	9 0.354
45	45 1.7717	24 0.945	58 2.2835	65 2.5591	48 1.89	59.9 2.36	6 0.236	9 0.354
	45 1.7717	28 1.102	58 2.2835	65.4 2.5748	47.8 1.88	59.8 2.35	10 0.394	9 0.354
50	50 1.9685	27 1.063	62 2.4409	70 2.7559	53.3 2.10	65.7 2.59	6 0.236	11 0.433
	50 1.9685	31 1.220	62 2.4409	70.4 2.7717	52.8 2.08	64.8 2.55	10 0.394	11 0.433
60	60 2.3622	28 1.102	72 2.8346	85 3.3465	63.5 2.50	79.2 3.12	7 0.276	11 0.433
	60 2.3622	32 1.260	72 2.8346	85.4 3.3622	63.5 2.50	79.5 3.13	11 0.433	11 0.433
70	70 2.7559	28 1.102	85 3.3465	95 3.7402	73.5 2.89	89.2 3.51	7 0.276	11 0.433
	70 2.7559	32 1.260	85 3.3465	95.4 3.7559	73.5 2.89	89.5 3.52	11 0.433	11 0.433

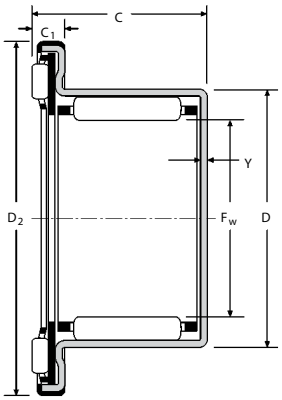
Bearing Designation		Limiting Speed Oil	Load Ratings kN/lbs.				Wt. kg/lbs.	Matching			Shaft Dia.
			Radial		Thrust						
400 Series	500 Series		Dynamic	Static	Dynamic	Static		Inner Ring	Thin Plate	Thick Plate	
		RPM	C	C_0	C	C_0					mm
RAX 410		15500	5.90 1330	7.16 1610	5.00 1120	10.9 2450	0.025 0.055		CP 10 22	CP 2 10 22	10
	RAX 510	15500	5.90 1330	7.16 1610	8.20 1840	17.9 4020	0.026 0.057		CP 10 22	CP 2 10 22	
RAX 412		13000	6.78 1520	9.03 2030	7.10 1600	18.5 4160	0.032 0.071	IM 9 12 16 P	CP 12 26	CP 2 12 26	12
RAX 415		11500	9.66 2170	12.6 2830	7.60 1710	20.8 4680	0.034 0.075	IM 12 15 16 P	CP 15 28	CP 2 15 28	15
	RAX 515	11500	9.66 2170	12.6 2830	14.0 3150	34.0 7640	0.036 0.079	IM 12 15 16 P	CP 15 28	CP 2 15 28	
RAX 417		10500	11.8 2650	16.3 3660	8.10 1820	23.0 5170	0.041 0.090	IM 14 17 17 P	CP 17 30	CP 2 17 30	17
	RAX 517	10500	11.8 2650	16.3 3660	15.0 3370	39.0 8770	0.044 0.097	IM 14 17 17 P	CP 17 30	CP 2 17 30	
RAX 420		9000	14.8 3330	23.7 5330	11.8 2650	39.0 8770	0.066 0.146	IM 15 20 20 P	CP 20 35	CP 3 20 35	20
	RAX 520	9000	14.8 3330	23.7 5330	22.0 4950	54.0 12100	0.070 0.154	IM 15 20 20 P	CP 20 35	CP 3 20 35	
RAX 425		7500	15.1 3390	26.2 5890	13.3 2990	49.0 11000	0.099 0.218	IM 20 25 20 P	CP 25 42	CP 3 25 42	25
	RAX 525	7500	15.1 3390	26.2 5890	25.5 5730	70.0 15700	0.105 0.231	IM 20 25 20 P	CP 25 42	CP 3 25 42	
RAX 430		6500	20.2 4540	34.6 7780	14.5 3260	57.0 12800	0.111 0.245	IM 25 30 20 P	CP 30 47	CP 3 30 47	30
	RAX 530	6500	20.2 4540	34.6 7780	26.5 5960	77.0 17300	0.118 0.260	IM 25 30 20 P	CP 30 47	CP 3 30 47	
RAX 435		5500	22.1 4970	40.8 9170	18.9 4250	84.0 18900	0.130 0.287	IM 30 35 20 P	CP 35 52	CP 3 35 52	35
	RAX 535	5500	22.1 4970	40.8 9170	33.8 7600	94.0 21100	0.146 0.322	IM 30 35 20 P	CP 35 52	CP 3 35 52	
RAX 440		5000	23.8 5350	47.0 10600	20.4 4590	96.0 21600	0.150 0.331	IM 35 40 20 P	CP 40 60	CP 3 40 60	40
RAX 445		4500	24.9 5600	51.8 11600	21.8 4900	109.0 24500	0.179 0.395	IM 40 45 20 P	CP 45 65	CP 3 45 65	45
	RAX 545	4500	24.9 5600	51.8 11600	49.0 11000	143.0 32100	0.206 0.454	IM 40 45 20 P	CP 45 65	CP 3 45 65	
RAX 450		4000	30.2 6790	68.5 15400	22.5 5060	118.0 26500	0.205 0.452	IM 45 50 25 P	CP 50 70	CP 3 50 70	50
	RAX 550	4000	30.2 6790	68.5 15400	51.0 11500	157.0 35300	0.232 0.511	IM 45 50 25 P	CP 50 70	CP 3 50 70	
RAX 460		3500	31.9 7170	78.1 17600	31.5 7080	193.0 43400	0.282 0.622	IM 55 60 25 P	CP 60 85	CP 4 60 85	60
	RAX 560	3500	31.9 7170	78.1 17600	71.0 16000	255.0 57300	0.327 0.721	IM 55 60 25 P	CP 60 85	CP 4 60 85	
RAX 470		3000	36.1 8120	84.7 19000	34.5 7760	223.0 50100	0.386 0.851	IM 60 70 25 P	CP 1,5 70 95	CP 4 70 95	70
	RAX 570	3000	36.1 8120	84.7 19000	77.0 17300	295.0 66300	0.435 0.959	IM 60 70 25 P	CP 1,5 70 95	CP 4 70 95	

OPEN AND CLOSED BEARINGS

METRIC SERIES



RAX 700



RAXF 700

Outside Dia.	Dimensions mm/in.						+.05 +0.0019 -.06 -0.0024	Bearing Designation Open End	Bearing Designation Closed End
mm	F_w	D	C	D_a	E_{ab}	E_a	C_1		
5	5 0.1969	9 0.3543	11 0.433	15.5 0.6102	7.2 0.28	11.2 0.44	3.3 0.130	RAX 705	
12	12 0.4724	18 0.7087	14.2 0.559	27.5 1.0827	15 0.59	22.6 0.89	4.2 0.165	RAX 712	RAXF 712
14	14 0.5512	20 0.7874	14.2 0.559	29.5 1.1614	17 0.67	24.6 0.97	4.2 0.165	RAX 714	RAXF 714
15	15 0.5906	21 0.8268	14.2 0.559	31.5 1.2402	19 0.75	26.6 1.05	4.2 0.165	RAX 715	RAXF 715
18	18 0.7087	24 0.9449	18.2 0.717	33.5 1.3189	21 0.83	28.6 1.13	4.2 0.165	RAX 718	RAXF 718
20	20 0.7874	26 1.0236	18.2 0.717	36.5 1.4370	22 0.87	31.6 1.24	4.2 0.165	RAX 720	RAXF 720
25	25 0.9843	33 1.2992	22.2 0.874	45.5 1.7913	30 1.18	39.6 1.56	4.2 0.165	RAX 725	RAXF 725
30	30 1.1811	38 1.4961	22.2 0.874	50.5 1.9882	35 1.38	44.7 1.76	4.2 0.165	RAX 730	RAXF 730
35	35 1.3780	43 1.6929	22.2 0.874	56.5 2.2244	39 1.54	50.9 2.00	4.2 0.165	RAX 735	
40	40 1.5748	48 1.8898	22.2 0.874	61.5 2.4213	43 1.69	54.9 2.16	4.2 0.165	RAX 740	RAXF 740
45	45 1.7717	52 2.0472	22.2 0.874	66.5 2.6181	48 1.89	59.9 2.36	4.2 0.165	RAX 745	

mm/in.	Limiting Speed Oil	Load Ratings kN/lbs. Radial Dynamic	Radial Static	Thrust Dynamic	Thrust Static	Wt. kg/lbs.	mm/in. Ring Gage	Matching Inner Ring	Thin Plate	Thick Plate	Shaft Dia.
Y	RPM	C	C_0	C	C_0						mm
–	25000	2.15 480	1.95 440	3.15 710	6.35 1430	0.005 0.010	9.000 0.3543				5
13.2 0.520	13000	6.30 1420	7.20 1620	6.90 1550	17.7 3980	0.017 0.036	18.000 0.7087	IM 8 12 12,4	CP 12 26	CP 2 12 26	12
13.2 0.520	11500	6.90 1550	8.50 1910	7.40 1660	20.0 4500	0.018 0.040	20.000 0.7874	IM 10 14 12,4	CP 14 26	CP 2 14 26	14
13.2 0.520	10500	7.40 1660	9.30 2090	7.80 1750	22.0 4950	0.020 0.044	21.000 0.8268	IM 12 15 12,4	CP 15 28	CP 2 15 28	15
17.2 0.677	10000	11.5 2590	17.7 3980	8.00 1800	23.0 5170	0.027 0.060	24.000 0.9449	IM 13 18 16,4	CP 18 30	CP 2 18 30	18
17.2 0.677	9000	12.2 2740	19.5 4380	11.8 2650	39.0 8770	0.031 0.068	26.000 1.0236	IM 15 20 16,4	CP 20 35	CP 3 20 35	20
21.2 0.835	7200	20.5 4610	32.0 7190	13.7 3080	52.0 11700	0.055 0.121	33.000 1.2992	IM 20 25 20,4	CP 25 42	CP 3 25 42	25
21.2 0.835	6300	22.3 5010	37.5 8430	14.9 3350	60.0 13500	0.063 0.139	38.000 1.4961	IM 25 30 20,4	CP 30 47	CP 3 30 47	30
21.2 0.835	5500	24.5 5510	45.0 10120	19.4 4360	88.0 19800	0.075 0.165	43.000 1.6929	IM 30 35 20,4	CP 35 52	CP 3 35 52	35
21.2 0.835	5000	26.2 5890	51.0 11470	20.4 4590	96.0 21600	0.086 0.190	48.000 1.8898	IM 35 40 20,4	CP 40 60	CP 3 40 60	40
21.2 0.835	4500	24.8 5580	55.0 12360	21.8 4900	109 24500	0.088 0.194	52.000 2.0472	IM 40 45 20,4	CP 45 65	CP 3 45 65	45

C

NOTES

DRAWN CUP ROLLER CLUTCHES

Overview: Drawn cup needle roller clutches are similar to drawn cup needle bearings in design, but allow free rotation in only one direction while transmitting torque in the opposite direction. These designs use the same small radial section as drawn cup needle roller bearings and are offered as clutch-only units or as clutch and bearing assemblies.

- **Sizes:** 3 mm - 35 mm bore ($^1/_8$ in. - 1.4 in.) bore.
- **Markets:** Office equipment, paper-towel dispensers, exercise equipment, appliances and two-speed gearboxes.
- **Features:** Compact, lightweight and operate directly on a hardened shaft.
- **Benefits:** Installation is easily accomplished with a simple press fit.

Drawn Cup Roller Clutches

Metric Series

FCS, FC-K	regular clutch, single roller per stainless steel spring
FC	regular clutch, multi-roller per stainless steel spring
FCL-K	light series clutch, single roller per stainless steel spring
FCB	regular clutch and bearing assembly, multi-roller per stainless steel spring
FCBL-K, FCBN -K	light series clutch and bearing assembly, single roller per stainless steel spring

FCL - 10 - K

Bore, in millimeters

Inch Series

RC	regular clutch, single roller per integral spring
RC-FS	regular clutch, single roller per stainless steel spring
RCB	regular clutch and bearing assembly, single roller per integral spring
RCB-FS	regular clutch and bearing assembly, single roller per stainless steel spring

RC - 10 14 10 - FS

Bore
10 = $^{10}/_{16}$ = $^{5}/_{8}$ in.

Outside Diameter
14 = $^{14}/_{16}$ = $^{7}/_{8}$ in.

Width
10 = $^{10}/_{16}$ = $^{5}/_{8}$ in.

Drawn Cup Roller Clutches

C

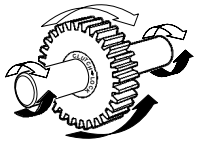
DRAWN CUP ROLLER CLUTCHES

METRIC AND INCH SERIES

The Timken® Torrington® drawn cup roller clutch transmits torque between shaft and housing in one direction and allows free overrun in the opposite direction. When transmitting torque, either the shaft or the housing can be the input member. Applications are generally described as indexing, backstopping or overrunning.

LOCK FUNCTION

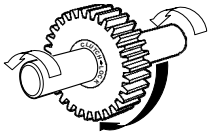
Shaft drives gear clockwise (white arrows)



or gear can drive shaft counter-clockwise (black arrows)

OVERRUN FUNCTION

Shaft overruns in gear counter clockwise (white arrows)



or gear overruns on shaft clockwise (black arrow)

C

IDENTIFICATION

The prefix letters in the designation of the Timken Torrington drawn cup roller clutches and drawn cup roller clutch and bearing assemblies denote whether these are manufactured to metric or inch nominal dimensions. Designation codes for clutches and clutch and bearing assemblies with metric nominal dimensions begin with the letter "F". Designation codes for clutches and clutch and bearing assemblies with inch nominal dimensions begin with the letter "R".

The basic types of clutches and clutch and bearing assemblies are listed below:

METRIC SERIES TYPES

FCS, FC-K regular clutch, single roller per stainless steel spring

FC regular clutch, multi-roller per stainless steel spring

FCB regular clutch and bearing assembly, multi-roller per stainless steel spring

FCL-K light series clutch, single roller per stainless steel spring

FCBL-K light series clutch and bearing assembly, single roller per stainless steel spring.

INCH SERIES TYPES

RC regular clutch, single roller per integral spring

RC-FS regular clutch, single roller per stainless steel spring

RCB regular clutch and bearing assembly, single roller per integral spring

RCB-FS regular clutch and bearing assembly, single roller per stainless steel spring

Types Of Clutches And Clutch And Bearing Assemblies

Drawn Cup Roller Clutch Type FC with Steel Springs

Drawn Cup Clutch & Bearing Assembly Type FCB with Steel Springs

Drawn Cup Roller Clutch, Types FCS, FC-K, FCL-K, and RC-FS with Steel Springs

Drawn Cup Clutch & Bearing Assembly Types FCBL-K and RCB-FS with Steel Springs

Drawn Cup Roller Clutch, Type RC with Integral Springs

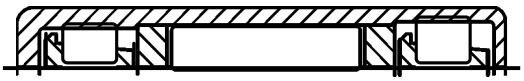
Drawn Cup Clutch & Bearing Assembly Type RCB with Integral Springs

CONSTRUCTION

In many respects, construction is similar to that of drawn cup bearings. Design and manufacture of drawn cup clutches, just as with drawn cup bearings, was pioneered and developed by Timken. The well established design utilizes the same low profile radial section as drawn cup bearings. The precisely formed interior ramps provide surfaces against which the needle rollers wedge to positively lock the clutch with the shaft when rotated in the proper direction. These ramps, formed during the operation of drawing the cup, are case hardened to assure long wear life. The incorporation of ramp forming into the cup drawing operation is a manufacturing innovation that contributes much to the low cost of the unit.

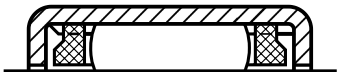
Two designs of precision molded clutch cages are employed. Clutch and clutch and bearing assembly types FC, FC-K, FCS, FCL-K, RC-FS, FCB, FCBL-K and RCB-FS use a glass fiber reinforced nylon cage equipped with inserted stainless steel leaf springs. The stainless steel springs permit higher rates of clutch engagement and achieve greater spring life. The nylon cage permits operation at higher temperatures. Clutch types RC and RCB utilize a one-piece cage of acetyl resin plastic with integral leaf style springs used for lower temperatures than permitted for the units with nylon cages.

Types FCB, FCBL-K, RCB and RCB-FS clutch and bearing assemblies have cages for retention and guidance of the needle rollers in the bearings located on both sides of the clutch unit.



Clutch And Bearing Assembly

Types FC, FC-K, FCS, FCL-K, RC and RC-FS are of clutch-only configurations for use with external radial support (usually two drawn cup needle roller bearings). Separate bearings position the shaft and housing concentrically and carry the radial load during overrun.



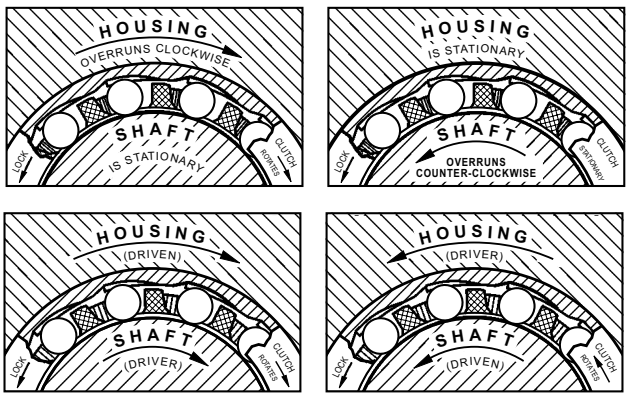
Clutch Only

OPERATION

Operation is in two modes; the overrun mode and the lock mode. Operational mode is controlled by the direction of the clutch or shaft rotation with respect to the locking ramps.

In the overrun mode shown in the drawings below, the relative rotation between the housed clutch and the shaft causes the rollers to move away from their locking position against the locking ramps in the drawn cup. The housing and the clutch are then free to overrun in one direction, or the shaft is free to overrun in the other direction.

In the lock mode shown in the drawings below, the relative rotation between the housed clutch and the shaft is opposite to that in the overrun mode. The rollers, assisted by the leaf type springs, become wedged between the locking ramps and the shaft to transmit torque between the two members. Either the member housing the clutch drives the shaft in one direction, or the shaft can drive the clutch and its housing member in the other direction.



Clearance between the rollers and cup ramps is exaggerated in these drawings.

APPLICATION

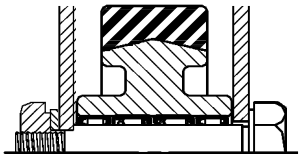
Timken® Torrington® clutches and clutch and bearing assemblies are successfully applied in a wide range of commercial products where indexing, backstopping and overrunning operations must be performed reliably. The sketches on these pages illustrate some of the many possible uses.

When applying the clutch-only unit, separate bearings on each side of the clutch are required to position the shaft concentrically with the housing and to carry the radial loads during overrun. Drawn cup needle roller bearings with the same radial section as the clutch should be used in the through bored housings for simplicity and economy. Two clutches can be used side by side for greater torque capacity.

Where the radial loads are light, the clutch and bearing assembly can be used without additional support bearings. This reduces the overall assembly width, the number of stocked and ordered parts, and assembly costs as well.

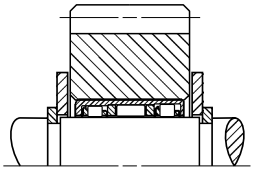
Timken Torrington drawn cup roller clutches are manufactured to commercial hardware standards and are used extensively in appliances, business machines, industrial and recreation equipment and a wide range of other applications.

Clutch & Bearing Arrangement



for Heavy Loads

Clutch & Bearing Assembly



for Light Loads

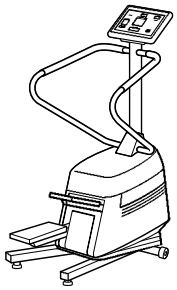
In any application where our clutch may be considered, it will be part of a system in which the operating conditions and the clutch mounting will affect its function. Before any clutch selection is made, it is important that the following catalog section be carefully studied to understand the effects of these factors. Consideration should be given to operating conditions such as:

- Magnitude of externally applied torque as well as inertial torque.
- Magnitude of applied radial loads during overrunning.
- Potential for vibration or axial shaft movement within the clutch during engagement.
- Engagement rate, as it pertains to the selection of stainless steel or plastic leaf springs.
- Oil lubricant supply during high overrunning speeds.
- External and internal environmental temperatures that can affect clutch performance.
- Lubricant selection effect on clutch engagement.
- Indexing inaccuracies resulting from backlash [lost motion].

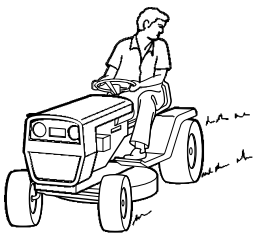
Consideration should be given to the shaft and housing design requirements such as:

- Shaft hardness and strength particularly when approaching torque rating limits.
- Shaft roundness, taper and surface finish necessary to ensure sufficient fatigue life and torque carrying ability.
- Housing strength [hardness and cross section] to support the applied torque loads.
- Housing roundness, taper and surface finish necessary to ensure uniform torque and load distribution.

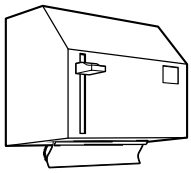
A test program under all expected operating conditions should be carried out before putting a new application into production. Timken customer engineers are constantly working with and testing new applications, and, their experience can be of great help to the designer considering the use of a drawn cup roller clutch.



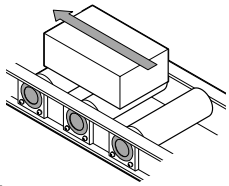
Stair Steppers, and other Athletic Equipment



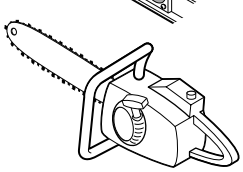
Lawnmower Differential



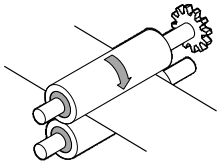
Tape Dispensers and Similar Web Roll Feed Mechanisms



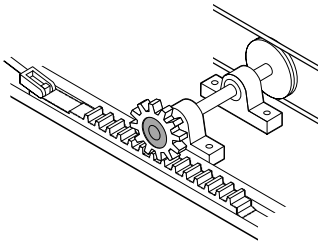
Conveyor Rollers



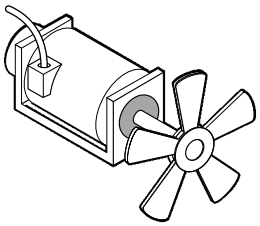
Chainsaw Starters



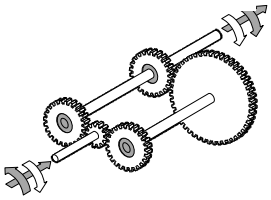
Paper Feed Rolls in Business Machines



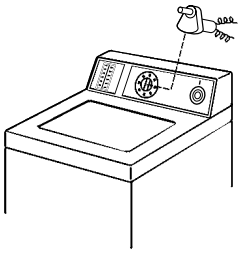
Rack Indexing Drive



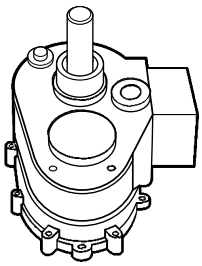
Motor Backstops



2 Speed Gearbox with Reversing Input



Timing Motor Freewheels



Washing Machine Transmission

HOUSING DESIGN

Drawn cup clutches and clutch and bearing assemblies are mounted with a simple press fit in their housings. Through-bored and chamfered housings are preferred. A 30° angle is suggested and care should be taken to round the edge where the chamfer meets the housing bore. A sharp edge at this location can greatly increase installation forces. Provisions for axial location, such as shoulders or snap rings, are not required. The case hardened cups have a long fatigue life, but must be properly supported to realize this benefit. Steel housings are preferred and must be used for applications involving high torque loads to prevent radial expansion of the clutch cups. The suggested minimum housing outside diameters in the tables of dimensions are for steel.

The housing bore should be round within one-half of the diameter tolerance.

The taper within the length of the outer ring should not exceed 0.013 mm (.0005 inch).

The surface finish of the housing bore should not exceed 1.6 mm R_a (63 microinches R_a).

The torque ratings given in the clutch tables are based on a steel housing of a large section. When other housing material must be used (such as aluminum, powdered metal and plastics) the torque rating of the clutch will be reduced. Such housings may be satisfactory for lightly torqued applications but your Timken representative should be consulted for appropriate housing and shaft suggestions. Otherwise, an insufficient press fit and use of a lower strength housing material can result in more internal clearance and reduced performance of the clutch.

When using non-steel housings, thorough testing of the design is suggested.

Adhesive compounds can be used to prevent creeping rotation of the clutch in plastic housings with low friction properties. Adhesives will not provide proper support in oversized metal housings. When using adhesives, care must be taken to keep the adhesive out of the clutches and bearings.

SHAFT DESIGN

The clutch or clutch and bearing assembly operates directly on the shaft whose specifications of dimension, hardness and surface finish are well within standard manufacturing limits.

Either case hardening or through-hardening grades of good bearing quality steel are satisfactory for raceways. Steels modified for free machining, such as those high in sulfur content and particularly those containing lead, are seldom satisfactory for raceways.

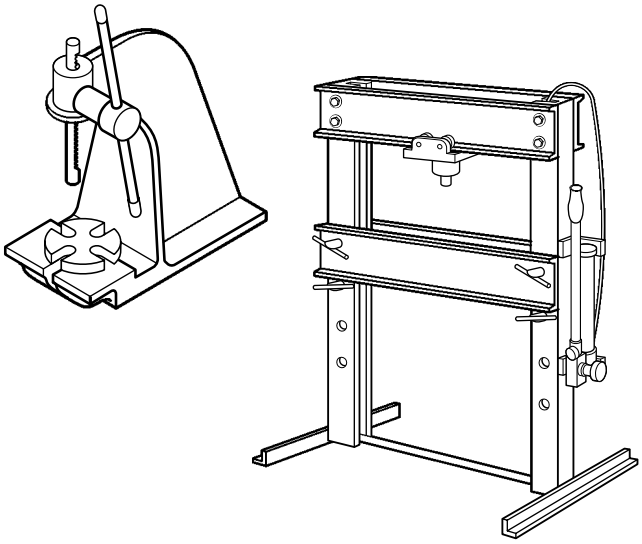
For long fatigue life, the shaft raceway, must have a hardness equivalent to 58 HRC, and ground to the suggested diameter shown in the tables of dimensions. It may be through hardened, or it may be case hardened, with an effective case depth of 0.4 mm (0.015 inch). (Effective case depth is defined as the distance from the surface inward to the equivalent of 50 HRC hardness level after grinding.)

Taper within the length of the raceway should not exceed 0.008 mm (0.0003 inch), or one-half the diameter tolerance, whichever is smaller. The radial deviation from true circular form of the raceway should not exceed 0.0025 mm (0.0001 inch) for diameters up to and including 25 mm (1.0 inch). For raceways greater than 25 mm (1.0 inch) the allowable radial deviation should not exceed 0.0025 mm (0.0001 inch) multiplied by a factor of the raceway diameter divided by 25 (1.0 inch). Surface finish on the raceway should not exceed 0.4 mm (16 microinches) R_a. Deviations will reduce the load capacity and fatigue life of the shaft.

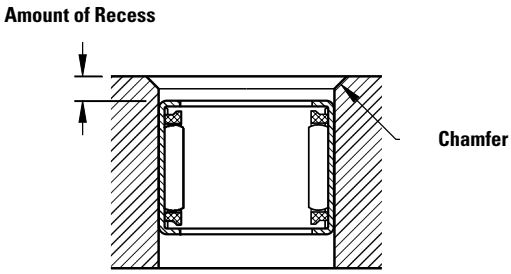
INSTALLATION

Simplicity of installation promotes additional cost savings. The drawn cup roller clutch, or the clutch and bearing assembly, must be pressed into its housing. Procedures are virtually identical with those for installing drawn cup bearings as detailed on pages C40 and C62. The unit is pressed into the bore of a gear hub or pulley hub, or housing of the proper size, and no shoulders, splines, keys, screws or snap rings are required.

Installation procedures are summarized in the following sketches:

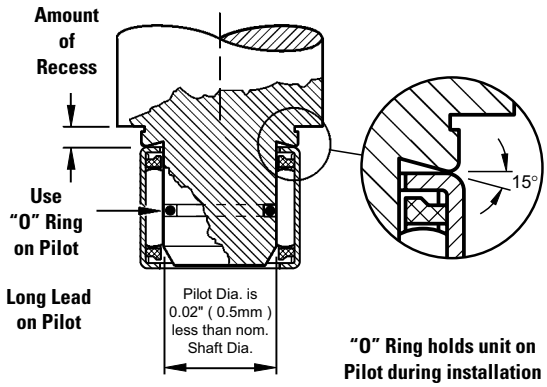


Use an arbor press or hydraulic ram press which will exert steady pressure. Never use a hammer or other tool requiring pounding to drive the clutch into its housing.



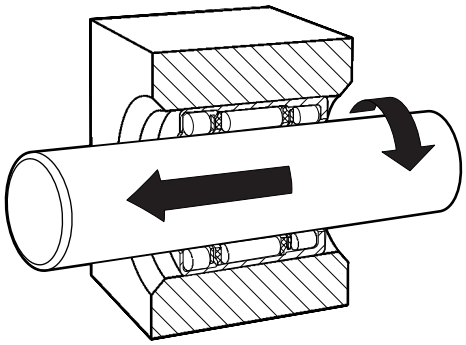
Make sure that the housing bore is chamfered to permit easy introduction of the clutch and bearing or the clutch unit. Press unit slightly beyond the chamfer in the housing bore to assure full seating. Through-bored housings are always preferred. If the housing has a shoulder, never seat the clutch against the shoulder. For further details see pages C40 and C62.

IMPORTANT: The mounted clutch or clutch and bearing assembly engages when the housing is rotated relative to the shaft in the direction of the arrow and LOCK marking [LOCK] stamped on the cup. Make sure that the unit is oriented properly before pressing it into its housing.



Use an installation tool as shown in the diagram above. If clutch is straddled by needle roller bearings, press units into position in proper sequence and preferably leave a small clearance between units.

When assembling the shaft, it should be rotated in the overrun direction during insertion. The end of the shaft should have a large chamfer or rounding.



APPLIED LOADS

The clutch-only unit is designed to transmit purely torque loads. Applied torque should not exceed the catalog ratings which are based on the compressive strength of well-aligned clutch components. Bearings on either side of the clutch are to assure concentricity between the shaft and the housing and to support radial loads during clutch overrun. Integral clutch and bearing assemblies are available for this purpose where the radial loads are light. The total maximum dynamic radial load that may be shared by the two needle roller and cage radial bearing assemblies should not be greater than C/3.

In determining the total torque load on a clutch, it is essential to consider the torque due to inertial forces developed in the mechanism, in addition to the externally applied torque. The larger the clutch and the greater the mass of the mechanism controlled by it, the more important this consideration becomes.

Clutch lockup depends on friction. For this reason applications involving severe vibrations or axial motion of the shaft within the clutch are to be avoided. The applications where there are overhanging or overturning loads should incorporate bearings that will maintain alignment between the shaft and the clutch housing. Consult your Timken representative for suggestions.

LUBRICATION

Oil is the preferred lubricant, as it minimizes wear and heat generation. For those applications where oil is not practical, clutches are packed with a soft grease containing mineral oil. Thick grease will retard roller engagement and can cause individual rollers to slip, possibly overloading any engaged rollers.

TEMPERATURE

Temperature extremes can cause clutch malfunctions and failure. The molded plastic cage with integral springs holds its necessary resiliency and strength when the operating temperature within the clutch is kept below 90 degrees Celsius (200 degrees Fahrenheit). The clutch with reinforced nylon cage and separate steel springs operates well at temperatures up to 120 degrees C (250 degrees Fahrenheit) continuously and to 150 degrees Celsius (300 degrees Fahrenheit) intermittently. Excessive thickening of the lubricant at low temperatures may prevent some or all of the rollers from engaging. New applications should be tested under expected operating conditions to determine whether or not temperature problems exist.

BACKLASH

Backlash, or lost motion, prior to engagement is minimal. The variation in backlash from one cycle to another is extremely low. Grease lubrication or improper fitup [housing bore and shaft diameter] may increase backlash. Angular displacement between the shaft and housing increases as an applied torque load is increased.

RATE OF ENGAGEMENT

Clutch lockup depends upon static friction. Axial motion between shaft and clutch rollers prevents lockup.

Clutches with integral springs engage satisfactorily at cyclic rates up to 200 engagements per minute. Intermittent operation at higher rates has been successful. The steel spring type clutches have proven dependability at rates up to 6000 or 7000 engagements per minute. Even higher cyclic rates may be practical. Since grease may impair engagement at high cyclic rates, a light oil should be used.

OVERRUN LIMIT SPEED

Exact limiting speeds are not easily predictable. The value for each clutch given in the tabular data is not absolute but serves as a guide for the designer. Oil lubrication is absolutely necessary for high speed operations. Consult your Timken representative when overrunning speeds are high.

INSPECTION

Although the outer cup of the clutch is accurately drawn from strip steel, it can go slightly out of round during heat treat. When the assembly is pressed into a ring gage or properly prepared housing of correct size and wall thickness, it becomes round and properly sized. Direct measurement of the outside diameter of a drawn cup assembly is an incorrect procedure. The proper inspection procedure is as follows:

1. Press the assembly into a ring gage of the proper size as given in the tabular data.
2. Gage the bore with the specified plug gages of the proper size, as given in the tables of dimensions.
   a. The locking plug is rotated to insure lockup when the clutch is operated at low limit shaft and is mounted in a high limit housing strong enough to properly size the clutch.
   b. The overrun plug is rotated to ensure free over-running when the clutch is operated on a high limit shaft and is mounted in a low limit housing.
   c. The go plug and no go plug insure proper size of the bearings in the clutch and bearing assemblies.

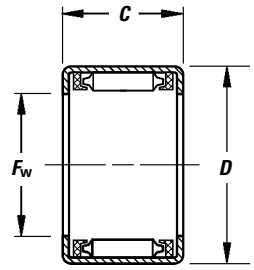
Gage sizes are listed in the tables of dimensions. Plug gage sizes reflect adjustment for the loose and tight conditions resulting from high or low housings or shafts.

DRAWN CUP ROLLER CLUTCHES

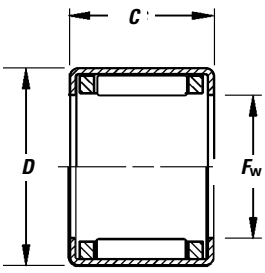
METRIC SERIES

- For proper application, separate bearings suggested (adjacent to clutch) to carry radial loads and assure concentricity between shaft and housing.
- Clutch engages when housing rotated (relative to the shaft) in direction of arrow marking [LOCK] as labeled on cup
- Proper inspection requires use of ring gage and bore plug gage(s) — see the inspection section page C307.
- Full details on installation given on page C306.
- Shaft raceway and housing bore diameters necessary for proper mounting and operation are lited on the opposite page.
- Types FC, FCS, FC-K and FCL-K clutches have stainless steel springs inserted in molded cage to position rollers for lockup.

The mounted clutch and bearing assembly engages when the housing is rotated relative to the shaft in the direction of the arrow marking [← LOCK] stamped on the cup



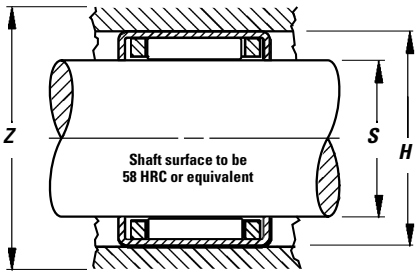
FC



FCS, FCL-K and FC-K

Shaft Diameter	Dimensions mm/in.		-0,3 mm -0.012 in.	Clutch Designation	Torque Rating N•m/in.-lbf.	Minimum O.D. of Steel Housing for Rated Torque mm/in.	Overrun Limiting Speed for Rotating Shaft	Suitable Drawn Cup Bearing[1]
mm	F_w	D	C			Z	RPM	
4	4 0.1575	8 0.315	6 0.236	FC-4-K	0.349 3.09	11 0.433	26000	HK0408
6	6 0.2362	10 0.3937	12 0.472	FCS-6	2.15 19	14 0.551	22000	HK0608
8	8 0.315	12 0.4724	12 0.472	FCL-8-K	3.39 30	17 0.669	21000	HK0808
	8 0.315	14 0.5512	12 0.472	FC-8	4.42 39.1	20 0.787	21000	—
10	10 0.3937	14 0.5512	12 0.472	FCL-10-K	4.6 40.7	20 0.787	19000	HK1010
	10 0.3937	16 0.6299	12 0.472	FC-10	5.82 51.5	25 0.984	19000	—
12	12 0.4724	18 0.7087	16 0.63	FC-12	14 124	27 1.063	19000	HK1212
16	16 0.6299	22 0.8661	16 0.63	FC-16	21.7 192	31 1.22	14000	HK1612
20	20 0.7874	26 1.0236	16 0.63	FC-20	32.6 289	38 1.496	11000	HK2012
25	25 0.9843	32 1.2598	20 0.787	FC-25	71 628	46 1.811	8700	HK2512
30	30 1.1811	37 1.4567	20 0.787	FC-30	99.1 877	51 2.008	7300	HK3012

[1] See pages C42-C49 for suitable bearing types and sizes.



.25 mm (.010 in.) min.

Ring Gage	Gaging mm/in. Clutch Locking Plug	Clutch Overrun Plug	Mounting mm/in. Shaft Raceway Diameter Max.	Shaft Raceway Diameter Min.	Housing Bore Min.	Housing Bore Max.	Wt. kg/lbs. Approx.
			S		H		
7.984 0.3143	**3.980** 0.1567	**4.004** 0.1576	**4.000** 0.1575	**3.995** 0.1573	**7.984** 0.3143	**7.993** 0.3147	**0.001** 0.002
9.984 0.3931	**5.980** 0.2354	**6.004** 0.2364	**6.000** 0.2362	**5.995** 0.236	**9.984** 0.3931	**9.993** 0.3934	**0.003** 0.007
11.980 0.4717	**7.976** 0.314	**8.005** 0.3152	**8.000** 0.315	**7.994** 0.3147	**11.980** 0.4717	**11.991** 0.4721	**0.003** 0.007
13.98 0.5504	**7.976** 0.314	**8.005** 0.3152	**8.000** 0.315	**7.994** 0.3147	**13.980** 0.5504	**13.991** 0.5508	**0.007** 0.015
13.980 0.5504	**9.976** 0.3928	**10.005** 0.3939	**10.000** 0.3937	**9.994** 0.3935	**13.980** 0.5504	**13.991** 0.5508	**0.004** 0.009
15.980 0.6291	**9.976** 0.3928	**10.005** 0.3939	**10.000** 0.3937	**9.994** 0.3935	**15.980** 0.6291	**15.991** 0.6296	**0.009** 0.02
17.980 0.7079	**11.974** 0.4714	**12.006** 0.4727	**12.000** 0.4724	**11.992** 0.4721	**17.980** 0.7079	**17.991** 0.7083	**0.012** 0.026
21.976 0.8652	**15.972** 0.6288	**16.006** 0.6302	**16.000** 0.6299	**15.992** 0.6296	**21.976** 0.8652	**21.989** 0.8657	**0.018** 0.04
25.976 1.0227	**19.970** 0.7862	**20.007** 0.7877	**20.000** 0.7874	**19.991** 0.787	**25.976** 1.0227	**25.989** 1.0232	**0.021** 0.046
31.972 1.2587	**24.967** 0.983	**25.007** 0.9845	**25.000** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**0.034** 0.075
36.972 1.4556	**29.967** 1.1798	**30.007** 1.1814	**30.000** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**0.042** 0.093

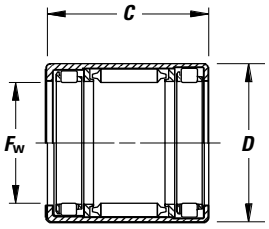
DRAWN CUP ROLLER CLUTCHES AND BEARING ASSEMBLIES

METRIC SERIES

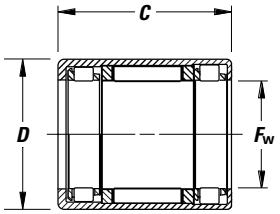
- Clutch and bearing assembly engages when housing rotated (relative to shaft) in direction of arrow marking [LOCK] as labeled on cup.
- Shaft raceway and housing bore diameters necessary for proper mounting and operation are listed on the opposite page.
- Proper inspection requires use of ring gage and bore plug gage(s) — see the inspection section page C307.
- Full details on installation given on page C306.
- Types FCB, FCBL-L and FCBN-K clutch and bearing assemblies have stainless steel springs inserted in molded cage to position rollers for lockup.

The mounted clutch and bearing assembly engages when the housing is rotated relative to the shaft in the direction of the arrow marking [← LOCK] stamped on the cup

Clutch and Bearing Assemblies



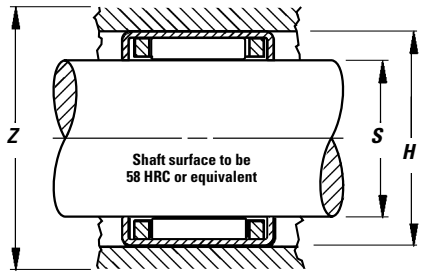
FCB



FCBL-K and FCBN-K

Shaft Diameter	Dimensions mm/in.		-0,3 mm -0.012 in.	Clutch and Bearing Assembly Designation	Torque Rating N•m/in.-lbf.	Minimum O.D. of Steel Housing for Rated Torque	Load Ratings Static kN/lbf.	Load Ratings Dynamic kN/lbf.	Overrun Limiting Speed for Rotating Shaft
mm	F_w	D	C			Z	C_0	C	RPM
8	8 0.3150	12 0.4724	22 0.866	FCBL-8-K	3.39 30.0	17 0.669	3.28 740	3.62 810	21000
8	8 0.3150	14 0.5512	20 0.787	FCB-8	4.42 39.1	20 0.787	3.04 680	4.22 950	21000
10	10 0.3937	16 0.6299	20 0.787	FCB-10	5.82 51.5	25 0.984	3.80 850	4.84 1 090	19000
12	12 0.4724	18 0.7087	26 1.024	FCB-12	14.00 124	27 1.063	5.84 1 310	6.30 1 420	19000
20	20 0.7874	26 1.0236	26 1.024	FCB-20	32.60 289	38 1.496	9.46 2 130	8.16 1 830	11000
25	25 0.9843	32 1.2598	30 1.181	FCB-25	71.00 628	46 1.811	13.1 2 940	11.3 2 540	8700
30	30 1.1811	37 1.4567	30 1.181	FCB-30	99.10 877	51 2.008	14.9 3 350	11.5 2 590	7300

Load Ratings are based on a minimum raceway hardness of 58 HRC or equivalent.



.25 mm (.010 in.) min.

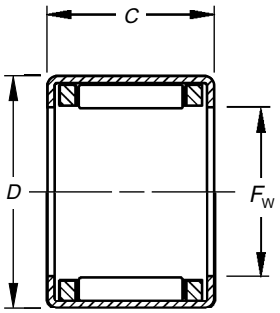
Gaging mm/in.				Mounting mm/in.				
Ring Gage	Clutch Locking Plug	Clutch Overrun and Bearing Go Plug	Bearing No Go Plug	Shaft Raceway Diameter		Housing Bore		Wt. kg/lbs. Approx.
				Max.	Min.	Min.	Max.	
				S		H		
11.980 0.4717	**7.976** 0.3140	**8.005** 0.3152	**8.033** 0.3163	**8.000** 0.3150	**7.994** 0.3147	**11.980** 0.4717	**11.991** 0.4721	**0.005** 0.011
13.980 0.5504	**7.976** 0.3140	**8.005** 0.3152	**8.033** 0.3163	**8.000** 0.3150	**7.994** 0.3147	**13.980** 0.5504	**13.991** 0.5508	**0.011** 0.024
15.980 0.6291	**9.976** 0.3928	**10.005** 0.3939	**10.033** 0.3950	**10.000** 0.3937	**9.994** 0.3935	**15.980** 0.6291	**15.991** 0.6296	**0.013** 0.029
17.980 0.7079	**11.974** 0.4714	**12.006** 0.4727	**12.036** 0.4739	**12.000** 0.4724	**11.992** 0.4721	**17.980** 0.7079	**17.991** 0.7083	**0.018** 0.040
25.976 1.0227	**19.970** 0.7862	**20.007** 0.7877	**20.043** 0.7891	**20.000** 0.7874	**19.991** 0.7870	**25.976** 1.0227	**25.989** 1.0232	**0.028** 0.062
31.972 1.2587	**24.967** 0.9830	**25.007** 0.9845	**25.043** 0.9859	**25.000** 0.9843	**24.991** 0.9839	**31.972** 1.2587	**31.988** 1.2594	**0.048** 0.106
36.972 1.4556	**29.967** 1.1798	**30.007** 1.1814	**30.043** 1.1828	**30.000** 1.1811	**29.991** 1.1807	**36.972** 1.4556	**36.988** 1.4562	**0.054** 0.119

DRAWN CUP ROLLER CLUTCHES

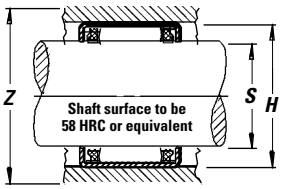
INCH SERIES

- For proper application, separate bearings suggested (adjacent to clutch) to carry radial loads and assure concentricity between shaft and housing.
- Clutch engages when housing rotated (relative to the shaft) in direction of arrow marking [LOCK] as labeled on cup.
- Proper inspection requires use of ring gage and bore plug gage(s) — see the inspection section page C307.
- Full details on installation given on page C306.
- Shaft raceway and housing bore diameters necessary for proper mounting and operation are listed on the opposite page.
- Type RCFS clutches have stainless steel springs inserted in molded cage to position rollers for lockup.

The mounted clutch engages when the housing is rotated relative to the shaft in the direction of the arrow marking [← LOCK] stamped on the cup.



RC and RC-FS



.25 mm (.010 in.) min.

Shaft Diameter	Dimensions mm/in.			Clutch Designations		Torque Rating N•m/in.-lbs.	Minimum O.D. of Steel Housing For Rated Torque	Overun Limiting Speed for Rotating Shaft
			-0.25 mm -0.010 in.	With Stainless Steel Springs	With Integral Springs			
in.	F_w	D	C				Z	RPM
1/8	**3.18** 0.125	**7.14** 0.281	**6.35** 0.250	—	**RC-02**	**0.323** 2.86	**11.2** 0.44	**34000**
1/4	**6.35** 0.250	**11.13** 0.438	**12.70** 0.500	—	**RC-040708**	**2.02** 17.9	**15.7** 0.62	20000
3/8	**9.53** 0.375	**15.88** 0.625	**12.70** 0.500	**RC-061008-FS***	**RC-061008**	**5.45** 48.2	**22.4** 0.88	18000
1/2	**12.70** 0.500	**19.05** 0.750	**12.70** 0.500	**RC-081208-FS***	**RC-081208**	**8.85** 78.3	**27.9** 1.10	17000
5/8	**15.88** 0.625	**22.23** 0.875	**15.88** 0.625	**RC-101410-FS***	**RC-101410**	**16.8** 149	**30.5** 1.20	14000
3/4	**19.05** 0.750	**25.40** 1.000	**15.88** 0.625	**RC-121610-FS***	**RC-121610**	**23.3** 206	**35.6** 1.40	12000
1	**25.40** 1.000	**33.35** 1.313	**15.88** 0.625	**RC-162110-FS***	**RC-162110**	**49.6** 439	**48.3** 1.90	8700

* Suffix "-FS" is not always stamped on the clutch cup. Type RC-FS with stainless steel springs is always readily identified by RED clutch cage.

[1] See pages C82-C89 for other suitable bearing types and sizes.

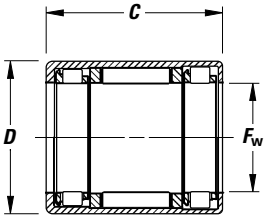
	Gaging mm/in.			Mounting mm/in.				Wt. kg/lbs.
	Ring Gage	Clutch Locking Plug	Clutch Overrun Plug	Shaft Raceway Diameter		Housing Bore		
				Max.	Min.	Min.	Max.	
				S		H		
—	**7.155** 0.2817	**3.160** 0.1244	**3.195** 0.1258	**3.175** 0.1250	**3.167** 0.1247	**7.142** 0.2812	**7.155** 0.2817	**0.001** 0.002
J-45	**11.125** 0.4380	**6.337** 0.2495	**6.383** 0.2513	**6.350** 0.2500	**6.337** 0.2495	**11.100** 0.4370	**11.125** 0.4380	**0.004** 0.008
JH-68	**15.888** 0.6255	**9.512** 0.3745	**9.558** 0.3763	**9.525** 0.3750	**9.512** 0.3745	**15.862** 0.6245	**15.888** 0.6255	**0.008** 0.017
JH-87	**19.063** 0.7505	**12.687** 0.4995	**12.733** 0.5013	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**0.009** 0.020
JH-1010	**22.238** 0.8755	**15.862** 0.6245	**15.908** 0.6263	**15.875** 0.6250	**15.862** 0.6245	**22.212** 0.8745	**22.238** 0.8755	**0.014** 0.030
J-126	**25.387** 0.9995	**19.012** 0.7485	**19.058** 0.7503	**19.050** 0.7500	**19.037** 0.7495	**25.387** 0.9995	**25.413** 1.0005	**0.015** 0.034
JH-1612	**33.325** 1.3120	**25.362** 0.9985	**25.408** 1.0003	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**0.026** 0.058

DRAWN CUP ROLLER CLUTCH AND BEARING ASSEMBLIES

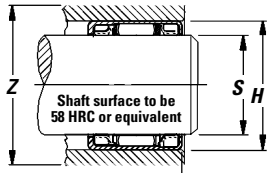
INCH SERIES

- Clutch and bearing assembly engages when housing rotated (relative to shaft) in direction of arrow marking [LOCK] as labeled on cup.
- Shaft raceway and housing bore diameters necessary for proper mounting and operation are listed.
- Proper inspection requires use of ring gage and bore plug gage(s) — see the inspection section page C307.
- Full details on installation given on page C306.
- Clutch and bearing assemblies have spring integrally molded (type RCB) stainless steel springs inserted (type RCB-FS) in molded cage to position rollers for lockup.

The mounted clutch and bearing assemblies engages when the housing is rotated relative to the shaft in the direction of the arrow marking [← LOCK] stamped on the cup.



RCB and RCB-FS



.25 mm (.010 in.) min.

Shaft Diameter	Dimensions mm/In.			Clutch and Bearing Designations With		Torque Rating	Minimum O.D. of Steel Housing For	Load Ratings kN/lbf.	
			-0.25 mm -0.010 in.	Stainless Steel Springs	Integral Springs	N•m/in.-lbf.			
in.	F_w	D	C				Z	C	C_0
3/8	9.53 0.375	15.88 0.625	22.23 0.875	RCB-061014-FS*	RCB-061014	5.45 48.2	22.4 0.88	4.89 1100	6.01 1350
1/2	12.70 0.500	19.05 0.750	22.23 0.875	RCB-081214-FS*	RCB-081214	8.85 78.3	27.9 1.1	6.49 1460	7.12 1600
5/8	15.88 0.625	22.23 0.875	25.40 1.000	RCB-101416-FS*	RCB-101416	16.8 149.0	30.5 1.2	8.14 1830	8.05 1810
3/4	19.05 0.750	25.40 1.000	25.40 1.000	RCB-121616-FS*	RCB-121616	23.3 206.0	35.6 1.4	9.79 2200	8.90 2000
1	25.40 1.000	33.35 1.313	27.00 1.063	RCB-162117-FS*	RCB-162117	49.6 439.0	48.3 1.9	17.6 3960	15.4 3460

* Suffix "-FS" is not always stamped on the clutch cup. Type RC-FS with stainless steel springs is always readily identified by RED clutch cage.

Overrun	Gaging mm/in.				Mounting mm/in.				Wt. kg/lbs.
	Ring Gage Plug	Lock Plug Diameter	Overrun Plug Bore	No Go Bearing	Shaft Raceway		Housing Approx.		
					Max.	Min.	Min.	Max.	
RPM					**S**		**H**		
18000	**15.888** 0.6255	**9.512** 0.3745	**9.553** 0.3761	**9.589** 0.3775	**9.525** 0.3750	**9.512** 0.3745	**15.862** 0.6245	**15.888** 0.6255	**0.014** 0.030
17000	**19.063** 0.7505	**12.687** 0.4995	**12.728** 0.5011	**12.764** 0.5025	**12.700** 0.5000	**12.687** 0.4995	**19.037** 0.7495	**19.063** 0.7505	**0.016** 0.036
14000	**22.238** 0.8755	**15.862** 0.6245	**15.903** 0.6261	**15.939** 0.6275	**15.875** 0.6250	**15.862** 0.6245	**22.212** 0.8745	**22.238** 0.8755	**0.023** 0.050
12000	**25.387** 0.9995	**19.012** 0.7485	**19.053** 0.7501	**19.088** 0.7515	**19.050** 0.7500	**19.037** 0.7495	**25.387** 0.9995	**25.413** 1.0005	**0.026** 0.057
8700	**33.325** 1.3120	**25.362** 0.9985	**25.403** 1.0001	**25.438** 1.0015	**25.400** 1.0000	**25.387** 0.9995	**33.325** 1.3120	**33.350** 1.3130	**0.045** 0.100

NOTES

NEEDLE ROLLER BEARING ACCESSORIES

NEEDLE/CYLINDRICAL ROLLERS

Overview: Loose needle and cylindrical rollers are mainly used as bearing rolling elements to reduce friction and torque in rotating and pivoting applications. However, these precision rollers have many other uses such as shafts or locating pins.

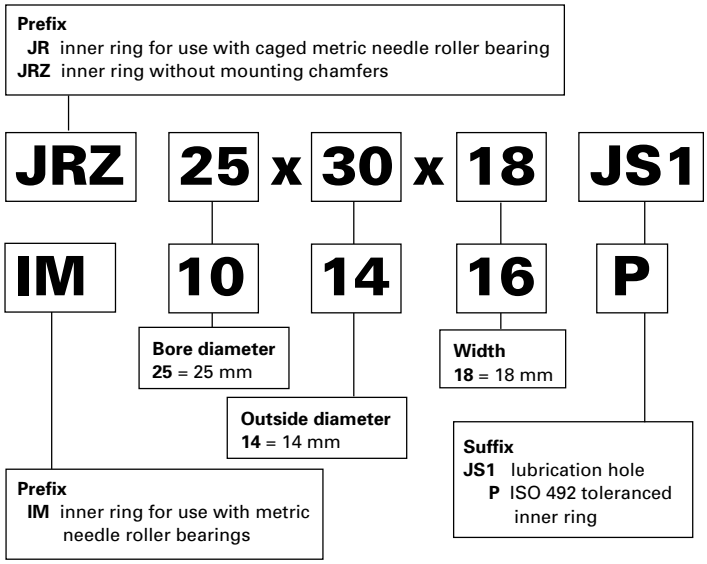
- **Sizes:** Diameters from 1.5 mm (0.0591 in.) to 14 mm (0.551 in.). Lengths from 5 mm (0.20 in.) to 57.2 mm (1.25 in.).
- **Markets:** Vehicle and industrial transmissions, universal joints, and two-cycle engines.
- **Features:** Cylindrical and needle sizes are available. Needle rollers are available with flat and rounded ends, metric series needle rollers available in Grade 2, 3 or 5.
- **Benefits:** Provide the maximum load carrying capacity within the smallest envelope at a low cost.

METRIC INNER RINGS

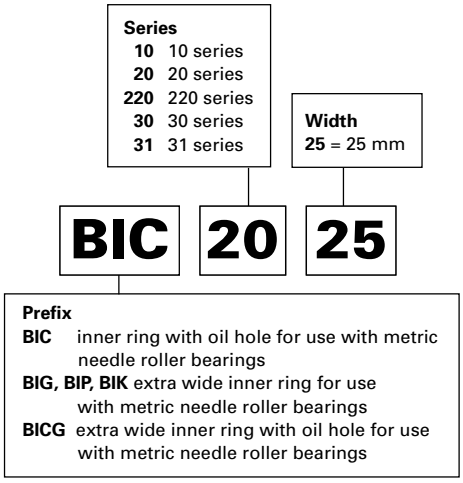
Overview: Inner rings are made from bearing quality steel and their O.D. and bore are precision ground. They function as the inner raceway for a needle roller bearing by providing a surface that meets all shaft raceway design requirements (hardness, surface finish, roundness, etc.).

- **Sizes:** 5 mm (0.197 in.) bore to 180 mm (7.087 in.) outside diameter.
- **Markets:** Automotive, truck, power transmissions, and industrial applications.
- **Features:** Available with and without chamfers, some are available with a profiled outside diameter.
- **Benefits:** When it is not practical to manufacture the shaft to raceway quality, an inner ring allows a customer to obtain acceptable bearing performance.

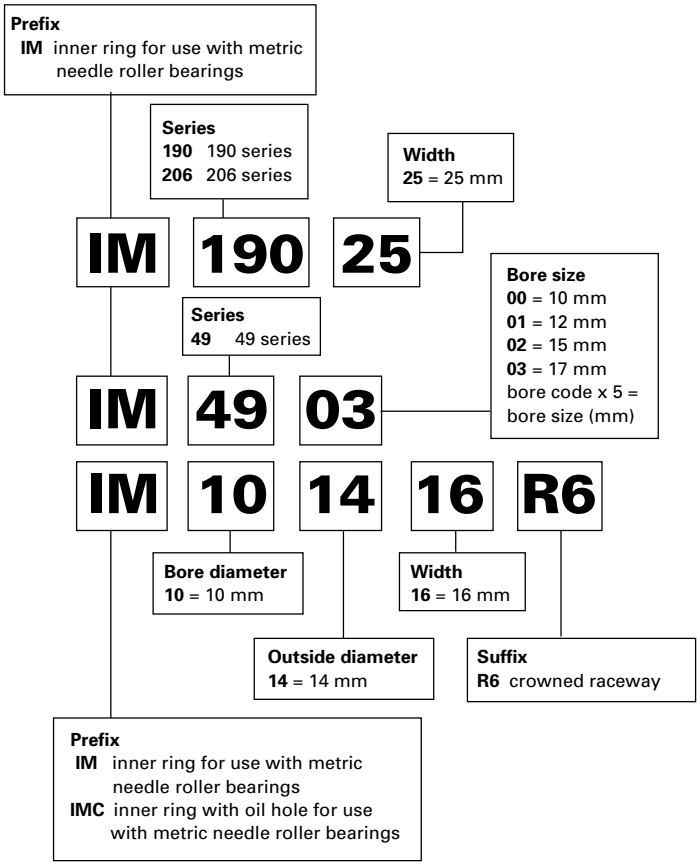
Standard Inner Rings for Needle Roller Bearings - Metric Nominal Dimensions



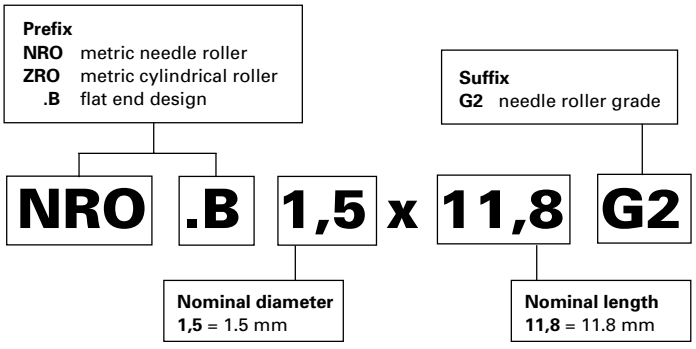
Extra Wide Inner Rings for Needle Roller Bearings - Metric Nominal Dimensions



Inner Rings for Full Complement Needle Roller Bearings - Metric Nominal Dimensions

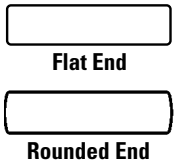


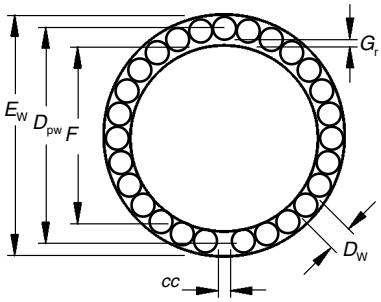
Loose Rollers - Metric Nominal Dimensions

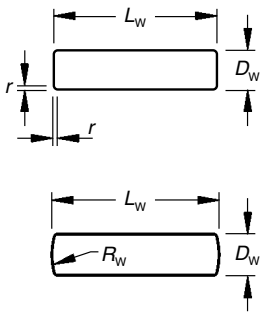


Needle Roller Bearings

C







C

NEEDLE ROLLERS – METRIC SERIES

Needle rollers are made from rolling bearing quality steel hardened to 60-64 HRC or equivalent. Nominal metric needle rollers in various grades are standardized at national and international levels. The grades determine the dimensional and form tolerances of the needle rollers. Metric series needle rollers may differ by their end form: type A has rounded ends and type B has flat ends. Timken prefers to supply needle rollers in the most economical flat end or type B design in G2 grade. Metric series needle rollers of type A may also be made available on request, and in other G3 or G5 grades.

METRIC SERIES NEEDLE ROLLER DIMENSIONS

Nominally metric needle rollers, conforming to the International Standard ISO 3096, are shown in Table 1. The symbols used in Table 1 as well as in subsequent tables and figures are summarized in Table 5. Needle rollers with flat ends, which are the preferred design are shown in Table 1. Chamfer dimension limits are also shown, the use of which results in the maximum possible effective contact length between roller and raceway. Yet, the relieves at the needle roller ends help to reduce stress concentration resulting in more uniform stress distribution, optimum load ratings, and longer life.

Every needle roller gage is separately packed and the packages are marked accordingly.

Reference standards are:

- **ISO 3096** – Rolling bearings – Needle rollers – Dimensions and tolerances
- **DIN 5402** – Sheet 3 – Rolling bearing components – Needle rollers.

EXAMPLE OF METRIC SERIES NEEDLE ROLLER DESIGNATION AND PACKAGE MARKING:

NRO.B1,5x13,8G2
M2M4

NRO	–	Needle roller
.B	–	Flat end needle rollers
1,5	–	Nominal diameter D_w = 1,5 mm
13,8	–	Nominal length L_w = 13,8 mm
G2	–	Needle roller grade (see table 2)
M2M4	–	deviation of needle roller gage -2/-4 mm

The actual finished diameter is between 1.498 and 1.496 mm.

In the marking of the needle roller gage, P identifies zero (0) or plus (+), M identifies minus (-). If a shipment of needle rollers of the same size comprises several boxes, each box contains needle rollers of the same grade. The gage may vary from box to box. Each individual box, however, contains needle rollers of identical gage.

NEEDLE ROLLERS – METRIC SERIES

mm/in. Dia. D_w	mm/in. Length L_w	Needle Roller Designation	Wt. kg/lbs. 1000 pcs Approx.	Chamfer Dimension Limits mm/in. $r_{s\ min}$	Rad.	Axial
1.5 0.0591	5.8 0.228	NRO.B1.5x5.8G2	0.080 0.176	0.1 0.004	0.4 0.016	0.6 0.024
1.5 0.0591	6.8 0.268	NRO.B1.5x6.8G2	0.094 0.207	0.1 0.004	0.4 0.016	0.6 0.024
1.5 0.0591	7.8 0.307	NRO.B1.5x7.8G2	0.108 0.238	0.1 0.004	0.4 0.016	0.6 0.024
1.5 0.0591	9.8 0.386	NRO.B1.5x9.8G2	0.136 0.300	0.1 0.004	0.4 0.016	0.6 0.024
1.5 0.0591	11.8 0.465	NRO.B1.5x11.8G2	0.164 0.362	0.1 0.004	0.4 0.016	0.6 0.024
1.5 0.0591	13.8 0.543	NRO.B1.5x13.8G2	0.191 0.421	0.1 0.004	0.4 0.016	0.6 0.024
2 0.0787	7.8 0.307	NRO.B2x7.8G2	0.190 0.419	0.1 0.004	0.6 0.024	0.8 0.031
2 0.0787	9.8 0.386	NRO.B2x9.8G2	0.240 0.529	0.1 0.004	0.6 0.024	0.8 0.031
2 0.0787	11.8 0.465	NRO.B2x11.8G2	0.290 0.639	0.1 0.004	0.6 0.024	0.8 0.031
2 0.0787	13.8 0.543	NRO.B2x13.8G2	0.340 0.750	0.1 0.004	0.6 0.024	0.8 0.031
2 0.0787	15.8 0.622	NRO.B2x15.8G2	0.390 0.860	0.1 0.004	0.6 0.024	0.8 0.031
2 0.0787	17.8 0.701	NRO.B2x17.8G2	0.440 0.970	0.1 0.004	0.6 0.024	0.8 0.031
2 0.0787	19.8 0.780	NRO.B2x19.8G2	0.490 1.080	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	7.8 0.307	NRO.B2.5x7.8G2	0.300 0.661	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	9.8 0.386	NRO.B2.5x9.8G2	0.380 0.838	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	11.8 0.465	NRO.B2.5x11.8G2	0.450 0.992	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	13.8 0.543	NRO.B2.5x13.8G2	0.530 1.168	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	15.8 0.622	NRO.B2.5x15.8G2	0.610 1.345	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	17.8 0.701	NRO.B2.5x17.8G2	0.690 1.521	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	19.8 0.780	NRO.B2.5x19.8G2	0.760 1.676	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	21.8 0.858	NRO.B2.5x21.8G2	0.840 1.852	0.1 0.004	0.6 0.024	0.8 0.031
2.5 0.0984	23.8 0.937	NRO.B2.5x23.8G2	0.920 2.028	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	9.8 0.386	NRO.B3x9.8G2	0.540 1.190	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	11.8 0.465	NRO.B3x11.8G2	0.650 1.433	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	13.8 0.543	NRO.B3x13.8G2	0.760 1.676	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	15.8 0.622	NRO.B3x15.8G2	0.870 1.918	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	17.8 0.701	NRO.B3x17.8G2	0.990 2.183	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	19.8 0.780	NRO.B3x19.8G2	1.100 2.425	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	21.8 0.858	NRO.B3x21.8G2	1.210 2.668	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	23.8 0.937	NRO.B3x23.8G2	1.320 2.910	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	25.8 1.016	NRO.B3x25.8G2	1.430 3.153	0.1 0.004	0.6 0.024	0.8 0.031
3 0.1181	27.8 1.094	NRO.B3x27.8G2	1.540 3.395	0.1 0.004	0.6 0.024	0.8 0.031

mm/in. Dia. D_w	mm/in. Length L_w	Needle Roller Designation	Wt. kg/lbs. 1000 pcs Approx.	Chamfer Dimension Limits mm/in. $r_{s\ min}$	Rad.	Axial
3.5 0.1378	11.8 0.465	NRO.B3.5x11.8G2	0.910 2.006	0.1 0.004	0.9 0.035	1.0 0.039
3.5 0.1378	13.8 0.543	NRO.B3.5x13.8G2	1.040 2.293	0.1 0.004	0.9 0.035	1.0 0.039
3.5 0.1378	15.8 0.622	NRO.B3.5x15.8G2	1.190 2.624	0.1 0.004	0.9 0.035	1.0 0.039
3.5 0.1378	17.8 0.701	NRO.B3.5x17.8G2	1.340 2.954	0.1 0.004	0.9 0.035	1.0 0.039
3.5 0.1378	21.8 0.858	NRO.B3.5x21.8G2	1.640 3.616	0.1 0.004	0.9 0.035	1.0 0.039
3.5 0.1378	23.8 0.937	NRO.B3.5x23.8G2	1.850 4.079	0.1 0.004	0.9 0.035	1.0 0.039
3.5 0.1378	25.8 1.016	NRO.B3.5x25.8G2	1.950 4.299	0.1 0.004	0.9 0.035	1.0 0.039
3.5 0.1378	29.8 1.173	NRO.B3.5x29.8G2	2.250 4.960	0.1 0.004	0.9 0.035	1.0 0.039
3.5 0.1378	34.8 1.370	NRO.B3.5x34.8G2	2.650 5.842	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	11.8 0.465	NRO.B4x11.8G2	1.600 3.527	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	13.8 0.543	NRO.B4x13.8G2	1.360 2.998	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	15.8 0.622	NRO.B4x15.8G2	1.550 3.417	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	17.8 0.701	NRO.B4x17.8G2	1.750 3.858	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	19.8 0.780	NRO.B4x19.8G2	1.950 4.299	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	21.8 0.858	NRO.B4x21.8G2	2.150 4.740	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	23.8 0.937	NRO.B4x23.8G2	2.350 5.181	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	25.8 1.016	NRO.B4x25.8G2	2.550 5.622	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	27.8 1.094	NRO.B4x27.8G2	2.740 6.041	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	29.8 1.173	NRO.B4x29.8G2	2.950 6.504	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	34.8 1.370	NRO.B4x34.8G2	3.400 7.496	0.1 0.004	0.9 0.035	1.0 0.039
4 0.1575	39.8 1.567	NRO.B4x39.8G2	3.900 8.598	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	15.8 0.622	NRO.B5x15.8G2	2.430 5.357	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	19.8 0.780	NRO.B5x19.8G2	3.050 6.724	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	21.8 0.858	NRO.B5x21.8G2	3.360 7.408	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	23.8 0.937	NRO.B5x23.8G2	3.670 8.091	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	25.8 1.016	NRO.B5x25.8G2	3.980 8.774	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	27.8 1.094	NRO.B5x27.8G2	4.290 9.458	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	29.8 1.173	NRO.B5x29.8G2	4.600 10.141	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	34.8 1.370	NRO.B5x34.8G2	5.400 11.905	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	39.8 1.567	NRO.B5x39.8G2	6.150 13.558	0.1 0.004	0.9 0.035	1.0 0.039
5 0.1969	49.8 1.961	NRO.B5x49.8G2	7.500 16.535	0.1 0.004	0.9 0.035	1.0 0.039
6 0.2362	17.8 0.701	NRO.B6x17.8G2	3.950 8.708	0.1 0.004	0.9 0.035	1.0 0.039

METRIC SERIES NEEDLE ROLLER TOLERANCES

TABLE 2 – VARIATION OF GAGE LOT DIAMETER, PREFERRED GAGES AND CIRCULARITY DEVIATION (VALUES IN MM)

Grade Gage Lot Diameter	Variation of High/Low Deviation of Mean Diameter Max.	Gages Deviation Max.										Circularity
	V_{DWL}	D_{wmp}										
2	2	high	0	-1	-2	-3	-4	-5	-6	-7	-8	1
		low	-2	-3	-4	-5	-6	-7	-8	-9	-10	
3	3	high	0		-1.5	-3		-4.5	-6		-7	1.5
		low	-3		-4.5	-6		-7.5	-9		-10	
5	5	high	0			-3			-5			2.5
		low	-5			-8			-10			

Note 1 - Tolerance values apply only at the middle of the needle roller length.
Note 2 - Needle rollers of any nominal dimensions and any of the quoted grades will be supplied sub-divided into the gages listed in Table 2 at our option, if nothing to the contrary is agreed upon at the time of ordering.

END FORM TOLERANCES

Table 3 specifies the applicable end configuration for rounded end and flat end needle rollers of all grades.

TABLE 3 –
END CONFIGURATION LIMITS FOR METRIC NEEDLE ROLLERS

Rounded End Needle Rollers End Radius		Nominal Diameter of Needle Roller		Flat End Needle Rollers Chamfer Dimension Limits (Dimensions in millimeters)		
					Radial	Axial
Min.	Max.	>	≤			
R_w*		D_w		$r_{s\,min}$*	$r_{s\,max}$	
—	—	—	1	0.1	0.3	0.5
D_w	L_w	1	1.5	0.1	0.4	0.6
2	2	1.5	3	0.1	0.6	0.8
		3	6	0.1	0.9	1

Notes: *The chamfer of a needle roller shall clear a fillet radius equal to $r_{s\,min}$ which should also be considered for designs using rounded end needle rollers.

NEEDLE ROLLER LENGTH TOLERANCE

Tolerances on the length L_w for needle rollers of all grades: h13, see Table 4.

TABLE 4 –
TOLERANCES FOR NEEDLE ROLLER LENGTH, NOMINAL METRIC NEEDLE ROLLERS

Nominal Length, L_w mm		Tolerance Limits mm (ISO h13)	
>	≤	Max.	Min.
3	6	0	-0.18
6	10	0	-0.22
10	18	0	-0.27
18	30	0	-0.33
30	50	0	-0.39

DESIGN CALCULATIONS FOR NEEDLE ROLLER BEARING COMPLEMENTS

In the majority of full complement needle roller applications, needle roller complements of less than 35 needle rollers per row and a ratio of length to diameter between 4:1 and 8:1 is advantageous. Other combinations of quantity and length to diameter ratios of needle rollers have been used successfully. Specific design requirements usually dictate the appropriate selection.

In general, needle roller complements for rotating motion should employ a smaller number of large diameter needle rollers, while needle roller complements subjected to oscillating motion (especially under high loads) should employ a large number of smaller diameter needle rollers.

Oscillating applications with small angular travel encourage the development of fretting corrosion. The best performance under these conditions has been achieved by using the largest practical number of small diameter needle rollers.

CALCULATION OF RACEWAY DIAMETERS

The calculation of inner and outer raceway diameters may be carried out using either the formula given in Table 5 or more conveniently the raceway calculation form in Table 6. To assist the designer in making these calculations, the values of K required for calculation of needle roller complements of 6 through 60 needle rollers are listed in Table 7. Values of K for other numbers of needle rollers can be calculated using the formulas given in Table 5.

Table 8 lists the suggested values for minimum radial internal clearance ($G_{r\,min}$) and the minimum circumferential clearance divided by π ($cc_{\,min}/\pi$), to be used for calculating needle roller complements for normal rotating applications where the speeds, loads and shaft deflections are moderate.

Applications with poor lubrication, unusual motion, large misalignment, raceway distortions, load reversals, high speeds, etc. can not be characterized as normal rotating applications. These miscellaneous applications require adjustment of the minimum clearances listed in Table 8. The factors in Table 9 may be used for general guidance in the adjustment of the minimal clearances. For any of the listed miscellaneous applications or any application where abnormal factors such as those listed above exist, and particularly when the inner raceway diameter will exceed 50 mm, consult your Timken representative for design assistance.

TABLE 5 – DESIGN FACTORS FOR NEEDLE ROLLERS

Z	number of needle rollers per bearing path
K	chordal factor, K = 1/sin (180°/ Z)
cc	total circumferential clearance. See Tables 8 and 9 for cc_{min}/π values.
G_r	radial internal clearance. See Tables 8 and 9 for $G_{r\,min}$ values
D_{pw}	pitch diameter: $D_{pw} = K \bullet D_{w\,max} + (cc_{min}/\pi) = E_{min} - D_{w\,max}$ $= F_{max} + G_{r\,min} + D_{w\,max}$
E	outer raceway bore diameter: $E_{min} = D_{pw} + D_{w\,max} = (K + 1) \bullet D_{w\,max} + (cc_{min}/\pi)$ $= F_{max} + G_{r\,min} + 2D_{w\,max}$
F	inner raceway diameter: $F_{max} = D_{pw} - D_{w\,max} - G_{r\,min}$ $= (K-1) \bullet D_{w\,max} + (cc_{min}/\pi) - G_{r\,min}$ $= E_{min} - 2D_{w\,max} - G_{r\,min}$
D_w	nominal needle roller diameter
D_{we}	needle roller diameter applicable in the calculation of load ratings: $D_{we} = D_{pw} - F_{max} - G_{r\,min} = \frac{D_{pw} - cc_{min}/\pi}{K}$ $= \frac{F_{max} + G_{r\,min} - (cc_{min}/\pi)}{(K-1)}$ $= E_{min} - D_{pw} = \frac{E_{min} - cc_{min}/\pi}{(K+1)}$
L_w	overall needle roller length
R_w	end radius, rounded end needle roller
r_s	corner rounding, flat end needle roller
L_{we}	needle roller length applicable in the calculation of load ratings, for rounded end needle rollers: $L_{we} = L_{w\,max} - (L_{w\,max} - \sqrt{L_{w\,max}^2 - D_{we}^2})$ for flat end needle rollers: $L_{we} = L_{w\,max} - (2 \bullet r_{s\,min})$

Note: If length of contact of the needle roller with the raceway is reduced because of undercuts, chamfers, etc. L_{we} must be reduced correspondingly.

RACEWAY DIAMETER TOLERANCES

Table 10 lists the recommended tolerances that should be applied to the dimensions for the maximum inner raceway and minimum outer raceway diameter after they have been calculated using the information given in Table 5 or Table 6.

TABLE 6 – RACEWAY CALCULATION FORM

STEP	SOURCE	DESIGN FACTOR	MILLIMETERS	
1	given	Dw, needle roller diameter	3000 max.	
2	Table 7	K, for 30 needle rollers	9.56677	
3	(1) X (2)	KDw	28700	
4	Table 8`	$ccmin/\pi = 0.025$	0.025 min.	
5	(3) + (4)	Dpw pitch diameter	28725	
6	given	Dw, needle roller diameter	3000 max.	
7	(5) - (6)		25725	
8	Table 8	Gr, radial clearance	0.013 min.	
9	(7) - (8)	F, inner raceway diameter	25712 max.	25703 min.*
10	(5) + (6)	E, outer raceway diameter	31725 min.	31741 max.*

*From Table 10

CLEARANCES IN NEEDLE ROLLER COMPLEMENTS

Needle rollers, supplied in bulk, are generally used for full complement assemblies. Successful operation of a full complement of needle rollers not only requires careful selection of radial internal clearance but, more importantly, depends on proper circumferential clearance, or the total clearance between needle rollers.

Needle roller guidance in a full complement assembly depends largely on contact between needle rollers. Too little circumferential clearance causes overheating. Too much circumferential clearance ina heavily loaded full complement of needle rollers causes loss of needle roller guidance and results in needle roller skew and resultant end thrusting.

Control of radial clearance and circumferential clearance is influenced by the needle roller diameter tolerance, as well as the tolerances of the inner and outer raceway diameters.

END CLEARANCE

The total needle roller end clearance, or end play, nomally should be 0.20 mm minimum per path of needle rollers.

TABLE 7

K VALUES

Z	K	Z	K	Z	K	Z	K	Z	K	Z	K
6	2.00000	16	5.12583	26	8.29623	36	11.47371	46	14.65364	56	17.86471
7	2.30476	17	5.44219	27	8.61379	37	11.79163	47	14.97171	57	18.15285
8	2.61313	18	5.75877	28	8.93140	38	12.10957	48	15.28979	58	18.47100
9	2.92380	19	6.07553	29	9.24907	39	12.42752	49	15.60788	59	18.78916
10	3.23607	20	6.39245	30	9.56677	40	12.74549	50	15.92597	60	19.10732
11	3.54947	21	6.70951	31	9.88452	41	13.06348	51	16.24408		
12	3.86370	22	7.02667	32	10.20230	42	13.38149	52	16.56219		
13	4.17858	23	7.34394	33	10.52011	43	13.69951	53	16.88031		
14	4.49396	24	7.66130	34	10.83795	44	14.01754	54	17.19843		
15	4.80973	25	7.97873	35	11.15582	45	14.33559	55	17.51657		

TABLE 8 – MINIMUM CLEARANCES, NORMAL ROTATING APPLICATIONS

F Nominal Inner Raceway Diameter mm		cc_{min}/π	$G_{r\,min}$
>	≤	mm	mm
—	3	0.025	0.006
3	6	0.025	0.008
6	10	0.025	0.009
10	18	0.025	0.011
18	30	0.025	0.013
30	50	0.05	0.016
50	80	0.05	0.019
80	120	0.05	0.022

TABLE 9 – MINIMUM CLEARANCES, MISCELLANEOUS APPLICATIONS

Application	cc_{min}/π	$G_{r\,min}$
universal joint	$^1/_3$ • normal	$^1/_2$ • normal
transmission pilot	normal	3 • normal
constant mesh gear	0.2 • roller dia.	normal
transmission planet	normal	normal
crank pin for two cycle engine	5 • normal	7 • normal

TABLE 10 – SUGGESTED RACEWAY DIAMETER TOLERANCES

F Nominal Inner Raceway Diameter mm		Tolerance Limits (ISO h5) mm	
>	≤	High	Low
3	6	0	-0.005
6	10	0	-0.006
10	18	0	-0.008
18	30	0	-0.009
30	50	0	-0.011
50	80	0	-0.013
80	120	0	-0.015

E Nominal Outer Raceway Diameter mm		Tolerance Limits (ISO H6) mm	
>	≤	Low	High
3	6	0	+0.008
6	10	0	+0.009
10	18	0	+0.011
18	30	0	+0.013
30	50	0	+0.016
50	80	0	+0.019
80	120	0	+0.022

LOAD RATING AND LIFE CALCULATIONS FOR FULL COMPLEMENTS OF NEEDLE ROLLERS

Before selecting the quantity and size of needle rollers to be used in a needle roller complement, it is usually necessary to calculate the load rating required using the applied load, speed and desired life. For a review of bearing size selection, see the engineering section.

Since it is not practical to tabulate the dynamic and static load ratings for the great number of needle roller complements that can be assembled by using different quantities, diameters and lengths of rollers, formulae are provided for the necessary calculations.

For convenience, values of f_c and values of $Z^{3/4}$ have been combined into single factors ($f_c \bullet Z^{3/4}$). These factors for a wide range of roller complements are tabulated in Table 11.

BASIC DYNAMIC LOAD RATINGS

The basic dynamic load rating C, for any roller bearing can be calculated from the formula:

$$C = f_c \bullet (i \bullet L_{we} \bullet \cos\alpha)^{7/9} \bullet Z^{3/4} \bullet D_{we}^{29/27}$$

where: f_c = a factor which depends on the geometry of the bearing components, the accuracy to which the various components are made, and the material. Maximum values are listed in such standards as ISO 281 and USA ANSI-ABMA Standard 11.

i = number of rows of rollers in any one bearing.

α = nominal angle of contact. Since a = 0 for a radial roller bearing, $\cos\alpha = 1$.

Other symbols are explained in Table 5.

For single path radial roller bearings, where $i = 1$ and $\cos\alpha = 1$, the basic dynamic load rating formula can be written as:

$$C = f_c \bullet Z^{3/4} \bullet L_{we}^{7/9} \bullet D_{we}^{29/27}$$

TABLE 11 – VALUES OF $F_C Z^{3/4}$ FOR METRIC UNITS

Z	$f_c Z^{3/4}$ kN - mm units
6	0.267
7	0.336
8	0.400
9	0.459
10	0.514
11	0.565
12	0.613
13	0.658
14	0.701
15	0.742
16	0.781
17	0.818
18	0.853
19	0.887
20	0.919
21	0.951
22	0.981
23	1.011
24	1.039
25	1.067
26	1.094
27	1.120
28	1.145
29	1.170
30	1.195
31	1.219
32	1.242
33	1.265
34	1.288
35	1.310
36	1.331
37	1.353
38	1.374
39	1.394
40	1.415
41	1.435
42	1.454
43	1.474
44	1.493
45	1.512
46	1.531
47	1.549
48	1.568
49	1.586
50	1.604
51	1.621
52	1.639
53	1.656
54	1.673
55	1.690
56	1.707
57	1.724
58	1.740
59	1.757
60	1.773

Example:

Calculate the basic dynamic load rating for a full complement of 28 flat end rollers, 3 mm diameter and 17.8 mm length.

$C = f_c \bullet Z^{3/4} \bullet L_{we}^{7/9} \bullet D_{we}^{29/27}$

$f_c Z^{3/4}$ from Table 11 = 1145

$D_{we}^{29/27} = 3^{29/27} = 3{,}254$

$L_{we} = 17.8 - 0.2 = 17.6$ mm

$L_{we}^{7/9} = 17.6^{7/9} = 9305$

$C = 1145 \bullet 9305 \bullet 3254 = 34.7$ kN

When a couple load (overturning moment) is imposed on a single row of needle rollers, the resulting uneven distribution of load can seriously affect bearing life. In such cases, two rows of needle rollers are generally suggested.

BASIC STATIC LOAD RATING

The basic static load rating (C_0) for any roller bearing, including needle roller bearings, can be calculated from the following formula included in ISO 76, USA ANSI-ABMA Standard 11, and other Standards:

$$C_0 = f_0 \bullet \left(1 - \frac{D_{we} \bullet \cos}{D_{pw}}\right) \bullet i \bullet Z \bullet L_{we} \bullet D_{we} \cos \alpha$$

where: $f_0 = 0{,}044$ when kilo-newton and millimeter units are used.

D_{pw} = pitch diameter of the needle roller complement (mm).

i = number of rows of rollers in any one bearing.

α = nominal angle of contact. Since $\alpha = 0$ for radial roller bearing, $\cos \alpha = 1$.

The other symbols are described in Table 5.

INNER AND OUTER RACEWAY DIMENSIONS, MM

	D_w = 1.5				D_w = 2.0				D_w = 2.5			
	Max.	Min.	Min.	Max.	Max.	Min.	Min.	Max.	Max.	Min.	Min.	Max.
Z	F		E		F		E		F		E	
14	5.258	5.253	8.266	8.275	7.004	6.998	11.013	11.024	8.751	8.745	13.760	13.771
15	5.732	5.727	8.740	8.749	7.635	7.629	11.644	11.655	9.540	9.534	14.549	14.560
16	6.205	6.199	9.214	9.223	8.268	8.262	12.277	12.288	10.329	10.321	15.340	15.351
17	6.679	6.673	9.688	9.697	8.900	8.894	12.909	12.920	11.119	11.111	16.130	16.141
18	7.154	7.148	10.163	10.174	9.534	9.528	13.543	13.554	11.911	11.903	16.922	16.933
19	7.629	7.623	10.638	10.649	10.165	10.157	14.176	14.187	12.703	12.695	17.714	17.725
20	8.105	8.099	11.114	11.125	10.799	10.791	14.810	14.821	13.495	13.487	18.506	18.519
21	8.580	8.574	11.589	11.600	11.433	11.425	15.444	15.455	14.288	14.280	19.299	19.312
22	9.056	9.050	12.065	12.076	12.067	12.059	16.078	16.089	15.081	15.073	20.092	20.105
23	9.532	9.526	12.541	12.552	12.702	12.694	16.713	16.724	15.874	15.865	20.885	20.898
24	10.008	10.000	13.017	13.028	13.337	13.329	17.348	17.359	16.667	16.659	21.678	21.691
25	10.482	10.474	13.493	13.504	13.971	13.963	17.982	17.993	17.461	17.453	22.472	22.485
26	10.958	10.950	13.969	13.980	14.606	14.598	18.617	18.630	18.253	18.244	23.266	23.279
27	11.435	11.427	14.446	14.457	15.242	15.234	19.253	19.266	19.046	19.037	24.059	24.072
28	11.911	11.903	14.922	14.933	15.877	15.869	19.888	19.901	19.841	19.832	24.854	24.867
29	12.388	12.380	15.399	15.410	16.512	16.504	20.523	20.536	20.635	20.626	25.648	25.661
30	12.864	12.856	15.875	15.886	17.148	17.140	21.159	21.172	21.429	21.420	26.442	26.455
31	13.341	13.333	16.352	16.363	17.783	17.775	21.794	21.807	22.223	22.214	27.236	27.249
32	13.817	13.809	16.828	16.839	18.417	18.408	22.430	22.443	23.018	23.009	28.031	28.044
33	14.294	14.286	17.305	17.316	19.052	19.043	23.065	23.078	23.812	23.803	28.825	28.838
34	14.771	14.763	17.782	17.793	19.688	19.679	23.701	23.714	24.607	24.598	29.620	29.633
35	15.248	15.240	18.259	18.272	20.324	20.315	24.337	24.350	25.402	25.393	30.415	30.431
36	15.725	15.717	18.736	18.749	20.959	20.950	24.972	24.985	26.196	26.187	31.209	31.225
37	16.201	16.193	19.212	19.225	21.595	21.586	25.608	25.621	26.991	26.982	32.004	32.020
38	16.678	16.670	19.689	19.702	22.231	22.222	26.244	26.257	27.786	27.777	32.799	32.815
39	17.155	17.147	20.166	20.179	22.867	22.858	26.880	26.893	28.581	28.572	33.594	33.610
40	17.632	17.624	20.643	20.656	23.503	23.494	27.516	27.529	29.376	29.367	34.389	34.405
41	18.107	18.098	21.120	21.133	24.139	24.130	28.152	28.165	30.193	30.182	35.209	35.225
42	18.584	18.575	21.597	21.610	24.775	24.766	28.788	28.801	30.988	30.977	36.004	36.020
43	19.061	19.052	22.074	22.087	25.411	25.402	29.424	29.437	31.783	31.772	36.799	36.815
44	19.538	19.529	22.551	22.564	26.047	26.038	30.060	30.076	32.578	32.567	37.594	37.610
45	20.015	20.006	23.028	23.041	26.683	26.674	30.696	30.712	33.373	33.362	38.389	38.405
46	20.492	20.483	23.505	23.518	27.319	27.310	31.332	31.348	34.168	34.157	39.184	39.200
47	20.970	20.961	23.983	23.996	27.955	27.946	31.968	31.984	34.963	34.952	39.979	39.995
48	21.447	21.438	24.460	24.473	28.592	28.583	32.605	32.621	35.758	35.747	40.774	40.790
49	21.924	21.915	24.937	24.950	29.228	29.219	33.241	33.257	36.554	36.543	41.570	41.586
50	22.401	22.392	25.414	25.427	29.864	29.855	33.877	33.893	37.349	37.338	42.365	42.381
51	22.878	22.869	25.891	25.904	30.522	30.511	34.538	34.554	38.144	38.133	43.160	43.176
52	23.355	23.346	26.368	26.381	31.158	31.147	35.174	35.190	38.939	38.928	43.955	43.971
53	23.832	23.823	26.845	26.858	31.795	31.784	35.811	35.827	39.735	39.724	44.751	44.767
54	24.310	24.301	27.323	27.336	32.431	32.420	36.447	36.463	40.530	40.519	45.546	45.562
55	24.787	24.778	27.800	27.813	33.067	33.056	37.083	37.099	41.325	41.314	46.341	46.357
56	25.264	25.255	28.277	28.290	33.703	33.692	37.719	37.735	42.121	42.110	47.137	47.153
57	25.741	25.732	28.754	28.767	34.340	34.329	38.356	38.372	42.916	42.905	47.932	47.948
58	26.219	26.210	29.232	29.245	34.976	34.965	38.992	39.008	43.712	43.701	48.728	48.744
59	26.696	26.687	29.709	29.722	35.612	35.601	39.628	39.644	44.507	44.496	49.523	49.539
60	27.173	27.164	30.186	30.202	36.249	36.238	40.265	40.281	45.302	45.291	50.318	50.337

Timken® Torrington® Metric Series Needle Roller Designation and Load Rating Multiplier ($D_{we}^{29/27}$ $L_{we}^{7/9}$)

D_w = 1.5		D_w = 2.0		D_w = 2.5	
Needle Roller Designation	$D_{we}^{(29/27)}L_{we}^{(7/9)}$	Needle Roller Designation	$D_{we}^{(29/27)}L_{we}^{(7/9)}$	Needle Roller Designation	$D_{we}^{(29/27)}L_{we}^{(7/9)}$
NRO.B1.5x5.8G2	5.903	NRO.B2x7.8G2	10.195	NRO.B2.5x7.8G2	12.957
NRO.B1.5x6.8G2	6.707	NRO.B2x9.8G2	12.227	NRO.B2.5x9.8G2	15.538
NRO.B1.5x7.8G2	7.485	NRO.B2x11.8G2	14.166	NRO.B2.5X11.8G2	18.002
NRO.B1.5x9.8G2	8.977	NRO.B2x13.8G2	16.031	NRO.B2.5x13.8G2	20.373
NRO.B1.5x11.8G2	10.400	NRO.B2x15.8G2	17.837	NRO.B2.5x15.8G2	22.667
NRO.B1.5x13.8G2	11.770	NRO.B2x17.8G2	19.591	NRO.B2.5x17.8G2	24.897
		NRO.B2x19.8G2	21.302	NRO.B2.5x19.8G2	27.071
		NRO.B2x21.8G2	22.974	NRO.B2.5x21.8G2	29.196
				NRO.B2.5x23.8G2	31.278

INNER AND OUTER RACEWAY DIMENSIONS, MM

	D_w =3.0				D_w =3.5				D_w =4.0			
	Max.	Min.	Min.	Max.	Max.	Min.	Min.	Max.	Max.	Min.	Min.	Max.
Z	F		E		F		E		F		E	
14	10.496	10.488	16.507	16.518	12.243	12.235	19.254	19.267	13.990	13.982	22.001	22.014
15	11.443	11.435	17.454	17.465	13.348	13.340	20.359	20.372	15.253	15.245	23.264	23.277
16	12.391	12.383	18.402	18.415	14.454	14.446	21.465	21.478	16.517	16.509	24.528	24.541
17	13.341	13.333	19.352	19.365	15.562	15.554	22.573	22.586	17.783	17.775	25.794	25.807
18	14.290	14.282	20.301	20.314	16.670	16.662	23.681	23.694	19.047	19.038	27.060	27.073
19	15.241	15.233	21.252	21.265	17.778	17.770	24.789	24.802	20.314	20.305	28.327	28.340
20	16.191	16.183	22.202	22.215	18.886	18.877	25.899	25.912	21.582	21.573	29.595	29.608
21	17.143	17.135	23.154	23.167	19.995	19.986	27.008	27.021	22.850	22.841	30.863	30.879
22	18.092	18.083	24.105	24.118	21.105	21.096	28.118	28.131	24.119	24.110	32.132	32.148
23	19.044	19.035	25.057	25.070	22.216	22.207	29.229	29.242	25.388	25.379	33.401	33.417
24	19.996	19.987	26.009	26.022	23.327	23.318	30.340	30.356	26.657	26.648	34.670	34.686
25	20.948	20.939	26.961	26.974	24.438	24.429	31.451	31.467	27.927	27.918	35.940	35.956
26	21.901	21.892	27.914	27.927	25.549	25.540	32.562	32.578	29.197	29.188	37.210	37.226
27	22.853	22.844	28.866	28.879	26.660	26.651	33.673	33.689	30.489	30.478	38.505	38.521
28	23.806	23.797	29.819	29.832	27.772	27.763	34.785	34.801	31.760	31.749	39.776	39.792
29	24.759	24.750	30.772	30.788	28.884	28.875	35.897	35.913	33.030	33.019	41.046	41.062
30	25.712	25.703	31.725	31.741	29.996	29.987	37.009	37.025	34.301	34.290	42.317	42.333
31	26.666	26.657	32.679	32.695	31.130	31.119	38.146	38.162	35.572	35.561	43.588	43.604
32	27.619	27.610	33.632	33.648	32.242	32.231	39.258	39.274	36.843	36.832	44.859	44.875
33	28.572	28.563	34.585	34.601	33.354	33.343	40.370	40.386	38.114	38.103	46.130	46.146
34	29.526	29.517	35.539	35.555	34.467	34.456	41.483	41.499	39.386	39.375	47.402	47.418
35	30.501	30.490	36.517	36.533	35.579	35.568	42.595	42.611	40.657	40.646	48.673	48.689
36	31.455	31.444	37.471	37.487	36.692	36.681	43.708	43.724	41.929	41.918	49.945	49.961
37	32.409	32.398	38.425	38.441	37.805	37.794	44.821	44.837	43.201	43.190	51.217	51.236
38	33.363	33.352	39.379	39.395	38.917	38.906	45.933	45.949	44.472	44.461	52.488	52.507
39	34.317	34.306	40.333	40.349	40.030	40.019	47.046	47.062	45.744	45.733	53.760	53.779
40	35.270	35.259	41.286	41.302	41.143	41.132	48.159	48.175	47.016	47.005	55.032	55.051
41	36.224	36.213	42.240	42.256	42.256	42.245	49.272	49.288	48.288	48.277	56.304	56.323
42	37.178	37.167	43.194	43.210	43.369	43.358	50.385	50.404	49.560	49.549	57.576	57.595
43	38.133	38.122	44.149	44.165	44.482	44.471	51.498	51.517	50.829	50.816	58.848	58.867
44	39.087	39.076	45.103	45.119	45.595	45.584	52.611	52.630	52.101	52.088	60.120	60.139
45	40.041	40.030	46.057	46.073	46.709	46.698	53.725	53.744	53.373	53.360	61.392	61.411
46	40.995	40.984	47.011	47.027	47.822	47.811	54.838	54.857	54.646	54.633	62.665	62.684
47	41.949	41.938	47.965	47.981	48.935	48.924	55.951	55.970	55.918	55.905	63.937	63.956
48	42.903	42.892	48.919	48.935	50.045	50.032	57.064	57.083	57.190	57.177	65.209	65.228
49	43.858	43.847	49.874	49.890	51.159	51.146	58.178	58.197	58.463	58.450	66.482	66.501
50	44.812	44.801	50.828	50.847	52.272	52.259	59.291	59.310	59.735	59.722	67.754	67.773
51	45.766	45.755	51.782	51.801	53.385	53.372	60.404	60.423	61.007	60.994	69.026	69.045
52	46.721	46.710	52.737	52.756	54.499	54.486	61.518	61.537	62.280	62.267	70.299	70.318
53	47.675	47.664	53.691	53.710	55.612	55.599	62.631	62.650	63.552	63.539	71.571	71.590
54	48.629	48.618	54.645	54.664	56.726	56.713	63.745	63.764	64.825	64.812	72.844	72.863
55	49.584	49.573	55.600	55.619	57.839	57.826	64.858	64.877	66.097	66.084	74.116	74.135
56	50.535	50.522	56.554	56.573	58.952	58.939	65.971	65.990	67.370	67.357	75.389	75.408
57	51.490	51.477	57.509	57.528	60.066	60.053	67.085	67.104	68.642	68.629	76.661	76.680
58	52.444	52.431	58.463	58.482	61.180	61.167	68.199	68.218	69.915	69.902	77.934	77.953
59	53.398	53.385	59.417	59.436	62.293	62.280	69.312	69.331	71.188	71.175	79.207	79.226
60	54.353	54.340	60.372	60.391	63.407	63.394	70.426	70.445	72.460	72.447	80.479	80.501

Timken® Torrington® Metric Series Needle Roller Designation and Load Rating Multiplier ($D_{we}^{29/27}$ $L_{we}^{7/9}$)

	D_w = 3.0		D_w = 3.5		D_w = 4.0	
	Needle Roller Designation	$D_{we}^{(29/27)}L_{we}^{(7/9)}$	Needle Roller Designation	$D_{we}^{(29/27)}L_{we}^{(7/9)}$	Needle Roller Designation	$D_{we}^{(29/27)}L_{we}^{(7/9)}$
	NRO.B3x9.8G2	18.900	NRO.B3.5x11.8G2	25.839	NRO.B4x11.8G2	29.824
	NRO.B3x11.8G2	21.897	NRO.B3.5x13.8G2	29.242	NRO.B4x13.8G2	33.752
	NRO.B3x13.8G2	24.780	NRO.B3.5x15.8G2	32.535	NRO.B4x15.8G2	37.553
	NRO.B3x15.8G2	27.571	NRO.B3.5x17.8G2	35.736	NRO.B4x17.8G2	41.247
	NRO.B3x17.8G2	30.283	NRO.B3.5x19.8G2	38.856	NRO.B4x19.8G2	44.848
	NRO.B3x19.8G2	32.927	NRO.B3.5x21.8G2	41.906	NRO.B4x21.8G2	48.369
	NRO.B3x21.8G2	35.512	NRO.B3.5x23.8G2	44.894	NRO.B4x23.8G2	51.818
	NRO.B3x23.8G2	38.044	NRO.B3.5x25.8G2	47.826	NRO.B4x25.8G2	55.202
	NRO.B3x25.8G2	40.529	NRO.B3.5x29.8G2	53.544	NRO.B4x27.8G2	58.528
	NRO.B3x27.8G2	42.971	NRO.B3.5x34.8G2	60.454	NRO.B4x29.8G2	61.801

NEEDLE ROLLER BEARINGS

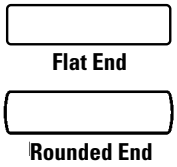
INNER AND OUTER RACEWAY DIMENSIONS, MM

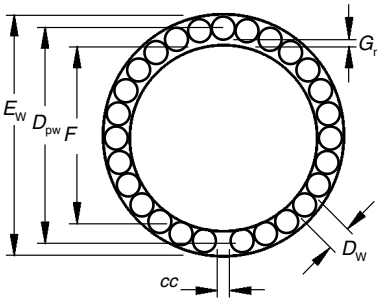
	D_w = 5.0				D_w = 6.0			
	Max.	min.	Min.	Max.	Max.	Min.	Min.	Max.
Z	F		E		F		E	
14	17.484	17.476	27.495	27.508	20.976	20.967	32.989	33.005
15	19.061	19.052	29.074	29.087	22.870	22.861	34.883	34.899
16	20.641	20.632	30.654	30.670	24.767	24.758	36.780	36.796
17	22.223	22.214	32.236	32.252	26.665	26.656	38.678	38.694
18	23.806	23.797	33.819	33.835	28.565	28.556	40.578	40.594
19	25.390	25.381	35.403	35.419	30.487	30.476	42.503	42.519
20	26.974	26.965	36.987	37.003	32.389	32.378	44.405	44.421
21	28.560	28.551	38.573	38.589	34.291	34.280	46.307	46.323
22	30.167	30.156	40.183	40.199	36.194	36.183	48.210	48.226
23	31.754	31.743	41.770	41.786	38.098	38.087	50.114	50.133
24	33.340	33.329	43.356	43.372	40.002	39.991	52.018	52.037
25	34.928	34.917	44.944	44.960	41.906	41.895	53.922	53.941
26	36.515	36.504	46.531	46.547	43.811	43.800	55.827	55.846
27	38.103	38.092	48.119	48.135	45.717	45.706	57.733	57.752
28	39.691	39.680	49.707	49.723	47.622	47.611	59.638	59.657
29	41.279	41.268	51.295	51.314	49.528	49.517	61.544	61.563
30	42.868	42.857	52.884	52.903	51.432	51.419	63.451	63.470
31	44.457	44.446	54.473	54.492	53.338	53.325	65.357	65.376
32	46.045	46.034	56.061	56.080	55.245	55.232	67.264	67.283
33	47.635	47.624	57.651	57.670	57.152	57.139	69.171	69.190
34	49.224	49.213	59.240	59.259	59.059	59.046	71.078	71.097
35	50.810	50.797	60.829	60.848	60.966	60.953	72.985	73.004
36	52.400	52.387	62.419	62.438	62.873	62.860	74.892	74.911
37	53.989	53.976	64.008	64.027	64.781	64.768	76.800	76.819
38	55.579	55.566	65.598	65.617	66.688	66.675	78.707	78.726
39	57.169	57.156	67.188	67.207	68.596	68.583	80.615	80.637
40	58.758	58.745	68.777	68.796	70.504	70.491	82.523	82.545
41	60.348	60.335	70.367	70.386	72.412	72.399	84.431	84.453
42	61.938	61.925	71.957	71.976	74.320	74.307	86.339	86.361
43	63.529	63.516	73.548	73.567	76.228	76.215	88.247	88.269
44	65.119	65.106	75.138	75.157	78.136	78.123	90.155	90.177
45	66.709	66.696	76.728	76.747	80.042	80.027	92.064	92.086
46	68.299	68.286	78.318	78.337	81.950	81.935	93.972	93.994
47	69.890	69.877	79.909	79.928	83.858	83.843	95.880	95.902
48	71.480	71.467	81.499	81.521	85.767	85.752	97.789	97.811
49	73.070	73.057	83.089	83.111	87.675	87.660	99.697	99.719
50	74.661	74.648	84.680	84.702	89.584	89.569	101.606	101.628
51	76.251	76.238	86.270	86.292	91.492	91.477	103.514	103.536
52	77.842	77.829	87.861	87.883	93.401	93.386	105.423	105.445
53	79.433	79.420	89.452	89.474	95.310	95.295	107.332	107.354
54	81.020	81.005	91.042	91.064	97.219	97.204	109.241	109.263
55	82.611	82.596	92.633	92.655	99.127	99.112	111.149	111.171
56	84.202	84.187	94.224	94.246	101.036	101.021	113.058	113.080
57	85.792	85.777	95.814	95.836	102.945	102.930	114.967	114.989
58	87.383	87.368	97.405	97.427	104.854	104.839	116.876	116.898
59	88.974	88.959	98.996	99.018	106.763	106.748	118.785	118.807
60	90.565	90.550	100.587	100.609	108.672	108.657	120.694	120.719

Timken® Torrington® Metric Series Needle Roller Designation and Load Rating Multiplier ($D_{we}^{29/27}$ $L_{we}^{7/9}$)

	D_w = 5.0		D_w = 6.0	
	Needle Roller Designation	$D_{we}^{(29/27)}L_{we}^{(7/9)}$	Needle Roller Designation	$D_w^{(29/27)}L_{we}^{(7/9)}$
	NRO.B5x15.8G2	47.723	NRO.B6X17.8G2	63.756
	NRO.B5x19.8G2	56.995		
	NRO.B5x21.8G2	61.469		
	NRO.B5x23.8G2	65.852		
	NRO.B5X25.8G2	70.153		
	NRO.B5X27.8G2	74.379		
	NRO.B5X29.8G2	78.539		
	NRO.B5X34.5G2	88.676		
	NRO.B5X39.8G2	98.491		
	NRO.B5X49.8G2	117.342		

NEEDLE ROLLERS – INCH SERIES





INTRODUCTION

Before selecting a specific needle roller complement, the engineering section of this catalog should be reviewed for detailed information concerning:

- bearing type selection
- bearing life and reliability
- definition of load ratings
- life and load relationships
- effect of raceway hardness
- example of life calculation
- lubrication
- shaft design
- housing design

In addition to these general considerations, material which follows should also be reviewed when selecting a needle roller complement.

Standard inch series needle rollers are furnished in two styles – elliptical end or the most economical design: flat end. Materials, dimensions and tolerances for standard needle rollers are specified in this section.

When required, needle rollers having spherical ends, conical ends, trunnion ends or crank pin ends, as well as other end designs, can be furnished. Your Timken representative should be consulted before final needle roller selection is made.

INCH SERIES – NEEDLE ROLLER DIMENSIONS

Needle rollers are made from rolling bearing quality steel hardened to 60-64 HRC or equivalent. Nominally inch needle rollers are given in Table 1. Your Timken representative should be consulted for availability. The symbols used in Tables 1 as well as in subsequent tables and figures are summarized in Table 2.

Needle rollers with elliptical ends permit the use of a more generous fillet between the raceway and the locating shoulder than possible with flat end rollers. Also, due to the length of the elliptical end, the possibility of the roller's cylindrical surface operating over the edge of the raceway is less, thus reducing the chance of occurrence of harmful stress concentrations. On the other hand, where design considerations permit their use, flat end rollers achieve the maximum possible effective contact length between roller and raceway along with maximum load ratings and longer life.

CLEARANCES IN NEEDLE ROLLER COMPLEMENTS

Needle rollers, supplied in bulk, are generally used to assemble full complement bearings. Successful operation of a full complement of rollers not only requires careful selection of radial clearance but, more importantly, depends on proper circumferential clearance, or the total clearance between rollers.

Circumferential guidance in a full complement of needle rollers depends largely on roller-to-roller contact. Too little circumferential clearance causes overheating. Too much circumferential clearance in a heavily loaded full complement of needle rollers causes loss of roller guidance and results in roller skew and heavy end thrust.

Control of radial clearance and circumferential clearance is influenced by the roller diameter tolerance, as well as the tolerances of the inner and outer raceway diameters.

END CLEARANCE

The total needle roller end clearance, or end play, normally should be 0.008 inch minimum per path of needle rollers.

NOMINAL INCH NEEDLE ROLLERS TOLERANCES

Unless otherwise specified, inch needle rollers are normally manufactured with a tolerance of +0.0000 in. -0.0002 in. This tolerance has proven acceptable and ensures satisfactory control of circumferential clearance. The needle roller length tolerance may vary with the end configuration. The normal roller length tolerance for rounded end rollers is +0.000 in. -0.020 in.

Timken also manufactures needle rollers with 0.0001 in. diameter tolerance. These offer enhanced load carrying capability and improved control of circumferential clearance. For needle rollers of greater precision, please consult with your Timken representative.

Nominal dimensions for typical inch series needle rollers are shown in Table 1. Timken supplies rollers with smaller and larger length-to-diameter ratios for special applications. Rollers with dimensions other than those shown in Table 1 can be obtained provided the quantities permit economical production. For example, although the largest needle rollers shown in Table 1 are 0.2500 in. (the usual limits for needle rollers), Timken produces quantities of rollers as large as 0.6250 in. diameter.

Your Timken representative should be contacted with the following information about the required needle rollers:

- nominal metric or inch
- diameter and tolerance (e.g., .1250 in., + 0 in. -.0002 in.)
- length and tolerance (e.g., .560 in., + 0 in. -.020 in.)
- end form (e.g., elliptical end or flat end)
- material (e.g., high carbon chrome steel)
- special features required (e.g., Controlled Stress)
- quantity required

TABLE 1 – NOMINAL DIMENSIONS FOR TYPICAL INCH NEEDLE ROLLERS

Nominal Diameter	Nominal Length																					
D_w	L_w																					
Inch	0.12	0.16	0.19	0.22	0.25	0.28	0.31	0.38	0.44	0.5	0.56	0.62	0.75	0.88	1	1.12	1.25	1.38	1.5	1.75	2	2.25	2.5
0.0625					•	•	•	•	•	•	•	•	•										
0.0781							•	•	•	•	•	•	•	•									
0.0938								•	•	•	•	•	•	•	•								
0.125										•	•	•	•	•	•	•	•	•					
0.1562												•	•	•	•	•	•	•	•				
0.1875													•	•	•	•	•	•	•	•			
0.2188														•	•	•	•	•	•	•	•		
0.25														•	•	•	•	•	•	•	•	•	

• Indicates preferred needle roller sizes. Consult with your Timken representative.

DESIGN CALCULATIONS FOR NEEDLE ROLLER BEARING COMPLEMENTS

In the majority of full complement needle roller applications, roller complements of less than 35 needle rollers per row and a ratio of roller length to roller diameter between 4:1 and 8:1 is advantageous. Other combinations of quantity and length-to-diameter ratios of needle rollers have been used successfully. Specific design requirements usually dictate the appropriate selection.

In general, roller complements for rotating motion should employ a smaller number of larger diameter needle rollers, while roller complements subjected to oscillating motion (especially under high loads) should employ a larger number of smaller diameter needle rollers.

Oscillating applications with small angular travel encourage the development of fretting corrosion. The best performance under these conditions has been achieved by using the largest practical number of small diameter needle rollers.

CALCULATION OF RACEWAY DIAMETERS

It may be convenient to use the Bearing Calculation Form in Table 3 to calculate the maximum inner raceway and the minimum outer raceway diameters of a bearing. The formula given in Table 2 can also be used. To assist the designer in making these calculations, the values of K required for calculation of needle roller complements of 6 through 60 needle rollers are listed in Table 4. Values of K for other numbers of needle rollers will be furnished on request, or can be calculated from the formula given in Table 2.

Table 5 lists the suggested values for minimum radial clearance and ($G_{r\,min}$) minimum circumferential clearance divided by π (cc_{min}/π), to be used for calculating needle roller complements for normal rotating applications where the speeds, loads and shaft deflections are moderate.

Applications with poor lubrication, unusual motion, large misalignment, raceway distortions, load reversals, high speeds, etc., can not be characterized as normal rotating applications. These miscellaneous applications require adjustment of the minimum clearances listed in Table 5. The factors in Table 6 may be used for general guidance in the adjustment of the minimal clearances. For any of the listed miscellaneous applications or any application where abnormal factors such as those listed above exist, and particularly when the inner raceway diameter will exceed 2 inches, your Timken representative should be consulted for design assistance.

TABLE 2 – DESIGN FACTORS FOR NEEDLE ROLLERS

Z	number of needle rollers per bearing path
K	chordal factor, $K = 1/\sin(180°/Z)$
cc	total circumferential clearance. See Tables 8 and 9 for cc_{min}/π values.
G_r	radial internal clearance. See Tables 8 and 9 for $G_{r\,min}$ values
D_{pw}	pitch diameter: $D_{pw} = K \bullet D_{w\,max} + (cc_{min}/\pi) = E_{min} - D_{w\,max}$ $= F_{max} + G_{r\,min} + D_{w\,max}$
E	outer raceway bore diameter: $E_{min} = D_{pw} + D_{w\,max} = (K + 1) \bullet D_{w\,max} + (cc_{min}/\pi)$ $= F_{max} + G_{r\,min} + 2D_{w\,max}$
F	inner raceway diameter: $F_{max} = D_{pw} - D_{w\,max} - G_{r\,min}$ $= (K-1) \bullet D_{w\,max} + (cc_{min}/\pi) - G_{r\,min}$ $= E_{min} - 2D_{w\,max} - G_{r\,min}$
D_w	nominal needle roller diameter
D_{we}	needle roller diameter applicable in the calculation of load ratings: $D_{we} = D_{pw} - F_{max} - G_{r\,min} = \frac{D_{pw} - cc_{min}/\pi}{K}$ $= \frac{F_{max} + G_{r\,min} - (cc_{min}/\pi)}{(K-1)}$ $= E_{min} - D_{pw} = \frac{E_{min} - cc_{min}/\pi}{(K+1)}$
L_w	overall needle roller length
R_w	end radius, rounded end needle roller
r_s	corner rounding, flat end needle roller
L_{we}	needle roller length applicable in the calculation of load ratings, for elliptical end needle rollers: $L_{we} = L_{w\,max} - (0.4 \bullet D_{we})$ for flat end needle rollers: $L_{we} = L_{w\,max} - (2 \bullet r_{s\,min})$

Note: If length of contact of the needle roller with the raceway is reduced because of undercuts, chamfers, etc. L_{we} must be reduced correspondingly.

RACEWAY DIAMETER TOLERANCE LIMITS

Table 7 lists the suggested tolerances that should be applied to the dimensions for the maximum inner raceway and the minimum outer raceway diameter after they have been calculated using the Bearing Calculation Form, Table 3.

TABLE 3 – BEARING CALCULATION FORM

Step	Source	Design Factor	Inch	
1	given	D_w,roller diameter	**0.1250** max.	min.
2	Table 4	K, for 30 rollers	**9.56677**	
3	(1) x (2)	KD_w	**1.1958**	
4	Table 5	cc_{min}/π = 0.001"	**0.0010** min.	max.
5	(3) + (4)	D_{pw} pitch diameter	**1.1968**	
6	given	D_w, roller diameter	**0.1250** max.	min.
7	(5) – (6)		**1.0718**	
8	Table 5	G_r , radial clearance	**0.0005** min.	max.
9	(7)– (8)	F, inner raceway diameter	**1.0713** max.	**1.0709** min.*
10	(5) + (6)	E, outer raceway diameter	**1.3218** min.	**1.3224** max.*

*From Table 7.

TABLE 5 – MINIMUM CLEARANCES, NORMAL ROTATING APPLICATIONS

F Nominal Inner Raceway Diameter inch		cc_{min}/π	$G_{r\,min}$
>	≤	inch	inch
–	0.1181	0.001	0.0002
0.1181	0.2362	0.001	0.0003
0.2362	0.3937	0.001	0.0004
0.3937	0.7087	0.001	0.0004
0.7087	1.1811	0.001	0.0005
1.1811	1.9685	0.002	0.0006
1.9685	3.1496	0.002	0.0007
3.1496	4.7244	0.002	0.0009

TABLE 6 – MINIMUM CLEARANCES, MISCELLANEOUS APPLICATIONS

Application	cc_{min}/π	$G_{r\,min}$
universal joint	⅓ • normal	½ • normal
transmission pilot	normal	3 • normal
constant mesh gear	0.2 • roller dia.	normal
transmission planet	normal	normal
crank pin for two	5 • normal	7 • normal

TABLE 4 –

K Values	
Z	K
6	2.00000
7	2.30476
8	2.61313
9	2.92380
10	3.23607
11	3.54947
12	3.86370
13	4.17858
14	4.49396
15	4.80973
16	5.12583
17	5.44219
18	5.75877
19	6.07553
20	6.39245
21	6.70951
22	7.02667
23	7.34394
24	7.66130
25	7.97873
26	8.29623
27	8.61379
28	8.93140
29	9.24907
30	9.56677
31	9.88452
32	10.20230
33	10.52011
34	10.83795
35	11.15582
36	11.47371
37	11.79163
38	12.10957
39	12.42752
40	12.74549
41	13.06348
42	13.38149
43	13.69951
44	14.01754
45	14.33559
46	14.65364
47	14.97171
48	15.28979
49	15.60788
50	15.92597
51	16.24408
52	16.56219
53	16.88031
54	17.19843
55	17.51657
56	17.83471
57	18.15285
58	18.47100
59	18.78916
60	19.10732

TABLE 7 – SUGGESTED RACEWAY DIAMETER TOLERANCES

F Nominal Inner Raceway Diameter inch		Tolerence Limits (ISO h5) inch	
>	≤	High	Low
0.1181	0.2362	0	-0.0002
0.2362	0.3937	0	-0.0002
0.3937	0.7087	0	-0.0003
0.7087	1.1811	0	-0.0004
1.1811	1.9685	0	-0.0004
1.9685	3.1496	0	-0.0005
3.1496	4.7244	0	-0.0006

E Nominal Outer Raceway Diameter inch		Tolerence Limits (ISO H6) inch	
>	≤	Low	High
0.1181	0.2362	0	+0.0003
0.2362	0.3937	0	+0.0004
0.3937	0.7087	0	+0.0004
0.7087	1.1811	0	+0.0005
1.1811	1.9685	0	+0.0006
1.9685	3.1496	0	+0.0007
3.1496	4.7244	0	+0.0009

KEYSTONED ROLLER ASSEMBLIES

Retention of the rollers in the outer raceway by key-stoning can be helpful in assembly operations. The following formula may be used to check the bearing design to be sure that a given number of rollers, Z, will keystone.

$$Y \bullet D_{w\,min} > E_{max} = \text{keystone condition}$$

That is, the product of the keystone constant Y, given below, and the minimum roller diameter $D_{w\,min}$, must be greater than the maximum outer race bore, E_{max}.

Roller complements with 14 or more rollers usually will not keystone unless steps are taken to reduce the circumferential clearance. It is suggested that your Timken representative be consulted when designing a keystoned roller complement with 14 or more rollers.

TABLE 8 – KEYSTONE CONSTANT

Z	Y	Z	Y	Z	Y
8	3.67633	12	4.88797	16	6.13885
9	3.97094	13	5.19892	17	6.45365
10	4.27277	14	5.51128	18	6.76893
11	4.57895	15	5.82467	19	7.08461

LOAD RATING AND LIFE CALCULATIONS FOR FULL COMPLEMENTS OF NEEDLE ROLLERS

Before selecting the quantity and size of needle rollers to be used in a needle roller complement, it is usually necessary to calculate the load rating required using the applied load, speed and desired life. For a review of bearing size selection, see the engineering section.

Since it is not practical to tabulate the dynamic and static load ratings for the great number of needle roller complements that can be assembled by using different quantities, diameters and lengths of rollers, formulae are provided for the necessary calculations.

For convenience, values of f_c and values of $Z^{3/4}$ have been combined into single factors ($f_c \bullet Z^{3/4}$). These factors for a wide range of needle roller complements are contained in Table 9.

BASIC DYNAMIC LOAD RATINGS

The basic dynamic load rating C, for any roller bearing can be calculated from the formula:

$$C = f_c (i\ L_w \cos \alpha)^{7/9} Z^{3/4} D_w^{29/27}$$

where: f_c = a factor which depends on the geometry of the bearing components, the accuracy to which the various components are made, and the material. Maximum values are listed in such standards as ISO 281 and USA ANSI-ABMA Standard 11.

i = number of rows of needle rollers in any one bearing.

α = nominal angle of contact. Since $\alpha = 0$ for a radial needle roller bearing, $\cos \alpha = 1$.

Other symbols are explained in Table 2.

For single path radial needle roller bearings, where i = 1 and $\cos \alpha = 1$, the basic dynamic load rating formula can be written as:

$$C_r = f_c Z^{3/4} L_{we}^{7/9} D_w^{29/27}$$

TABLE 9 – VALUES OF $F_C Z^{3/4}$ FOR INCH UNITS

Z	$f_c Z^{3/4}$ lbf - inch units
6	24000
7	30200
8	35900
9	41200
10	46100
11	50700
12	55100
13	59100
14	63000
15	66600
16	70100
17	73400
18	76600
19	79700
20	82600
21	85400
22	88100
23	90800
24	93300
25	95800
26	98200
27	100600
28	102900
29	105100
30	107300
31	109500
32	111600
33	113600
34	115600
35	117600
36	119600
37	121500
38	123400
39	125200
40	127100
41	128900
42	130600
43	132400
44	134100
45	135800
46	137500
47	139200
48	140800
49	142400
50	144000
51	145600
52	147200
53	148800
54	150300
55	151800
56	153300
57	154800
58	156300
59	157800
60	159200

Example:

Calculate the basic dynamic load rating in lbf for a full complement of 28 elliptical end rollers, 0.1250 in. diameter and 0.750 in. length.

$C = f_c \bullet Z^{3/4} \bullet L_{we}^{7/9} \bullet D_{we}^{29/27}$

$f_c Z^{3/4}$ from Table 9 = 102900

$D_{we}^{29/27} = 0.1250^{29/27} = 0.1072$

$L_{we} = 0.750 - (0.4 \bullet 0.1250) = 0.700$ (see Table 2)

$L_{we}^{7/9} = 0.700^{7/9} = 0.758$

$C = 102900 \bullet 0.1072 \bullet 0.758 = 8360$ lbf

When a couple load (overturning moment) is imposed on a single row of needle rollers, the resulting uneven distribution of load can seriously affect bearing life. In such cases, two rows of needle rollers are generally suggested.

Your Timken representative should be consulted before a final selection of a needle roller complement is made.

BASIC STATIC LOAD RATING

The basic static load rating (C_0) for any roller bearing, including needle roller bearings, can be calculated from the following formula included in ISO 76, USA ANSI-ABMA Standard 11 and other Standards:

$$C_0 = f_0 \bullet \left(1 - \frac{D_{we} \bullet \cos}{D_{pw}}\right) i \; Z \; L_{we} \; D_{we} \; \cos \alpha$$

where: $f_0 = 6430$ when pound-force and inch units are used

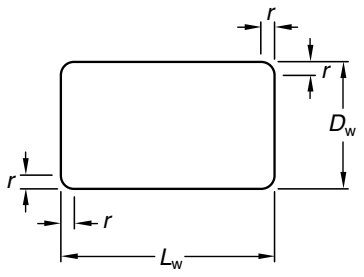
D_{pw} = pitch diameter of the needle roller complement (inch).

i = number of rows of rollers in any one bearing.

α = nominal angle of contact. Since $\alpha = 0$ for radial roller bearing, $\cos \alpha = 1$.

The other symbols are described in Table 2.

CYLINDRICAL ROLLERS – METRIC SERIES



Timken® Torrington® cylindrical rollers are made from bearing quality steel and hardened to 58-65 HRC or equivalent. Nominal metric cylindrical rollers are sorted into gages based on the mean deviation from nominal diameter and nominal length. The relieved ends of the cylindrical rollers, when used in bearing complements, help to reduce stress concentration at the ends of rollers, both under misalignment or ideal alignment. This results in a more uniform stress distribution along the roller-raceway contact length and optimum bearing performance.

METRIC SERIES CYLINDRICAL ROLLER DIMENSIONS

Nominally metric cylindrical rollers conforming to **DIN 5402** sheet 1 are shown in Table 1. Chamfer dimension limits of these cylindrical rollers with flat ends are also shown in Table 1. The use of these chamfer limits results in the maximum possible effective contact length between roller and raceway, along with the already mentioned relieved ends, producing the maximum possible load ratings and longer life.

Each cylindrical roller gage is packed separately and the mean deviations of diameter and length gages are shown on the package (below the roller designation).

EXAMPLE OF METRIC SERIES CYLINDRICAL ROLLER DESIGNATION AND PACKAGE MARKING:

ZRO.6 x 8
P0/M6

Nominal diameter: D_w = 6 mm

Nominal length: L_w = 8 mm

Mean deviation of the diameter ±0 µm (see Table 2)

Mean deviation of the length -6 µm. (see Table 3)

The actual finished diameter is between 5,999 and 6,001 mm.

The actual finished length is between 7,991 and 7,997 mm.

In the marking of the cylindrical roller gage, P identifies zero (0) or plus (+), M identifies minus (-). If a shipment of cylindrical rollers of the same size comprises several boxes, each box contains cylindrical rollers of the identical gage, although the gage may vary from box to box.

TABLE 1 –
DIMENSIONS OF METRIC SERIES CYLINDRICAL ROLLERS

Nominal Diameter mm	Nominal Length			Cylindrical Roller Designation	Wt. kg 100 pieces (approx.)
D_w	L_w	$r_{s\,min}$	$r_{s\,max}$		
3	5	0.2	0.4	ZRO.3x5	0.027
3.5	5	0.2	0.4	ZRO.3.5x5	0.037
4	4	0.2	0.4	ZRO.4x4	0.039
4	6	0.2	0.4	ZRO.4x6	0.058
4	8	0.2	0.4	ZRO.4x8	0.078
5	5	0.2	0.6	ZRO.5x5	0.075
5	8	0.2	0.6	ZRO.5x8	0.121
5.5	8	0.2	0.6	ZRO.5.5x8	0.146
6	6	0.2	0.6	ZRO.6x6	0.13
6	12	0.2	0.6	ZRO.6x12	0.261
6.5	9	0.2	0.6	ZRO.6.5x9	0.23
7	7	0.2	0.6	ZRO.7x7	0.206
7	10	0.2	0.6	ZRO.7x10	0.296
7	14	0.2	0.6	ZRO.7x14	0.417
7.5	7.5	0.2	0.6	ZRO.7.5x7.5	0.254
7.5	9	0.2	0.6	ZRO.7.5x9	0.312
7.5	11	0.2	0.6	ZRO.7.5x11	0.374
8	8	0.2	0.6	ZRO.8x8	0.308
8	12	0.2	0.6	ZRO.8x12	0.465
9	10	0.3	0.7	ZRO.9x10	0.5
9	14	0.3	0.7	ZRO.9x14	0.68
10	10	0.3	0.7	ZRO.10x10	0.6
10	11	0.3	0.7	ZRO.10x11	0.68
10	14	0.3	0.7	ZRO.10x14	0.85
11	15	0.3	0.7	ZRO.11x15	1.1
12	14	0.3	0.7	ZRO.12x14	1.23
13	20	0.4	0.8	ZRO.13x20	2.04
14	14	0.4	0.8	ZRO.14x14	1.66
14	20	0.4	0.8	ZRO.14x20	2.38

Mass in accordance with DIN 5402.

TABLE 2 – DIAMETER AND FORM ACCURACY OF METRIC SERIES CYLINDRICAL ROLLERS

Nominal Diameter D_w		Total Diameter Deviation		Variation of Gage	Mean Deviation of Gage DIN/ISO 1101													Circularity Deviation
> mm	≤ mm	high µm	low µm	µm	µm													max. µm
—	20	+7	-9	2	+6	+5	+4	+3	+2	+1	0	-1	-2	-3	-4	-5	-6	-7	-8	0.8

TABLE 3 – LENGTH GAGES OF METRIC SERIES CYLINDRICAL ROLLERS

Nominal Length L_w		Total Length Deviation		Variation of gage	Mean Deviation of Gage				Axial Runout DIN/ISO 1101
> mm	≤ mm	high µm	high µm	µm	µm				µm
—	48	+9	-15	6	+6	0	-6	-12	6

C

INNER RINGS – METRIC SERIES

When it is impractical to meet the shaft raceway design requirements (hardness, surface finish, case depth, etc.) outlined in the engineering section of this catalog, standard inner rings may be used.

Inner rings are made of rolling bearing steel and after hardening, their bores, raceways and end surfaces are ground. Metric series inner rings may be used to provide inner raceway surfaces for metric series needle roller and cage radial assemblies, metric series needle roller bearings and metric series drawn cup needle roller bearings. The extended inner rings are suitable for use with bearings containing lip contact seals and for applications in which axial movement may be present.

CONSTRUCTION

Metric series inner rings are available in four basic designs and differ only by the chamfers at the ends of the raceway surfaces, the lubricant access holes and the raceway profile. Inner rings of series JR have chamfers to assist in bearing installation but are without lubricating holes. Inner rings of series JR and IM have bearing installation chamfers and lubricating holes (bore diameters 5 to 50 mm). Inner rings of series JRZ.JS1 are without installation chamfers, allowing for maximum possible raceway contact. IM...RG6 inner rings have a profiled outer diameter for use in applications having a greater degree of misalignment.

The BIC and BICG Series inner rings have chamfers and oil holes and are designed to be used with the full complement, metric, needle roller bearings of Series RNA1000, RNA2000 and RNA3000. These inner rings are intended for RNA bearings of the same number; for example a BIC2020 would be used with a RNA2020.

DIMENSIONAL ACCURACY

The tolerances of size, form, and runout for metric series inner rings meet the requirements of ISO normal tolerance class for radial bearings (see the engineering section). Most metric series inner rings are produced with outside diameter raceway tolerance in accordance with h5 which, in most cases, is suitable for combining the metric series needle roller bearings to give the normal clearance class, and for use with drawn cup bearings. Other raceway tolerances may also be found on inner rings for combining with needle roller bearings to give one of the clearance classes, or other specially requested radial internal clearance requirement.

MOUNTING OF INNER RINGS

Inner rings may be mounted on the shaft with either a loose transition fit or an interference fit. These fits used in conjunction with the proper fit of the bearing outer ring, will provide the correct operating clearances for most applications.

Regardless of the fit of the inner ring on the shaft, the inner ring should be axially located by shaft shoulders or other positive means. The shaft shoulder diameter adjacent to the inner ring must not exceed the inner ring outside diameter (per suggestions on page C103 of the metric series needle roller bearing section).

When metric series inner rings are to be used with the metric series needle roller bearings, appropriate shaft tolerances should be selected from Table 3 in the metric series needle roller bearing section. When metric series inner rings are to be used with drawn cup bearings the suggested shaft tolerances are given in the “Inner ring” discussion on page C39 of the “metric series drawn cup needle roller bearings” section of this catalog.

INCH SERIES INNER RINGS

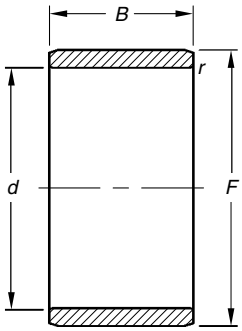
Inch series inner rings for use with inch series drawn cup bearings are tabulated on page C92 of this catalog. See catalog page C150 for inch series inner rings for use with inch series needle roller bearings.

END WASHERS – METRIC SERIES

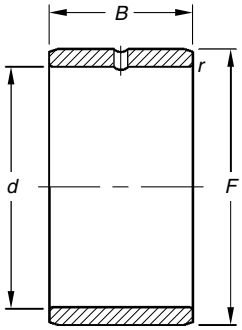
When the metric series needle roller and cage radial assembly used in series NAO and RNAO needle roller bearings without flanges cannot be axially located by suitable shoulders or side faces, end washers of series SNSH may be used. These end washers, which are made of spring steel, are designed to be guided in the housing bore. They are tabulated on page C353.

INNER RINGS

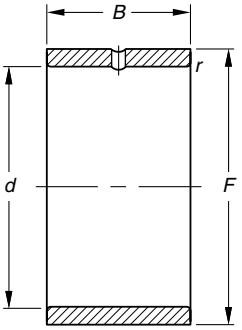
METRIC SERIES



JR, IM..P



JR.JS1

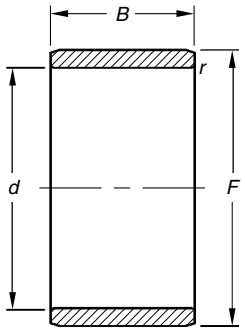


JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
5	5 0.1969	8 0.3150	8 0.315	0.3 0.01	JR5x8x8JS1	0.002 0.004
	5 0.1969	8 0.3150	12 0.4724	0.3 0.01	JR5x8x12	0.003 0.007
	5 0.1969	8 0.3150	16 0.630	0.3 0.01	JR5x8x16	0.004 0.009
6	6 0.2362	9 0.3543	8 0.315	0.3 0.01	JR6x9x8JS1	0.002 0.004
	6 0.2362	9 0.3543	12 0.472	0.3 0.01	JR6x9x12	0.003 0.007
	6 0.2362	9 0.3543	16 0.630	0.3 0.01	JR6x9x16	0.004 0.009
	6 0.2362	10 0.3937	10 0.394	0.3 0.01	JR6x10x10	0.004 0.009
	6 0.2362	10 0.3937	10 0.394	0.3 0.01	JR6x10x10JS1	0.004 0.009
	6 0.2362	10 0.3937	12 0.472	0.3 0.01	JRZ6x10x12JS1	0.005 0.011
7	7 0.2756	10 0.3937	10.5 0.413	0.3 0.01	JR7x10x10.5	0.003 0.007
	7 0.2756	10 0.3937	12 0.472	0.3 0.01	JR7x10x12	0.004 0.009
	7 0.2756	10 0.3937	16 0.630	0.3 0.01	JR7x10x16	0.005 0.011
8	8 0.3150	12 0.4724	10 0.394	0.3 0.01	JR8x12x10	0.005 0.011
	8 0.3150	12 0.4724	10 0.394	0.3 0.01	JR8x12x10JS1	0.005 0.011
	8 0.3150	12 0.4724	10.5 0.413	0.3 0.01	JR8x12x10.5	0.005 0.011
	8 0.3150	12 0.4724	12 0.472	0.3 0.01	JRZ8xl2x12JS1	0.006 0.013
	8 0.3150	12 0.4724	12.5 0.492	0.3 0.01	JR8x12x12.5	0.006 0.013
	8 0.3150	12 0.4724	16 0.630	0.3 0.01	IM 8 12 16 P	0.007 0.016
9	9 0.3543	12 0.4724	12 0.472	0.3 0.01	JR9x12x12	0.005 0.011
	9 0.3543	12 0.4724	16 0.630	0.3 0.01	JR9x12x16	0.006 0.013
10	10 0.3937	13 0.5118	12.5 0.492	0.3 0.01	JR10x13x12.5	0.005 0.011
	10 0.3937	14 0.5512	11 0.433	0.3 0.01	JR10x14x11JS1	0.007 0.015
	10 0.3937	14 0.5512	12 0.472	0.3 0.01	JR10x14x12	0.007 0.015
	10 0.3937	14 0.5512	12 0.472	0.3 0.01	JR10x14x12JS1	0.007 0.015
	10 0.3937	14 0.5512	13 0.512	0.3 0.01	JR10x14x13	0.007 0.015
	10 0.3937	14 0.5512	14 0.551	0.3 0.01	JRZ10x14x14JS1	0.008 0.018
	10 0.3937	14 0.5512	16 0.630	0.3 0.01	JR10x14x16	0.009 0.020

INNER RINGS – *continued*

METRIC SERIES



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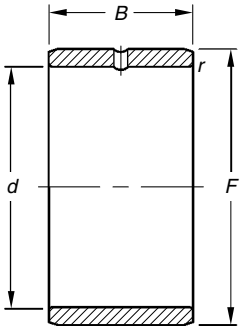
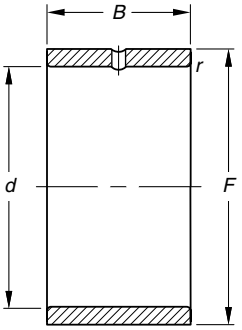


JR.JS1



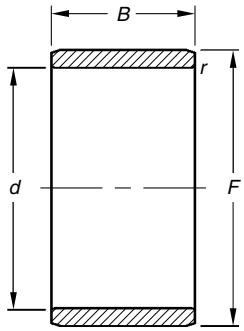
JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
10	10 0.3937	14 0.5512	20 0.787	0.3 0.01	JR10x14x20	0.012 0.026
12	12 0.4724	15 0.5906	12.5 0.492	0.3 0.01	JR12x15x12.5	0.006 0.013
	12 0.4724	15 0.5906	16 0.630	0.3 0.01	JR12x15x16	0.008 0.018
	12 0.4724	15 0.5906	16.5 0.650	0.3 0.01	JR12x15x16.5	0.008 0.018
	12 0.4724	15 0.5906	18.5 0.728	0.3 0.01	JR12x15x18.5	0.009 0.020
	12 0.4724	15 0.5906	22.4 0.882	0.2 0.01	IM 12 15 22,4 P	0.011 0.024
	12 0.4724	15 0.5906	22.5 0.886	0.3 0.01	JR12x15x22.5	0.011 0.024
	12 0.4724	16 0.6299	12 0.472	0.3 0.01	JR12x16x12	0.008 0.018
	12 0.4724	16 0.6299	12 0.472	0.3 0.01	JR12x16x12JS1	0.008 0.018
	12 0.4724	16 0.6299	13 0.512	0.3 0.01	JR12x16x13	0.008 0.018
	12 0.4724	16 0.6299	14 0.551	0.3 0.01	JRZ12x16x14JS1	0.010 0.022
	12 0.4724	16 0.6299	16 0.630	0.3 0.01	JR12x16x16	0.011 0.024
	12 0.4724	16 0.6299	20 0.787	0.3 0.01	JR12x16x20	0.014 0.031
	12 0.4724	16 0.6299	22 0.866	0.3 0.01	JR12x16x22	0.015 0.033
13	13 0.5118	18 0.7087	16 0.630	0.35 0.014	IM 13 18 16 P	0.015 0.032
14	14 0.5512	17 0.6693	17 0.669	0.3 0.01	JR14x17x17	0.009 0.020
15	15 0.5906	18 0.7087	16.5 0.650	0.3 0.01	JR15x18x16.5	0.010 0.022
	15 0.5906	19 0.7480	16 0.630	0.3 0.01	JR15x19x16	0.013 0.029
	15 0.5906	19 0.7480	20 0.787	0.3 0.01	JR15x19x20	0.017 0.037
	15 0.5906	20 0.7874	12 0.472	0.3 0.01	JR15x20x12	0.012 0.026
	15 0.5906	20 0.7874	12 0.472	0.3 0.01	JR15x20x12JS1	0.012 0.026
	15 0.5906	20 0.7874	13 0.512	0.3 0.01	JR15x20x13	0.014 0.031
	15 0.5906	20 0.7874	14 0.551	0.3 0.01	JRZ15x20x14JS1	0.015 0.033
	15 0.5906	20 0.7874	16 0.630	0.3 0.01	JR15x20x16	0.017 0.037
	15 0.5906	20 0.7874	20 0.787	0.35 0.014	IM 15 20 20 P	0.021 0.045
	15 0.5906	20 0.7874	23 0.906	0.3 0.01	JR15x20x23	0.025 0.055
	15 0.5906	20 0.7874	26 1.024	0.3 0.01	JR15x20x26	0.028 0.062

Continued on next page.

INNER RINGS – *continued*

METRIC SERIES



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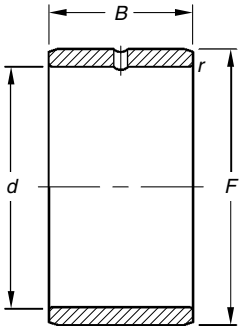
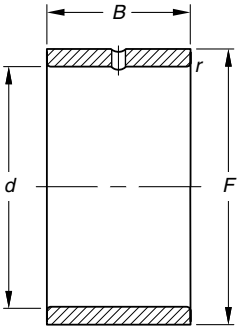


JR.JS1

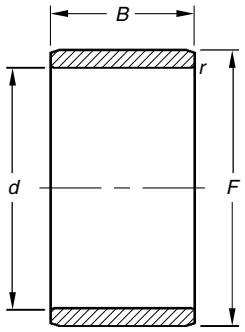


JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
17	17 0.6693	20 0.7874	16.5 0.650	0.3 0.01	JR17x20x16.5	0.011 0.024
	17 0.6693	20 0.7874	20 0.787	0.3 0.01	JR17x20x20	0.014 0.031
	17 0.6693	20 0.7874	20.5 0.807	0.3 0.01	JR17x20x20.5	0.014 0.031
	17 0.6693	20 0.7874	30.5 1.201	0.3 0.01	JR17x20x30.5	0.021 0.046
	17 0.6693	21 0.8268	16 0.630	0.3 0.01	JR17x21x16	0.015 0.033
	17 0.6693	21 0.8268	20 0.787	0.3 0.01	JR17x21x20	0.019 0.042
	17 0.6693	22 0.8661	13 0.512	0.3 0.01	JR17x22x13	0.015 0.033
	17 0.6693	22 0.8661	16 0.630	0.3 0.01	JR17x22x16	0.019 0.042
	17 0.6693	22 0.8661	16 0.630	0.3 0.01	JR17x22x16JS1	0.019 0.042
	17 0.6693	22 0.8661	16 0.630	0.3 0.01	JRZ17x22x16JS1	0.019 0.042
	17 0.6693	22 0.8661	20 0.787	0.35 0.014	IM 17 22 20 P	0.023 0.051
	17 0.6693	22 0.8661	23 0.906	0.3 0.01	JR17x22x23	0.028 0.062
	17 0.6693	22 0.8661	26 1.024	0.3 0.01	JR17x22x26	0.031 0.068
	17 0.6693	22 0.8661	32 1.260	0.3 0.01	JR17x22x32	0.038 0.084
20	20 0.7874	24 0.9449	16 0.630	0.3 0.01	JR20x24x16	0.018 0.040
	20 0.7874	24 0.9449	20 0.787	0.3 0.01	JR20x24x20	0.022 0.049
	20 0.7874	25 0.9843	16 0.630	0.3 0.01	JR20x25x16	0.022 0.049
	20 0.7874	25 0.9843	16 0.630	0.3 0.01	JR20x25x16JS1	0.022 0.049
	20 0.7874	25 0.9843	17 0.669	0.3 0.01	JR20x25x17	0.023 0.051
	20 0.7874	25 0.9843	18 0.709	0.3 0.01	JRZ20x25x18JS1	0.025 0.055
	20 0.7874	25 0.9843	20 0.787	0.3 0.01	JR20x25x20	0.028 0.062
	20 0.7874	25 0.9843	20.5 0.807	0.3 0.01	JR20x25x20.5	0.029 0.064
	20 0.7874	25 0.9843	26 1.024	0.3 0.01	JR20x25x26	0.036 0.079
	20 0.7874	25 0.9843	26.5 1.043	0.3 0.01	JR20x25x26.5	0.037 0.082
	20 0.7874	25 0.9843	30 1.181	0.3 0.01	JR20x25x30	0.042 0.093
	20 0.7874	25 0.9843	32 1.260	0.3 0.01	JR20x25x32	0.044 0.097
	20 0.7874	25 0.9843	38.5 1.516	0.3 0.01	JR20x25x38.5	0.054 0.119

INNER RINGS – *continued*

METRIC SERIES



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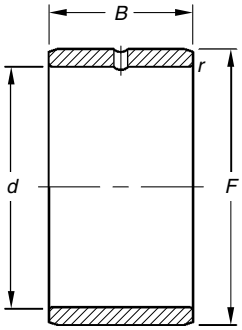
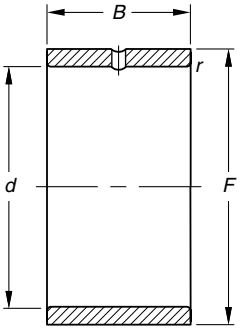


JR.JS1



JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
22	22 0.8661	26 1.0236	16 0.630	0.3 0.01	JR22x26x16	0.019 0.042
	22 0.8661	26 1.0236	20 0.787	0.3 0.01	JR22x26x20	0.023 0.051
	22 0.8661	28 1.1024	17 0.669	0.3 0.01	JR22x28x17	0.030 0.066
	22 0.8661	28 1.1024	20.5 0.807	0.3 0.01	JR22x28x20.5	0.038 0.084
	22 0.8661	28 1.1024	30 1.181	0.3 0.01	JR22x28x30	0.056 0.123
23	23 0.9055	28 1.1024	20 0.787	0.35 0.014	IM 23 28 20 P	0.030 0.066
25	25 0.9843	29 1.1417	20 0.787	0.3 0.01	JR25x29x20	0.027 0.060
	25 0.9843	29 1.1417	30 1.181	0.3 0.01	JR25x29x30	0.040 0.088
	25 0.9843	30 1.1811	16 0.630	0.3 0.01	JR25x30x16	0.027 0.060
	25 0.9843	30 1.1811	16 0.630	0.3 0.01	JR25x30x16JS1	0.027 0.060
	25 0.9843	30 1.1811	17 0.669	0.3 0.01	JR25x30x17	0.028 0.062
	25 0.9843	30 1.1811	18 0.709	0.3 0.01	JRZ25x30x18JS1	0.031 0.068
	25 0.9843	30 1.1811	20 0.787	0.3 0.01	JR25x30x20	0.034 0.075
	25 0.9843	30 1.1811	20.5 0.807	0.3 0.01	JR25x30x20.5	0.035 0.077
	25 0.9843	30 1.1811	26 1.024	0.3 0.01	JR25x30x26	0.044 0.097
	25 0.9843	30 1.1811	26.5 1.043	0.3 0.01	JR25x30x26.5	0.045 0.099
	25 0.9843	30 1.1811	30 1.181	0.3 0.01	JR25x30x30	0.051 0.112
	25 0.9843	30 1.1811	32 1.260	0.3 0.01	JR25x30x32	0.054 0.119
	25 0.9843	30 1.1811	38.5 1.516	0.3 0.01	JR25x30x38.5	0.066 0.146
28	28 1.1024	32 1.2598	17 0.669	0.3 0.01	JR28x32x17	0.028 0.062
	28 1.1024	32 1.2598	20 0.787	0.3 0.01	JR28x32x20	0.030 0.066
	28 1.1024	32 1.2598	30 1.181	0.3 0.01	JR28x32x30	0.044 0.097
30	30 1.1811	35 1.3780	16 0.630	0.3 0.01	JR30x35x16	0.031 0.068
	30 1.1811	35 1.3780	17 0.669	0.3 0.01	JR30x35x17	0.033 0.073
	30 1.1811	35 1.3780	18 0.709	0.3 0.01	JRZ30x35x18JS1	0.036 0.079
	30 1.1811	35 1.3780	20 0.787	0.3 0.01	JR30x35x20	0.039 0.086
	30 1.1811	35 1.3780	20 0.787	0.3 0.01	JRZ30x35x20JS1	0.039 0.086

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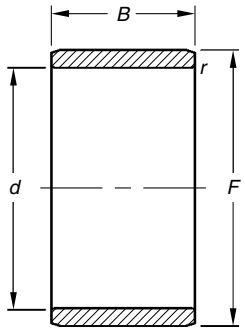
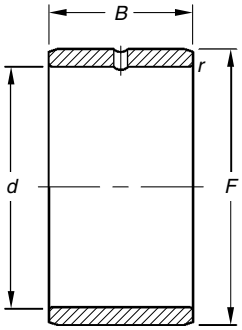
INNER RINGS – *continued*

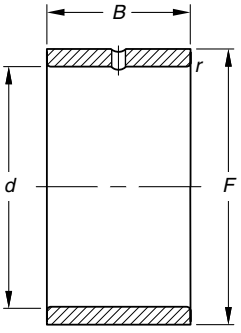
METRIC SERIES



JR, IM..P



JR.JS1

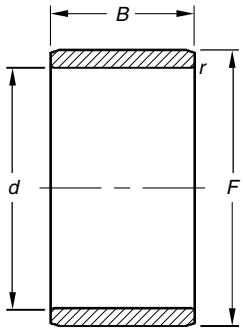


JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\,min}$		
30	30 1.1811	35 1.3780	20.5 0.807	0.3 0.01	JR30x35x20.5	0.040 0.088
	30 1.1811	35 1.3780	26 1.024	0.3 0.01	JR30x35x26	0.054 0.119
	30 1.1811	35 1.3780	30 1.181	0.3 0.01	JR30x35x30	0.057 0.126
	30 1.1811	35 1.3780	32 1.260	0.3 0.01	JR30x35x32	0.062 0.137
	30 1.1811	38 1.4961	20 0.787	0.6 0.02	JR30x38x20JS1	0.067 0.148
32	32 1.2598	37 1.4567	20 0.787	0.3 0.01	JR32x37x20	0.043 0.095
	32 1.2598	37 1.4567	30 1.181	0.3 0.01	JR32x37x30	0.064 0.141
	32 1.2598	40 1.5748	20 0.787	0.6 0.02	JR32x40x20	0.069 0.152
	32 1.2598	40 1.5748	36 1.417	0.6 0.02	JR32x40x36	0.128 0.282
35	35 1.3780	40 1.5748	17 0.669	0.3 0.01	JR35x40x17	0.040 0.088
	35 1.3780	40 1.5748	20 0.787	0.3 0.01	JR35x40x20	0.046 0.101
	35 1.3780	40 1.5748	20.5 0.807	0.3 0.01	JR35x40x20.5	0.049 0.108
	35 1.3780	40 1.5748	22 0.866	0.3 0.01	JR35x40x22	0.052 0.115
	35 1.3780	40 1.5748	30 1.181	0.3 0.01	JR35x40x30	0.071 0.157
	35 1.3780	40 1.5748	34 1.339	0.3 0.01	JR35x40x34	0.080 0.176
	35 1.3780	40 1.5748	40 1.575	0.3 0.01	JR35x40x40	0.094 0.207
	35 1.3780	42 1.6535	20 0.787	0.6 0.02	JR35x42x20	0.065 0.143
	35 1.3780	42 1.6535	20 0.787	0.6 0.02	JR35x42x20JS1	0.065 0.143
	35 1.3780	42 1.6535	23 0.906	0.6 0.02	JRZ35x42x23JS1	0.074 0.163
	35 1.3780	42 1.6535	36 1.417	0.6 0.02	JR35x42x36	0.122 0.269
	35 1.3780	44 1.7323	22 0.866	0.6 0.02	JR35x44x22	0.097 0.214
37	37 1.4567	42 1.6535	20 0.787	0.35 0.014	IM 37 42 20 P	0.046 0.101
38	38 1.4961	43 1.6929	20 0.787	0.3 0.01	JR38x43x20	0.050 0.110
	38 1.4961	43 1.6929	30 1.181	0.3 0.01	JR38x43x30	0.075 0.165
40	40 1.5748	45 1.7717	17 0.669	0.3 0.01	JR40x45x17	0.044 0.097
	40 1.5748	45 1.7717	20 0.787	0.3 0.01	JR40x45x20	0.052 0.115
	40 1.5748	45 1.7717	20.5 0.807	0.3 0.01	JR40x45x20.5	0.054 0.119

INNER RINGS – *continued*

METRIC SERIES



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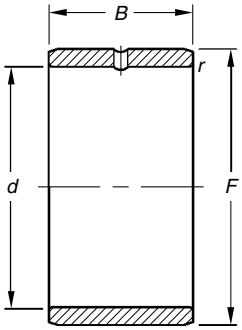
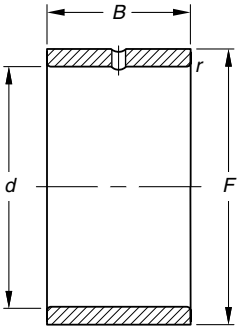


JR.JS1



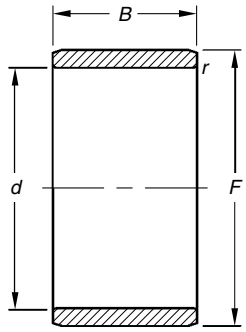
JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
40	40 1.5748	45 1.7717	25 0.984	0.35 0.014	IM 40 45 25 P	0.062 0.137
	40 1.5748	45 1.7717	30 1.181	0.3 0.01	JR40x45x30	0.078 0.172
	40 1.5748	45 1.7717	34 1.339	0.3 0.01	JR40x45x34	0.089 0.196
	40 1.5748	45 1.7717	40 1.575	0.3 0.01	JR40x45x40	0.115 0.254
	40 1.5748	48 1.8898	22 0.866	0.6 0.02	JR40x48x22	0.094 0.207
	40 1.5748	48 1.8898	23 0.906	0.6 0.02	JRZ40x48x23JS1	0.100 0.220
	40 1.5748	48 1.8898	40 1.575	0.6 0.02	JR40x48x40	0.173 0.381
	40 1.5748	50 1.9685	20 0.787	1 0.04	JR40x50x20	0.110 0.243
42	42 1.6535	47 1.8504	20 0.787	0.3 0.01	JR42x47x20	0.055 0.121
	42 1.6535	47 1.8504	30 1.181	0.3 0.01	JR42x47x30	0.083 0.183
45	45 1.7717	50 1.9685	20 0.787	0.3 0.01	JR45x50x20	0.058 0.128
	45 1.7717	50 1.9685	25 0.984	0.6 0.02	JR45x50x25	0.073 0.161
	45 1.7717	50 1.9685	25.5 1.004	0.3 0.01	JR45x50x25.5	0.075 0.165
	45 1.7717	50 1.9685	35 1.378	0.6 0.02	JR45x50x35	0.103 0.227
	45 1.7717	50 1.9685	40 1.575	0.3 0.01	JR45x50x40	0.117 0.258
	45 1.7717	52 2.0472	22 0.866	0.6 0.02	JR45x52x22	0.090 0.198
	45 1.7717	52 2.0472	23 0.906	0.6 0.02	JR45x52x23	0.096 0.212
	45 1.7717	52 2.0472	23 0.906	0.6 0.02	JRZ45x52x23JS1	0.096 0.212
	45 1.7717	52 2.0472	40 1.575	0.6 0.02	JR45x52x40	0.167 0.368
	45 1.7717	55 2.1654	20 0.787	1 0.04	JR45x55x20	0.133 0.293
	45 1.7717	55 2.1654	20 0.787	1 0.04	JR45x55x20JS1	0.133 0.293
	45 1.7717	55 2.1654	22 0.866	1 0.04	JR45x55x22	0.135 0.298
	45 1.7717	55 2.1654	40 1.575	1 0.04	JR45x55x40	0.247 0.545
50	50 1.9685	55 2.1654	20 0.787	0.3 0.01	JR50x55x20	0.065 0.143
	50 1.9685	55 2.1654	25 0.984	0.6 0.02	JR50x55x25	0.081 0.179
	50 1.9685	55 2.1654	35 1.378	0.65 0.026	IM 50 55 35 P	0.107 0.236
	50 1.9685	55 2.1654	35 1.378	0.6 0.02	JR50x55x35	0.113 0.249

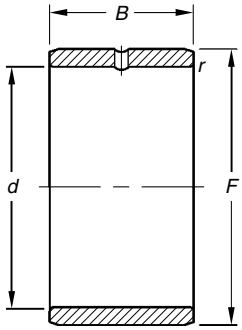
Continued on next page.

INNER RINGS – *continued*

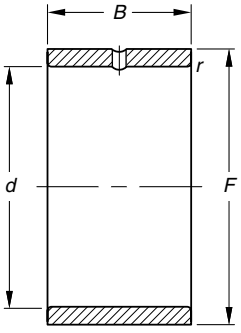
METRIC SERIES



JR, IM..P



JR.JS1

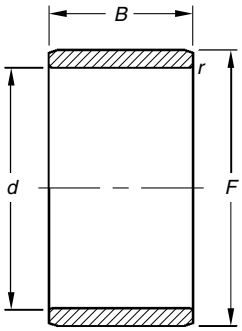


JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\,min}$		
50	50 1.9685	55 2.1654	40 1.575	0.3 0.01	JR50x55x40	0.130 0.287
	50 1.9685	58 2.2835	22 0.866	0.6 0.02	JR50x58x22	0.117 0.258
	50 1.9685	58 2.2835	23 0.906	0.6 0.02	JRZ50x58x23JS1	0.122 0.269
	50 1.9685	58 2.2835	40 1.575	0.6 0.02	JR50x58x40	0.213 0.470
	50 1.9685	60 2.3622	20 0.787	1 0.04	JR50x60x20	0.155 0.342
	50 1.9685	60 2.3622	20 0.787	1 0.04	JR50x60x20JS1	0.155 0.342
	50 1.9685	60 2.3622	25 0.984	1 0.04	JR50x60x25	0.170 0.375
	50 1.9685	60 2.3622	40 1.575	1 0.04	JR50x60x40	0.310 0.683
55	55 2.1654	60 2.3622	25 0.984	0.6 0.02	JR55x60x25	0.088 0.194
	55 2.1654	60 2.3622	35 1.378	0.65 0.026	IM 55 60 35 P	0.118 0.260
	55 2.1654	60 2.3622	35 1.378	0.6 0.02	JR55x60x35	0.124 0.273
	55 2.1654	63 2.4803	25 0.984	1 0.04	JR55x63x25	0.141 0.311
	55 2.1654	63 2.4803	45 1.772	1 0.04	JR55x63x45	0.286 0.631
	55 2.1654	65 2.5591	30 1.181	1 0.04	JR55x65x30	0.222 0.489
	55 2.1654	65 2.5591	60 2.362	1 0.04	JR55x65x60	0.444 0.979
58	58 2.2835	65 2.5591	25 0.984	0.85 0.033	IM 58 65 25 P	0.125 0.276
60	60 2.3622	68 2.6772	25 0.984	0.6 0.02	JR60x68x25	0.153 0.337
	60 2.3622	68 2.6772	35 1.378	0.6 0.02	JR60x68x35	0.220 0.485
	60 2.3622	68 2.6772	45 1.772	1 0.04	JR60x68x45	0.284 0.626
	60 2.3622	70 2.7559	25 0.984	1 0.04	JR60x70x25	0.200 0.441
	60 2.3622	70 2.7559	30 1.181	1 0.04	JR60x70x30	0.240 0.529
	60 2.3622	70 2.7559	35 1.378	0.85 0.033	IM 60 70 35 P	0.280 0.616
	60 2.3622	70 2.7559	60 2.362	1 0.04	JR60x70x60	0.480 1.058
65	65 2.5591	72 2.8346	25 0.984	1 0.04	JR65x72x25	0.143 0.315
	65 2.5591	72 2.8346	45 1.772	1 0.04	JR65x72x45	0.266 0.586
	65 2.5591	73 2.8740	25 0.984	0.6 0.02	JR65x73x25	0.170 0.375
	65 2.5591	73 2.8740	35 1.378	0.6 0.02	JR65x73x35	0.240 0.529
	65 2.5591	75 2.9528	28 1.102	1 0.04	JR65x75x28	0.240 0.529

INNER RINGS – *continued*

METRIC SERIES



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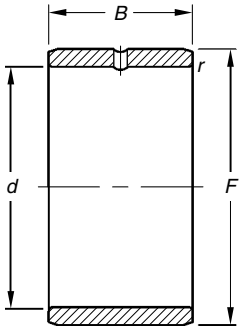
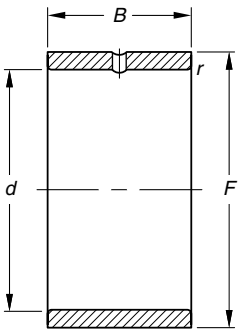


JR.JS1



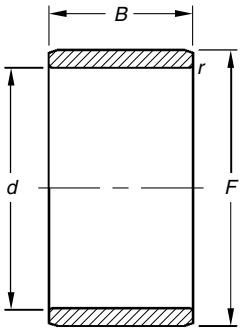
JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
65	65 2.5591	75 2.9528	30 1.181	1 0.04	JR65x75x30	0.260 0.573
	65 2.5591	75 2.9528	60 2.362	1 0.04	JR65x75x60	0.520 1.146
70	70 2.7559	80 3.1496	25 0.984	1 0.04	JR70x80x25	0.230 0.507
	70 2.7559	80 3.1496	30 1.181	1 0.04	JR70x80x30	0.270 0.595
	70 2.7559	80 3.1496	35 1.378	1 0.04	JR70x80x35	0.320 0.705
	70 2.7559	80 3.1496	54 2.126	1 0.04	JR70x80x54	0.500 1.102
	70 2.7559	80 3.1496	60 2.362	1 0.04	JR70x80x60	0.556 1.226
75	75 2.9528	85 3.3465	25 0.984	1 0.04	JR75x85x25	0.240 0.529
	75 2.9528	85 3.3465	30 1.181	1 0.04	JR75x85x30	0.289 0.637
	75 2.9528	85 3.3465	35 1.378	1 0.04	JR75x85x35	0.338 0.745
	75 2.9528	85 3.3465	54 2.126	1 0.04	JR75x85x54	0.530 1.168
80	80 3.1496	90 3.5433	25 0.984	1 0.04	JR80x90x25	0.260 0.573
	80 3.1496	90 3.5433	30 1.181	1 0.04	JR80x90x30	0.306 0.675
	80 3.1496	90 3.5433	35 1.378	1 0.04	JR80x90x35	0.355 0.783
	80 3.1496	90 3.5433	54 2.126	1 0.04	JR80x90x54	0.565 1.246
85	85 3.3465	95 3.7402	26 1.024	1 0.04	JR85x95x26	0.290 0.639
	85 3.3465	95 3.7402	30 1.181	1 0.04	JR85x95x30	0.334 0.736
	85 3.3465	95 3.7402	36 1.417	1 0.04	JR85x95x36	0.397 0.875
	85 3.3465	100 3.9370	35 1.378	1.1 0.04	JR85x100x35	0.595 1.312
	85 3.3465	100 3.9370	63 2.480	1.1 0.04	JR85x100x63	1.080 2.381
90	90 3.5433	100 3.9370	26 1.024	1 0.04	JR90x100x26	0.300 0.661
	90 3.5433	100 3.9370	30 1.181	1 0.04	JR90x100x30	0.350 0.772
	90 3.5433	100 3.9370	36 1.417	1 0.04	JR90x100x36	0.422 0.930
	90 3.5433	105 4.1339	32 1.260	1.1 0.04	JR90x105x32	0.580 1.279
	90 3.5433	105 4.1339	35 1.378	1.1 0.04	JR90x105x35	0.624 1.376
	90 3.5433	105 4.1339	63 2.480	1.1 0.04	JR90x105x63	1.140 2.513
95	95 3.7402	105 4.1339	26 1.024	1 0.04	JR95x105x26	0.310 0.683

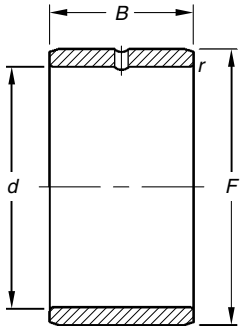
Continued on next page.

INNER RINGS – *continued*

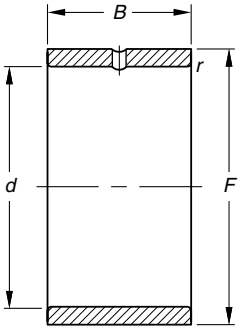
METRIC SERIES



JR, IM..P



JR.JS1

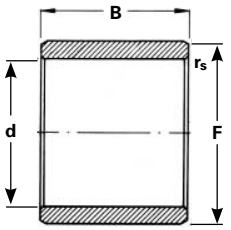


JRZ.JS1

Shaft Diameter	Dimensions mm/in.				Inner Ring Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
95	95 3.7402	105 4.1339	36 1.417	1 0.04	JR95x105x36	0.430 0.948
	95 3.7402	110 4.3307	35 1.378	1.1 0.04	JR95x110x35	0.653 1.440
	95 3.7402	110 4.3307	63 2.480	1.1 0.04	JR95x110x63	1.200 2.646
100	100 3.9370	110 4.3307	30 1.181	1.1 0.04	JR100x110x30	0.384 0.847
	100 3.9370	110 4.3307	40 1.575	1.1 0.04	JR100x110x40	0.510 1.124
	100 3.9370	115 4.5276	40 1.575	1.1 0.04	JR100x115x40	0.790 1.742
110	110 4.3307	120 4.7244	30 1.181	1 0.04	JR110x120x30	0.425 0.937
	110 4.3307	125 4.9213	40 1.575	1.1 0.04	JR110x125x40	0.870 1.918
120	120 4.7244	130 5.1181	30 1.181	1 0.04	JR120x130x30	0.460 1.014
	120 4.7244	135 5.3150	45 1.772	1.1 0.04	JR120x135x45	1.060 2.337
130	130 5.1181	145 5.7087	35 1.378	1.1 0.04	JR130x145x35	0.890 1.962
	130 5.1181	150 5.9055	50 1.969	1.5 0.06	JR130x150x50	1.730 3.814
140	140 5.5118	155 6.1024	35 1.378	1.1 0.04	JR140x155x35	0.955 2.105
	140 5.5118	160 6.2992	50 1.969	1.5 0.06	JR140x160x50	1.860 4.101
150	150 5.9055	165 6.4961	40 1.575	1.1 0.04	JR150x165x40	1.170 2.579
160	160 6.2992	175 6.8898	40 1.575	1.1 0.04	JR160x175x40	1.240 2.734
170	170 6.6929	185 7.2835	45 1.772	1.1 0.04	JR170x185x45	1.480 3.263
180	180 7.0866	195 7.6772	45 1.772	1.1 0.04	JR180x195x45	1.560 3.439

INNER RINGS FOR FULL COMPLEMENT NEEDLE ROLLER BEARINGS

METRIC SERIES



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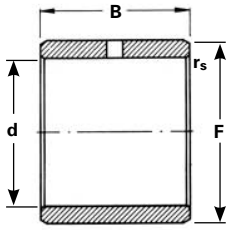

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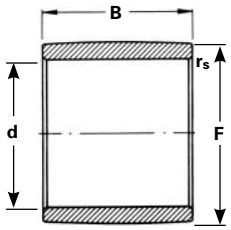


IM…R6

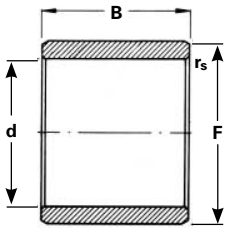
Shaft Diameter	Dimensions mm/in. g5			Hole mm/in.[1] Location		Bearing Designation	Wt. kg/lbs.
mm	d	F	B	C_3	$r_{s\ min}$		
8	8 0.3150	12 0.4724	12.4 0.488		0.3 0.01	IM 8 12 12.4	0.006 0.013
9	9 0.3543	13 0.5118	12.4 0.488		0.3 0.01	IM 9 13 12.4	0.006 0.014
	9 0.3543	13 0.5118	12.4 0.488		0.3 0.01	IM 9 13 12.4 R6	0.006 0.014
10	10 0.3937	14 0.5512	12.4 0.488		0.3 0.01	IM 10 14 12.4	0.007 0.015
	10 0.3937	14 0.5512	16.4 0.646		0.3 0.01	IM 10 14 16.4	0.009 0.020
11	11 0.4331	15 0.5906	12.4 0.488		0.3 0.01	IM 11 15 12.4	0.008 0.018
12	12 0.4724	15 0.5906	12.4 0.488		0.2 0.01	IM 12 15 12.4	0.006 0.013
	12 0.4724	16 0.6299	12.4 0.488		0.2 0.01	IM 12 16 12.4	0.008 0.018
	12 0.4724	16 0.6299	12.4 0.488		0.3 0.01	IM 12 16 12.4 R6	0.008 0.018
	12 0.4724	16 0.6297	12.4 0.488	6.2 0.24	0.3 0.01	IMC 12 16 12.4	0.008 0.018
13	13 0.5118	17 0.6693	12.4 0.488		0.3 0.01	IM 13 17 12.4	0.009 0.019
	13 0.5118	18 0.7087	12.4 0.488		0.35 0.014	IM 13 18 12.4	0.011 0.025
	13 0.5118	18 0.7087	12.4 0.488		0.35 0.014	IM 13 18 12.4 R6	0.011 0.025
	13 0.5118	18 0.7087	16.4 0.646		0.35 0.014	IM 13 18 16.4	0.015 0.033
15	15 0.5906	20 0.7874	12.4 0.488		0.35 0.014	IM 15 20 12.4	0.013 0.028
	15 0.5906	20 0.7874	16.4 0.646		0.35 0.014	IM 15 20 16.4	0.017 0.037
	17 0.6693	22 0.8661	16.4 0.646		0.35 0.014	IM 17 22 16.4	0.019 0.041
	17 0.6693	22 0.8661	16.4 0.646		0.35 0.014	IM 17 22 16.4 R6	0.019 0.041
17	17 0.6693	22 0.8659	16.4 0.646	8.2 0.32	0.35 0.014	IMC 17 22 16.4	0.019 0.041
20	20 0.7874	25 0.9843	16.4 0.646		0.35 0.014	IM 20 25 16.4	0.022 0.047
	20 0.7874	25 0.9843	16.4 0.646		0.35 0.014	IM 20 25 16.4 R6	0.022 0.047
	20 0.7874	25 0.9840	16.4 0.646	8.2 0.32	0.35 0.014	IMC 20 25 16.4	0.022 0.047
	20 0.7874	25 0.9843	20.4 0.803		0.35 0.014	IM 20 25 20.4	0.027 0.060
	20 0.7874	25 0.9840	20.4 0.803	10.2 0.40	0.35 0.014	IMC 20 25 20.4	0.027 0.060
	20 0.7874	25 0.9843	25.0 0.984		0.35 0.014	IM 20 25 25	0.033 0.073
23	23 0.9055	28 1.1024	20.4 0.803		0.35 0.014	IM 23 28 20.4	0.031 0.067
25	25 0.9843	30 1.1811	16.4 0.646		0.35 0.014	IM 25 30 16.4	0.027 0.058
	25 0.9843	30 1.1811	16.4 0.646		0.35 0.014	IM 25 30 16.4 R6	0.027 0.058

[1] single 2 mm dia. thru hole

Continued on next page.

INNER RINGS FOR FULL COMPLEMENT NEEDLE ROLLER BEARINGS — *continued*

METRIC SERIES



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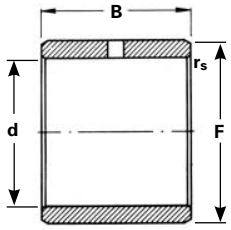

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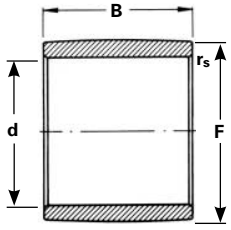


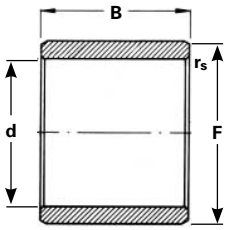
IM…R6

Shaft Diameter	Dimensions mm/in. g5			Hole mm/in.[1] Location		Bearing Designation	Wt. kg/lbs.
mm	d	F	B	C_3	$r_{s\,min}$		
25	25 0.9843	30 1.1808	16.4 0.646	8.2 0.32	0.35 0.014	IMC 25 30 16.4	0.027 0.058
	25 0.9843	30 1.1811	20.4 0.803		0.35 0.014	IM 25 30 20.4	0.033 0.073
	25 0.9843	30 1.1808	20.4 0.803	10.2 0.40	0.35 0.014	IMC 25 30 20.4	0.033 0.073
	25 0.9843	30 1.1811	25 0.984		0.35 0.014	IM 25 30 25	0.040 0.088
30	30 1.1811	35 1.3780	16.4 0.646		0.35 0.014	IM 30 35 16.4	0.031 0.068
	30 1.1811	35 1.3780	16.4 0.646		0.35 0.014	IM 30 35 16.4 R6	0.031 0.068
	30 1.1811	35 1.3776	16.4 0.646	8.2 0.32	0.35 0.014	IMC 30 35 16.4	0.031 0.068
	30 1.1811	35 1.3780	20.4 0.803		0.35 0.014	IM 30 35 20.4	0.039 0.086
	30 1.1811	35 1.3780	20.4 0.803		0.35 0.014	IM 30 35 20.4 R6	0.039 0.086
	30 1.1811	35 1.3776	20.4 0.803	10.2 0.40	0.35 0.014	IMC 30 35 20.4	0.039 0.086
	30 1.1811	35 1.3780	25.0 0.984		0.35 0.014	IM 30 35 25	0.048 0.106
35	35 1.3780	40 1.5748	16.4 0.646		0.35 0.014	IM 35 40 16.4	0.036 0.079
	35 1.3780	40 1.5748	16.4 0.646		0.35 0.014	IM 35 40 16.4 R6	0.036 0.079
	35 1.3780	40 1.5748	20.4 0.803		0.35 0.014	IM 35 40 20.4	0.045 0.099
	35 1.3780	40 1.5748	20.4 0.803		0.35 0.014	IM 35 40 20.4 R6	0.045 0.099
	35 1.3780	40 1.5744	20.4 0.803	10.2 0.40	0.35 0.014	IMC 35 40 20.4	0.045 0.099
	35 1.3780	40 1.5748	25 0.984		0.35 0.014	IM 35 40 25	0.055 0.121
40	40 1.5748	44 1.7323	16.4 0.646		0.3 0.01	IM 40 44 16.4	0.032 0.071
	40 1.5748	44 1.7323	16.4 0.646		0.3 0.01	IM 40 44 16.4 R6	0.032 0.071
	40 1.5748	44 1.7319	16.4 0.646	8.2 0.32	0.3 0.01	IMC 40 44 16.4	0.032 0.071
	40 1.5748	45 1.7717	20.4 0.803		0.35 0.014	IM 40 45 20.4	0.051 0.112
	40 1.5748	44 1.7319	20.4 0.803	10.2 0.40	0.35 0.014	IMC 40 45 20.4	0.05 0.112
45	45 1.7717	50 1.9685	20.4 0.803		0.65 0.026	IM 45 50 20.4	0.056 0.123
	45 1.7717	50 1.9685	20.4 0.803		0.65 0.026	IM 45 50 20.4 R6	0.056 0.123
	45 1.7717	50 1.9685	25 0.984		0.65 0.026	IM 45 50 25	0.069 0.152
	45 1.7717	60 2.3622	25 0.984		0.65 0.026	IM 45 50 25 R6	0.069 0.152
50	50 1.9685	55 2.1654	20.4 0.803		0.65 0.026	IM 50 55 20.4 R6	0.062 0.137
	50 1.9685	55 2.1654	20.4 0.803		0.65 0.026	IM 50 55 20.4	0.062 0.137

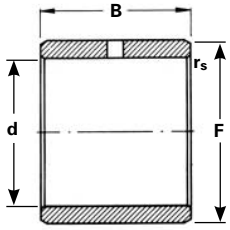
[1] single 2 mm dia. thru hole

INNER RINGS FOR FULL COMPLEMENT NEEDLE ROLLER BEARINGS

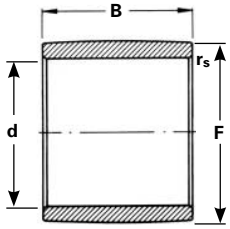
METRIC SERIES



IM



IMC



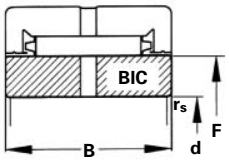
IM…R6

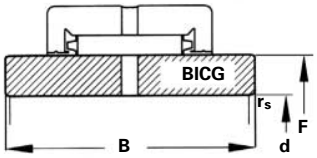
Shaft Diameter	Dimensions mm/in.				Bearing Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
17	17 0.6693	20 0.7874	27.5 1.083	0.2 0.01	IM 19017	0.019 0.042
	17 0.6693	20 0.7874	32 1.240	0.2 0.01	IM 20617	0.021 0.046
	17 0.6693	22 0.8665	13 0.512	0.35 0.014	IM 4903[1]	0.015 0.033
20	20 0.7874	25 0.9843	27.5 1.083	0.35 0.014	IM 19020	0.038 0.084
	20 0.7874	25 0.9843	32 1.240	0.35 0.014	IM 20620	0.044 0.097
25	25 0.9843	30 1.1811	27.5 1.083	0.35 0.014	IM 19025	0.042 0.093
	25 0.9843	30 1.1811	32 1.240	0.35 0.014	IM 20625	0.052 0.115
30	30 1.1811	35 1.3785	17 0.669	0.35 0.014	IM 4906[1]	0.033 0.072
	30 1.1811	35 1.3780	27.5 1.083	0.35 0.014	IM 19030	0.053 0.117
	30 1.1811	35 1.3780	32 1.240	0.35 0.014	IM 20630	0.061 0.134
35	35 1.3780	40 1.5748	27.5 1.083	0.35 0.014	IM 19035	0.063 0.139
	35 1.3780	40 1.5748	32 1.240	0.35 0.014	IM 20635	0.072 0.159
40	40 1.5748	45 1.7717	27.5 1.083	0.35 0.014	IM 19040	0.069 0.152
	40 1.5748	45 1.7717	32 1.240	0.35 0.014	IM 20640	0.080 0.176
45	45 1.7717	50 1.9685	30.5 1.201	0.65 0.026	IM 19045	0.085 0.187
	45 1.7717	50 1.9685	35 1.358	0.65 0.026	IM 20645	0.096 0.212
	45 1.7717	52 2.0476	22 0.866	0.85 0.033	IM 4909[1]	0.087 0.192

[1] Call for O.D. tolerance

EXTRA WIDE INNER RINGS

METRIC SERIES





Shaft Diameter	Dimensions mm/in.				Bearing Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
12	12 0.4724	17.6 0.6929	15 0.591	1 0.04	BIC 1012	0.016 0.035
	12 0.4724	17.6 0.6929	20 0.787	1 0.04	BIP 1012	0.020 0.044
15	15 0.5906	20.8 0.8189	15 0.591	1 0.04	BIC 1015	0.018 0.040
	15 0.5906	22.1 0.8701	22 0.866	1 0.04	BIC 2015	0.035 0.077
17	17 0.6693	23.9 0.9409	15 0.591	1 0.04	BIC 1017	0.026 0.057
20	20 0.7874	28.7 1.1299	18 0.709	1 0.04	BIC 1020	0.046 0.101
	20 0.7874	28.7 1.1299	22 0.866	1 0.04	BIC 2020	0.056 0.123
	20 0.7874	28.7 1.1299	22 0.866	1 0.04	BIP 1020	0.056 0.123
25	25 0.9843	33.5 1.3189	18 0.709	1 0.04	BIC 1025	0.054 0.119
	25 0.9843	33.5 1.3189	22 0.866	1 0.04	BIC 2025	0.065 0.143
	25 0.9843	33.5 1.3189	30 1.181	1 0.04	BIC 22025	0.500 1.102
	25 0.9843	33.5 1.3189	32 1.260	1 0.04	BIG 2025	0.095 0.209
	25 0.9843	33.5 1.3189	42 1.654	1 0.04	BIK 2025	0.125 0.276
30	30 1.1811	38.2 1.5039	18 0.709	1 0.04	BIC 1030	0.060 0.132
	30 1.1811	38.2 1.5039	22 0.866	1 0.04	BIC 2030	0.074 0.163
	30 1.1811	44.0 1.7323	30 1.181	1 0.04	BIC 3030	0.188 0.414
	30 1.1811	38.2 1.5039	32 1.260	1 0.04	BIG 2030	0.108 0.238
	30 1.1811	44.0 1.7323	40 1.575	1 0.04	BIG 3030	0.247 0.545
35	35 1.3780	44.0 1.7323	18 0.709	1 0.04	BIC 1035	0.077 0.170
	35 1.3780	44.0 1.7323	22 0.866	1 0.04	BIC 2035	0.093 0.205
	35 1.3780	44.0 1.7323	32 1.260	1 0.04	BIG 2035	0.135 0.298
40	40 1.5748	49.7 1.9567	18 0.709	1.5 0.06	BIC 1040	0.094 0.207
	40 1.5748	49.7 1.9567	22 0.866	1.5 0.06	BIC 2040	0.115 0.254
	40 1.5748	55.4 2.1811	36 1.417	1.5 0.06	BIC 3040	0.321 0.708
	40 1.5748	49.7 1.9567	32 1.260	1.5 0.06	BiG 2040	0.170 0.375
	40 1.5748	49.7 1.9567	22 0.866	1.5 0.06	BIP 1040	0.115 0.254
45	45 1.7717	55.4 2.1811	18 0.709	1.5 0.06	BIC 1045	0.113 0.249

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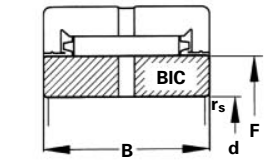
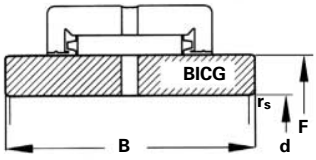
EXTRA WIDE INNER RINGS – *continued*

METRIC SERIES





Shaft Diameter	Dimensions mm/in.				Bearing Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
45	45 1.7717	55.4 2.1811	22 0.866	1.5 0.06	BIC 2045	0.139 0.306
	45 1.7717	62.1 2.4449	38 1.496	1.5 0.06	BIC 3045	0.422 0.930
	45 1.7717	55.4 2.1811	32 1.260	1.5 0.06	BIG 2045	0.210 0.463
50	50 1.9685	62.1 2.4449	20 0.787	2 0.08	BIC 1050	0.163 0.359
	50 1.9685	62.1 2.4449	24 0.945	2 0.08	BIC 11050	0.196 0.432
	50 1.9685	62.1 2.4449	28 1.102	2 0.08	BIC 2050	0.228 0.503
	50 1.9685	68.8 2.7087	38 1.496	2 0.08	BIC 3050	0.515 1.135
	50 1.9685	62.1 2.4449	38 1.496	2 0.08	BIG 2050	0.312 0.688
	50 1.9685	62.1 2.4449	28 1.102	2 0.08	BIP 1050	0.228 0.503
55	55 2.1654	68.8 2.7087	20 0.787	2 0.08	BIC 1055	0.205 0.452
	55 2.1654	72.6 2.8583	38 1.496	2 0.08	BIC 3055	0.525 1.157
	55 2.1654	72.6 2.8583	48 1.890	2 0.08	BICG 3055	0.660 1.455
	55 2.1654	68.8 2.7087	38 1.496	2 0.08	BIG 2055	0.390 0.860
	55 2.1654	68.8 2.7087	28 1.102	2 0.08	BIP 1055	0.288 0.635
60	60 2.3622	72.6 2.8583	28 1.102	2 0.08	BIC 2060	0.282 0.622
	60 2.3622	78.3 3.0827	38 1.496	2 0.08	BIC 3060	0.583 1.285
	60 2.3622	72.6 2.8583	38 1.496	2 0.08	BICG 2060	0.385 0.849
	60 2.3622	72.6 2.8583	38 1.496	2 0.08	BIG 2060	0.385 0.849
65	65 2.5591	83.1 3.2717	38 1.496	2 0.08	BIC 3065	0.623 1.373
	65 2.5591	78.3 3.0827	38 1.496	2 0.08	BIG 2065	0.437 0.963
70	70 2.7559	88.0 3.4646	38 1.496	2 0.08	BIC 3070	0.662 1.459
	70 2.7559	88.0 3.4646	48 1.890	2 0.08	BIG 3070	0.820 1.808
	70 2.7559	88.0 3.4646	58 2.283	2 0.08	BIK 3070	1.010 2.227
75	75 2.9528	88.0 3.4646	32 1.260	2 0.08	BIC 2075	0.410 0.904
	75 2.9528	88.0 3.4646	42 1.654	2 0.08	BIG 2075	0.538 1.186
	75 2.9528	96.0 3.7795	58 2.283	2 0.08	BIK 3075	1.260 2.778
80	80 3.1496	96.0 3.7795	24 0.945	2 0.08	BIC 1080	0.410 0.904

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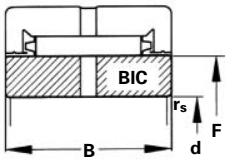
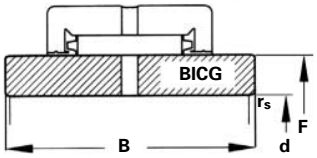
EXTRA WIDE INNER RINGS — *continued*

METRIC SERIES

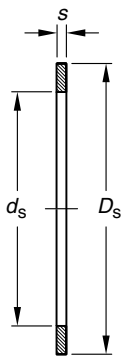




Shaft Diameter	Dimensions mm/in.				Bearing Designation	Wt. kg/lbs.
mm	d	F	B	$r_{s\ min}$		
80	80 3.1496	96.0 3.7795	32 1.260	2 0.08	BIC 2080	0.545 1.202
	80 3.1496	99.5 3.9173	38 1.496	2 0.08	BIC 3080	0.805 1.775
	80 3.1496	96.0 3.7795	42 1.654	2 0.08	BIG 2080	0.714 1.574
90	90 3.5433	104.7 4.1220	32 1.260	2 0.08	BIC 2090	0.531 1.171
	90 3.5433	109.1 4.2953	43 1.693	2 0.08	BIC 3090	0.990 2.183
	90 3.5433	109.1 4.2953	53 2.087	2 0.08	BIG 3090	1.220 2.690
	90 3.5433	109.1 4.2953	63 2.480	2 0.08	BIK 3090	1.480 3.263
95	95 3.7402	109.1 4.2953	32 1.260	2 0.08	BIC 2095	0.548 1.208
	95 3.7402	114.7 4.5157	43 1.693	2 0.08	BIC 3095	1.075 2.370
	95 3.7402	114.7 4.5157	63 2.480	2 0.08	BIK 3095	1.585 3.494
100	100 3.9370	119.2 4.6929	43 1.693	2 0.08	BIC 3100	1.090 2.403
	100 3.9370	114.7 4.5157	42 1.654	2 0.08	BIG 2100	0.800 1.764
105	105 4.1339	119.2 4.6929	32 1.260	2 0.08	BIC 2105	0.615 1.356
	105 4.1339	124.7 4.9094	55 2.165	2 0.08	BIG 3105	1.505 3.318
110	110 4.3307	124.7 4.9094	34 1.339	2 0.08	BIC 2110	0.705 1.554
	110 4.3307	124.7 4.9094	44 1.732	2 0.08	BIG 2110	0.920 2.028
125	125 4.9213	142.5 5.6102	44 1.732	2 0.08	BICG 2125	1.340 2.954
	125 4.9213	142.5 5.6102	44 1.732	2 0.08	BIG 2125	1.325 2.921
130	130 5.1181	158.0 6.2205	52 2.047	2 0.08	BIC 3130	2.530 5.578

END WASHERS

METRIC SERIES



SNSH

Dimensions mm/in.			End Washer Designation	Wt. kg/lbs.
d_s	D_s	S		
8.0 0.315	18 0.709	2.0 0.079	SNSH8X18X2	0.001 0.002
8.5 0.335	15 0.591	0.5 0.020	SNSH8.5X15X0.5	0.001 0.002
10.5 0.413	17 0.669	0.5 0.020	SNSH10.5X17X0.5	0.001 0.001
10.5 0.413	20 0.787	0.5 0.020	SNSH10.5X20X0.5	0.001 0.002
12.5 0.492	19 0.748	0.5 0.020	SNSH12.5X19X0.5	0.001 0.001
12.5 0.492	22 0.866	0.5 0.020	SNSH12.5X22X0.5	0.001 0.002
14.5 0.571	22 0.866	0.5 0.020	SNSH14.5X22X0.5	0.001 0.002
14.5 0.571	26 1.024	0.5 0.020	SNSH14.5X26X0.5	0.001 0.003
15.5 0.610	23 0.906	0.5 0.020	SNSH15.5X23X0.5	0.001 0.002
16.5 0.650	24 0.945	0.5 0.020	SNSH16.5X24X0.5	0.001 0.002
16.5 0.650	28 1.102	0.5 0.020	SNSH16.5X28X0.5	0.002 0.004
17.5 0.689	25 0.984	0.5 0.020	SNSH17.5X25X0.5	0.001 0.002
18.5 0.728	26 1.024	0.5 0.020	SNSH18.5X26X0.5	0.001 0.002
18.5 0.728	30 1.181	0.5 0.020	SNSH18.5X30X0.5	0.002 0.004
20.5 0.807	28 1.102	0.5 0.020	SNSH20.5X28X0.5	0.001 0.002
20.5 0.807	32 1.260	0.5 0.020	SNSH20.5X32X0.5	0.002 0.004

Dimensions mm/in.			End Washer Designation	Wt. kg/lbs.
d_s	D_s	S		
22.5 0.886	30 1.181	0.5 0.020	SNSH22.5X30X0.5	0.001 0.003
22.5 0.886	35 1.378	0.5 0.020	SNSH22.5X35X0.5	0.002 0.005
25.5 1.004	35 1.378	0.5 0.020	SNSH25.5X35X0.5	0.002 0.004
25.5 1.004	37 1.457	0.5 0.020	SNSH25.5X37X0.5	0.002 0.005
28.5 1.122	40 1.575	0.5 0.020	SNSH28.5X40X0.5	0.002 0.005
30.5 1.201	40 1.575	0.5 0.020	SNSH30.5X40X0.5	0.002 0.005
35.5 1.398	47 1.850	0.5 0.020	SNSH35.5X47X0.5	0.003 0.006
40.5 1.594	50 1.969	0.5 0.020	SNSH40.5X50X0.5	0.003 0.006
41.0 1.614	55 2.165	1.0 0.039	SNSH41X55X1	0.008 0.018
45.5 1.791	55 2.165	0.5 0.020	SNSH45.5X55X0.5	0.003 0.007
46.0 1.811	62 2.441	1.0 0.039	SNSH46X62X1	0.011 0.024
51.0 2.008	65 2.559	1.0 0.039	SNSH51X65X1	0.010 0.022
56.0 2.205	72 2.835	1.0 0.039	SNSH56X72X1	0.013 0.029
61.0 2.402	78 3.071	1.0 0.039	SNSH61X78X1	0.015 0.033
66.0 2.598	85 3.346	1.0 0.039	SNSH66X85X1	0.018 0.040

NOTES

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TIMKEN

BALL BEARINGS

D

D BALL BEARINGS

RADIAL AND ANGULAR CONTACT BEARINGS

Overview: Timken is a premier manufacturer of ball bearings. We produce a broad range of precision ball bearings, wide inner ring ball bearings and housed units for standard industrial applications and specialized uses. From standard single-row deep groove radial ball bearings to advanced integral designs, Timken has your solution.

- **Sizes:** 3 mm - 600 mm bore.
- **Markets:** Aircraft, construction, agriculture, machine tool and general industry.
- **Features:** Special coatings for corrosion resistance, special seal designs.
- **Benefits:** Radial: Better life in contaminated environments.

  Angular: Single-row angular contact ball bearing - suited to work in lower operating temperature and high speed with a heavy thrust load. Can be mounted in a duplex arrangement. The refined bore tolerance give a higher life.

  Double-row angular contact ball bearing - excellent axial and radial rigidity in confined space.

Radial and Angular Contact Ball Bearings

Prefixes:

A	stainless steel
F	flanged outer ring
H	snug fit
J	extra loose internal fit
JJ	extra extra loose internal fit
L	internal self-aligning
M	precision ABEC 3
P	loose fit
R	normal fit
S	extra small inch-dimension type
T	tight fit
V	precision ABEC 5
W	wide-type single-row (same width inner and outer)
WIR	single-row, wide inner only

Bore Size: (04 and up: multiply last two numbers by five to get bore in millimeters)

00	10 mm
01	12 mm
02	15 mm
03	17 mm
04	20 mm
05	25 mm
12	60 mm
20	100 mm

Suffixes:

C1, C2, C3, etc. (manufacturing code - Timken® use only)	
FT	full ball complement
K	Conrad, non-filling slot type
W	maximum capacity, filling slot type
WI	angular contact, low-shoulder outer
WO	angular contact, low-shoulder inner
WN	angular contact, low-shoulder, inner and outer

W **3** **05** **K** **LL**

Numbers: Basic Type Series:

S1	**3, 5, 7, etc.,** single-row inch, extra small
30	single-row metric, extra small
100	single-row, extra large
200	single-row, light
300	single-row, medium
5200	double-row, light
5300	double-row, medium
7200	single-row, angular contact, light
7300	single-row, angular contact, medium
7400	single-row, angular contact, heavy
9100	single-row, extra-light
9300	single-row, ultra-light
XLS	inch-dimension, Conrad type

Additional Features:

B	spherical outside diameter
BR	cast bronze retainer
D	one shield
DD	two shields
G	Wireloc (snap ring)
L	one Mechani-Seal
LL	two Mechani-Seals
MBR	machined bronze retainer
P	one seal
PP	two seals
PP2, 3, 4, etc.	Tri-Ply Seals if prefix letter is W (example: W208PPB5)
R	one land-riding rubber seal
RR	two land-riding rubber seals
S	external self-aligning
SMBR	iron silicon bronze retainer
T	one felt seal
TT	two felt seals

Radial and Angular Contact Ball Bearings

INTRODUCTION

EXTRA SMALL SERIES

Extra small bearings are available in the 30 Metric Series, the 33 and S Inch Series and the F Flanged Series. These bearings can sustain radial, thrust and combined loads proportionate to the capacities of the small shafts for which they are designed. They are appropriate for use in fractional horsepower motors, precision instruments, domestic appliances, film projectors and similar devices.

The F flanged series has external shoulders with the bearing for mounting in through-bored housings. This series is used where compactness is essential or where it is not feasible to machine housing shoulders.

All series in the extra small family include shielded versions. The 30 Metric Series is also available with felt seals, Mechani-Seals and rubber seals, while the 33 and S Inch Series is available with rubber seals.

Some sizes in the Extra Small Series are manufactured from stainless steel.

Extra Small Series

EXTRA SMALL 33 AND S SERIES BUSINESS MACHINE BEARINGS

Standard and special extra small bearings are available and often used in business machine applications. They include clamp-type collar bearings for slip-fit mounting on shafts, bearings with Wireloc in the outer ring, and rubber cushioned "O" series with special housed units.

EXTRA LIGHT 9300 AND 9100 SERIES

Bearings in the Extra Light 9300 and 9100 Series are ideally suited for applications where housing diameters are restricted and it is desirable to maintain relatively large shaft diameters. Both series are made in the Conrad or non-filling slot construction with the 9300 Series having a somewhat thinner section.

The 9100 Series is generally available with shields, rubber seals and snap ring combinations. The 9300 Series is selectively available with two rubber seals. Machine tools, textile machinery and jet engine gear boxes are some of the end products in which these series have found wide use.

Extra Light 9300 and 9100 Series

LIGHT 200 SERIES

Bearings in the 200 Series have a greater section height than the Extra Light 9300 and 9100 Series bearings and feature a close dimensional balance between bore, outside diameter and width. These characteristics make them well-suited for a broad range of applications involving light to medium loads combined with relatively high speeds.

Their versatility has made them a popular design choice of designers and has resulted in many variations in the series. They are available in either the Conrad or maximum capacity type and with shields, rubber seals, Mechani-Seals, felt seals or a combination of shield and seal. Snap ring combinations are also included.

Wide-type 200 Series rubber seal (W200PP) and Mechani-Seal (W200KLL) bearings are made with standard bores and outside diameters, but in widths equal to the corresponding sizes of double-row bearings. This series offers a larger support area for shaft and housing contact and extra space for lubricant.

Light 200 Series

MEDIUM 300 SERIES

The 300 Series radial ball bearings are similar in construction to the 200 Series, but have considerably heavier cross sections throughout. They provide greater radial and thrust capacity and are able to withstand heavier shock loads.

Because of their rugged construction, these bearings are particularly suited for heavy-duty applications like those found in large electric motors, woodworking machinery and gear boxes. This series includes both Conrad and maximum capacity designs as well as shielded, sealed and snap ring variations.

In the 300 Series wide-type, rubber seal (W300PP) and Mechani-Seal (W300KLL) bearings are made with standard bores and outside diameters, but in width equal to the corresponding sizes of double-row bearings.

Medium 300 Series

XLS AND EXTRA LARGE 100 SERIES

Bearings in the inch-dimension XLS Series and metric-dimension Extra Large 100 Series have extra large diameters and a compact cross section. XLS bearings are made in the Conrad and maximum capacity filling slot designs. The Extra Large 100 Series offers the maximum capacity, filling slot and counterbore types.

XLS and Extra Large 100 Series

TRI-PLY SEAL DISK HARROW BEARINGS

Bearings with Tri-Ply Seals are designed for service involving severe contamination, such as disk harrows, disk tillers and other seed preparation equipment and certain conveyor applications. Tri-Ply sealed units come in two designs – one consisting of three Timken rubber seals separated by steel spacers and retained by steel caps in the outer ring and the other, a highly effective one-piece, molded seal design. Both designs have an exterior shroud cap to protect the seals and reinforce the exceptional sealing action of the complete unit. A patented notched seal groove design, provided on selected sizes, is one of the most positive seal retention methods ever developed.

Tri-Ply Seal Disk Harrow Bearings

HEX BORE BEARINGS

These bearings are designed for either outer or inner ring rotation in low speed, moderately loaded applications such as farm machinery and conveyors. Their chief advantage is ease of mounting. Except for axial positioning by adjacent parts, no collars, setscrews or other external parts are required to lock the inner ring to the hex shaft.

Hex Bore Bearings

R-SEAL DISK HARROW BEARINGS

R-Seal bearings are designed for a wide variety of farm machinery applications where single-lip positive contact seals are required. Each sealing element has a Timken Fafnir rubber seal that effectively seals the bearing with a heavy flare on the cylindrically ground O.D. (inner ring). A steel back-up plate supports the seal rubber and prevents the seal lip from inverting. An outside metal shroud cap gives maximum abrasion protection to the rubber element and completes the assembly that is rolled into the outer ring seal groove for positive retention.

R-Seal radial ball bearings are used in positions in planting, cultivating and harvesting machinery. They are available in various configurations including round bores in metric and inch dimensions and cylindrical and spherical outside diameters.

R-Seal Agricultural Bearings

ANGULAR CONTACT – SINGLE-ROW 7000 PRODUCT FAMILY

Timken offers a 7200WN Light, 7300WN Medium and 7400WN Heavy Series single-row, angular contact bearings, which are designed for combination loading with high-thrust capacity in one direction.

The 7000WN bearings are manufactured with better than ABEC 1 inner ring bore tolerances and ABEC 3 running accuracy. These bearings, when mounted in a duplex arrangement, provide axial and/or radial rigidity in applications where control of shaft displacement is essential.

These bearings are available with various cage designs as defined in the dimension tables. The external dimensions of all 7000WN bearings interchange with corresponding sizes in the 200, 300 and 400 single-row radial series.

Single-Row Angular Contact Bearings 7000 Product Family

ANGULAR CONTACT – DOUBLE-ROW

Double-row Angular Contact Bearings are available in the Light 5200 and Medium 5300 Series. These bearings have the same bores and outside diameters as the corresponding sizes in the 200 and 300 Series, single-row, radial type.

Chief advantages of the double-row type are rigidity, compactness and high capacity. The two rows of balls provide for bearings large radial capacity combined with moderate thrust capacity in either direction.

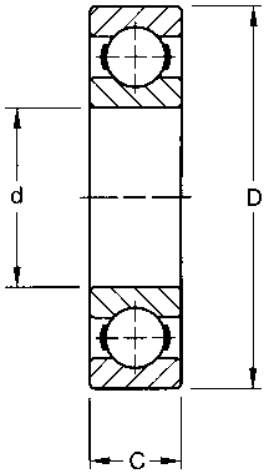
Double-row bearings are available in both the Conrad (K) construction with uninterrupted race shoulders and the maximum capacity type. The latter has a filling slot in the shoulder of both rings and a maximum ball complement.

Sizes with the W suffix have the filling slot on one side only. In these cases, thrust should be applied on the side opposite the filling slot.

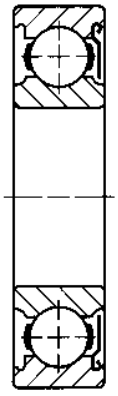
Double-Row Angular Contact

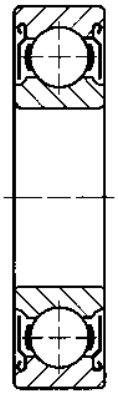
EXTRA SMALL 30 METRIC SERIES

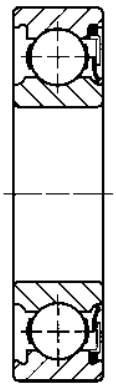
- Designed for small shafts.
- Can sustain radial, thrust and combined load proportionate to capacities of small shafts.
- Suitable for use in fractional horsepower motors, domestic appliances, precision instruments and similar devices.
- Offer various combinations of shields and seals, as listed below.
- Electric motor quality for applications where quietness is required.
- Stainless steel series, denoted by a prefix A before the bearing number. (Example: A38K)

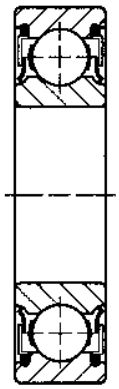


Open


One Shield
D


Two Shields
DD


One Rubber Seal
P


Two Rubber Seals
PP

OPEN AND SHIELDED TYPES
DIMENSIONS – TOLERANCES

Bearing Number open	one shield D	two shield DD	Bore d +.000 mm, -0.008 mm +0.0000", -0.0003"		Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width C +0.00 mm, -.12 mm +0.000", -0.005"		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(2)	
			mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
34K	34KD	34KDD	4	0.1575	16	0.6299	0.008	0.0003	5	0.197	0.3	0.012	0.005	0.01	560	125	1630	365
35K	35KD	35KDD	5	0.1969	19	0.7480	0.009	0.00035	6	0.236	0.3	0.012	0.009	0.02	865	195	2450	560
36K	36KD	36KDD	6	0.2362	19	0.7480	0.009	0.00035	6	0.236	0.3	0.012	0.009	0.02	865	195	2450	560
37K	37KD	37KDD	7	0.2756	22	0.8661	0.009	0.00035	7	0.276	0.3	0.012	0.009	0.02	1400	312	3650	830
38K	38KD	38KDD	8	0.3150	22	0.8661	0.009	0.00035	7	0.276	0.3	0.012	0.009	0.02	1400	312	3650	830
38KV	—	—	8	0.3150	24	0.9449	0.009	0.00035	7	0.276	0.3	0.012	0.018	0.04	1370	305	3650	830
39K	39KD	39KDD	9	0.3543	26	1.0236	0.009	0.00035	8	0.315	0.3	0.012	0.018	0.04	1960	440	5000	1120

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

SEALED TYPES
DIMENSIONS – TOLERANCES

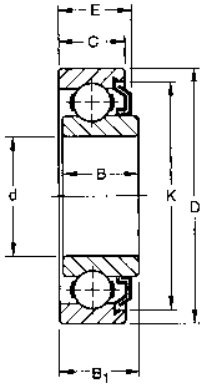
Bearing Number one seal P	two seals PP	Bore d +0.000 mm, -.008 mm +0.0000", -.0003"		Outside Diameter D +.000 mm, -.009 mm +0.0000", -.00035"		Width C +0.00 mm, -.12 mm +0.000", -0.005"		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(2)	
		mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
36P	36PP	6	0.2362	19	0.7480	10	0.394	0.3	0.012	0.014	0.03	865	195	2450	560
36P2	36PP2	6	0.2362	19	0.7480	6	0.236	0.3	0.012	0.014	0.03	865	195	2450	560
37P	37PP	7	0.2756	22	0.8661	10	0.394	0.3	0.012	0.018	0.04	1370	305	3650	830
37P2	37PP2	7	0.2756	22	0.8661	7	0.276	0.3	0.012	0.018	0.04	1400	312	3650	830
38P	38PP	8	0.3150	22	0.8661	10	0.394	0.3	0.012	0.018	0.04	1370	305	3650	830
38P2	38PP2	8	0.3150	22	0.8661	7	0.276	0.3	0.012	0.018	0.04	1400	312	3650	830
39P	39PP	9	0.3543	26	1.0236	8	0.315	0.6	0.024	0.023	0.05	1960	440	5000	1120

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

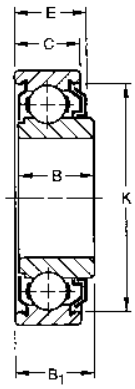
EXTRA SMALL 30 METRIC SERIES

MECHANI-SEALS

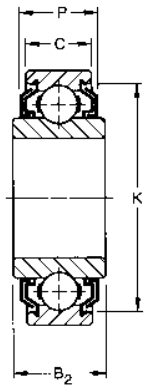
- Developed by The Timken® Company.
- Adapted to the 30 metric series for effective grease retention and exclusion of foreign matter.
- Can be operated at speeds comparable to open-type bearings.
- Available with:
  - One Mechani-Seal (suffix L).
  - One Mechani-Seal and one shield (suffix LD).
  - Two Mechani-Seals (suffix LL).



One Seal
L



One Seal and Shield
LD



Two Seals
LL

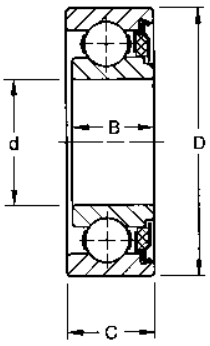
DIMENSIONS – TOLERANCES

Bearing Number one seal L	one seal and shield LD	two seals LL	Bore d +0.000 mm -0.008 mm +0.0000" -0.0003" mm	in.	Outside Diameter D +0.000 mm -0.009 mm +0.0000" -0.00035" mm	in.	Width B_1 mm	in.	Ring Width +0.00 mm, -.12 mm +0.000" -.005": inner B mm	in.	inner B_2[3] mm	in.	outer C mm	in.	Fillet Radius[1] mm	in.	Seal Protection width E mm	in.	width P mm	in.	O.D. K mm	in.	Inner Ring Offset[2] mm	in.	Wt. kg	lbs.	Static Load Rating C_o N	lbs.	Extended Dynamic Load Rating C_E[4] N	lbs.
36KL	36KLD	36KLL	6	0.2362	19	0.7480	10.31	0.406	9.80	0.386	14.27	0.562	8.00	0.315	0.3	0.012	9.60	0.378	10.87	0.428	16.7	21/32	0.50	0.020	0.014	0.03	865	195	2450	560
36KVL	—	—	6	0.2362	24	0.9449	10.31	0.406	9.80	0.386	—	—	8.00	0.315	0.3	0.012	9.60	0.378	—	—	19.0	3/4	0.50	0.020	0.022	0.05	865	195	2450	560
37KL	37KLD	37KLL	7	0.2756	22	0.8661	10.31	0.406	9.80	0.386	14.27	0.562	8.00	0.315	0.3	0.012	9.60	0.378	11.18	0.440	18.7	47/64	0.50	0.020	0.018	0.04	1400	312	3650	830
37KVL	37KVLD	—	7	0.2756	24	0.9449	10.31	0.406	9.80	0.386	—	—	8.00	0.315	0.3	0.012	9.60	0.378	—	—	19.0	3/4	0.50	0.020	0.022	0.05	1400	312	3650	830
38KL	38KLD	38KLL	8	0.3150	22	0.8661	10.31	0.406	9.80	0.386	14.27	0.562	8.00	0.315	0.3	0.012	9.60	0.378	11.18	0.440	18.7	47/64	0.50	0.020	0.018	0.04	1400	312	3650	830
38KVL	38KVLD	38KVLL	8	0.3150	24	0.9449	10.31	0.406	9.80	0.386	14.27	0.562	8.00	0.315	0.3	0.012	9.60	0.378	11.13	0.438	19.0	3/4	0.50	0.020	0.022	0.05	1370	305	3650	830
—	—	38KLL2	8	0.3150	22	0.8661	—	—	—	—	12.62	0.497	8.00	0.315	0.3	0.012	—	—	11.18	0.440	18.7	47/64	—	—	0.022	0.05	1370	305	3650	830
—	—	38KVLL2	8	0.3150	24	0.9449	—	—	—	—	12.62	0.497	8.00	0.315	0.3	0.012	—	—	11.13	0.438	19.0	3/4	—	—	0.022	0.05	1370	305	3650	830
39KL2	39KLD2	—	9	0.3543	26	1.0236	10.31	0.406	9.80	0.386	—	—	8.00	0.315	0.6	0.024	9.60	0.378	—	—	21.4	27/32	0.50	0.020	0.022	0.05	1960	440	5000	1120
—	39KVLD	39KVLL2	9	0.3543	30	1.1811	—	—	—	—	16.41	0.646	9.00	0.354	0.6	0.024	—	—	15.98	0.629	25.4	1	0.50	0.020	0.041	0.09	2650	595	6550	1500

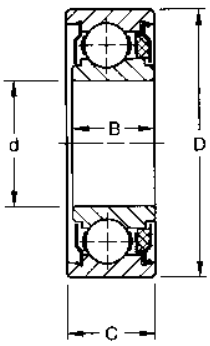
(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Does not apply to bearings with two seals.
Note: Inner ring offset is .51 mm (.020 inches) for the L, LD, and VLD versions.
(3) Two seals (suffix LL) type only.
(4) Based on 10^6 revolutions of calculated fatigue life.

FELT-SEALS

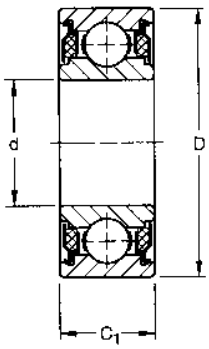
- Provide effective barrier against the entrance of foreign matter and the escape of lubricant.
- Contact seal with the felt riding on the ground surface of inner ring O.D.
- Can be operated at moderate speeds without excessive heating because the felt washer absorbs some lubricant.
- Electric motor quality where quietness is required.
- Available with:
  - One felt seal (suffix T).
  - One felt seal and one shield (suffix TD).
  - Two felt seals (suffix TT).



One Felt Seal
T



One Felt Seal and Shield
TD



Two Felt Seals
TT

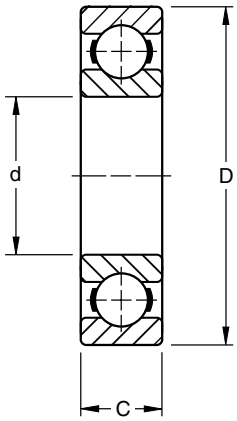
DIMENSIONS – TOLERANCES

Bearing Number one seal T	one seal and shield TD	two seals TT	Bore d +0.000 mm -0.008 mm +0.0000" -0.0003" mm	in.	Outside Diameter D +0.000 mm -0.009 mm +0.0000" -0.00035" mm	in.	Ring Width +0.00 mm, -.12 mm +0.000" -.005": inner B mm	in.	outer C mm	in.	C_1 mm	in.	Inner Ring Offset[2] mm	in.	Fillet Radius[1] mm	in.	Wt. kg	lbs.	Static Load Rating C_o N	lbs.	Extended Dynamic Load Rating C_E[3] N	lbs.
36KT	36KTD	36KTT	6	0.2362	19	0.7480	9.80	0.386	10.31	0.406	14.27	0.562	0.50	0.020	0.3	0.012	0.014	0.03	865	195	2450	560
36KVT	36KVTD	—	6	0.2362	24	0.9449	9.80	0.386	10.31	0.406	—	—	0.50	0.020	0.3	0.012	0.027	0.06	1370	305	3650	830
37KT	37KTD	—	7	0.2756	22	0.8661	9.80	0.386	10.31	0.406	—	—	0.50	0.020	0.3	0.012	0.018	0.04	1370	305	3650	830
37KVT	37KVTD	—	7	0.2756	24	0.9449	9.80	0.386	10.31	0.406	—	—	0.50	0.020	0.3	0.012	0.022	0.05	1370	305	3650	830
38KT	38KTD	38KTT	8	0.3150	22	0.8661	9.80	0.386	10.31	0.406	14.27	0.562	0.50	0.020	0.3	0.012	0.018	0.04	1370	305	3650	830
38KVT	38KVTD	38KVTT	8	0.3150	24	0.9449	9.80	0.386	10.31	0.406	14.27	0.562	0.50	0.020	0.3	0.012	0.022	0.05	1370	305	3650	830
39KT	39KTD	39KTT	9	0.3543	26	1.0236	11.10	0.437	11.51	0.453	14.27	0.562	0.40	0.016	0.6	0.024	0.027	0.06	1960	440	5000	1120
39KVT	39KVTD	—	9	0.3543	30	1.1811	12.19	0.480	12.70	0.500	—	—	0.50	0.020	0.6	0.024	0.041	0.09	2650	595	6550	1500

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Does not apply to bearings with two seals.
(3) Based on 10^6 revolutions of calculated fatigue life.

EXTRA SMALL 33 AND S INCH SERIES

- Designed for small shafts.
- Can sustain radial, thrust and combined loads, proportionate to capacities of small shafts.
- Suitable for use in fractional horsepower motors, domestic appliances, precision instruments and similar devices.
- Include combinations of shields and seals, as listed below.
- Electric motor quality for applications where quietness is required.
- Several sizes are manufactured both in standard bearing-quality steel and stainless steel, as indicated in the tables.



DIMENSIONS – TOLERANCES

Bearing Number		Bore d		tolerance +0.000 mm +0.000" to minus		Outside Diameter D		tolerance +0.000 mm +0.000" to minus		Width C +0.000 mm, -0.13 mm +0.000, -0.005"		Fillet Radius(1)		Wt.		Static Load Rating C_0		Extended Dynamic Load Rating C_E (2)	
standard	stainless	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
33K3	A33K3	3.175	0.1250	0.008	0.0003	9.525	0.3750	0.010	0.0004	3.96	0.156	0.3	0.012	0.005	0.01	212	48	710	160
33K4	A33K4	3.175	0.1250	0.008	0.0003	12.700	0.5000	0.010	0.0004	4.37	0.172	0.3	0.012	0.005	0.01	490	110	1430	325
33K5	A33K5	4.762	0.1875	0.008	0.0003	12.700	0.5000	0.010	0.0004	3.96	0.156	0.3	0.012	0.005	0.01	490	110	1430	325
S1K7	AS1K7	6.350	0.2500	0.008	0.0003	15.875	0.6250	0.010	0.0004	4.98	0.196	0.3	0.012	0.005	0.01	560	125	1630	365
S1K	AS1K	6.350	0.2500	0.008	0.0003	19.050	0.7500	0.010	0.0004	5.56	0.219	0.4	0.016	0.009	0.02	1160	260	3100	695
S3K	AS3K	9.525	0.3750	0.008	0.0003	22.225	0.8750	0.010	0.0004	5.56	0.219	0.4	0.016	0.009	0.02	1400	312	3650	830
S5K	AS5K	12.700	0.5000	0.008	0.0003	28.575	1.1250	0.010	0.0004	6.35	0.250	0.4	0.016	0.018	0.04	2240	500	5600	1270
S7K	AS7K	15.875	0.6250	0.008	0.0003	34.925	1.3750	0.013	0.0005	7.14	0.281	0.8	0.031	0.032	0.07	3050	682	7500	1700
S8K	—	19.050	0.7500	0.010	0.0004	41.275	1.6250	0.013	0.0005	7.92	0.312	0.8	0.031	0.050	0.11	4400	1000	10400	2320
S9K	—	22.225	0.8750	0.010	0.0004	47.625	1.8750	0.013	0.0005	9.52	0.375	0.8	0.031	0.064	0.14	4900	1120	11000	2500
S10K	—	25.400	1.0000	0.010	0.0004	50.800	2.0000	0.013	0.0005	9.52	0.375	0.8	0.031	0.082	0.18	4900	1120	11000	2500
S11K	—	28.575	1.1250	0.010	0.0004	53.975	2.1250	0.013	0.0005	9.52	0.375	0.8	0.031	0.091	0.20	5400	1220	11800	2650
S12K	—	31.750	1.2500	0.013	0.0005	57.150	2.2500	0.013	0.0005	9.52	0.375	0.8	0.031	0.100	0.22	6000	1340	12200	2750

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

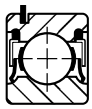
SHIELD AND SEAL COMBINATIONS


One Shield D


Two Shields DD


One Shield And Seal PD


Two Seals PP

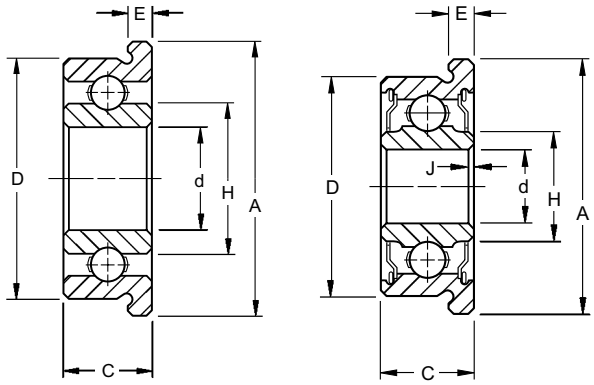

Two Seals Wireloc PPG

Standard One Shield D	Standard Two Shields DD	Stainless One Shield D	Stainless Two Shields DD	Width +0.00 mm, -.12 mm +0.000", -.005"			One Shield And Seal PD	Two Seals PP	Two Seals (Wireloc) PPG	Width +0.00 mm, -.12 mm +0.000", -.005"		
				mm	in.	in.				mm	in.	in.
33KD3	33KDD3	A33KD3	A33KDD3	3.96	0.156	5/32	—	33PP3	—	3.96	0.156	5/32
33KD4	33KDD4	—	—	4.37	0.172	11/64	—	—	—	—	—	—
33KD5	33KDD5	A33KD5	A33KDD5	4.98	0.196	—	—	33PP5	33PPG5	4.98	0.196	—
S1KD7	S1KDD7	AS1KD7	AS1KDD7	4.98	0.196	—	—	S1PP7	S1PPG7	4.98	0.196	—
S1KD	S1KDD	AS1KD	AS1KDD	7.14	0.281	9/32	—	S1PP	S1PPG	7.14	0.281	9/32
S3KD	S3KDD	AS3KD	AS3KDD	7.14	0.281	9/32	—	S3PP	S3PPG	7.14	0.281	9/32
S5KD	S5KDD	AS5KD	AS5KDD	7.92	0.312	5/16	S5PD	S5PP	S5PPG	7.92	0.312	5/16
S7KD	S7KDD	—	—	8.74	0.344	11/32	—	S7PP	—	8.74	0.344	11/32
S8KD	S8KDD	—	AS8KDD	11.13	0.438	7/16	S8PD	S8PP	—	11.13	0.438	7/16
S9KD	S9KDD	—	—	12.70	0.500	1/2	—	—	—	—	—	—
S10KD	S10KDD	—	—	12.70	0.500	1/2	—	S10PP2	—	12.70	0.500	1/2
—	—	—	—	—	—	—	—	S12NPP	—	12.70	0.500	—

FLANGED SERIES

CYLINDRICAL O.D.

- Four sizes offered in flanged construction.
- Integral shoulders for mounting in through-bored housings.
- Straight outside diameters.
- Interchangeable with corresponding unflanged sizes.
- Available with double shields.
- Electric motor quality for applications where quietness is required.



Open Type | Shielded Type

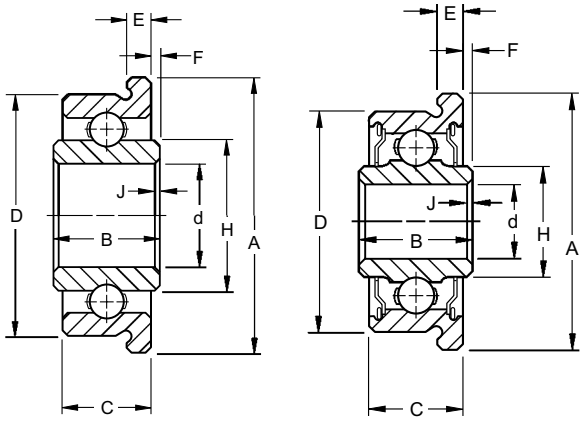
DIMENSIONS – TOLERANCES

Bearing Number		Bore d +0.000 mm -0.008 mm / +0.0000″ -0.0003″		chamfer J x 45° +0.25 mm -0.00 mm / +0.010″ -0.000″		Outside Diameter D +0.000 mm -0.010 mm / +0.000″ -0.0004″		Width C +0.00 mm -0.13 mm / +0.000″ -0.005″		Inner Ring Shoulder H Min.		Flange A +0.13 mm -0.05 mm / +0.005″ -0.002″		E ±0.05 mm / ±0.002″		Shielded Type Overall Width +0.00 mm -0.13 mm / +0.000″ -0.005″		H Min.		Wt.		Static Load Rating C_0		Extended Dynamic Load Rating C_E [2]	
open	shielded*	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
F33K3	F33KDD3	3.175	0.1250	0.30	0.012	9.525	0.3750	3.96	0.156	5.13	0.202	11.18	0.440	0.76	0.030	3.96	0.156	4.65	0.183	0.005	0.01	212	48	710	160
F33K5	F33KDD5	4.762	0.1875	0.30	0.012	12.700	0.5000	3.96	0.156	6.86	0.270	14.35	0.565	1.07	0.042	4.98	0.196	6.30	0.248	0.005	0.01	490	110	1430	325
FS1K7	FS1KDD7[1]	6.350	0.2500	0.30	0.012	15.875	0.6250	4.98	0.196	8.86	0.349	17.53	0.690	1.07	0.042	4.98	0.196	8.43	0.332	0.005	0.01	560	125	1630	365
FS3K	FS3KDD[1]	9.525	0.3750	0.41	0.016	22.225	0.8750	5.56	0.219	13.13	0.517	24.61	0.969	1.57	0.062	7.14	0.281	12.06	0.475	0.009	0.02	1400	310	3650	830

[1] Also available in stainless steel. To specify, add prefix "A" before bearing number.
[2] Based on 10^6 revolutions of calculated fatigue life.
* Also available with two contact seals. To specify, replace "KDD" in part number with "PP".

TAPERED O.D.

- F Flanged series has shoulders integral with the bearings for mounting in through-bored housings.
- Used where compactness is essential or where it is not desirable to machine housing shoulders.
- All sizes in series have tapered outside diameters and are available with double shields.
- Suitable applications include precision instruments, packaging machinery and motion picture projectors.
- Several sizes in the series are manufactured in both standard bearing-quality, chromium-alloy, high-carbon steel and stainless steel (stainless steel specified by suffix "A").
- Electric motor quality where quietness is required.



Open Type | Shielded Type

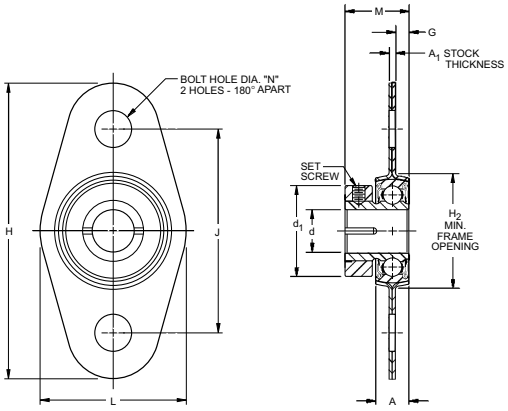
DIMENSIONS – TOLERANCES

Bearing Number		Bore d +0.008 mm -0.00 mm / +0.0003″ -0.0000″		chamfer J x 45° +0.025 mm -.00 mm / +0.010″ -0.000″		Outside Diameter D +0.000 mm -0.10 mm / +0.000″ -0.0004″		Inner Width B ±0.3 mm / ±0.010″		Ring Widths Inner Project F ±0.13 mm / -0.005″		Inner H[3] Min.		Outer Width C +.00 mm -0.10 mm / +0.000″ -0.004″		Taper Per Foot		Flange A +0.13 mm -0.05 mm / +0.005″ -0.002″		E ±0.05 mm / ±0.002″		Wt.		Static Load Rating C_0		Extended Dynamic Load C_E[4]	
open	shielded	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
F2[1]	—	4.762	0.1875	0.25	0.010	11.130	0.4382	4.80	0.189	0.41	0.016	6.93	0.273	4.14	0.163	2.03	0.080	12.70	0.500	1.07	0.042	0.005	0.01	465	106	1160	260
—	F2DD-2	3.175	0.1250	0.25	0.010	9.534	0.3757	4.77	0.188	0.38	0.015	4.60	0.181	4.14	0.163	1.90	0.075	11.13	0.438	0.94	0.037	0.005	0.01	212	48	710	160
F3	—	4.762	0.1875	0.25	0.010	14.305	0.5632	5.54	0.218	0.38	0.015	6.93	0.273	4.95	0.195	2.03	0.080	15.88	0.625	1.07	0.042	0.005	0.01	490	110	1430	325
—	F3DD	4.762	0.1875	0.25	0.010	14.305	0.5632	6.35	0.250	0.38	0.015	6.22	0.245	5.74	0.226	1.73	0.068	15.88	0.625	1.07	0.042	0.005	0.01	490	110	1430	325
F4	F4DD	6.350	0.2500	0.25	0.010	15.893	0.6257	6.35	0.250	0.38	0.015	8.41	0.331	5.74	0.226	1.73	0.068	17.45	0.687	1.07	0.042	0.005	0.01	560	125	1630	365
F5	F5DD[2]	7.938	0.3125	0.25	0.010	17.480	0.6882	6.35	0.250	0.38	0.015	10.41	0.410[2]	5.74	0.226	1.73	0.068	19.05	0.750	1.07	0.042	0.005	0.01	865	196	2400	540

[1] Full type, no retainer. Not suggested for speeds over 500 RPM.
[2] H dimension is 9.68 mm (.381") for F5DD.
[3] Land dimension of the inner ring.
[4] Based on 10^6 revolutions of calculated fatigue life.

ST FLANGETTE UNIT

- Pressed steel housed units designed for light-duty applications.
- Available in shaft sizes from 6.35 mm - 12.7 mm ($^1/_4$ to $^1/_2$ inch).
- Designed to simplify mounting on side plate or frame-type housings.
- Two identical steel stampings house a clamp-type bearing with a spherical O.D. outer ring.
- Spherical inside surface of each stamping mates with the spherical O.D. of the bearing, providing initial self-alignment at mounting.
- Offers features of basic clamp-type bearing.
- Available with sealed or shielded construction.
- Radial load capacity is 25 percent of basic bearing's dynamic load rating at 33.3 RPM.
- Inspected to ABEC-1 tolerances, except bore.
- Suggested shaft tolerance: Nominal bore size to -.0005 in. resulting in .000 in. to .001 in. loose-shaft fit.



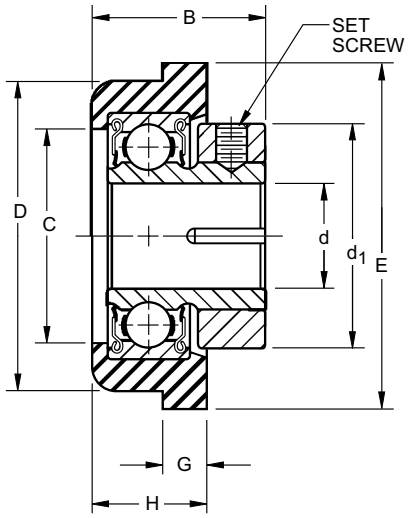
Unit Number	Bore** d +0.13 mm -0.000 mm +0.0005" -0.0000"		A		d1		H2		M		G		A1		H		L		J		N		Set-screw Thread*	Max. Radial Unit Load	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.		N	lbs.
S1PPB7-3 ST	6.350	0.2500	5.556	7/32	14.287	9/16	19.844	25/32	10.922	0.430	2.007	0.079	0.683	0.0269	45.244	1 25/32	22.225	7/8	30.956	1 7/32	0.219	7/32	4-40	312	70
S3PPB15 ST	7.937	0.3125	7.144	9/32	19.844	25/32	27.781	13/32	14.275	0.562	2.718	0.107	0.836	0.0329	53.181	2 3/32	30.163	1 13/16	38.894	1 17/32	0.219	7/32	8-36	668	150
S3PPB5 ST	9.525	0.3750	7.144	9/32	19.844	25/32	27.781	13/32	14.275	0.562	2.718	0.107	0.836	0.0329	53.181	2 3/32	30.163	1 13/16	38.894	1 17/32	0.219	7/32	8-36	668	150
S5PPB2 ST	12.700	0.5000	7.937	5/16	23.019	29/32	32.544	19/32	15.875	0.625	3.048	0.120	0.912	0.0359	59.531	2 11/32	36.512	1 17/16	45.244	1 25/32	0.219	7/32	8-36	980	220

* All setscrews are hex socket oval point, six fluted socket setscrews available upon request. Setscrews with fused plastic patch available at added cost.

**Bore tolerance applies prior to collar assembly.

RTF-RUBBER TIRE FLANGE HOUSED UNIT

- Synthetic, conductive elastomer of Durometer hardness 80-85 facilitates mounting of standard cylindrical O.D. bearings in side plate of frame-type housings.
- Generous taper on entrance corner of rubber cartridge simplifies insertion of unit into side panel, assuring reasonable squareness of bearings when fully mounted.
- Bearing is positioned by integral flange of the rubber cartridge.
- Resiliency of elastomer accommodates wider than the standard suggested housing bore tolerance.
- Greater flexibility in adjusting to minor shaft and/or housing alignment.
- Helps reduce airborne noise and structural vibration.
- Additional advantages are similar to features of basic clamp-type bearing design.
- Due to deflection characteristics of the elastomer, radial and thrust ratings for the RTF Series are 10 percent of the basic bearing's dynamic load rating at 33.3 RPM.



Unit Number	Bore** d +0.13 mm -0.000 mm +0.0005" -0.0000"		D RTF O.D. ±0.13 mm ±0.005"		D HSG Bore ±0.13 mm ±0.005"		C		d1		E		B		G		H		Set-screw Thread*	Max. Radial Unit Load	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.		N	lbs.
S1PP73RTF	6.350	0.2500	19.355	0.762	19.050	0.750	13.494	17/32	14.287	9/16	22.225	7/8	11.906	15/32	1.984	5/64	7.541	19/64	4-40	116	26
S3PP16RTF	7.937	0.3125	27.280	1.074	26.975	1.062	19.050	3/4	19.844	25/32	30.956	17/32	15.875	5/8	3.969	5/32	10.319	13/32	8-36	258	58
S3PP4RTF	9.525	0.3750	27.280	1.074	26.975	1.062	19.050	3/4	19.844	25/32	30.956	17/32	15.875	5/8	3.969	5/32	10.319	13/32	8-36	258	58
S5PP2RTF	12.700	0.5000	35.255	1.388	34.925	1.375	25.400	1	23.019	29/32	38.894	1 17/32	17.859	45/64	3.969	5/32	11.906	15/32	8-36	392	88

* All setscrews are hex socket oval point, six fluted socket setscrews available upon request. Setscrews with fused plastic patch available at added cost.

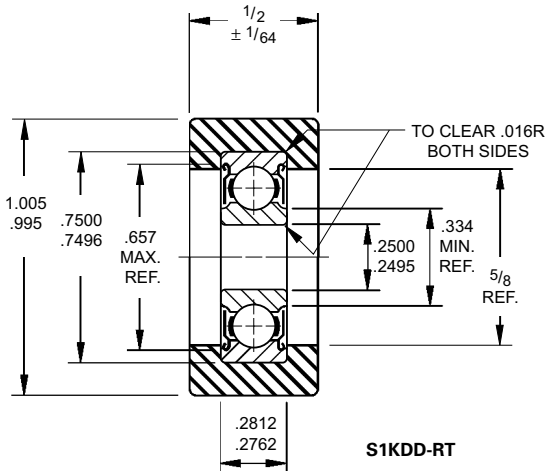
**Bore tolerance applies prior to collar assembly.

SPECIAL BEARINGS

- Pulley, guide roller and pinch roll bearings:
  - Available in several bore sizes.
  - Lightweight, low inertia, low torque and accurate running characteristics with minimum runout and wobble.
  - Many units feature outer ring assemblies with integral molded tires.
  - Most common tire materials are aluminum, steel and a variety of engineered plastics such as nylon, polycarbonate, acetal resin or polyurethane.
  - Tire material and configuration are determined by application requirements.
  - Standard materials and shapes can be made in many sizes.
  - Timken engineering may assist in testing materials you feel are suitable for your applications.

- Timken universal ring design:
  - Sealed or shielded versions readily available in the most basic bearing sizes.
  - Varying degrees of seal drag, to suit the sealing torque requirements dictated by the environmental conditions of the application.

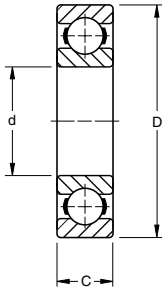
- Integral assembly design concept:
  - Complete package of bearings, housings, shafts, etc.
  - Assembled and ready to mount.
  - Custom designed to solve customer assembly problems and minimize inventory of multiple components.
  - Overall cost savings.
  - Bearing units shown have been developed especially for business machine applications.



S1KDD-RT

ULTRA LIGHT 9300K SERIES

- Designed for applications where housing diameters are restricted and it is desirable to maintain relatively large shaft diameters.
- Resembles the 9100K Series, except corresponding sizes of the 9300K Series have a somewhat thinner section.
- Used extensively in machine tools, textile machinery and jet engine gearbox applications.



DIMENSIONS – TOLERANCES

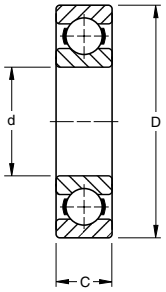
Bearing Number	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Width C		tolerance +0.000 mm +0.0000" to minus		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(4)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
9301K	12	0.4724	0.008	0.0003	24	0.9449	0.009	0.00035	6	0.236	0.12	0.005	0.3	0.012	0.014	0.03	1600	360	3650	830
9302K	15	0.5906	0.008	0.0003	28	1.1024	0.009	0.00035	7	0.276	0.12	0.005	0.3	0.012	0.018	0.04	2270	510	4890	1100
9303K(2)	17	0.6693	0.008	0.0003	30	1.1811	0.009	0.00035	7	0.276	0.12	0.005	0.3	0.012	0.027	0.06	2540	570	5250	1180
9305K(2)	25	0.9843	0.010	0.0004	42	1.6535	0.011	0.00045	9	0.354	0.12	0.005	0.3	0.012	0.045	0.10	4540	1020	8010	1800
9306K(2)(3)	30	1.1811	0.010	0.0004	47	1.8504	0.011	0.00045	9	0.354	0.12	0.005	0.3	0.012	0.075	0.16	4980	1120	8270	1860
9307K	35	1.3780	0.012	0.00045	55	2.1654	0.013	0.0005	10	0.394	0.12	0.005	0.6	0.024	0.095	0.21	8010	1800	13300	3000
9308K	40	1.5748	0.012	0.00045	62	2.4409	0.013	0.0005	12	0.472	0.12	0.005	0.6	0.024	0.141	0.31	8900	2000	13800	3100
9310K	50	1.9685	0.012	0.00045	72	2.8346	0.013	0.0005	12	0.472	0.12	0.005	0.6	0.024	0.168	0.37	11560	2600	16700	3750
9311K	55	2.1654	0.015	0.0006	80	3.1496	0.013	0.0005	13	0.512*	0.15	0.006	1.0	0.039	0.209	0.46	14010	3150	18900	4250
9313K	65	2.5591	0.015	0.0006	90	3.5433	0.015	0.0006	13	0.512*	0.15	0.006	1.0	0.039	0.250	0.55	16010	3600	19600	4400
9316K	80	3.1496	0.015	0.0006	110	4.3307	0.015	0.0006	16	0.630*	0.15	0.006	1.0	0.039	0.363	0.80	24020	5400	28500	6400

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Also available with rubber seals, e.g., 9303PP.
(3) Also available with two shields, e.g., 9306KDD.
(4) Based on 10^6 revolutions of calculated fatigue life.

* Width tolerance is +.00 mm to -.15 mm (+.000" to -.006").

EXTRA LIGHT 9100K SERIES

- For applications where housing diameters are restricted and it is desirable to maintain relatively large shaft diameters.
- Electric motor quality for applications where quietness is a requirement.



DIMENSIONS – TOLERANCES

Bearing Number	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Width C		tolerance +0.000 mm +0.0000" to minus		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(2)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
9100K	10	0.3937	0.008	0.0003	26	1.0236	0.009	0.00035	8	0.3150	0.12	0.005	0.3	0.012	0.018	0.04	1960	440	5160	1160
9101K	12	0.4724	0.008	0.0003	28	1.1024	0.009	0.00035	8	0.3150	0.12	0.005	0.3	0.012	0.018	0.04	2360	530	5870	1320
9102K	15	0.5906	0.008	0.0003	32	1.2598	0.011	0.00045	9	0.3543	0.12	0.005	0.3	0.012	0.027	0.06	2800	630	6360	1430
9103K	17	0.6693	0.008	0.0003	35	1.3780	0.011	0.00045	10	0.3937	0.12	0.005	0.3	0.012	0.041	0.09	3200	720	6800	1530
9104K	20	0.7874	0.010	0.0004	42	1.6535	0.011	0.00045	12	0.4724	0.12	0.005	0.6	0.024	0.073	0.16	5000	1120	10700	2400
9105K	25	0.9843	0.010	0.0004	47	1.8504	0.011	0.00045	12	0.4724	0.12	0.005	0.6	0.024	0.077	0.17	5740	1290	11300	2550
9106K	30	1.1811	0.010	0.0004	55	2.1654	0.013	0.0005	13	0.5118	0.12	0.005	1.0	0.039	0.118	0.26	8010	1800	14600	3350
9107K	35	1.3780	0.012	0.00045	62	2.4409	0.013	0.0005	14	0.5512	0.12	0.005	1.0	0.039	0.145	0.32	9960	2240	18000	4050
9108K	40	1.5748	0.012	0.00045	68	2.6772	0.013	0.0005	15	0.5906	0.12	0.005	1.0	0.039	0.195	0.43	12200	2750	20000	4500
9109K	45	1.7717	0.012	0.00045	75	2.9528	0.013	0.0005	16	0.6299	0.12	0.005	1.0	0.039	0.249	0.55	14900	3350	24000	5400
9110K	50	1.9685	0.012	0.00045	80	3.1496	0.013	0.0005	16	0.6299	0.12	0.005	1.0	0.039	0.272	0.60	16000	3600	24900	5600
9111K	55	2.1654	0.015	0.0006	90	3.5433	0.015	0.0006	18	0.7087	0.15	0.006	1.0	0.039	0.390	0.86	20700	4650	32000	7200
9112K	60	2.3622	0.015	0.0006	95	3.7402	0.015	0.0006	18	0.7087	0.15	0.006	1.0	0.039	0.417	0.92	22600	5100	33400	7500
9113K	65	2.5591	0.015	0.0006	100	3.9370	0.015	0.0006	18	0.7087	0.15	0.006	1.0	0.039	0.445	0.98	24500	5500	34700	7800
9114K	70	2.7559	0.015	0.0006	110	4.3307	0.015	0.0006	20	0.7874	0.15	0.006	1.0	0.039	0.630	1.39	29800	6700	43200	9720
9115K	75	2.9528	0.015	0.0006	115	4.5276	0.015	0.0006	20	0.7874	0.15	0.006	1.0	0.039	0.680	1.50	32700	7350	44500	10000
9116K	80	3.1496	0.015	0.0006	125	4.9213	0.018	0.0007	22	0.8661	0.15	0.006	1.0	0.039	0.885	1.95	35600	8000	54300	12200
9117K	85	3.3465	0.020	0.0008	130	5.1181	0.018	0.0007	22	0.8661	0.20	0.008	1.0	0.039	0.966	2.13	35600	8000	56500	12700
9118K	90	3.5433	0.020	0.0008	140	5.5118	0.018	0.0007	24	0.9449	0.20	0.008	1.5	0.059	1.157	2.55	48000	10800	66700	15000
9119K	95	3.7402	0.020	0.0008	145	5.7087	0.018	0.0007	24	0.9449	0.20	0.008	1.5	0.059	1.188	2.62	52500	11800	68100	15300
9120K	100	3.9370	0.020	0.0008	150	5.9055	0.018	0.0007	24	0.9449	0.20	0.008	1.5	0.059	1.315	2.90	52500	11800	68100	15300

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

Continued on the next page.

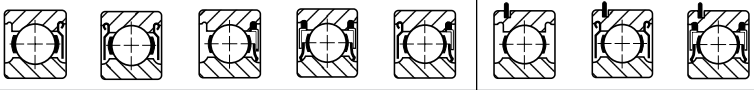
EXTRA LIGHT 9100K SERIES *(continued)*

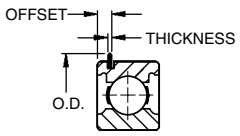
DIMENSIONS – TOLERANCES

Bearing Number	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Width C		tolerance +0.000 mm +0.0000" to minus		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(2)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
9121K	105	4.1339	0.020	0.0008	160	6.2992	0.025	0.0010	26	1.0236	0.20	0.008	2.0	0.079	1.6	3.6	59600	13400	76900	17600
9122K	110	4.3307	0.020	0.0008	170	6.6929	0.025	0.0010	28	1.1024	0.20	0.008	2.0	0.080	—	—	71100	16000	92500	20800
9124K	120	4.7244	0.020	0.0008	180	7.0866	0.025	0.0010	28	1.1024	0.20	0.008	2.0	0.079	2.2	4.9	71100	16000	88900	20000
9126K	130	5.1181	0.025	0.0010	200	7.8740	0.030	0.0012	33	1.2992	0.25	0.010	2.0	0.079	3.4	7.4	90700	20400	115600	26000
9128K	140	5.5118	0.025	0.0010	210	8.2677	0.030	0.0012	33	1.2992	0.25	0.010	2.0	0.080	3.6	8.0	105000	23600	124500	28000
9130K	150	5.9055	0.025	0.0010	225	8.8583	0.030	0.0012	35	1.3780	0.25	0.010	2.0	0.080	5.5	12.0	92500	20800	113400	25500
9132K	160	6.2992	0.025	0.0010	240	9.4488	0.030	0.0012	38	1.4961	0.25	0.010	2.0	0.080	6.7	14.8	138000	31000	166800	37500
9134K	170	6.6929	0.025	0.0010	260	10.2362	0.035	0.0014	42	1.6535	0.25	0.010	2.0	0.080	9.0	19.8	160000	36000	189000	42500
9136K	180	7.0866	0.025	0.0010	280	11.0236	0.035	0.0014	44	1.8110	0.25	0.010	2.0	0.080	11.0	24.3	195700	44000	222000	50000
9138K	190	7.4803	0.030	0.0012	290	11.4173	0.035	0.0014	46	1.8110	0.30	0.012	2.0	0.080	12.0	26.5	204000	45500	216000	48000
9140K	200	7.8740	0.030	0.0012	310	12.2047	0.035	0.0014	51	2.0079	0.30	0.012	2.0	0.080	15.4	34.0	245000	55000	245000	55000
9144K	220	8.6614	0.030	0.0012	340	13.3858	0.040	0.0016	56	2.2047	0.30	0.012	2.5	0.100	20.0	44.2	290000	65500	280000	63000
9146K	240	9.4488	0.030	0.0012	360	14.1732	0.040	0.0016	56	2.2047	0.30	0.012	2.5	0.100	21.5	47.3	320000	72000	290000	65500
9152K	260	10.2362	0.035	0.0014	400	15.7480	0.040	0.0016	65	2.5591	0.35	0.014	3.0	0.120	31.6	69.6	400000	90000	345000	78000
9156K	280	11.0236	0.035	0.0014	420	16.5354	0.045	0.0018	65	2.5591	0.35	0.014	3.0	0.120	33.5	73.8	355000	80000	360000	80000
9160K	300	11.8110	0.035	0.0014	460	18.1102	0.045	0.0018	74	2.9134	0.35	0.014	3.0	0.120	46.6	102.9	520000	118000	415000	93000
9164K	320	12.5984	0.040	0.0016	480	18.8976	0.045	0.0018	74	2.9134	0.40	0.016	3.0	0.120	49.1	108.3	570000	127000	430000	98000
9180K	400	15.7480	0.040	0.0016	600	23.6220	0.050	0.0020	90	3.5433	0.40	0.016	4.0	0.160	—	—	815000	180000	550000	122000

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

SHIELDS, SEALS AND SNAP RING COMBINATIONS



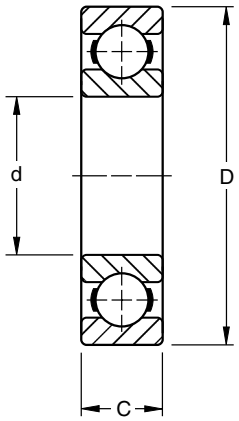


Shields and Seals					Snap Ring (Wireloc)(1)			O.D.		Thickness		Offset	
One Shield D	Two Shields DD	One Seal P	Two Seals PP	One Shield And Seal PD	Open Type G	Two Shields DDG	Two Seals PPG	mm	in.	mm	in.	mm	in.
9100KD	9100KDD	9100P	9100PP	9100PD	—	—	—	—	—	—	—	—	—
9101KD	9101KDD	9101P	9101PP	9101PD	—	—	—	—	—	—	—	—	—
9102KD	9102KDD	9102P	9102PP	—	9102KG	9102KDDG	9102PPG	36.5	1 7/16	1.07	0.042	3.05	0.120
9103KD	9103KDD	9103P	9103PP	9103PD2(2)	9103KG	9103KDDG	9103PPG	39.3	1 35/64	1.07	0.042	3.05	0.120
9104KD	9104KDD	9104P	9104PP	—	9104KG	9104KDDG	9104PPG	46.0	1 13/16	1.07	0.042	3.05	0.120
9105KD	9105KDD	9105P	9105PP	—	—	—	—	52.4	2 1/16	1.07	0.042	3.05	0.120
9106KD	9106KDD	9106P	9106PP	9106PD	9106KG	9106KDDG	9106PPG	60.3	2 3/8	1.07	0.042	3.05	0.120
9107KD	9107KDD	9107P	9107PP	—	9107KG	9107KDDG	9107PPG	67.5	2 21/32	1.65	0.065	3.63	0.143
9108KD	9108KDD	9108P	9108PP	—	9108KG	9108KDDG	9108PPG	74.2	2 59/64	1.65	0.065	4.04	0.159
9109KD	9109KDD	9109P	9109PP	9109PD	9109KG	9109KDDG	9109PPG	81.4	3 13/64	1.65	0.065	4.04	0.159
9110KD	9110KDD	9110P	9110PP	—	9110KG	—	—	86.5	3 13/32	1.65	0.065	4.04	0.159
9111KD	9111KDD	9111P	9111PP	—	9111KG	—	9111PPG	96.4	3 51/64	2.41	0.095	5.18	0.204
9112KD	9112KDD	9112P	9112PP	—	9112KG	—	—	101.2	3 63/64	2.41	0.095	5.18	0.204
9113KD	9113KDD	9113P	9113PP	9113PD	9113KG	—	9113PPG	106.4	4 3/16	2.41	0.095	5.18	0.204
9114KD	9114KDD	9114P	9114PP	—	9114KG	—	—	116.3	4 37/64	2.41	0.095	5.18	0.204
9115KD	9115KDD	9115P	9115PP	—	—	—	—	121.4	4 25/32	2.41	0.095	5.18	0.204
—	—	—	—	—	—	—	—	—	—	—	—	—	—
9117KD	—	—	—	—	9117KG	9117KDDG	—	139.7	5 1/2	2.77	0.109	5.54	0.218
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—
9120KD	—	—	9120NPP	—	—	—	—	159.5	6 9/32	2.77	0.109	6.35	0.250
9121KD	—	—	—	—	—	—	—	169.5	6 43/64	2.77	0.109	6.35	0.250
—	—	—	—	—	—	—	—	—	—	—	—	—	—
9124KD	—	9124P	9124PP	—	9124KG	—	—	192.9	7 19/32	3.05	0.120	6.63	0.261
—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—

(1) The snap ring is normally packaged separately in the box with bearing.
(2) Width of bearing is 12.700 mm (.5000").

LIGHT 200K SERIES

- Conrad-type bearing is well-balanced, with deep races and uninterrupted race shoulders. Excellent, general-purpose bearing.
- Capacity to carry radial and thrust in either direction or combined loads.
- Electric motor quality for applications where quietness is a requirement.



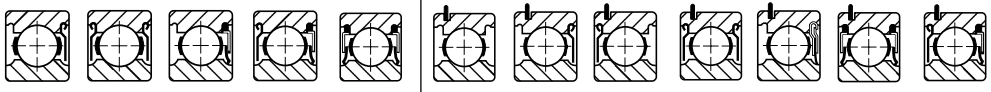
DIMENSIONS – TOLERANCES

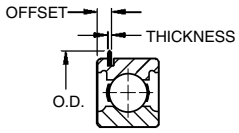
Bearing Number	Bore d tolerance +0.000 mm +0.0000" to minus				Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width C tolerance +0.000 mm +0.0000" to minus				Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(2)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
200K	10	0.3937	0.008	0.0003	30	1.1811	0.009	0.00035	9	0.3543	0.12	0.005	0.6	0.024	0.027	0.06	2600	585	6800	1530
201K	12	0.4724	0.008	0.0003	32	1.2598	0.011	0.00043	10	0.3937	0.12	0.005	0.6	0.024	0.036	0.08	3000	680	7600	1730
202K	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00043	11	0.4331	0.12	0.005	0.6	0.024	0.041	0.09	3470	830	8650	1930
203K	17	0.6693	0.008	0.0003	40	1.5748	0.011	0.00043	12	0.4724	0.12	0.005	0.6	0.024	0.064	0.14	4700	1060	10900	2450
204K	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00043	14	0.5512	0.12	0.005	1.0	0.039	0.104	0.23	6500	1460	14400	3250
205K	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.0005	15	0.5906	0.12	0.005	1.0	0.039	0.127	0.28	7800	1760	16000	3600
206K	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	16	0.6299	0.12	0.005	1.0	0.039	0.195	0.43	11300	2550	22200	5000
207K	35	1.3780	0.012	0.00047	72	2.8346	0.013	0.0005	17	0.6693	0.12	0.005	1.0	0.039	0.290	0.64	15300	3450	29100	6550
208K	40	1.5748	0.012	0.00047	80	3.1496	0.013	0.0005	18	0.7087	0.12	0.005	1.0	0.039	0.376	0.83	19800	4460	36200	8130
209K	45	1.7717	0.012	0.00047	85	3.3465	0.015	0.0006	19	0.7480	0.12	0.005	1.0	0.039	0.426	0.94	20500	4600	36300	8160
210K	50	1.9685	0.012	0.00047	90	3.5433	0.015	0.0006	20	0.7874	0.12	0.005	1.0	0.039	0.476	1.05	23100	5200	40000	9000
211K	55	2.1654	0.015	0.0006	100	3.9370	0.015	0.0006	21	0.8268	0.15	0.006	1.5	0.059	0.635	1.40	29100	6550	49000	11000
212K	60	2.3622	0.015	0.0006	110	4.3307	0.015	0.0006	22	0.8661	0.15	0.006	1.5	0.059	0.807	1.78	35500	8000	62100	13400
213K	65	2.5591	0.015	0.0006	120	4.7244	0.015	0.0006	23	0.9055	0.15	0.006	1.5	0.059	1.016	2.24	39900	9000	62100	14600
214K	70	2.7559	0.015	0.0006	125	4.9213	0.018	0.0007	24	0.9449	0.15	0.006	1.5	0.059	1.107	2.44	44000	9890	69000	15500
215K	75	2.9528	0.015	0.0006	130	5.1181	0.018	0.0007	25	0.9843	0.15	0.006	1.5	0.059	1.198	2.64	44800	10100	68900	15500
216K	80	3.1496	0.015	0.0006	140	5.5118	0.018	0.0007	26	1.0236	0.15	0.006	2.0	0.079	1.483	3.27	54200	12200	81300	18300
217K	85	3.3465	0.020	0.0008	150	5.9055	0.018	0.0007	28	1.1024	0.20	0.008	2.0	0.079	1.860	4.10	62200	14000	95900	21600
218K	90	3.5433	0.020	0.0008	160	6.2992	0.025	0.0010	30	1.1811	0.20	0.008	2.0	0.079	2.209	4.87	71100	16000	109000	24500
220K	100	3.9370	0.020	0.0008	180	7.0866	0.025	0.0010	34	1.3386	0.20	0.008	2.0	0.080	4.077	8.98	93000	20800	134000	30500
221K	105	4.1339	0.020	0.0008	190	7.4803	0.030	0.0012	36	1.4173	0.20	0.008	2.0	0.080	3.777	8.32	93000	20800	127000	28500
222K	110	4.3307	0.020	0.0008	200	7.8740	0.030	0.0012	38	1.4961	0.20	0.008	2.0	0.080	4.300	9.47	104900	23600	153000	34500
224K	120	4.7244	0.020	0.0008	215	8.4646	0.030	0.0012	40	1.5748	0.20	0.008	2.0	0.080	7.064	15.56	133000	30000	173000	39000
226K	130	5.1181	0.020	0.0010	230	9.0551	0.030	0.0012	40	1.5748	0.25	0.010	3.0	0.120	6.642	14.63	149000	33500	189000	42500
228K	140	5.5118	0.025	0.0010	250	9.8425	0.030	0.0012	42	1.6535	0.25	0.010	3.0	0.120	11.196	24.66	162000	36500	200000	45000
230K	150	5.9055	0.025	0.0010	270	10.6299	0.035	0.0014	45	1.7717	0.25	0.010	3.0	0.120	12.17	26.8	180000	40500	218000	49000
232K	160	6.2992	0.025	0.0010	290	11.4173	0.035	0.0014	48	1.8898	0.25	0.010	3.0	0.120	15.03	33.1	235000	53000	260000	58500
234K	170	6.6929	0.025	0.0010	310	12.2047	0.035	0.0014	52	2.0472	0.25	0.010	4.0	0.160	18.66	41.1	276000	62000	291000	65500
236K	180	7.0866	0.025	0.0010	320	12.5984	0.040	0.0016	52	2.0472	0.25	0.010	4.0	0.160	19.39	42.7	298000	67000	309000	69500
238K	190	7.4803	0.030	0.0012	340	13.3858	0.040	0.0016	55	2.1654	0.30	0.012	4.0	0.160	23.02	50.7	290000	65000	300000	67000
240K	200	7.8740	0.030	0.0012	360	14.1732	0.040	0.0016	58	2.2835	0.30	0.012	4.0	0.160	26.42	58.2	375000	83000	355000	80000
242K	210	8.2677	0.030	0.0012	380	14.9606	0.040	0.0016	61	2.4016	0.30	0.012	4.0.	0.160	32.42	71.4	335000	76500	325000	73500
244K	220	8.6614	0.030	0.0012	400	15.7480	0.040	0.0016	65	2.5591	0.30	0.012	4.0	0.160	36.96	81.4	380000	86500	355000	80000
246K	230	9.0551	0.030	0.0012	420	16.5354	0.045	0.0018	68	2.6772	0.30	0.012	4.0	0.160	42.36	93.3	425000	95000	380000	85000
248K	240	9.4488	0.030	0.0012	440	17.3228	0.045	0.0018	72	2.8346	0.30	0.012	4.0	0.160	46.81	103.1	520000	116000	455000	102000
250K	250	9.8425	0.035	0.0014	460	18.1102	0.045	0.0018	76	2.9921	0.30	0.012	4.0	0.160	55.57	122.4	585000	129000	490000	110000
252K	260	10.2362	0.035	0.0014	480	18.8976	0.045	0.0018	80	3.1496	0.35	0.014	5.0	0.200	63.11	139.0	640000	143000	520000	118000
256K	280	11.0236	0.035	0.0014	500	19.6850	0.045	0.0018	80	3.1496	0.35	0.014	5.0	0.200	64.20	141.4	710000	160000	560000	125000
260K	300	11.8110	0.035	0.0014	540	21.2598	0.050	0.0020	85	3.3465	0.35	0.014	5.0	0.200	87.49	192.7	670000	150000	520000	116000
264K	320	12.5984	0.040	0.0016	580	22.8346	0.050	0.0020	92	3.6220	0.40	0.016	5.0	0.200	94.66	208.5	980000	220000	710000	160000

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

SHIELDS, SEALS AND SNAP RING COMBINATIONS

Shields and Seals | **Snap Ring (Wireloc)** [1]



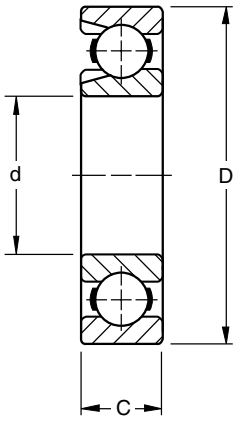


One Shield D	Two Shields DD	One Seal (N) P	One Seal One Shield PD	Two[3] Seals (N) PP	Open Type G	One Shield DG	One Shield GD	Two Shields DDG	One Seal PG	Two Seals PPG	One Seal One Shield PDG	O.D. Snap Ring		Thickness		Offset	
												mm	in.	mm	in.	mm	in.
200KD	200KDD	200P	200PD[2]	200PP	—	—	—	200KDDG	—	200PPG	—	34.5	$1\frac{23}{64}$	1.07	0.042	3.05	0.120
201KD	201KDD	201P	201PD	201PP	201KG	201KDG	—	201KDDG	—	201PPG	—	36.5	$1\frac{7}{16}$	1.07	0.042	3.05	0.120
202KD	202KDD	202P	202PD	202PP	202KG	202KDG	—	202KDDG	—	202PPG	—	39.3	$1\frac{35}{64}$	1.07	0.042	3.05	0.120
203KD	203KDD	203P	203PD	203PP	203KG	203KDG	—	203KDDG	—	203PPG	—	44.4	$1\frac{3}{4}$	1.07	0.042	3.05	0.120
204KD	204KDD	204P	204PD	204PP	204KG	204KDG	—	204KDDG	—	204PPG	—	52.4	$2\frac{1}{16}$	1.07	0.042	3.45	0.136
205KD	205KDD	205P	205PD	205PP	205KG	205KDG	—	205KDDG	—	205PPG	—	57.5	$2\frac{17}{64}$	1.07	0.042	3.45	0.136
206KD	206KDD	206P	206PD	206PP	206KG	206KDG	—	206KDDG	—	206PPG	—	67.6	$2\frac{21}{32}$	1.65	0.065	4.83	0.190
207KD	207KDD	207P	207PD	207PP	207KG	207KDG	—	207KDDG	—	207PPG	—	78.2	$3\frac{5}{64}$	1.65	0.065	4.83	0.190
208KD	208KDD	208P	—	208PP	208KG	208KDG	—	208KDDG	—	208PPG	—	86.5	$3\frac{13}{32}$	1.65	0.065	4.83	0.190
209KD	209KDD	209P	—	209PP	209KG	209KDG	—	209KDDG	—	—	—	91.3	$3\frac{19}{32}$	1.65	0.065	4.83	0.190
210KD	210KDD	210P	—	210PP	210KG	210KDG	—	210KDDG	—	210NPPG	—	96.4	$3\frac{51}{64}$	2.41	0.095	5.59	0.220
211KD	211KDD	211NP	211NPD	211NPP	211KG	211KDG	211KGD	211KDDG	—	211NPPG	211NPDG	106.3	$4\frac{3}{16}$	2.41	0.095	5.59	0.220
212KD	212KDD	212NP	212NPD	212NPP	212KG	212KDG	—	—	—	212NPPG	212NPDG	116.3	$4\frac{37}{64}$	2.41	0.095	5.59	0.220
213KD	213KDD	213NP	—	213NPP	213KG	—	—	213KDDG	—	213NPPG	213NPDG	129.4	$5\frac{3}{32}$	2.77	0.109	6.73	0.265
214KD	214KDD	214P	—	214NPP	214KG	214KDG	—	—	—	—	—	134.5	$5\frac{19}{64}$	2.77	0.109	6.73	0.265
215KD	215KDD	215P	—	215NPP	—	—	—	—	—	—	—	—	—	—	—	—	—
216KD	216KDD	—	—	216NPP	—	—	—	—	—	—	—	—	—	—	—	—	—
217KD	217KDD	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
218KD	218KDD	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
222KD	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

[1] The snap ring is normally packaged separately in the box with the bearing.
[2] Available with snap ring as 200PDG.
[3] Also available in "VV" sealed design. Check for availability.
Note: "N" prefix for NP(P) seals indicate non-removable seal.

LIGHT 200W SERIES

- 200W Series, maximum capacity type, is dimensionally interchangeable with the 200K type, but has greater capacity for supporting heavier radial loads and light thrust loads in either direction.
- Maximum capacity bearings feature a filling slot in shoulder of each raceway to assemble an extra-large complement of balls.
- Consult your Timken representative for the availability of sizes other than those listed here.



DIMENSIONS – TOLERANCES

Bearing Number	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Width C		tolerance +0.000 mm +0.0000" to minus		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating* C_E(3)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
202W	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00045	11	0.4331	0.12	0.005	0.6	0.024	0.054	0.12	5060	1140	11000	2450
204W(2)	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00045	14	0.5512	0.12	0.005	1.0	0.039	0.113	0.25	9300	2120	19500	4400
205W(2)	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.0005	15	0.5906	0.12	0.005	1.0	0.039	0.141	0.31	12200	2750	22600	5100
206W	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	16	0.6299	0.12	0.005	1.0	0.039	0.213	0.47	16900	3800	31000	6950
207W	35	1.3780	0.012	0.00047	72	2.8346	0.013	0.0005	17	0.6693	0.12	0.005	1.0	0.039	0.313	0.69	22600	5100	40000	9000
208W	40	1.5748	0.012	0.00047	80	3.1496	0.013	0.0005	18	0.7087	0.12	0.005	1.0	0.039	0.413	0.91	28400	6400	47000	10600
209W	45	1.7717	0.012	0.00047	85	3.3465	0.015	0.0006	19	0.7480	0.12	0.005	1.0	0.039	0.463	1.02	31500	7100	50000	11200
210W	50	1.9685	0.012	0.00047	90	3.5433	0.015	0.0006	20	0.7874	0.12	0.005	1.0	0.039	0.522	1.15	34600	7800	52000	11800
211W	55	2.1654	0.015	0.0006	100	3.9370	0.015	0.0006	21	0.8268	0.15	0.006	1.5	0.059	0.681	1.50	40600	9150	61000	13700
212W	60	2.3622	0.015	0.0006	110	4.3307	0.015	0.0006	22	0.8661	0.15	0.006	1.5	0.059	0.885	1.95	54200	12200	78000	17600
213W	65	2.5591	0.015	0.0006	120	4.7244	0.015	0.0006	23	0.9055	0.15	0.006	1.5	0.059	1.207	2.66	64800	14600	92000	20800
214W	70	2.7559	0.015	0.0006	125	4.9213	0.018	0.0007	24	0.9449	0.15	0.006	1.5	0.059	1.225	2.70	71100	16000	96000	21600
215W	75	2.9528	0.015	0.0006	130	5.1181	0.018	0.0007	25	0.9843	0.15	0.006	1.5	0.059	1.334	2.94	75500	17000	99000	22400
216W	80	3.1496	0.015	0.0006	140	5.5118	0.018	0.0007	26	1.0236	0.15	0.006	2.0	0.079	1.633	3.60	90600	20400	114000	26000
217W	85	3.3465	0.020	0.0008	150	5.9055	0.018	0.0007	28	1.1024	0.20	0.008	2.0	0.079	2.019	4.45	96000	22400	129000	29000
218W	90	3.5433	0.020	0.0008	160	6.2992	0.025	0.0010	30	1.1811	0.20	0.008	2.0	0.079	2.493	5.49	96500	25500	149000	33500
219W	95	3.7402	0.020	0.0008	170	6.6929	0.025	0.0010	32	1.2598	0.20	0.008	2.0	0.079	3.039	6.70	112000	29000	169000	38000
220W	100	3.9370	0.020	0.0008	180	7.0866	0.025	0.0010	34	1.3386	0.20	0.008	2.0	0.080	3.673	8.09	127000	33500	188000	42500
221W	105	4.1339	0.020	0.0008	190	7.4803	0.030	0.0012	36	1.4173	0.20	0.008	2.0	0.080	4.277	9.43	134000	35500	195000	44000
222W	110	4.3307	0.020	0.0008	200	7.8740	0.030	0.0012	38	1.4961	0.20	0.008	2.0	0.080	5.144	11.34	160000	42500	222000	50000
224W3	120	4.7244	0.020	0.0008	215	8.4646	0.030	0.0012	40	1.5748	0.25	0.010	2.0	0.080	6.586	14.52	156000	41500	222000	50000
226W3	130	5.1181	0.020	0.0010	230	9.0551	0.030	0.0012	40	1.5748	0.25	0.010	3.0	0.120	7.627	16.80	196000	53000	260000	58500
228W3	140	5.5118	0.025	0.0010	250	9.8425	0.030	0.0012	42	1.6535	0.25	0.010	3.0	0.120	9.307	20.50	260000	58500	270000	61000
230W	150	5.9055	0.025	0.0010	270	10.6299	0.035	0.0014	45	1.7717	0.25	0.010	3.0	0.120	12.485	27.50	290000	65500	300000	67000
232W	160	6.2992	0.025	0.0010	290	11.4173	0.035	0.0014	48	1.8898	0.25	0.010	3.0	0.120	15.436	34.00	340000	76500	325000	73500
234W	170	6.6929	0.025	0.0010	310	12.2047	0.035	0.0014	52	2.0472	0.25	0.010	4.0	0.160	19.068	42.00	375000	85000	345000	78000
236W	180	7.0866	0.025	0.0010	320	12.5984	0.040	0.0016	52	2.0472	0.25	0.010	4.0	0.160	19.886	43.80	405000	90000	365000	81500
238W	190	7.4803	0.030	0.0012	340	13.3858	0.040	0.0016	55	2.1654	0.30	0.012	4.0	0.160	23.608	52.00	465000	104000	405000	91500
240W	200	7.8740	0.030	0.0012	360	14.1732	0.040	0.0016	58	2.2835	0.30	0.012	4.0	0.160	27.150	59.80	560000	125000	465000	106000
242W	210	8.2677	0.030	0.0012	380	14.9606	0.040	0.0016	61	2.4016	0.30	0.012	4.0	0.160	33.279	73.30	570000	129000	465000	104000
244W	220	8.6614	0.030	0.0012	400	15.7480	0.040	0.0016	65	2.5591	0.30	0.012	4.0	0.160	38.091	83.90	680000	153000	530000	120000
246W	230	9.0551	0.030	0.0012	420	16.5354	0.045	0.0018	68	2.6772	0.30	0.012	4.0	0.160	45.719	100.70	695000	156000	530000	118000
248W	240	9.4488	0.030	0.0012	440	17.3228	0.045	0.0018	72	2.8346	0.30	0.012	4.0	0.160	48.761	107.40	865000	193000	640000	143000
250W	250	9.8425	0.030	0.0012	460	18.1102	0.045	0.0018	76	2.9921	0.30	0.012	4.0	0.160	57.568	126.80	930000	208000	670000	150000
252W	260	10.2362	0.035	0.0014	480	18.8976	0.045	0.0018	80	3.1496	0.35	0.014	5.0	0.200	65.468	144.20	1020000	232000	720000	160000
256W	280	11.0236	0.035	0.0014	500	19.6850	0.045	0.0018	80	3.1496	0.35	0.014	5.0	0.200	66.921	147.40	1120000	255000	765000	170000
260W	300	11.8110	0.035	0.0014	540	21.2598	0.050	0.0020	85	3.3465	0.35	0.014	5.0	0.200	89.894	198.00	1100000	245000	720000	160000
264W	320	12.5984	0.040	0.0016	580	22.8346	0.050	0.0020	92	3.6220	0.40	0.016	5.0	0.200	99.473	219.10	1560000	355000	965000	216000

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) These sizes have molded nylon cages.
(3) Based on 10^6 revolutions of calculated fatigue life.

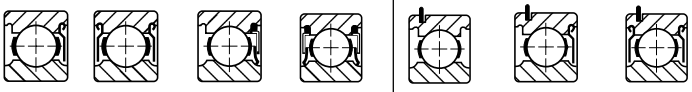
* For applications where thrust load exceeds 60% of radial load, consult your Timken representative.

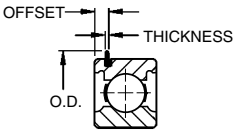
Listed in the table below are Timken maximum capacity type bearings (200W Series) with shields, seals and snap ring combinations.

The suffixes of the bearing numbers denote the following:

- **WD** - Filling slot opposite single shield
- **WNP** - Filling slot opposite single seal
- **WG** - Filling slot opposite snap ring
- **WDD** - Two shields
- **WNPP** - Two seals
- **WDG** - Filling slot and snap ring opposite shield
- **WDDG** - Two shields with filling slot opposite snap ring

SHIELDS, SEALS AND SNAP RING COMBINATIONS





Shields and Seals							Snap Ring (Wireloc)[1]					
One Shield D	Two Shields DD	One Seal P	Two Seals PP	Open Type G	One Shield DG	Two Shields DDG	O.D.		Thickness		Offset	
							mm	in.	mm	in.	mm	in.
204WD	—	—	—	204WG	—	—	52.4	2 1/16	1.07	0.042	3.45	0.136
205WD	—	—	—	205WG	—	—	57.5	2 17/64	1.07	0.042	3.45	0.136
206WD	—	—	—	206WG	206WDG	—	67.5	2 21/32	1.65	0.065	4.83	0.190
207WD	—	—	—	207WG	207WDG	—	78.2	3 5/64	1.65	0.065	4.83	0.190
208WD	208WDD	—	—	208WG	208WDG	208WDDG	86.5	3 13/32	1.65	0.065	4.83	0.190
209WD	209WDD	—	—	209WG	209WDG	—	91.3	3 19/32	1.65	0.065	4.83	0.190
210WD	210WDD	—	—	210WG	210WDG[2]	—	96.4	3 51/64	2.41	0.095	5.59	0.220
211WD	211WDD	—	—	211WG[3]	211WDG	—	106.4	4 3/16	2.41	0.095	5.59	0.220
212WD	212WDD	—	—	212WG	212WDG	212WDDG	116.3	4 37/64	2.41	0.095	5.59	0.220
213WD	213WDD	213WNP	213WNPP	213WG	213WDG	213WDDG	129.4	5 3/32	2.77	0.109	6.73	0.265
214WD	214WDD	—	—	214WG	214WDG	—	134.5	5 19/64	2.77	0.109	6.73	0.265
215WD	215WDD	215WNP	215WNPP	215WG	215WDG	215WDDG	139.7	5 1/2	2.77	0.109	6.73	0.265
216WD	216WDD	—	—	216WG	216WDG	—	149.6	5 57/64	2.77	0.109	7.54	0.297
217WD	217WDD	—	—	217WG	217WDG	—	159.5	6 9/32	2.77	0.109	7.54	0.297
218WD	218WDD	218WNP	—	218WG	—	—	169.5	6 43/64	2.77	0.109	7.54	0.297
219WD	219WDD	—	—	—	—	—	—	—	—	—	—	—
220WD	220WDD	—	—	220WG	—	—	192.9	7 19/32	3.05	0.12	8.61	0.339
221WD	—	—	—	—	—	—	—	—	—	—	—	—
222WD	—	—	—	—	—	—	—	—	—	—	—	—
224WD[4]	—	—	—	—	—	—	—	—	—	—	—	—

[1] The snap ring is normally packaged separately in the box with the bearing.
[2] Also available as a GWD-type filling slot opposite the shield and snap ring.
[3] Also available as 211GW with filling slot on same side as snap ring.
[4] Width is 1.6535" for the 224WD bearing.

LIGHT 200 SERIES EXTRA WIDTH INNER RING

- Sizes available in rubber seal (P) and Mechani-Seal (L) design.
- Extra width inner ring provides greater shaft support.
- P seal version uses a Buna N rubber contact seal.
- L seal employs a frictionless metallic member to form a labyrinth.
- Used extensively in high-speed pneumatic tools, small pumps, electric motors, domestic appliances, etc.
- Electric motor quality for applications where quietness is a requirement.

DIMENSIONS – TOLERANCES

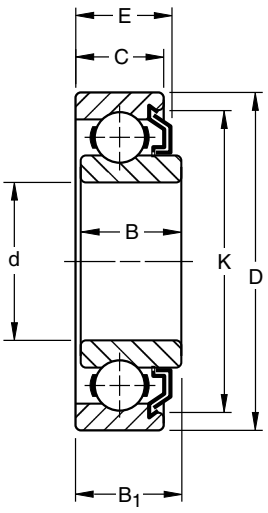
Bearing Number		Bore d				Outside Diameter D				Width B_1		Inner Ring Offset		Ring Widths 0.00, -.12 mm +0.000", - .005"				Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(1)	
one seal L	one seal and shield LD	tolerance +0.000 mm +0.0000" to minus				tolerance +0.000 mm +0.0000" to minus								Inner B		Outer C									
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
200KL	200KLD	10	0.3937	0.008	0.0003	30	1.1811	0.009	0.00035	12.70	0.500	0.51	0.020	12.19	0.480	8.99	0.354	0.6	0.024	0.036	0.08	2650	585	6550	1530
201KL	201KLD	12	0.4724	0.008	0.0003	32	1.2598	0.011	0.00045	12.70	0.500	0.51	0.020	12.19	0.480	10.01	0.394	0.6	0.024	0.041	0.09	3000	680	7500	1730
—	201KLD2	13	0.5118	0.008	0.0003	32	1.2598	0.011	0.00045	12.70	0.500	0.51	0.020	12.19	0.480	10.01	0.394	0.6	0.024	0.041	0.09	3000	680	7500	1730
201KL3	—	11.07	0.4358	0.008	0.0003	32	1.2598	0.011	0.00045	12.70	0.500	0.51	0.020	12.19	0.480	10.01	0.394	0.6	0.024	0.041	0.09	3000	680	7500	1730
202KL4	202KLD4	14	0.5512	0.008	0.0003	35	1.3780	0.011	0.00045	12.70	0.500	0.51	0.020	12.19	0.480	11.00	0.433	0.6	0.024	0.045	0.10	3690	830	8650	1930
202KL	202KLD	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00045	12.70	0.500	0.51	0.020	12.19	0.480	11.00	0.433	0.6	0.024	0.045	0.10	3450	830	8650	1930
202KL3	202KLD3	16	0.6299	0.008	0.0003	35	1.3780	0.011	0.00045	12.70	0.500	0.51	0.020	12.19	0.480	11.00	0.433	0.6	0.024	0.045	0.10	3450	830	8650	1930
203KL	203KLD	17	0.6693	0.008	0.0003	40	1.5748	0.011	0.00045	14.30	0.563	0.64	0.025	13.67	0.538	11.99	0.472	0.6	0.024	0.073	0.16	4700	1060	10800	2450
204KL	204KLD	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00045	15.88	0.625	0.64	0.025	15.24	0.600	14.00	0.551	1.0	0.039	0.113	0.25	6200	1460	14300	3200
205KL	205KLD	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.0005	15.88	0.625	0.64	0.025	15.24	0.600	15.01	0.591	1.0	0.039	0.132	0.29	7800	1760	16000	3600
206KL	206KLD	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	20.00	0.787	0.99	0.039	19.00	0.748	16.00	0.630	1.0	0.039	0.231	0.51	10000	2550	22200	5000
207KL	207KLD	35	1.3780	0.012	0.00045	72	2.8346	0.013	0.0005	21.00	0.827	0.99	0.039	20.00	0.787	17.00	0.669	1.0	0.039	0.322	0.71	13700	3450	29000	6550
209KL	209KLD	45	1.7717	0.012	0.00045	85	3.3465	0.015	0.0006	26.00	1.024	—	—	26.00	1.024	19.00	0.748	1.0	0.039	0.508	1.12	17600	4550	37000	8300
211KL	211KLD	55	2.1654	0.015	0.0006	100	3.9370	0.015	0.0006	27.00	1.063	—	—	27.00	1.063	21.01	0.827	1.5	0.059	0.748	1.65	29100	6550	49000	11000

(1) Based on 10^6 revolutions of calculated fatigue life.

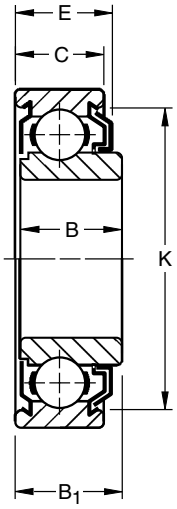
DIMENSIONS – TOLERANCES

Bearing Number		Bore d				Outside Diameter D				Ring Widths 0.00, -.12 mm +0.000", -.005"				Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(5)	
two seals LL	two seals NPP	tolerance +0.000 mm +0.0000" to minus				tolerance +0.000 mm +0.0000" to minus				Inner B_2		Outer C									
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
200KLL2	200KRR3(4)	10	0.3937	0.008	0.0003	30	1.1811	0.009	0.00035	16.40	0.646	8.99	0.354	0.6	0.024	0.036	0.08	2650	585	6800	1530
201KLL2	—	12	0.4724	0.008	0.0003	32	1.2598	0.011	0.00045	15.40	0.606	10.01	0.394	0.6	0.024	0.041	0.09	3000	680	7500	1700
201KLL3	—	13	0.5118	0.008	0.0003	32	1.2598	0.011	0.00045	15.40	0.606	10.01	0.394	0.6	0.024	0.041	0.09	3000	680	7500	1700
202KLL2	—	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00045	14.40	0.567	11.00	0.433	0.6	0.024	0.045	0.10	3690	830	8650	1930
202KLL3	202NPP11	16	0.6299	0.008	0.0003	35	1.3780	0.011	0.00045	14.40	0.567	11.00	0.433	0.6	0.024	0.045	0.10	3690	830	8650	1930
203KLL2(2)	203NPP8	17	0.6693	0.008	0.0003	40	1.5748	0.011	0.00045	16.60	0.654	11.99	0.472	0.6	0.024	0.073	0.16	4700	1060	10800	2450
204KLL2	204NPP7	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00045	17.75	0.699	14.00	0.551	1.0	0.039	0.113	0.25	6200	1460	14300	3200
205KLL2(3)	205NPP2	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.0005	16.75	0.659	15.01	0.591	1.0	0.039	0.132	0.29	7800	1760	16000	3600
206KLL	206NPP2	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	24.00	0.945	16.00	0.630	1.0	0.039	0.231	0.51	11300	2550	22200	5000
207KLL	—	35	1.3780	0.012	0.00045	72	2.8346	0.013	0.0005	25.00	0.984	17.00	0.669	1.0	0.039	0.322	0.71	15300	3450	29000	6550
208KLL	—	40	1.5748	0.012	0.00045	80	3.1496	0.013	0.0005	30.18	1.188	18.01	0.709	1.0	0.039	0.463	1.02	20200	4550	36000	8150
209KLL	—	45	1.7717	0.012	0.00045	85	3.3465	0.015	0.0006	30.00	1.181	19.00	0.748	1.0	0.039	0.508	1.12	20200	4550	37000	8300

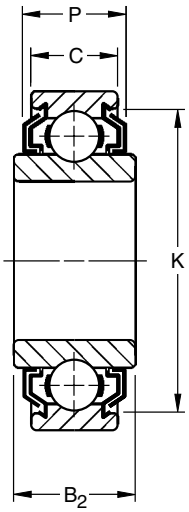
(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Also available as 203KLL with 18.24 mm (.718") inner ring width.
(3) Also available as 205KLL with 20.64 mm (.812") inner ring width.
(4) Equipped with R-Seal.
(5) Based on 10^6 revolutions of calculated fatigue life.



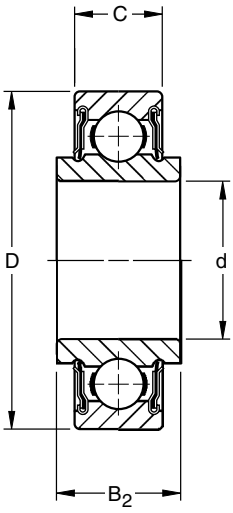
One Mechani-Seal
L



One Shield and
Mechani-Seal
LD

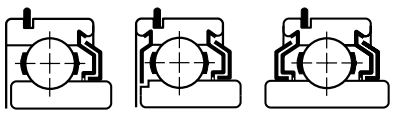


Two Mechani-Seals
LL

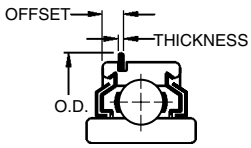


Two Rubber Seals
NPP(2)

MECHANI-SEAL SNAP RING COMBINATIONS



LG LDG LLG



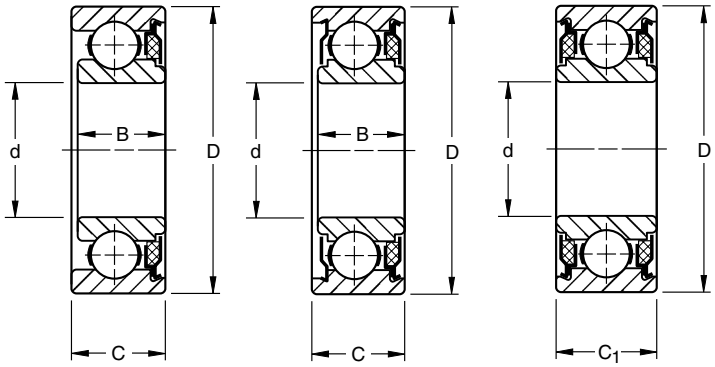
(Seal Projection) (L, LD, LL Types Only)						One Mechani-Seal	One Mechani-Seal and Shield	Two Mechani-Seals	Snap Ring(1)					
Width E		P		O.D. K		LG	LDG	LLG	O.D.		Thickness		Offset	
mm	in.	mm	in.	mm	in.				mm	in.	mm	in.	mm	in.
12.22	0.481	15.57	0.613	25.4	1	—	—	200KLLG2	34.5	1 23/64	1.07	0.042	3.05	0.120
12.19	0.480	14.40	0.567	27.0	1 1/16	—	—	201KLLG2	36.5	1 7/16	1.07	0.042	3.05	0.120
12.19	0.480	14.40	0.567	27.0	1 1/16	—	201KLDG3	—	36.5	1 7/16	1.07	0.042	3.05	0.120
12.37	0.487	13.79	0.543	30.2	1 3/16	—	202KLDG	202KLLG2	39.3	1 35/64	1.07	0.042	3.05	0.120
12.37	0.487	13.79	0.543	30.2	1 3/16	—	—	202KLLG3	39.3	1 35/64	1.07	0.042	3.05	0.120
14.00	0.551	16.00	0.630	34.9	1 3/8	203KLG	—	203KLLG2	44.4	1 3/4	1.07	0.042	3.05	0.120
15.57	0.613	17.14	0.675	40.1	1 37/64	204KLG2	—	204KLLG2	52.4	2 1/16	1.07	0.042	3.45	0.136
15.57	0.613	16.13	0.635	45.6	1 51/64	205KLG2	—	205KLLG2	57.5	2 17/64	1.07	0.042	3.45	0.136
19.48	0.767	22.99	0.905	54.4	2 9/64	—	—	206KLLG	67.5	2 21/32	1.65	0.065	4.83	0.190
20.50	0.807	23.98	0.944	62.7	2 15/32	—	—	207KLLG	78.2	3 5/64	1.65	0.065	4.83	0.190
23.32	0.918	28.63	1.127	69.8	2 3/4	—	—	—	86.5	3 13/32	1.65	0.065	4.83	0.190
24.23	0.954	29.46	1.160	75.4	2 31/32	—	—	209KLLG	91.3	3 19/32	1.65	0.065	4.83	0.190

(1) The snap ring is normally packaged separately in the box with the bearing.

NOTE: "N" prefix indicates a non-removable seal.

LIGHT 200 SERIES FELT SEAL TYPE

- Permits certain design economies, but cannot be assumed to be suitable for all conditions of service.
- In many cases, they are supplemented by adjacent parts in the application for adequate bearing protection in small equipment such as fractional horsepower motors, electric vacuum cleaners, small gear units, electric and pneumatic tools, etc.
- Suggested for effective grease retention and exclusion of foreign matter.
- Electric motor quality for applications where quietness is a requirement.



One Seal T | One Seal and Shield TD | Two Seals TT

DIMENSIONS – TOLERANCES

Bearing Number		Bore d				Outside Diameter D				Ring Widths +0.00 mm, -0.12 mm 0.000, -0.005"				Inner Ring Offset		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(3)	
one seals T	one seal and shield TD	tolerance +0.000 mm +0.0000" to minus				tolerance +0.000 mm +0.0000" to minus																	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
200KT	200KTD	10	0.3937	0.008	0.0003	30	1.1811	0.009	0.00035	12.19	0.480	12.70	0.500	0.51	0.020	0.6	0.024	0.045	0.10	2600	585	6790	1530
—	200KTD2	12	0.4724	0.008	0.0003	30	1.1811	0.009	0.00035	12.19	0.480	12.70	0.500	0.51	0.020	0.6	0.024	0.045	0.10	2600	585	6790	1530
201KT	201KTD	12	0.4724	0.008	0.0003	32	1.2598	0.011	0.00045	12.19	0.480	12.70	0.500	0.51	0.020	0.6	0.024	0.045	0.10	3000	680	7680	1730
201KT2	201KTD2	13	0.5118	0.008	0.0003	32	1.2598	0.011	0.00045	12.19	0.480	12.70	0.500	0.51	0.020	0.6	0.024	0.045	0.10	3000	680	7680	1730
202KT	202KTD	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00045	12.19	0.480	12.70	0.500	0.51	0.020	0.6	0.024	0.050	0.11	3600	830	8650	1930
202KT3(2)	202KTD3(2)	16	0.6299	0.008	0.0003	35	1.3780	0.011	0.00045	12.19	0.480	12.70	0.500	0.51	0.020	0.6	0.024	0.050	0.11	3600	830	8650	1930
203KT	203KTD	17	0.6693	0.008	0.0003	40	1.5748	0.011	0.00045	13.67	0.538	14.30	0.563	0.64	0.025	0.6	0.024	0.077	0.17	4700	1060	10900	2450
204KT	204KTD	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00045	15.24	0.600	15.88	0.625	0.64	0.025	1.0	0.039	0.118	0.26	6500	1460	14400	3250
205KT	205KTD	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.00050	15.24	0.600	15.88	0.625	0.64	0.025	1.0	0.039	0.132	0.29	7800	1760	16000	3600
206KT	206KTD	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.00050	19.00	0.748	19.99	0.788	0.99	0.039	1.0	0.039	0.245	0.54	11300	2550	22200	5000
207KT	207KTD	35	1.3780	0.012	0.00045	72	2.8346	0.013	0.00050	19.99	0.787	21.01	0.827	0.99	0.039	1.0	0.039	0.358	0.79	15300	3450	29000	6550

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) 202KT3 has 12.29 mm (.484") inner ring width.
(3) Based on 10^6 revolutions of calculated fatigue life.

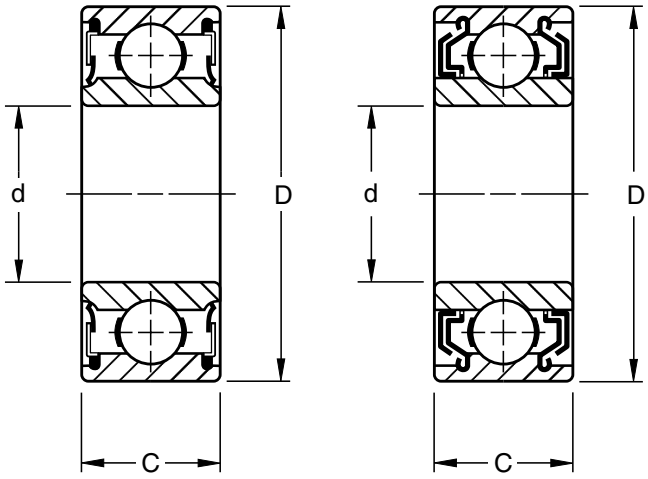
DIMENSIONS – TOLERANCES

Bearing Number	Bore d				Outside Diameter D				Ring Width C_1 +0.00 mm -0.12 mm +0.000 -0.005"		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(2)	
two seals TT	tolerance +0.000 mm +0.0000" to minus				tolerance +0.000 mm +0.0000" to minus													
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
200KTT	10	0.3937	0.008	0.0003	30	1.1811	0.009	0.00035	16.66	0.656	0.6	0.024	0.045	0.10	2600	585	6790	1530
201KTT	12	0.4724	0.008	0.0003	32	1.2598	0.011	0.00043	16.66	0.656	0.6	0.024	0.045	0.10	3000	680	7680	1730
201KTT3	13	0.5118	0.008	0.0003	32	1.2598	0.011	0.00043	16.66	0.656	0.6	0.024	0.045	0.10	3000	680	7680	1730
202KTT	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00043	16.66	0.656	0.6	0.024	0.050	0.11	3600	830	8650	1930
203KTT	17	0.6693	0.008	0.0003	40	1.5748	0.011	0.00043	18.24	0.718	0.6	0.024	0.077	0.17	4700	1060	10900	2450
204KTT	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00043	20.62	0.812	1.0	0.039	0.118	0.26	6500	1460	14400	3250
205KTT	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.00051	20.62	0.812	1.0	0.039	0.132	0.29	7800	1760	16000	3600
206KTT	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.00051	24.00	0.945	1.0	0.039	0.245	0.54	11300	2550	22200	5000
207KTT	35	1.3780	0.012	0.00045	72	2.8346	0.013	0.00051	25.00	0.984	1.0	0.039	0.358	0.79	15300	3450	29000	6550

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

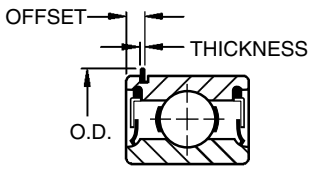
LIGHT, WIDE TYPE W200PP SERIES W200KLL SERIES

- Rubber seal (W200PP) and Mechani-Seal (W200KLL) types.
- Made with standard bores, standard outside diameters and a single row of balls.
- Same widths as double-row bearings of corresponding size.
- Extra width offers a larger support area for shaft and housing contact and added space for prepacked lubricant.
- Wide-type rubber seal bearings are particularly suited for use in electric motors, where they simplify housing design by eliminating auxiliary seals.
- Wide-type Mechani-Seal ball bearings are designed for applications where frictionless sealing and large grease capacity are required.
- Extremely effective grease retention and exclusion of foreign matter are assured by close running clearance between the seal members and slinger action of the outer member.



Rubber Seals PP

Mechani-Seals LL



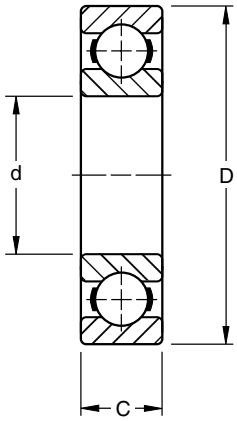
DIMENSIONS – TOLERANCES

Bearing Number		Bore d				Outside Diameter D				Width C		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load C_E(4)		Snap Ring PPG(3)					
Contact Seal PP	Mechani-seal LL			tolerance +0.000 mm +0.0000" to minus				tolerance +0.000 mm +0.0000" to minus		+0.00 mm -0.12 mm +0.000" -.005"										O.D.		thickness		offset	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.	mm	in.	mm	in.	mm	in.
W200PP	—	10	0.3937	0.008	0.0003	30	1.1811	0.009	0.00035	14.27	0.562	0.6	0.024	0.045	0.10	2650	600	6550	1500	—	—	—	—	—	—
W201PP	—	12	0.4724	0.008	0.0003	32	1.2598	0.011	0.00045	15.88	0.625	0.6	0.024	0.054	0.12	3000	695	7500	1700	—	—	—	—	—	—
W202PP	—	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00045	15.88	0.625	0.6	0.024	0.064	0.14	3450	780	8650	1930	—	—	—	—	—	—
W203PP(2)	—	17	0.6693	0.008	0.0003	40	1.5748	0.011	0.00045	17.48	0.688	0.6	0.024	0.091	0.20	4400	1000	10600	2360	44.4	$1\frac{3}{4}$	1.07	0.042	4.7	0.185
W204PP	W204KLL	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00045	20.62	0.812	1.0	0.039	0.150	0.33	6200	1400	14300	3200	—	—	—	—	—	—
W205PP(2)	W205KLL	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.0005	20.62	0.812	1.0	0.039	0.177	0.39	6950	1560	15600	3450	57.5	$2\frac{17}{64}$	1.07	0.042	5.72	0.225
W206PP(2)	W206KLL	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	23.83	0.938	1.0	0.039	0.295	0.65	10000	2280	21600	4800	67.5	$2\frac{21}{32}$	1.65	0.065	6.15	0.242
W207PP	W207KLL	35	1.3780	0.012	0.00045	72	2.8346	0.013	0.0005	26.97	1.062	1.0	0.039	0.458	1.01	13700	3050	28500	6400	—	—	—	—	—	—
W208PP	W208KLL	40	1.5748	0.012	0.00045	80	3.1496	0.013	0.0005	30.18	1.188	1.0	0.039	0.630	1.39	17600	4000	36000	8150	—	—	—	—	—	—
W209PP	W209KLL	45	1.7717	0.012	0.00045	85	3.3465	0.015	0.0006	30.18	1.188	1.0	0.039	0.668	1.47	17600	4000	36000	8150	—	—	—	—	—	—
W210PP	—	50	1.9685	0.012	0.00045	90	3.5433	0.015	0.0006	30.18	1.188	1.0	0.039	0.767	1.69	19600	4500	39000	8800	—	—	—	—	—	—
W214PP	—	70	2.7559	0.015	0.0006	125	4.9213	0.018	0.0007	39.67	1.562	1.5	0.059	1.810	3.99	37500	8500	69500	15600	—	—	—	—	—	—

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Also available with snap ring. To order, add suffix "G" to bearing number. Example: W205PPG.
(3) The snap ring is normally packaged separately in the box with the bearing.
(4) Based on 10^6 revolutions of calculated fatigue life.

MEDIUM 300K SERIES

- A heavier cross section than the 200 Series.
- Capable of carrying considerably heavier radial, thrust and combined loads for a given bore size.
- Capable of withstanding heavy shock loads. A ball bearing of heavier cross section is rarely required.
- Uses Conrad-type bearing that is well-balanced, with deep races and uninterrupted race shoulders.
- Electric motor quality where quietness is a requirement.

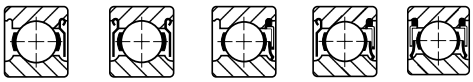


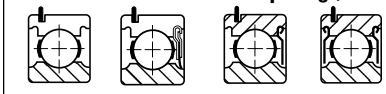
DIMENSIONS – TOLERANCES

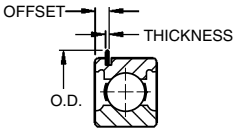
Bearing Number	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Width C		tolerance +0.000 mm +0.0000" to minus		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(2)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
300K	10	0.3937	0.008	0.0003	35	1.3780	0.011	0.00043	11	0.433	0.12	0.005	0.6	0.024	0.054	0.12	3460	780	9200	2080
301K	12	0.4724	0.008	0.0003	37	1.4567	0.011	0.00043	12	0.472	0.12	0.005	1.0	0.039	0.064	0.14	3620	815	9400	2120
302K	15	0.5906	0.008	0.0003	42	1.6535	0.011	0.00043	13	0.512	0.12	0.005	1.0	0.039	0.082	0.18	5240	1180	13300	3000
303K	17	0.6693	0.008	0.0003	47	1.8504	0.011	0.00043	14	0.551	0.12	0.005	1.0	0.039	0.109	0.24	6550	1460	15300	3450
304K	20	0.7874	0.010	0.0004	52	2.0472	0.013	0.0005	15	0.591	0.12	0.005	1.0	0.039	0.141	0.31	7800	1760	17900	4050
305K	25	0.9843	0.010	0.0004	62	2.4409	0.013	0.0005	17	0.669	0.12	0.005	1.0	0.039	0.236	0.52	12200	2750	26600	6000
306K	30	1.1811	0.010	0.0004	72	2.8346	0.013	0.0005	19	0.748	0.12	0.005	1.0	0.039	0.354	0.78	15600	3550	33900	7650
307K	35	1.3780	0.012	0.00047	80	3.1496	0.013	0.0005	21	0.827	0.12	0.005	1.5	0.059	0.472	1.04	18400	4150	37700	8500
308K	40	1.5748	0.012	0.00047	90	3.5433	0.015	0.0006	23	0.906	0.12	0.005	1.5	0.059	0.644	1.42	25900	5850	50600	11400
309K	45	1.7717	0.012	0.00047	100	3.9370	0.015	0.0006	25	0.984	0.12	0.005	1.5	0.059	0.862	1.90	31500	7100	59500	13400
310K	50	1.9685	0.012	0.00047	110	4.3307	0.015	0.0006	27	1.063	0.12	0.005	2.0	0.079	1.125	2.48	37700	8500	69300	15600
311K	55	2.1654	0.015	0.0006	120	4.7244	0.015	0.0006	29	1.142	0.15	0.006	2.0	0.079	1.424	3.14	44400	10000	81200	18300
312K	60	2.3622	0.015	0.0006	130	5.1181	0.018	0.0007	31	1.220	0.15	0.006	2.0	0.079	1.765	3.89	51500	11600	92300	20800
313K	65	2.5591	0.015	0.0006	140	5.5118	0.018	0.0007	33	1.299	0.15	0.006	2.0	0.079	2.168	4.78	59500	13400	104000	23600
314K	70	2.7559	0.015	0.0006	150	5.9055	0.025	0.0010	35	1.378	0.15	0.006	2.0	0.079	2.617	5.77	67900	15300	116000	26000
315K	75	2.9528	0.015	0.0006	160	6.2992	0.018	0.0007	37	1.457	0.15	0.006	2.0	0.079	3.175	7.00	76800	17300	128000	29000
316K	80	3.1496	0.015	0.0006	170	6.6929	0.025	0.0010	39	1.535	0.15	0.006	2.0	0.079	3.756	8.28	85700	19300	139000	31500
317K	85	3.3465	0.020	0.0008	180	7.0866	0.025	0.0010	41	1.614	0.20	0.008	2.5	0.098	5.008	11.04	95900	21600	151000	34000
318K	90	3.5433	0.020	0.0008	190	7.4803	0.030	0.0012	43	1.693	0.20	0.008	2.5	0.098	5.121	11.29	106000	24000	162000	36500
320K	100	3.9370	0.020	0.0008	215	8.4646	0.030	0.0012	47	1.850	0.20	0.008	2.5	0.098	7.085	15.62	139000	31500	195000	41500
321K	105	4.1339	0.020	0.0008	225	8.8583	0.030	0.0012	49	1.929	0.20	0.008	2.5	0.098	10.21	22.52	163000	36500	126000	48000
322K	110	4.3307	0.020	0.0008	240	9.4488	0.030	0.0012	50	1.969	0.20	0.008	2.5	0.098	12.17	26.82	166000	37500	220000	49000
326K	130	5.1181	0.020	0.0010	280	11.0236	0.035	0.0014	58	2.323	0.25	0.010	2.5	0.098	18.90	41.60	240000	54000	280000	63000
330K	150	5.9055	0.025	0.0010	320	12.5984	0.040	0.0016	65	2.559	0.25	0.010	2.5	0.098	27.10	59.70	310000	69500	335000	75000
332K	160	6.2992	0.025	0.0010	340	13.3858	0.040	0.0016	68	2.677	0.25	0.010	2.5	0.098	31.51	69.40	310000	69500	335000	75000
334K	170	6.6929	0.025	0.0010	360	14.1732	0.040	0.0016	72	2.835	0.25	0.010	2.5	0.098	36.82	81.10	355000	80000	360000	81500
336K	180	7.0866	0.025	0.0010	380	14.9606	0.040	0.0016	75	2.953	0.25	0.010	2.5	0.098	42.04	92.60	390000	88000	390000	88000
338K	190	7.4803	0.030	0.0012	400	15.7480	0.040	0.0016	78	3.071	0.30	0.012	4.0	0.16	47.6	105.0	440000	98000	425000	95000
340K	200	7.8740	0.030	0.0012	420	16.5354	0.045	0.0018	80	3.150	0.30	0.012	4.0	0.16	56.1	123.6	465000	104000	425000	95000
342K	210	8.2677	0.030	0.0012	440	17.3228	0.045	0.0018	84	3.307	0.30	0.012	4.0	0.16	58.1	128.2	570000	129000	510000	114000
344K	220	8.6614	0.030	0.0012	460	18.1102	0.045	0.0018	88	3.465	0.30	0.012	4.0	0.16	69.8	154.0	610000	137000	520000	116000
348K	240	9.4488	0.030	0.0012	500	19.6850	0.045	0.0018	95	3.740	0.30	0.012	4.0	0.16	81.1	178.9	735000	163000	600000	134000
352K	260	10.2362	0.035	0.0014	540	21.2598	0.050	0.0020	102	4.016	0.35	0.014	4.0	0.16	98.4	217.0	850000	190000	670000	150000
356K	280	11.0236	0.035	0.0014	580	22.8346	0.050	0.0020	108	4.252	0.35	0.014	4.0	0.16	142.8	315.0	780000	176000	585000	134000

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

SHIELDS, SEALS AND SNAP RING COMBINATIONS







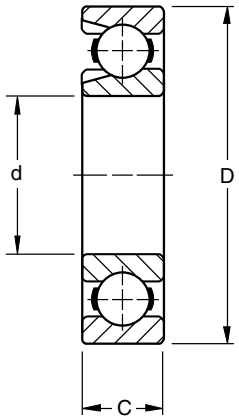
Shields and Seals					Snap Ring (Wireloc)[1]									
One Shield D	Two Shields DD	One Seal P	One Seal One Shield PD	Two Seals PP	Open Type G	One Shield PG	One Shield DG	Two Shields DDG	O.D.		Thickness		Offset	
									mm	in.	mm	in.	mm	in.
300KD	300KDD	300P	—	—	—	—	—	—	39.3	$1\frac{35}{64}$	1.07	0.042	3.05	0.120
301KD	301KDD	—	—	—	—	—	—	—	40.9	$1\frac{39}{64}$	1.07	0.042	3.05	0.120
302KD	302KDD	—	—	—	—	—	—	—	46.0	$1\frac{13}{16}$	1.07	0.042	3.05	0.120
303KD	303KDD	303P	—	303PP	303KG	—	—	—	52.4	$2\frac{1}{16}$	1.07	0.042	3.45	0.136
304KD	304KDD	304P	—	304PP	304KG	—	304KDG	304KDDG	57.5	$2\frac{17}{64}$	1.07	0.042	3.45	0.136
305KD	305KDD	305P	—	305PP	305KG	—	305KDG	305KDDG	67.5	$2\frac{21}{32}$	1.65	0.065	4.83	0.190
306KD	306KDD	306P	—	306PP	306KG	—	306KDG	306KDDG	78.2	$3\frac{5}{64}$	1.65	0.065	4.83	0.190
307KD	307KDD	307P	—	307PP	307KG	—	307KDG	307KDDG	86.5	$3\frac{13}{32}$	1.65	0.065	4.83	0.190
308KD	308KDD	308P	—	308PP	308KG	—	308KDG	308KDDG	96.4	$3\frac{51}{64}$	2.41	0.095	5.59	0.220
309KD	309KDD	309P	—	309PP	309KG	—	309KDG	309KDDG	106.4	$4\frac{3}{16}$	2.41	0.095	5.59	0.220
310KD	310KDD	310P	—	310PP	310KG	—	310KDG	310KDDG	116.3	$4\frac{37}{64}$	2.41	0.095	5.59	0.220
311KD	311KDD	311NP	311NPD	311NPP	311KG	311NPG	—	311KDDG	129.4	$5\frac{3}{32}$	2.77	0.109	6.73	0.265
312KD	312KDD	—	—	312NPP	312KG	—	—	312KDDG	139.7	$5\frac{1}{2}$	2.77	0.109	6.73	0.265
313KD	313KDD	—	—	—	—	—	—	313KDDG	149.6	$5\frac{57}{64}$	2.77	0.109	7.54	0.297
314KD	314KDD	—	—	—	—	—	—	—	—	——	—	—	—	
315KD	315KDD	—	—	—	—	—	—	—	—	——	—	—	—	
316KD	316KDD	—	—	—	—	—	—	—	—	——	—	—	—	
317KD	317KDD	—	—	—	—	—	—	—	—	——	—	—	—	
—	—	—	—	—	—	—	—	—	—	——	—	—	—	
320KD	320KDD	—	—	—	—	—	—	—	—	——	—	—	—	

[1] The snap ring is normally packaged separately in the box with the bearing.

Note: "N" prefix indicates a non-removable seal in NP (P) designs.

MEDIUM 300W SERIES

- A heavier cross section than the 200 Series.
- Capable of carrying considerably heavier radial, thrust and combined loads for a given bore size.
- Capable of withstanding heavy shock loads. A ball bearing of heavier cross section is rarely required.
- 300W Series bearings are dimensionally interchangeable with the 300K Series. However, bearings within the 300W Series are capable of carrying heavier radial loads, due to their larger ball complements.



DIMENSIONS – TOLERANCES

Bearing Number	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Width C		tolerance +0.000 mm +0.0000" to minus		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(2)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
303W	17	0.6693	0.008	0.0003	47	1.8504	0.011	0.00045	14	0.551	0.12	0.005	1.0	0.039	0.118	0.26	9400	2120	20600	4650
304W	20	0.7874	0.010	0.0004	52	2.0472	0.013	0.0005	15	0.591	0.12	0.005	1.0	0.039	0.154	0.34	11300	2550	23900	5400
305W	25	0.9843	0.010	0.0004	62	2.4409	0.013	0.0005	17	0.669	0.12	0.005	1.0	0.039	0.259	0.57	17300	3900	33900	7650
306W	30	1.1811	0.010	0.0004	72	2.8346	0.013	0.0005	19	0.748	0.12	0.005	1.0	0.039	0.386	0.85	22600	5100	42800	9650
307W	35	1.3780	0.012	0.00047	80	3.1496	0.013	0.0005	21	0.827	0.12	0.005	1.5	0.059	0.513	1.13	29000	6550	51500	11600
308W	40	1.5748	0.012	0.00047	90	3.5433	0.015	0.0006	23	0.906	0.12	0.005	1.5	0.059	0.844	1.86	39000	8000	66000	15000
309W	45	1.7717	0.012	0.00047	100	3.9370	0.015	0.0006	25	0.984	0.12	0.005	1.5	0.059	0.934	2.06	47000	10600	78100	17600
310W	50	1.9685	0.012	0.00047	110	4.3307	0.015	0.0006	27	1.063	0.12	0.005	2.0	0.079	1.207	2.66	56000	12700	92000	20800
311W	55	2.1654	0.015	0.0006	120	4.7244	0.015	0.0006	29	1.142	0.15	0.006	2.0	0.079	1.542	3.40	66000	15000	106000	24000
312W	60	2.3622	0.015	0.0006	130	5.1181	0.018	0.0007	31	1.220	0.15	0.006	2.0	0.079	1.923	4.24	78000	17600	122000	27500
313W	65	2.5591	0.015	0.0006	140	5.5118	0.018	0.0007	33	1.299	0.15	0.006	2.0	0.079	2.413	5.32	96000	21600	144000	32500
314W	70	2.7559	0.015	0.0006	150	5.9055	0.018	0.0007	35	1.378	0.15	0.006	2.0	0.079	2.885	6.36	101000	22800	153000	34500
315W	75	2.9528	0.015	0.0006	160	6.2992	0.025	0.0010	37	1.457	0.15	0.006	2.0	0.079	3.497	7.71	127000	28500	180000	40500
316W	80	3.1496	0.015	0.0006	170	6.6929	0.025	0.0010	39	1.535	0.15	0.006	2.0	0.079	4.154	9.15	142000	32000	195000	44000
317W	85	3.3465	0.020	0.0008	180	7.0866	0.025	0.0010	41	1.614	0.20	0.008	2.5	0.098	4.872	10.74	157000	35500	211000	47500
318W	90	3.5433	0.020	0.0008	190	7.4803	0.030	0.0012	43	1.693	0.20	0.008	2.5	0.098	5.625	12.39	173000	39000	226000	51000
319W	95	3.7402	0.020	0.0008	200	7.8740	0.030	0.0012	45	1.772	0.20	0.008	2.5	0.098	6.514	14.36	191000	43000	239000	54000
320W	100	3.9370	0.020	0.0008	215	8.4646	0.030	0.0012	47	1.850	0.20	0.008	2.5	0.098	7.992	17.62	226000	51000	270000	61000
321W	105	4.1339	0.020	0.0008	225	8.8583	0.030	0.0012	49	1.929	0.20	0.008	2.5	0.098	9.117	20.10	244000	55000	284000	64000
322W	110	4.3307	0.020	0.0008	240	9.4488	0.030	0.0012	50	1.968	0.20	0.008	2.5	0.098	10.81	23.84	266000	60000	302000	68000
324W	120	4.7244	0.020	0.0008	260	10.2362	0.035	0.0014	55	2.165	0.20	0.008	2.5	0.098	15.01	33.10	284000	64000	319000	72000
326W	130	5.1181	0.025	0.0010	280	11.0236	0.035	0.0014	58	2.323	0.25	0.010	2.5	0.098	19.56	43.12	326000	73500	355000	80000
328W	140	5.5118	0.025	0.0010	300	11.8110	0.035	0.0014	62	2.441	0.25	0.010	2.5	0.098	23.06	50.80	410000	91500	400000	90000
330W	150	5.9055	0.025	0.0010	320	12.5984	0.040	0.0016	65	2.559	0.25	0.010	2.5	0.098	26.81	59.10	422000	95000	422000	95000
336W	180	7.0866	0.025	0.0010	380	14.9606	0.040	0.0016	79	3.110	0.25	0.010	2.5	0.098	47.66	105.10	600000	132000	524000	118000
338W	190	7.4803	0.030	0.0012	400	15.7480	0.040	0.0016	78	3.071	0.30	0.012	4.0	0.160	49.21	108.40	720000	160000	580000	129000
340W	200	7.8740	0.030	0.0012	420	16.5354	0.045	0.0018	80	3.150	0.30	0.012	4.0	0.160	57.48	126.60	730000	163000	570000	127000
342W	210	8.2677	0.030	0.0012	440	17.3228	0.045	0.0018	84	3.307	0.30	0.012	4.0	0.160	60.70	133.70	935000	208000	720000	160000
344W	220	8.6614	0.030	0.0012	460	18.1102	0.045	0.0018	88	3.465	0.30	0.012	4.0	0.160	72.10	158.80	880000	196000	700000	150000
348W	240	9.4488	0.030	0.0012	500	19.6850	0.045	0.0018	95	3.740	0.30	0.012	4.0	0.160	84.99	187.20	1200000	260000	850000	186000
352W	260	10.2362	0.035	0.0014	540	21.2598	0.050	0.0020	102	4.016	0.35	0.014	4.0	0.160	103.38	227.70	1400000	310000	950000	208000
356W	280	11.0236	0.035	0.0014	580	22.8346	0.050	0.0020	108	4.252	0.35	0.014	4.0	0.160	146.78	323.30	1350000	300000	855000	190000

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Based on 10^6 revolutions of calculated fatigue life.

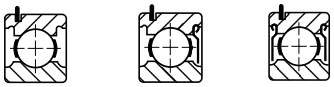
For applications where thrust load exceeds 60% Radial Load, consult your Timken representative.

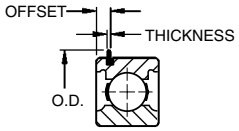
Listed in the table below are Timken maximum capacity type bearings (300W Series) with shields, seals and snap ring combinations.

The bearing number suffixes denote the following:

- **WD** - filling slot opposite single shield
- **WG** - filling slot opposite snap ring
- **WDD** - two shields
- **WDG** - filling slot and snap ring opposite shield

SHIELDS, SEALS AND SNAP RING COMBINATIONS



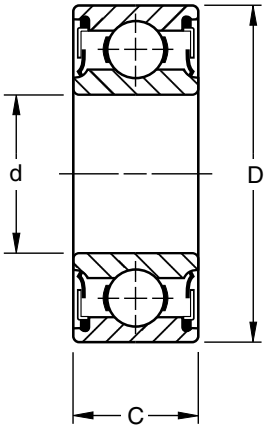


Shields and Seals		Snap Ring (Wireloc)[1]									
One Shield D	Two Shields DD	Open Type G	Open Shield DG	Two Shields DDG	O.D.		Thickness		Offset	
					mm	in.	mm	in.	mm	in.
—	—	—	—	—	—	—	—	—	—	—
—	—	304WG	—	—	57.5	2 17/64	1.07	0.042	3.45	0.136
305WD	—	305WG	—	—	67.5	2 21/32	1.65	0.065	4.83	0.190
306WD	306WDD	306WG	306WDG	—	78.2	3 5/64	1.65	0.065	4.83	0.190
307WD	307WDD	307WG	307WDG	—	86.5	3 13/32	1.65	0.065	4.83	0.190
308WD	308WDD	308WG[2]	308WDG	—	96.4	3 51/64	2.41	0.095	5.59	0.220
309WD	309WDD	309WG	309WDG	—	106.4	4 3/16	2.41	0.095	5.59	0.220
310WD	310WDD	310WG	310WDG	310WDDG	116.3	4 37/64	2.41	0.095	5.59	0.220
311WD	311WDD	311WG	311WDG	—	129.4	5 3/32	2.77	0.109	6.73	0.265
312WD	312WDD	312WG[3]	312WDG	312WDDG	139.7	5 1/2	2.77	0.109	6.73	0.265
313WD	313WDD	313WG	313WDG	313WDDG	149.6	5 57/64	2.77	0.109	7.54	0.297
314WD	314WDD	—	—	—	—	—	—	—	—	—
315WD	315WDD	—	—	—	—	—	—	—	—	—
316WD	316WDD	316WG	—	—	182.6	7 3/16	3.05	0.120	8.61	0.339
317WD	317WDD	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
320WD	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—
—	—	322WG	—	—	252.8	9 61/64	3.05	0.120	8.61	0.339

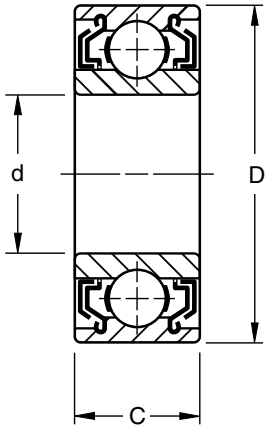
[1] The snap ring is normally packaged separately in the box with the bearing.
[2] Also available as a GW-Type filling slot and snap ring on same side. Also available 308GW2 with 20 mm width.
[3] Also available as 312WG-3 with filling slot on same side as snap ring.

MEDIUM, WIDE TYPE W300PP SERIES AND W300KLL SERIES

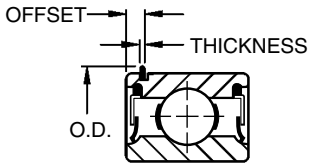
- The W300PP (rubber seal) Series and the W300KLL (Mechani-Seal) Series have the same bores and outside diameters as standard 300 Series ball bearings.
- Widths are equal to 5300 Series double-row ball bearings.
- Added width provides extra support on shafts and in housings and eliminates the need for locknuts and lockwashers on applications such as electric motors.
- Prepacked with the right amount of long-life, factory-filtered grease.
- These series incorporate the same advantages as the standard width Mechani-Seal and rubber seal bearings.
- Electric motor quality for applications where quietness is a requirement.



Rubber Seals
PP



Mechani-Seals
LL



D

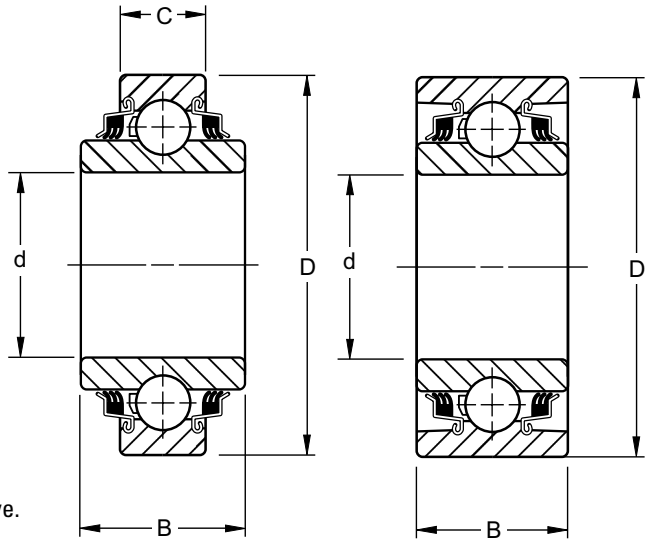
DIMENSIONS – TOLERANCES

Bearing Number		Bore d				Outside Diameter D				Width C		Fillet Radius(1)		Wt.		Static Load Rating C_o		Extended Dynamic Load C_E(4)		Snap Ring PPG					
Contact Seal PP	Mechani-Seal LL			tolerance +0.000 mm +0.0000" to minus				tolerance +0.000 mm +0.0000" to minus		+0.00 mm -.12 mm +0.000" -.005"										O.D.		Thickness		Offset	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.	mm	in.	mm	in.	mm	in.
W304PP	—	20	0.7874	0.010	0.0004	52	2.0472	0.013	0.0005	22.22	0.875	1.0	0.039	0.213	0.47	7800	1760	17900	4050	—	—	—	—	—	—
W305PP(2)	—	25	0.9843	0.010	0.0004	62	2.4409	0.013	0.0005	25.40	1.000	1.0	0.039	0.354	0.78	12200	2750	26600	6000	67.5	$2\frac{21}{35}$	1.65	0.065	4.82	0.190
W306PP	—	30	1.1811	0.010	0.0004	72	2.8346	0.013	0.0005	30.18	1.188	1.0	0.039	0.558	1.23	15600	3550	33900	7650	—	—	—	—	—	—
W307PP	W307KLL	35	1.3780	0.012	0.00047	80	3.1496	0.013	0.0005	34.92	1.375	1.5	0.059	0.780	1.72	18400	4150	37700	8500	—	—	—	—	—	—
W308PP(2)	W308KLL(2)	40	1.5748	0.012	0.00047	90	3.5433	0.015	0.0006	36.53	1.438	1.5	0.059	1.021	2.25	25900	5850	50600	11400	96.4	$3\frac{51}{64}$	2.41	0.095	5.59	0.220
W309PP	W309KLL	45	1.7717	0.012	0.00047	100	3.9370	0.015	0.0006	39.67	1.562	1.5	0.059	1.370	3.02	31500	7100	59000	13400	—	—	—	—	—	—
W310PP	—	50	1.9685	0.012	0.00047	110	4.3307	0.015	0.0006	44.45	1.750	2.0	0.079	1.828	4.03	37700	8500	69000	15600	—	—	—	—	—	—
W311PP(2)	W311KLL	55	2.1654	0.015	0.0006	120	4.7244	0.015	0.0006	49.23	1.938(3)	2.0	0.079	2.386	5.26	44400	10000	81000	18300	129.4	$5\frac{3}{32}$	2.77	0.109	0.73	0.265
W312PP(2)	W312KLL	60	2.3622	0.015	0.0006	130	5.1181	0.018	0.0007	53.98	2.125(3)	2.0	0.079	3.053	6.73	51500	11600	92000	20800	139.7	$5\frac{1}{2}$	2.77	0.109	0.73	0.265
W313PP	—	65	2.5591	0.015	0.0006	140	5.5118	0.018	0.0007	58.72	2.312(3)	2.0	0.079	3.883	8.56	59500	13400	104000	23600	—	—	—	—	—	—
W314PP	—	70	2.7559	0.015	0.0006	150	5.9055	0.018	0.0007	63.50	2.500(3)	2.0	0.079	4.731	10.43	67000	15300	116000	26000	—	—	—	—	—	—
W315PP	—	75	2.9528	0.015	0.0006	160	6.2992	0.025	0.0010	68.28	2.688(3)	2.0	0.079	5.811	12.81	76000	17300	128000	29000	—	—	—	—	—	—

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Also available with snap ring. To order, add suffix "G" to bearing number. Example: W305PPG. The snap ring is normally packaged separately in the box with the bearing.
(3) Width tolerance is .00 mm to -.15 mm (.000" to -.006").
(4) Based on 10^6 revolutions of calculated fatigue life.

TRI-PLY SEAL SERIES NON-RELUBRICATABLE TYPE CYLINDRICAL O.D.

- Designed for environments where severe contamination is present, such as agricultural tillage equipment.
- One-piece Tri-Ply seals:
  - Incorporate a highly effective design molded to an exterior shroud cap.
  - Provide exceptionally effective protection against loss of lubricant and entrance of wet or abrasive contaminants.
- Seven-piece Tri-Ply construction:
  - Standard on certain sizes.
  - Shroud cap nests closely with the outside seal.
  - Helps protect the rubber seal members from fiber wrap warpage and abrasion.
  - Balanced design, identified by deep races, large balls and extra-wide or heavy, shock-resistant inner and outer rings.
- Use of Tri-Ply Seal bearings simplifies housing designs and their extra inner ring width provides greater support on the shaft.
- For speeds in excess of 500 RPM, consult your Timken representative.



Type 1 Type 2

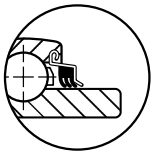


Figure 1

Figure 2

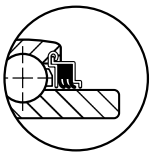


Figure 3

ROUND BORE

Bearing Number	Type-Fig.	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Ring Widths 0.00, -.12 mm +0.000", -0.005" B Inner		C Outer		Balls No.	Size	Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E[2]	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
W208PP10	1-1	38.113	1.5005	0.013	0.0005	80	3.1496	0.013	0.0005	42.87	1.688	21.00	0.827	9	1/2	0.681	1.50	19900	4500	36800	8300
W210PP8	2-	38.860	1.5300	0.250	0.0100	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	0.894	1.97	23000	5200	39900	9000
W210PP2	2-	49.230	1.9380	0.013	0.0005	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	0.767	1.69	23000	5200	39900	9000
W211PP2	2-2	55.580	2.1880	0.015	0.0006	100	3.9370	0.015	0.0006	33.34[1]	1.312	33.34	1.312	10	9/16	1.056	2.33	29000	6550	48800	11000
W214PP2	2-	70.000	2.7559	0.015	0.0006	125	4.9213	0.020	0.0008	39.69[1]	1.562	39.69	1.562	10	1 1/16	1.901	4.19	43500	9800	71000	16000
W315PP2	2-	76.342	3.0056	0.015	0.0006	160	6.2992	0.025	0.0010	68.26[1]	2.688	68.26	2.688	8	1 1/16	5.956	13.13	76800	17300	128000	29000

[1] Inner and outer width tolerance is .00 mm to -.15 mm (.000" to .006").
[2] Based on 10^6 revolutions of calculated fatigue life.

SQUARE BORE

Bearing Number	Type-Fig.	Shaft Size d		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Ring Widths 0.00, -.12 mm +0.000", -0.005" B Inner		C Outer		Balls No.	Size	Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E[2]	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
W208PP6	1–1	25.4	1	80	3.1496	0.013	0.0005	36.51	1.438	18	0.709	9	1/2	0.73	1.62	19900	4500	36800	8300
W208PP5	1–1	28.6	1 1/8	80	3.1496	0.013	0.0005	36.51	1.438	18	0.709	9	1/2	0.68	1.50	19900	4500	36800	8300
W208PP8	1–1	28.6	1 1/8	80	3.1496	0.013	0.0005	36.51	1.438	30.18	1.188	9	1/2	0.75	1.66	19900	4500	36800	8300
W211PP3	2–2	38.1	1 1/2	100	3.9370	0.015	0.0006	33.34[1]	1.312	33.34	1.312	10	9/16	1.27	2.79	29000	6550	48800	11000
W211PP5	1–2	38.1	1 1/2	101.6	4.0000	0.015	0.0006	44.45[1]	1.750	36.52	1.438	10	7/16	1.58	3.48	29000	6550	48800	11000

[1] Inner and outer width tolerance is .00 mm to -.15 mm (.000" to .006").
[2] Based on 10^6 revolutions of calculated fatigue life.

TRI-PLY SEAL SERIES NON-RELUBRICATABLE TYPE SPHERICAL O.D.

- Similar in design and features to bearings shown on D27, except for a spherical O.D.

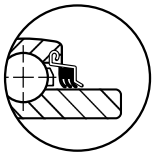


Figure 1

Figure 2

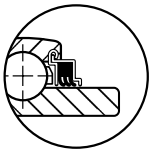
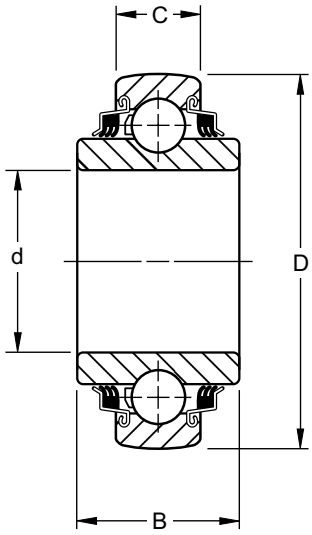
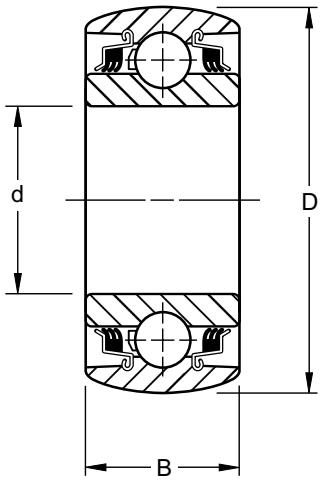


Figure 3



Type 1



Type 2

ROUND BORE

Bearing Number	Type-Fig.	Bore d tolerance +0.000 mm +0.0000″ to minus				Outside Diameter D tolerance +0.000 mm +0.0000″ to minus				Ring Widths +0.00, -.12 mm +0.000", -0.005" B Inner		C Outer		Balls No.	Size	Stamping Size	Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E[2]	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.		kg	lbs.	N	lbs.	N	lbs.
W208PPB7	1–1	30.170	1.1880	0.013	0.0005	80	3.150	0.013	0.0005	30.18	1.188	18.00	0.709	9	1/2	80MS	0.640	1.41	19900	4500	36800	8300
W208PPB2	1–	38.113	1.5005	0.013	0.0005	80	3.150	0.013	0.0005	42.96	1.688	18.00	0.709	9	1/2	80MS	0.721	1.59	19900	4500	36800	8300
W208PPB23	1–1	38.113	1.5005	0.013	0.0005	80	3.150	0.013	0.0005	42.96	1.688	30.18	1.188	9	15/32	80MS	0.681	1.50	15600	3550	32000	7200
W209PPB2	2–2	45.000	1.7717	0.013	0.0005	85	3.346	0.015	0.0006	30.18	1.188	30.18	1.188	9	1/2	85MS	0.653	1.44	20200	4550	36800	8300
W209PPB4	2–2	39.000	1.5350	0.250	0.0100	85	3.346	0.015	0.0006	30.18	1.188	30.18	1.188	9	1/2	85MS	0.748	1.65	20200	4550	36800	8300
W210PPB2	2–	49.230	1.9380	0.013	0.0005	90	3.543	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	90MS	0.708	1.56	23000	5200	39900	9000
W210PPB5	2–	45.340	1.7850	0.250	0.0100	90	3.543	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	90MS	0.794	1.75	23000	5200	39900	9000
W211PPB2	2–2	55.580	2.1880	0.015	0.0006	100	3.937	0.015	0.0006	33.34[1]	1.312	33.34	1.312	10	9/16	100MS	0.966	3.63	29000	6550	48800	11000
W214PPB2	2–	70.000	2.7559	0.015	0.0006	125	4.921	0.02	0.0008	39.69[1]	1.562	39.69	1.562	10	11/16	—	1.796	3.96	43500	9800	71000	16000
W214PPB9	1–	70.260	2.7660	0.025	0.0010	125	4.921	0.02	0.0008	44.45[1]	1.750	28.00	1.102	10	11/16	—	1.796	3.96	43500	9800	71000	16000

[1] Inner and outer width tolerance is .00 mm to -.15 mm (.000" to -.006").
[2] Based on 10^6 revolutions of calculated fatigue life.

SQUARE BORE

Bearing Number	Type-Fig.	Shaft Size to minus		Outside Diameter D tolerance +0.000 mm +0.0000″ to minus				Ring Widths +0.00, -.12 mm +0.000", -0.005" B Inner		C Outer		Balls No.	Size	Stamping Size	Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E[2]	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.		mm	in.	kg	lbs.	N	lbs.
W208PPB13	1–1	22.2	7/8	80	3.1496	0.013	0.0005	36.53	1.438	18.00	0.709	9	1/2	80MS	0.735	1.62	19900	4500	36800	8300
W208PPB6	1–1	25.4	1	80	3.1496	0.013	0.0005	36.53	1.438	18.00	0.709	9	1/2	80MS	0.721	1.59	19900	4500	36800	8300
W208PPB5	1–1	28.6	1 1/8	80	3.1496	0.013	0.0005	36.53	1.438	18.00	0.709	9	1/2	80MS	0.667	1.47	19900	4500	36800	8300
W209PPB5	1–2	31.8	1 1/4	85	3.3465	0.015	0.0006	36.53	1.438	30.18	1.188	9	1/2	85MS	0.794	1.75	20200	4550	36800	8300
W210PPB4	2–	28.6	1 1/8	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	90MS	0.957	2.11	23000	5200	39900	9000
W210PPB6	1–	28.6	1 1/8	90	3.5433	0.015	0.0006	36.53	1.438	30.18	1.188	10	1/2	90MS	1.021	2.25	23000	5200	39900	9000
W211PPB3	2–2	38.1	1 1/2	100	3.9370	0.015	0.0006	33.34[1]	1.312	33.34	1.312	10	9/16	100MS	1.207	2.66	29000	6550	48800	11000

[1] Inner and outer width tolerance is .00 mm to -.15 mm (.000" to -.006").
[2] Based on 10^6 revolutions of calculated fatigue life.

TRI-PLY SEAL SERIES RELUBRICATABLE TYPE

- Similar in design and features to those shown on the preceding two pages.
- Includes a provision for relubrication.

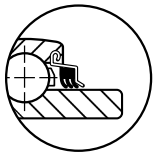


Figure 1

Figure 2

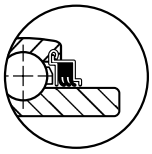
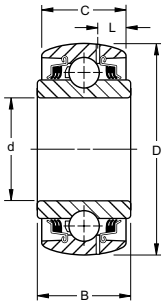
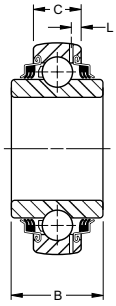


Figure 3



Type 1



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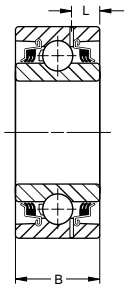
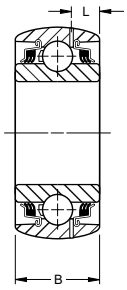


Type 3



Type 4

ROUND BORE

Bearing Number	Type-Fig.	Bore d mm	Bore d in.	tolerance +0.000 mm +0.0000" to minus mm	tolerance +0.000 mm +0.0000" to minus in.	Outside Diameter D mm	Outside Diameter D in.	tolerance +0.000 mm +0.0000" to minus mm	tolerance +0.000 mm +0.0000" to minus in.	Ring Width +0.00 mm, -0.12 mm +0.000", -.005" B Inner mm	B Inner in.	C Outer mm	C Outer in.	Balls No.	Balls Size in.	L mm	L in.	Wt. kg	Wt. lbs.	Static Load Rating C_0 N	Static Load Rating C_0 lbs.	Extended Dynamic Load C_E[3] N	Extended Dynamic Load C_E[3] lbs.
ROUND BORE																							
GW209PPB4	4–2	39.00	1.5350	0.250	0.0100	85	3.3465	0.015	0.0006	30.18	1.188	30.18	1.188	9	1/2	8.79	0.346	0.748	1.65	20200	4550	36800	8300
GW209PPB2	4–2	45.00	1.7717	0.013	0.0005	85	3.3465	0.015	0.0006	30.18	1.188	30.18	1.188	9	1/2	8.79	0.346	0.653	1.44	20200	4550	36800	8300
GW209PPB11	2–2	45.24	1.7810	0.250	0.0100	85	3.3465	0.015	0.0006	36.53	1.438	22.00	0.866	9	1/2	4.55	0.179	0.621	1.37	20200	4550	36800	8300
GW210PP3	3–	37.53	1.4065	0.013	0.0005	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	9.02	0.355	1.021	2.25	23000	5200	39900	9000
GW210PPB5	4–	45.34	1.7850	0.250	0.0100	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	9.02	0.355	0.794	1.75	23000	5200	39900	9000
GW210PPB2	4–	49.23	1.9380	0.013	0.0005	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	9.02	0.355	0.681	1.50	23000	5200	39900	9000
GW210PP9[1]	2–	49.40	1.9450	0.180	0.0070	90	3.5433	0.015	0.0006	36.53	1.438	23.00	0.906	10	1/2	4.70	0.185	0.794	1.75	23000	5200	39900	9000
GW211PPB13	2–2	45.34	1.7850	0.250	0.0100	100	3.9370	0.015	0.0006	33.34	1.312	25.00	0.984	10	9/16	5.82	0.299	0.916	2.02	29000	6550	48800	11000
GW211PPB10	4–2	49.23	1.9380	0.015	0.0006	100	3.9370	0.015	0.0006	33.34[2]	1.312	33.34	1.312	10	9/16	9.96	0.392	1.025	2.26	29000	6550	48800	11000
GW211PPB14	2–2	51.18	2.0150	0.250	0.0100	100	3.9370	0.015	0.0006	33.34[2]	1.312	25.00	0.984	10	9/16	5.82	0.229	0.907	2.00	29000	6550	48800	11000
GW211PP2	3–2	55.58	2.1880	0.015	0.0006	100	3.9370	0.015	0.0006	33.34[2]	1.312	33.34	1.312	10	9/16	9.96	0.392	1.361	3.00	29000	6550	48800	11000
GW211PPB2	4–2	55.58	2.1880	0.015	0.0006	100	3.9370	0.015	0.0006	33.34[2]	1.312	33.34	1.312	10	9/16	9.96	0.392	1.188	2.62	29000	6550	48800	11000
GW211PPB8	2–2	55.58	2.1880	0.015	0.0006	100	3.9370	0.015	0.0006	33.34[2]	1.312	25.00	0.984	10	9/16	5.82	0.229	0.839	1.85	29000	6550	48800	11000
GW211PPB9	2–2	55.75	2.1950	0.180	0.0070	100	3.9370	0.015	0.0006	39.69[2]	1.562	25.00	0.984	10	9/16	5.41	0.213	0.916	2.02	29000	6550	48800	11000
GW214PPB6	2–	68.28	2.6881	0.015	0.0006	125	4.9213	0.020	0.0008	68.26[2]	2.688	28.00	1.102	10	11/16	5.54	0.218	2.155	4.75	43500	9800	71000	16000
GW214PP2	3–	70.00	2.7559	0.015	0.0006	125	4.9213	0.020	0.0008	39.69[2]	1.562	39.69	1.562	10	11/16	10.52	0.414	1.901	4.19	43500	9800	71000	16000
GW214PPB2	4–	70.00	2.7559	0.015	0.0006	125	4.9213	0.020	0.0008	39.69[2]	1.562	39.69	1.562	10	11/16	10.52	0.414	1.796	3.96	43500	9800	71000	16000
GW214PPB5	1–	70.00	2.7559	0.015	0.0006	125	4.9213	0.020	0.0008	61.90[2]	2.438	39.69	1.562	10	11/16	10.52	0.414	2.155	4.75	43500	9800	71000	16000
GW216PPB3	2–3	76.45	3.0100	0.250	0.0100	140	5.5118	0.020	0.0008	63.50[2]	2.500	30.00	1.181	11	23/32	6.10	0.240	—	—	54000	12200	81000	18300
GW216PP5	3–3	63.88	2.5150	0.250	0.0100	140	5.5118	0.020	0.0008	63.50[2]	2.500	30.00	1.181	11	23/32	6.10	0.240	—	—	54000	12200	81000	18300

SQUARE BORE

		Shaft Size																					
SQUARE BORE		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.												
GW208PPB6	2–1	25.4	1	80	3.1496	0.013	0.0005	36.53	1.438	21.00	0.827	9	1/2	5.66	0.223	0.794	1.75	19900	4500	36800	8300
GW208PPB5	2–1	28.6	1 1/8	80	3.1496	0.013	0.0005	36.53	1.438	21.00	0.827	9	1/2	5.66	0.223	0.667	1.47	19900	4500	36800	8300
GW208PPB8	1–1	28.6	1 1/8	80	3.1496	0.013	0.0005	36.53	1.438	30.18	1.188	9	1/2	8.36	0.329	0.794	1.75	19900	4500	36800	8300
GW208PPB17	3–1	28.6	1 1/8	80	3.3755	0.013	0.0005	36.53	1.438	30.18	1.188	9	1/2	8.28	0.326	0.925	2.04	19900	4500	36800	8300
GW209PPB5	1–2	31.8	1 1/4	85	3.3456	0.015	0.0006	36.53	1.438	30.18	1.188	9	1/2	8.79	0.346	0.794	1.75	20200	4550	36800	8300
GW209PPB8	2–2	31.8	1 1/4	85	3.3456	0.015	0.0006	36.53	1.438	22.00	0.866	9	1/2	4.55	0.179	0.748	1.65	20200	4550	36800	8300
GW210PP4	3–	28.6	1 1/8	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	9.02	0.355	1.048	2.31	23000	5200	39900	9000
GW210PPB4	4–	28.6	1 1/8	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	10	1/2	9.02	0.355	0.794	1.75	23000	5200	39900	9000
GW211PP3	3–2	38.1	1 1/2	100	3.9370	0.015	0.0006	33.34[2]	1.312	33.34	1.312	10	9/16	9.96	0.392	1.266	2.79	29000	6550	48800	11000
GW211PPB3	4–2	38.1	1 1/2	100	3.9370	0.015	0.0006	33.34[2]	1.312	33.34	1.312	10	9/16	9.96	0.392	1.207	2.66	29000	6550	48800	11000
GW211PP17	3–2	38.1	1 1/2	100	3.9370	0.015	0.0006	44.45[2]	1.750	33.34	1.312	10	9/16	9.96	0.392	1.188	2.62	29000	6550	48800	11000
GW214PPB4	4–	50.8	2	125	4.9213	0.020	0.0008	39.69[2]	1.562	39.69	1.562	10	11/16	10.52	0.414	2.155	4.75	43500	9800	71000	16000
GW216PPB4	2–3	44.4	1 3/4	140	5.5118	0.020	0.0008	63.50[2]	2.500	30.00	1.181	11	23/32	6.10	0.240	—	—	54000	12200	81000	18300
GW216PP2[1]	2–3	57.2	2 1/4	140	5.5118	0.020	0.0008	63.50[2]	2.500	30.00	1.181	11	23/32	6.10	0.240	—	—	54000	12200	81000	18300
GW226PPB2	2–3	57.2	2 1/4	140	5.5118	0.020	0.0008	63.50[2]	2.500	30.00	1.181	11	23/32	6.10	0.240	—	—	54000	12200	81000	18300

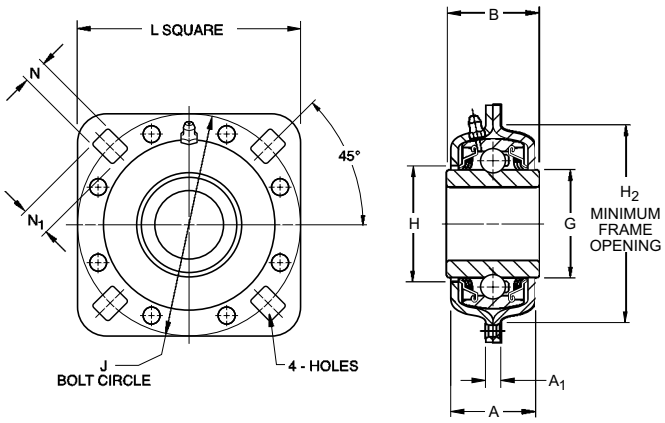
[1] Cylindrical O.D.

[2] Inner and outer width tolerance is .00 mm to-.15 mm (.000" to -.006").

[3] Based on 10^6 revolutions of calculated fatigue life.

TRI-PLY SERIES DISK HARROW UNITS

- The answer to versatility in design.
- For extra-special design needs, this unit incorporates a Tri-Ply bearing mounted in two stampings, riveted together with two o-rings.
- Available in two basic size groups, one incorporating a 209 and the other a 211 bearing.
- Both size groups offer these features:
  - Dynamic alignment capability (±3°).
  - Shroud effect from close clearance of stamping to inner ring.
  - Relubrication.
  - One unit piece for ease of handling and assembly.
  - Fitting flange mates with outer ring milled recess, preventing possibility of outer ring circumferential movement.
  - Stampings are case hardened to minimize wear.
  - Units are equipped with nylon retainer, molded one-piece seals and patented notched outer ring seal grooves.



209 METRIC SERIES

Unit Number	Shaft Diameter	B	H_2	J	N_1	N	L	G Ref.	H	A	A_1	Static Load Rating C_0	Extended Dynamic Load Rating C_E(1)
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	N	N
DHU 30S–209	30 SQ.	43	101.6	127.0	16.7	13.5	127.0	57.9	59.9	42.5	6.7	18000	36500
DHU 40R–209	40 SQ.	43	101.6	127.0	16.7	13.5	127.0	57.9	59.9	42.5	6.7	18000	36500
DHU 45R–209	45 RD.	43	101.6	127.0	16.7	13.5	127.0	57.9	59.9	42.5	6.7	18000	36500
211 METRIC SERIES													
DHU 40S–211	40 SQ.	51	113.5	139.7	15.1	13.5	139.7	69.7	73.0	49.2	7.5	25000	48000
DHU 50R–211	50 RD.	51	113.5	139.7	15.1	13.5	139.7	69.7	73.0	49.2	7.5	25000	48000
DHU 55R–211	55 RD.	51	113.5	139.7	15.1	13.5	139.7	69.7	73.0	49.2	7.5	25000	48000

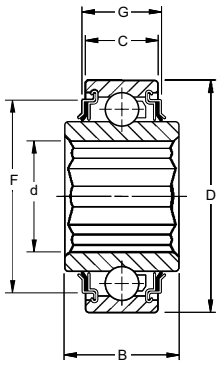
209 SERIES

Unit Number	Shaft Diameter	B	H_2	J	N_1	N	L	G Ref.	H	A	A_1	Static Load Rating C_0	Extended Dynamic Load Rating C_E(1)
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	lbs.	lbs.
DHU 1 1/2 R–209	1 1/2 RD.	1 11/16	4	5	21/32	17/32	5	2.279	2 23/64	1 43/64	17/64	4000	8150
DHU 1 1/8 S–209	1 1/8 SQ.	1 11/16	4	5	21/32	17/32	5	2.279	2 23/64	1 43/64	17/64	4000	8150
DHU 1 3/4 R–209	1 3/4 RD.	1 11/16	4	5	21/32	17/32	5	2.279	2 23/64	1 43/64	17/64	4000	8150
DHU 1 1/4S–209	1 1/4 SQ.	1 3/4	4	5	21/32	17/32	5	2.279	2 23/64	1 43/64	17/64	4000	8150
DHU 491 A	1 3/4 RD.	1 3/4	4	5	21/32	17/32	5	2.279	2 23/64	1 43/64	17/64	4000	8150
211 SERIES													
DHU 1 1/2 S–211	1 1/2 SQ.	2	4	5 1/2	19/32	17/32	5 1/2	2.746	2 7/8	1 15/16	19/64	5600	10800
DHU 1 3/4 R–211	1 3/4 RD.	2 1/8	4	5 1/2	19/32	17/32	5 1/2	2.746	2 7/8	1 15/16	19/64	5600	10800
DHU 2 3/16 R–211	2 3/16 RD.	2 3/16	4	5 1/2	19/32	17/32	5 1/2	2.746	2 7/8	1 15/16	19/64	5600	10800

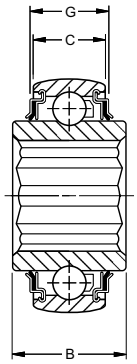
(2) Based on 10^6 revolutions of calculated fatigue life.

HEX BORE BEARINGS

- Designed to be used for outer or inner ring rotation in low-speed, moderately-loaded applications, primarily in agricultural implements and conveyors.
- Tolerances of the hex bore are suitable for mounting on cold rolled hex shafting.
- Main advantage is ease of mounting. Except for axial positioning by adjacent parts, no collars, setscrews or other locking devices are required to lock the inner ring to the hex shaft.
- Utilize the R-Type shroud seal.



Type 1



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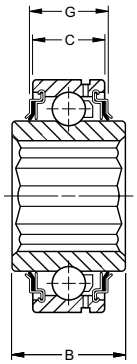

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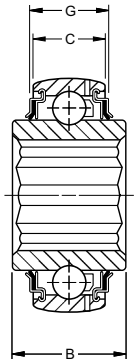
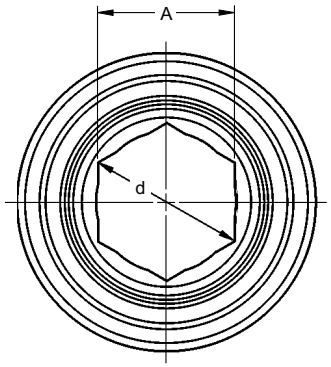


Type 4

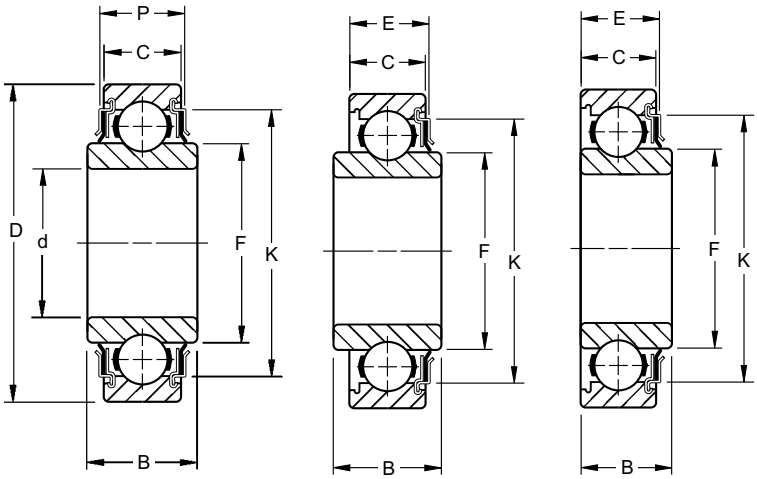


Bearing Number	Type	Hex Shaft Size	A Across Flats		Hex Bore d tolerance -0.00 mm +0.000" to plus		d Across corners min.		Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width +0.000 mm +0.0000" C Outer		-0.12 mm -.005" B Inner		F		G		Balls No.	Balls Size	Wt.		Static Load Rating C_0		Extended Dynamic Load Rating C_E[3]	
			mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.		in.	kg	lbs.	N	lbs.	N	lbs.
NON-RELUBRICATABLE TYPE																												
202KRR3	1	9/16	14.30	0.563	0.13	0.005	16.46	0.648	35	1.3780	0.013	0.0005	11	0.433	13.00	0.512	—	—	—	—	8	7/32	0.054	0.12	4400	1000	10600	2360
204KRR2	1	11/16	17.65	0.695	0.13	0.005	20.22	0.796	47	1.8504	0.013	0.0005	14	0.551	20.96	0.825	—	—	—	—	8	5/16	0.145	0.32	6200	1400	14300	3200
205KRR2	1	7/8	22.25	0.876	0.13	0.005	25.65	1.010	52	2.0472	0.013	0.0005	15	0.591	25.40	1.000	—	—	—	—	9	5/16	0.200	0.44	6950	1560	15600	3450
205KRRB2	2	7/8	22.25	0.876	0.13	0.005	25.65	1.010	52	2.0472	0.013	0.0005	15	0.591	25.40	1.000	—	—	—	—	9	5/16	0.200	0.44	6950	1560	15600	3450
205PPB13[1]	2	7/8	22.25	0.876	0.13	0.005	25.65	1.010	52	2.0472	0.013	0.0005	15	0.591	25.40	1.000	42.67	1.680	20.19	0.795	9	5/16	0.200	0.44	6950	1560	15600	3450
206KPP3[1]	1	1	25.43	1.001	0.13	0.005	29.31	1.154	62	2.4409	0.013	0.0005	16	0.630	24.00	0.945	52.07	2.050	19.56	0.770	9	3/8	0.345	0.76	10000	2280	21600	4800
206KPPB3[1]	2	1	25.43	1.001	0.13	0.005	29.31	1.154	62	2.4409	0.013	0.0005	16	0.630	24.00	0.945	52.07	2.050	19.56	0.770	9	3/8	0.345	0.76	10000	2280	21600	4800
206KRR6	1	1	25.43	1.001	0.13	0.005	29.31	1.154	62	2.4409	0.013	0.0005	16	0.630	24.00	0.945	52.07	2.050	19.56	0.770	9	3/8	0.341	0.75	10000	2280	21600	4800
206KRRB6	2	1	25.43	1.001	0.13	0.005	29.31	1.154	62	2.4409	0.013	0.0005	16	0.630	24.00	0.945	52.07	2.050	19.56	0.770	9	3/8	0.341	0.75	10000	2280	21600	4800
207KPP3	1	1 1/4	31.77	1.251	0.13	0.005	36.40	1.433	72	2.8346	0.013	0.0005	17	0.669	37.70	1.484	60.35	2.376	19.68	0.775	9	7/16	0.454	1.00	13700	3050	28500	6400
207KPPB3	2	1 1/4	31.77	1.251	0.13	0.005	36.40	1.433	72	2.8346	0.013	0.0005	17	0.669	25.00	0.984	60.35	2.376	19.68	0.775	9	7/16	0.395	0.87	13700	3050	28500	6400
207KRRB9	2	1 1/8	28.60	1.126	0.13	0.005	32.97	1.298	72	2.8346	0.013	0.0005	17	0.669	37.70	1.484	60.35	2.376	19.68	0.775	9	7/16	0.454	1.00	13700	3050	28500	6400
207KRRB12	2	1 1/8	28.60	1.126	0.13	0.005	32.97	1.298	72	2.8346	0.013	0.0005	17	0.669	25.00	0.984	60.35	2.376	19.68	0.775	9	7/16	0.395	0.87	13700	3050	28500	6400
207KRR17	1	1 1/4	31.77	1.251	0.13	0.005	36.65	1.443	72	2.8346	0.013	0.0005	17	0.669	25.00	0.984	60.35	2.376	19.68	0.775	9	7/16	0.395	0.87	13700	3050	28500	6400
207KRRB17	2	1 1/4	31.77	1.251	0.13	0.005	36.65	1.443	72	2.8346	0.013	0.0005	17	0.669	25.00	0.984	60.35	2.376	19.68	0.775	9	7/16	0.395	0.87	13700	3050	28500	6400
W208PPB16[1]	2	1 1/4	31.77	1.251	0.13	0.005	36.65	1.443	80	3.1496	0.013	0.0005	18	0.709	36.53	1.438	68.43	2.694	25.27	0.995	9	1/2	0.658	1.45	17600	4000	36000	8150
W208KRRB6	2	1 3/8	34.95	1.376	0.13	0.005	40.30	1.587	80	3.1496	0.013	0.0005	21	0.827	36.53	1.438	68.43	2.694	23.54	0.927	9	1/2	—	—	17600	4000	36000	8150
W208KRR8	1	1 1/4	31.77	1.251	0.13	0.005	36.65	1.443	80	3.1496	0.013	0.0005	18	0.709	36.53	1.438	68.43	2.694	20.45	0.805	9	1/2	0.658	1.45	17600	4000	36000	8150
209KRRB2	2	1 1/2	38.12	1.501	0.13	0.005	43.99	1.732	85	3.3456	0.015	0.0006	19	0.748	30.00	1.181	73.86	2.908	23.27	0.916	9	1/2	0.576	1.27	17600	4000	36000	8150
W210PPB7[1]	2	1 5/8	41.30	1.626	0.13	0.005	47.65	1.876	90	3.5433	0.015	0.0006	30.18	1.188	30.18	1.188	—	—	—	—	10	1/2	0.794	1.75	19600	4500	39000	8800
RELUBRICATABLE TYPE																												
G206KPP4[1]	3	1	25.43	1.001	0.13	0.005	29.26	1.152	62	2.4409	0.13	0.005	18	0.709	24.00	0.945	—	—	—	—	9	3/8	0.281	0.62	10000	2280	21600	4800
G206KPPB4[1]	4	1	25.43	1.001	0.13	0.005	29.26	1.152	62	2.4409	0.13	0.005	18	0.709	24.00	0.945	52.07	2.050	19.56	0.770	9	3/8	0.277	0.61	10000	2280	21600	4800
G206KRRB6	4	1	25.43	1.001	0.13	0.005	29.26	1.152	62	2.4409	0.13	0.005	18	0.709	24.00	0.945	52.07	2.050	19.56	0.770	9	3/8	0.268	0.59	10000	2280	21600	4800
G207KPPB2[1]	4	1 1/8	28.60	1.126	0.13	0.005	32.97	1.298	72	2.8346	0.13	0.005	19	0.748	37.70	1.484	60.32	2.375	25.40	1.000	9	7/16	0.454	1.00	13700	3050	28500	6400
GW208KRRB5	4	1 1/4	31.77	1.251	0.13	0.005	36.65	1.443	80	3.1496	0.13	0.005	21	0.827	36.51	1.438	60.35	2.694	22.43	0.883	9	1/2	0.635	1.40	17600	4000	36000	8150
GW208PPB22[1]	2	1 1/4	31.88	1.255	0.13	0.005	36.75	1.447	80	3.1496	0.13	0.005	21	0.827	36.51	1.438	52.07	2.050	28.32	1.115	9	1/2	0.681	1.50	17600	4000	36000	8150
GC1200KPPB2[1]		1 3/4	44.48	1.751	0.13	0.005	51.31	2.020	100	3.9370	0.015	0.0006	25[2]	0.984	57.15	2.250	86.11	3.390	29.01	1.142	10	9/16	1.521	3.35	19600	4500	39000	8800

(1) Tri-Ply Seal bearing.
(2) Inner and outer ring tolerance is .00 mm to -15 mm (.000" to -.006").
(3) Based on 10^6 revolutions of calculated fatigue life.

LIGHT 200 SERIES R-SEAL TYPE

- Consists of deep groove, Conrad-type bearings.
- Incorporates a flare-out, contact R-Seal.
- Synthetic rubber impregnated washer is enclosed between two metal shields, providing excellent protection against contaminants.
- Because of the heavy contact seal, this series is normally employed in moderate-speed service.



Type 1 Type 2 Type 3

DIMENSIONS – TOLERANCES

Bearing Type Number		Bore d tolerance +0.000 mm +0.0000" to minus				Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width +0.00 -0.12 mm +0.000 -.005" B Inner		C Outer		E Max.		P Max.		K Max.		Fillet Radius(1)		F		Static Load Rating C_0		Extended Dynamic Load Rating C_E(3)	
		mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm.	in.	mm.	in.	N	lbs.	N	lbs.
203KR2	3	15.883	0.6253	0.008	0.0003	40	1.5748	0.013	0.0005	14.00	0.551	12	0.472	—	—	—	—	—	—	0.6	0.024	24.44	0.962	4700	1060	10900	2450
203KRR2	1	16.256	0.6400	0.130	0.0005	40	1.5748	0.013	0.0005	18.29	0.720	12	0.472	—	—	—	—	—	—	0.6	0.024	24.44	0.962	4700	1060	10900	2450
203KRR5	1	13.081	0.5150	0.130	0.0005	40	1.5748	0.013	0.0005	18.29	0.720	12	0.472	—	—	—	—	—	—	0.6	0.024	24.44	0.962	4700	1060	10900	2450
203KRR7	1	17	0.6693	0.008	0.0003	40	1.5748	0.013	0.0005	16.61	0.654	12	0.472	—	—	—	—	—	—	0.6	0.024	24.44	0.962	4700	1060	10900	2450
204KR2	3	19.063	0.7505	0.013	0.0005	45.225	1.7805	0.013	0.0005	15.49	0.610	15.49	0.610	—	—	—	—	—	—	1	0.039	28.73	1.131	6500	1460	14400	3250
204KRR3	1	20	0.7874	0.010	0.0004	47	1.8504	0.013	0.0005	17.75	0.699	14	0.551	—	—	—	—	—	—	1	0.039	28.73	1.131	6500	1460	14400	3250
205KR4	2	25.413	1.0005	0.013	0.0005	52	2.0472	0.013	0.0005	25.40	1.000	15	0.591	15.875	0.625	—	—	42.67	1.68	1	0.039	33.81	1.331	7800	1760	16000	3600
206KR7	2	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	24.00	0.945	16	0.630	17.780	0.700	—	—	52.07	2.05	1	0.039	40.28	1.586	11300	2550	21800	4900
206KRR8	1	30	1.1811	0.013	0.0004	62	2.4409	0.013	0.0005	24.00	0.945	16	0.630	—	—	19.56	0.77	52.07	2.05	1	0.039	39.09	1.539	11300	2250	21800	4900
207KRR	1	35	1.3780	0.013	0.0005	72	2.8346	0.013	0.0005	25.00	0.984	17	0.669	—	—	19.68	0.775	60.35	2.376	1	0.039	46.94	1.848	15000	3450	29000	6550
208KRR2	1	40	1.5748	0.013	0.0005	80	3.1496	0.013	0.0005	27.00	1.063	21	0.827	—	—	21.31	0.839	68.45	2.695	1	0.039	52.25	2.057	19800	4460	36200	8130
209KRR3	1	45	1.7717	0.013	0.0005	85	3.3465	0.013	0.0005	27.00	1.063	21	0.827	—	—	24.18	0.952	72.42	2.851	1	0.039	57.89	2.279	20500	4600	36300	8160
210KRR	1	50	1.9685	0.013	0.0005	90	3.5433	0.015	0.0006	30.00	1.181	20	0.787	—	—	24.03	0.946	77.60	3.055	1	0.039	62.81	2.473	23100	5200	40000	9000
212KRR	1	60	2.3622	0.015	0.0006	110	4.3307	0.015	0.0006	36.00(2)	1.417	22	0.886	—	—	30.02	1.182	99.87	3.932	1	0.039	76.45	3.010	35500	8000	58600	13200

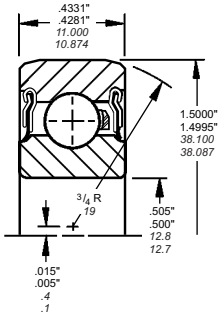
(1) Maximum shaft or housing fillet radius which bearing corners will clear.
(2) Inner and outer width tolerance is .00 mm to -.15 mm (.000" to .0006").
(3) Based on 10^6 revolutions of calculated fatigue life.

FARM RADIAL SPECIALS

BEARING NUMBER 202NPP9

SPECIAL FEATURES
- ½ in. Bore
- O.D. corner turned to a ¾ in. radius
- Special heavy stiff seals of Buna-N rubber
- Crimped-in seal

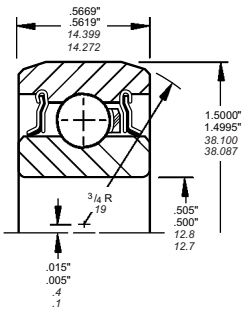
TYPICAL APPLICATIONS
Cam Follower



BEARING NUMBER 202KRR7

SPECIAL FEATURES
- ½ in. Bore
- 1½ in. O.D.
- Thick outer ring

TYPICAL APPLICATIONS
Cam Follower



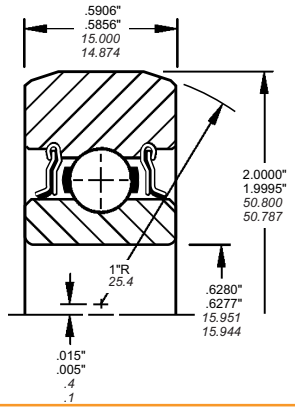
Continued on the next page.

FARM RADIAL SPECIALS *(continued)*

BEARING NUMBER 203KRR3

SPECIAL FEATURES
- 5/8 in. Bore
- 2 in. O.D.
- Thick outer ring

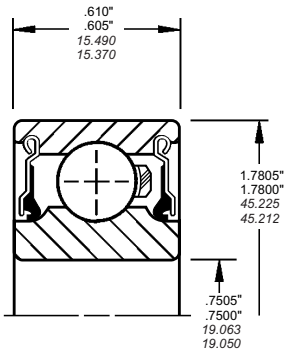
TYPICAL APPLICATIONS
Cam Follower
Guide Rolls for Baler Plunger



BEARING NUMBER P204RR6

SPECIAL FEATURES
- 3/4 in. Bore
- 1.7805 in. O.D.
- Replaces 204KRNP2

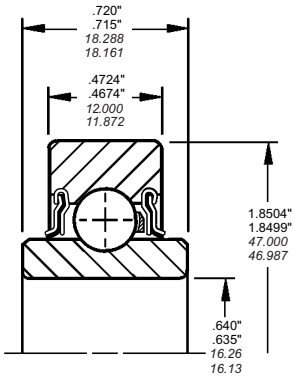
TYPICAL APPLICATIONS
Mower Spindle



BEARING NUMBER 203KRR6

SPECIAL FEATURES
- 5/8 in. Bore
- 47 mm O.D.
- Thick outer ring

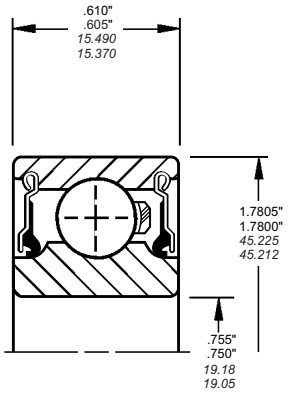
TYPICAL APPLICATIONS
Idler Pulley
Idler Sprocket



BEARING NUMBER 204RR7

SPECIAL FEATURES
- 3/4 in. Bore
- 1.7805 in. O.D.
- Replaces 204KRNP3

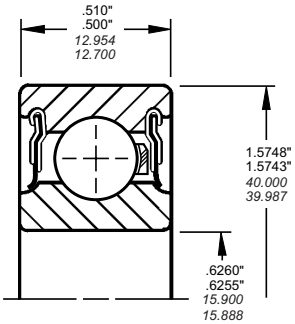
TYPICAL APPLICATIONS
Rolling Cultivator
Disk



BEARING NUMBER 203NPP9

SPECIAL FEATURES
- 5/8 in. Bore
- Width .500"

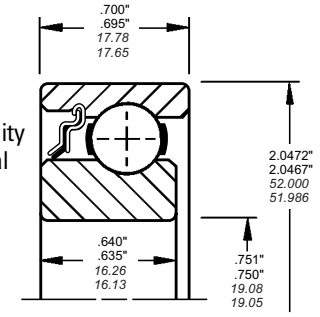
TYPICAL APPLICATIONS
Disk Grain Drill



BEARING NUMBER 205KR3

SPECIAL FEATURES
- 3/4 in. Bore
- Excellent moment load capacity available from special internal geometry of races
- Heavy contact flare-out type R-Seal with shroud cap

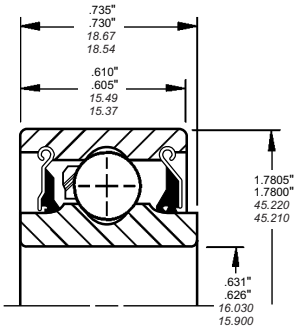
TYPICAL APPLICATIONS
Disk Hiller, Planter



BEARING NUMBER 204RY2

SPECIAL FEATURES
- 5/8 in. Bore
- Gothic Arch Race

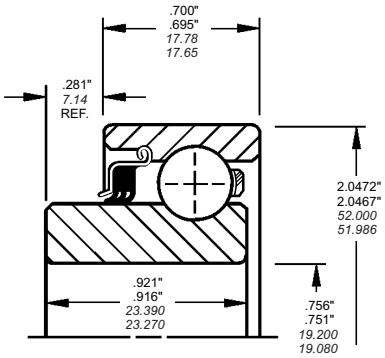
TYPICAL APPLICATIONS
Planter
Double Disk Opener



BEARING NUMBER 205KP6

SPECIAL FEATURES
- 3/4 in. Bore
- Tri-Ply Seal on one side with shroud cap

TYPICAL APPLICATIONS
Rolling Cultivator



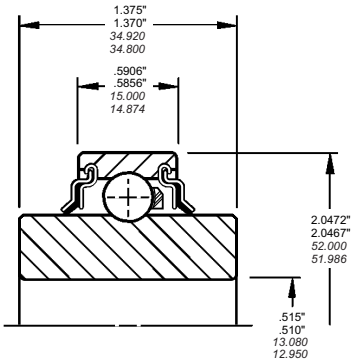
Continued on the next page.

FARM RADIAL SPECIALS *(continued)*

BEARING NUMBER 205KRR6

SPECIAL FEATURES
- ½ in. Bore
- Extended inner ring

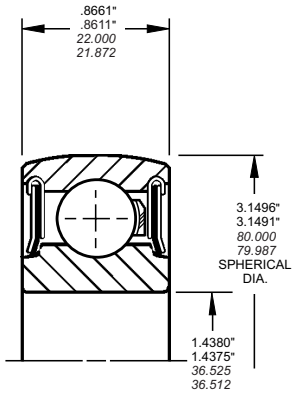
TYPICAL APPLICATIONS
Potato Harvester



BEARING NUMBER 208NPPB5

SPECIAL FEATURES
- 1 7/16 in. Bore
- PP Seals with shroud cap

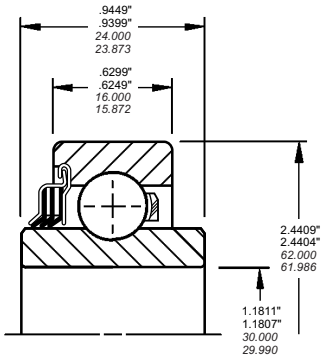
TYPICAL APPLICATIONS
Baler Crank Pin



BEARING NUMBER 206KP2

SPECIAL FEATURES
- Tri-Ply Seal on one side with shroud cap

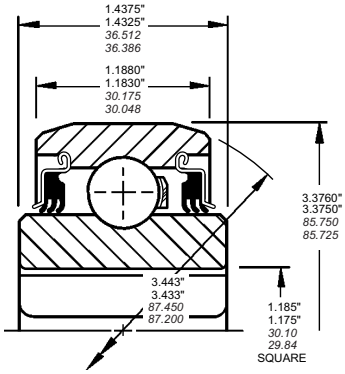
TYPICAL APPLICATIONS
Combine



BEARING NUMBER 208PPB12

SPECIAL FEATURES
- 1⅛ in. Square Bore
- Molded Tri-Ply seal
- Heavy outer ring

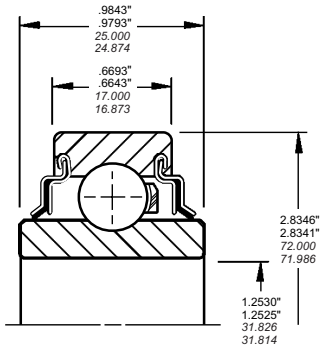
TYPICAL APPLICATIONS
Disk Harrow



BEARING NUMBER 207KRR14

SPECIAL FEATURES
- 1¼ in. Bore

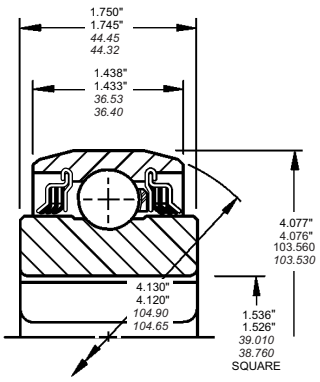
TYPICAL APPLICATIONS
Disk Harrow
Transport Wheel



BEARING NUMBER W211PPB6

SPECIAL FEATURES
- 1½ in. Square Bore
- Tri-Ply seal with shroud cap
- Heavy outer ring

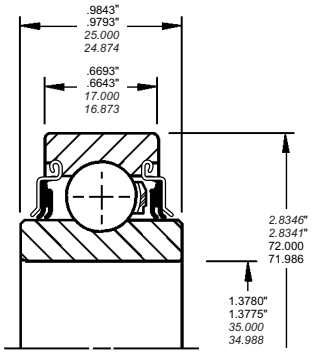
TYPICAL APPLICATIONS
Disk Harrow



BEARING NUMBER 207KYY

SPECIAL FEATURES
- Molded double lip seal

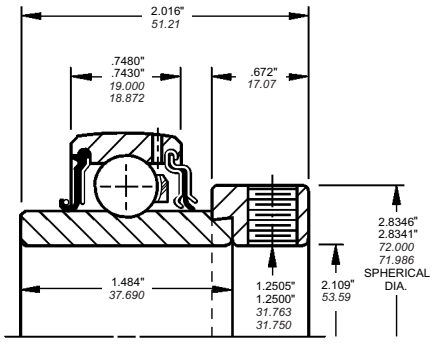
TYPICAL APPLICATIONS
Disk Harrow
Transport Wheel



BEARING NUMBER G1104KRXB2

SPECIAL FEATURES
- Oil Seal on one side

TYPICAL APPLICATIONS
Chain Case

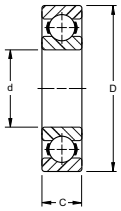


SPECIAL BEARINGS

Size	Special Features	Typical Application
200KRR3	Inner Ring Width .6457/.6407 One piece molded seals	Windrower
J202KRR8	Extended Inner Width .880/.875	Tobacco Harvester
202NPP9	½" Bore-O.D. corner turned to ¾" radius	Baler Cam Foller
P202NPP11	Extra Wide Inner .5669/.5619 Bore 16mm .6299/.6296	Cam Follower
P203KRR3	⅝" Bore 2" O.D. Heavy section outer ring	Cam Follower Guide Rolls for Baler Plunger
203KRR6	⅝" Bore 47mm O.D.Heavy section outer ring	Baler Pick-up
203NPP9	⅝" Bore .500" width	Disk Grain Drill Opener
P203PP10	.6255/.6260" Bore	Light Duty Disk Applications
BB203KRR2 A2139	Wide Inner .720/.715 Bore .6400/.6350 Gothic arch races	Rotary Hoe
P204KR2	Bore .7505/.7500 Width .610/.605 O.D. 1.7805/1.7800	Rotary Lawn Tractor Blade Spindle Bearing
204KRD4	⅝" Bore extended inner R-Seal side .689/.685	Disk Opener Seed Drill
204KRNP5	Bore .631/.626 Extended Inner Width 1.125/1.120	Planter Opener Wheels
P204KRRB5	Bore .793/.788 Inner Width .6988/.6938	Row Crop Machine
204RR6 E8728	Ground Bore .7505/.7500 Width .610 O.D. 1.7805 Extra loose radial play. Replaces 204KRNP2 E8728	Planter Gage Wheels
P204RR6	Same as above except standard radial play. Replaces 204KRNP2	Garden Tractor Mower Spindle
H204KRNP6	Bore, O.D., Width same as P204KR2	Planter
204RR7 E8728	¾" Bore 1.7805 O.D. .610 Width Extra loose radial play. Replaces 204KRNP2 E8728	Rolling Cultivator Disk Sprockets, Pulleys and Disk Opener
205NPP2	Inner Width .6594/.6544	Miscellaneous
205KR3	¾" Bore , Special Races, Heavy R-Seal with Shroud Cap	Disk Hiller Planter and Cotton Picker
205KP6	¾" Bore Tri-Ply seal on one side with shroud cap	Rolling Cultivator Coulter Bearing
205KRR6	½" Bore extended inner ring	Windrow Digger
205KRR7	½" Bore 1.500/1.495 Extended Inner Ring with Offset race	Cone Roller Beet and Potato Harvester
205PPB7 FS544	15⁄16" Bore Tri-Ply Seals 1.375/1.3760 Inner Width	Rolling Cultivator
G205KPRB11	⅞" Hex Bore, One R-Seal and one Tri-Ply Seal Inner Width 1.000/.975	Corn Head Mechanism
205PP9 FS544	¾" Bore Inner Width 1.3750/1.3700 Tri-Ply Seals	Cultivator
205PP10	⅝" Bore Inner Width 1.375/1.370 Tri-Ply Seals	Potato Harvester
205PP11	1" Bore Inner Width 1.187/1.185 Tri-Ply Seals	Marker Wheel

Size	Special Features	Typical Application
205PP12	⅝" Bore Inner Width 1.500/1.495 Tri-Ply Seals	Cone Roller, Beet and Potato Harvester
205PP13	⅞" Hex Bore Inner Width 1.000/.995 Tri-Ply Seals	Corn Head Mechanism
206KRD	Offset Rings Inner Width .748/.743 Outer Width .6299/.6249 R-Seal on extended inner side	Combine
206KP2	Tri-Ply Seal one side Wide Inner Ring .9449/.9399	Combine
206KPP2	Tri-Ply Seals Wide Inner Ring .9449/.9399	Forrage Harvester
H206KRP2 A1391	¾" Bore Wide Inner Ring .9449/ .9399 Extended on R-Seal side	Disk Hiller and Bedders
206KPPB3	1" Hex Bore Tri-Ply Seals Inner Ring Width .9449/.9399	Disk Harrow
206KRR4	Large Inner Ring Bore Corner to clear .090 R Shaft Fillet	Drive Shaft Bearing
206KRRB3	1⅛ Bore Flare out type R-Seal with Shroud Cap	Corn Picker Snapping Rolls
206KRRB9	1" Bore Inner Width .9450/.9400	Planter
206KRR13	¾" Bore	Idler Sprocket Bearing for round Baler
207KRR3	Large Inner Ring Bore Corner to clear .090 R Shaft Fillet	Trencher
207KRR8	Large Inner Ring Bore Corner to clear .090 R Shaft Fillet Narrow Inner .8499/.8399"	Baler
P207KRRB10	1¼ Bore Flare out type R-Seal with Shroud Cap	Corn Picker Snapping Rolls
207KRR12	1⅛" Hex Bore	Forage Harvester
P207KRNPB13	Bore 1.2505/1.2500 Extended Inner 1.000/.945 on R-Seal Side	Corn Picker Gathering Chain
207KRR14	Bore 1.2530/1.2525	Disk Harrow Transport Wheel
207KYY	Double Lip Seal	Disk Harrow Transport Wheel
P208KRR4 A1849	Bore 1.5312/1.5307 Large Inner Ring Bore Corner to clear .090R Shaft Fillet	Clutch Shaft
208NPPB5	Bore 1.4380/1.4375 Plya Seals with Shroud Cap	Crank Pin for Square Baler
209KRRB2	1" Hex Bore	Round Baler
304KR2	Offset Inner Ring with .7087/ .7037 Width	Tractor Water Pump
BB9105KRR2	1" Bore Inner Extended on one side with 1.000/.995 Width Two 17/64 dia. holes in Inner Ring 180° apart	Hay Rake
9113KDD3 FS264C	Cap Extends Past Inner Face on one side	PTO Drive
9114KDD3 FS264C	Cap Extends Past Inner Face on one side	PTO Drive
9117K3	Bore 3.2500/3.2492 O.D. 5.000/4.9992	PTO Drive

XLS/BIC SERIES – CONRAD TYPE



- An inch-dimension series with extra large diameters.
- Conrad or non-filling slot design.
- Compact sections for adaptability in applications where space is restricted.

DIMENSIONS – TOLERANCES

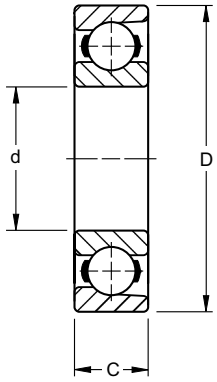
Bearing Number	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Width C		tolerance +0.000 mm +0.0000" to minus		Fillet Radius[1]		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E[2]	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
XLS44K	69.850	2.7500	0.015	0.0006	104.775	4.1250	0.015	0.0006	17.460	0.6875	0.13	0.005	1.2	0.047	0.449	0.99	22000	4900	28500	6400
XLS48K2	76.200	3.0000	0.015	0.0006	114.300	4.5000	0.015	0.0006	19.050	0.7500	0.13	0.005	1.2	0.047	0.567	1.25	33500	7500	44000	9800
XLS52K	82.550	3.2500	0.020	0.0008	120.650	4.7500	0.020	0.0008	19.050	0.7500	0.13	0.005	1.2	0.047	0.626	1.38	30000	6700	35500	8000
XLS56K	88.900	3.5000	0.020	0.0008	127.000	5.0000	0.020	0.0008	19.050	0.7500	0.13	0.005	1.7	0.065	0.671	1.48	31500	7100	36500	8150
XLS60K2	95.250	3.7500	0.020	0.0008	133.350	5.2500	0.020	0.0008	19.050	0.7500	0.13	0.005	1.6	0.063	0.712	1.57	34500	7800	39000	8650
XLS64K2	101.600	4.0000	0.020	0.0008	142.849	5.6240	0.025	0.0010	22.230	0.8750	0.13	0.005	2.0	0.080	0.794	1.75	41500	9500	47500	10600
41BIC196	104.648	4.1250	0.020	0.0008	152.400	6.0000	0.025	0.0010	22.230	0.8750	0.20	0.008	2.5	0.100	1.471	3.24	47500	10600	55000	12500
42BIC196	107.950	4.2500	0.020	0.0008	152.400	6.0000	0.025	0.0010	22.230	0.8750	0.20	0.008	2.5	0.100	1.374	3.03	47500	10600	55000	12500
43BIC206	111.125	4.3750	0.020	0.0008	158.750	6.2500	0.025	0.0010	22.230	0.8750	0.20	0.008	2.5	0.100	1.542	3.40	51000	11400	57000	12900
XLS72KD2	114.300	4.5000	0.020	0.0008	158.730	6.2490	0.025	0.0010	22.230	0.8750	0.20	0.008	2.0	0.080	1.121	2.47	54000	12000	60000	13400
45BIC206	114.300	4.5000	0.020	0.0008	158.750	6.2500	0.025	0.0010	22.230	0.8750	0.20	0.008	2.5	0.100	1.442	3.18	51000	11400	57000	12900
46BIC216	117.475	4.6250	0.020	0.0008	165.100	6.5000	0.025	0.0010	22.230	0.8750	0.20	0.008	2.5	0.100	1.615	3.56	54000	12000	58500	13200
47BIC216	120.650	4.7500	0.025	0.0010	165.100	6.5000	0.025	0.0010	22.230	0.8750	0.25	0.010	2.5	0.100	1.512	3.33	57000	12700	61000	13700
48BIC225	123.825	4.8750	0.025	0.0010	177.800	7.0000	0.025	0.0010	25.400	1.0000	0.25	0.010	2.5	0.100	2.254	4.97	65500	15000	75000	16600
XLS76K2	120.650	4.7500	0.025	0.0010	165.100	6.5000	0.025	0.0010	22.230	0.8750	0.25	0.010	1.7	0.065	1.157	2.55	57000	12700	61000	13700
XLS80K2	127.000	5.0000	0.025	0.0010	177.775	6.9990	0.025	0.0010	25.400	1.0000	0.25	0.010	2.0	0.080	1.611	3.55	67000	15000	72000	16300
50BIC225	127.000	5.0000	0.025	0.0010	177.800	7.0000	0.025	0.0010	25.400	1.0000	0.25	0.010	2.5	0.100	2.3	5.0	65500	15000	75000	16600
51BIC240	130.175	5.1250	0.025	0.0010	184.150	7.2500	0.030	0.0012	25.400	1.0000	0.25	0.010	2.5	0.100	2.5	5.5	69500	15600	76500	17300
52BIC240	133.350	5.2500	0.025	0.0010	184.150	7.2500	0.030	0.0012	25.400	1.0000	0.25	0.010	2.5	0.100	2.4	5.2	69500	15600	76500	17300
53BIC247	136.525	5.3750	0.025	0.0010	190.500	7.5000	0.030	0.0012	25.400	1.0000	0.25	0.010	2.5	0.100	2.6	5.7	75000	16600	80000	17600
55BIC247	139.700	5.5000	0.025	0.0010	190.500	7.5000	0.030	0.0012	25.400	1.0000	0.25	0.010	2.5	0.100	2.5	5.4	75000	16600	80000	17600
56BIC251	142.875	5.6250	0.025	0.0010	196.850	7.7500	0.030	0.0012	25.400	1.0000	0.25	0.010	2.5	0.100	2.7	5.9	75000	16600	80000	17600
57BIC251	146.050	5.7500	0.025	0.0010	196.850	7.7500	0.030	0.0012	25.400	1.0000	0.25	0.010	2.5	0.100	2.5	5.6	75000	16600	80000	17600
58BIC258	149.225	5.8750	0.025	0.0010	203.200	8.0000	0.030	0.0012	25.400	1.0000	0.25	0.010	2.5	0.100	2.8	6.1	78000	17300	81500	18000
60BIC258	152.400	6.0000	0.025	0.0010	203.200	8.0000	0.030	0.0012	25.400	1.0000	0.25	0.010	2.5	0.100	2.6	5.8	78000	17300	81500	18000
62BIC290	158.750	6.2500	0.025	0.0010	215.900	8.5000	0.030	0.0012	28.575	1.1250	0.25	0.010	3.0	0.120	3.5	7.7	104000	23200	106000	23600
65BIC298	165.100	6.5000	0.025	0.0010	222.250	8.7500	0.030	0.0012	28.575	1.1250	0.25	0.010	3.0	0.120	3.6	7.9	98000	22000	102000	22800
67BIC301	171.450	6.7500	0.025	0.0010	228.600	9.0000	0.030	0.0012	28.575	1.1250	0.25	0.010	3.0	0.120	3.7	8.2	104000	23200	104000	23600
70BIC309	177.800	7.0000	0.025	0.0010	241.300	9.5000	0.030	0.0012	31.750	1.2500	0.25	0.010	3.0	0.120	4.8	10.6	116000	26000	118000	26500
72BIC340	184.150	7.2500	0.030	0.0012	247.650	9.7500	0.030	0.0012	31.750	1.2500	0.31	0.012	3.0	0.120	4.9	10.8	122000	27500	122000	27000
75BIC348	190.500	7.5000	0.030	0.0012	254.000	10.0000	0.036	0.0014	31.750	1.2500	0.31	0.012	3.0	0.120	5.0	11.1	122000	27500	122000	27000
77BIC351	196.850	7.7500	0.030	0.0012	266.700	10.5000	0.036	0.0014	34.925	1.3750	0.31	0.012	3.0	0.120	6.3	13.9	146000	32500	143000	32500
80BIC359	203.200	8.0000	0.030	0.0012	273.050	10.7500	0.036	0.0014	34.925	1.3750	0.31	0.012	3.0	0.120	6.5	14.2	146000	32500	143000	32500
82BIC390	209.550	8.2500	0.030	0.0012	279.400	11.0000	0.036	0.0014	34.925	1.3750	0.31	0.012	3.0	0.120	6.6	14.6	153000	34500	150000	33500
85BIC391	215.900	8.5000	0.030	0.0012	292.100	11.5000	0.036	0.0014	38.100	1.5000	0.31	0.012	3.0	0.120	8.2	18.0	166000	37500	163000	36500
87BIC393	222.250	8.7500	0.030	0.0012	298.450	11.7500	0.036	0.0014	38.100	1.5000	0.31	0.012	3.0	0.120	8.4	18.5	176000	40000	170000	38000
90BIC401	228.600	9.0000	0.030	0.0012	304.800	12.0000	0.036	0.0014	38.100	1.5000	0.31	0.012	3.0	0.120	8.6	18.9	176000	40000	166000	37500
95BIC430	241.300	9.5000	0.030	0.0012	323.850	12.7500	0.041	0.0016	41.275	1.6250	0.36	0.014	4.0	0.160	10.6	23.4	200000	45000	190000	42500
100BIC439	254.000	10.0000	0.036	0.0014	336.550	13.2500	0.041	0.0016	41.275	1.6250	0.36	0.014	4.0	0.160	11.1	24.4	212000	47500	193000	43000
105BIC470	266.700	10.5000	0.036	0.0014	355.600	14.0000	0.041	0.0016	44.450	1.7500	0.36	0.014	4.0	0.160	13.5	29.8	255000	57000	224000	50000
110BIC479	279.400	11.0000	0.036	0.0014	368.300	14.5000	0.041	0.0016	44.450	1.7500	0.36	0.014	4.0	0.160	14.1	31.0	255000	57000	220000	50000
115BIC510	292.100	11.5000	0.036	0.0014	387.350	15.2500	0.041	0.0016	47.625	1.8750	0.36	0.014	5.0	0.200	16.9	37.2	280000	64000	240000	54000
120BIC519	304.800	12.0000	0.036	0.0014	406.400	16.0000	0.046	0.0018	50.800	2.0000	0.36	0.014	5.0	0.200	20.0	44.1	315000	71000	255000	58500
125BIC550	317.500	12.5000	0.041	0.0016	419.100	16.5000	0.046	0.0018	50.800	2.0000	0.41	0.016	5.0	0.200	20.7	45.7	325000	73500	265000	60000
135BIC580	342.900	13.5000	0.041	0.0016	457.200	18.0000	0.046	0.0018	57.150	2.2500	0.41	0.016	5.0	0.200	27.9	61.6	415000	93000	315000	71000
140BIC588	355.600	14.0000	0.041	0.0016	469.900	18.5000	0.046	0.0018	57.150	2.2500	0.41	0.016	5.0	0.200	28.8	63.4	415000	93000	310000	69500
145BIC610	368.300	14.5000	0.041	0.0016	495.300	19.5000	0.046	0.0018	63.500	2.5000	0.41	0.016	5.0	0.200	37.4	82.5	490000	110000	355000	80000
150BIC613	381.000	15.0000	0.041	0.0016	508.000	20.0000	0.051	0.0020	63.500	2.5000	0.41	0.016	5.0	0.200	38.5	84.8	490000	110000	355000	80000
155BIC615	393.700	15.5000	0.041	0.0016	520.700	20.5000	0.051	0.0020	63.500	2.5000	0.41	0.016	5.0	0.200	39.5	87.1	490000	110000	345000	78000
160BIC647	406.400	16.0000	0.046	0.0018	546.100	21.5000	0.051	0.0020	69.850	2.7500	0.46	0.018	5.0	0.200	48.8	107.6	585000	132000	400000	90000
165BIC660	419.100	16.5000	0.046	0.0018	558.800	22.0000	0.051	0.0020	69.850	2.7500	0.46	0.018	5.0	0.200	50.2	110.6	620000	137000	415000	93000
170BIC661	431.800	17.0000	0.046	0.0018	571.500	22.5000	0.051	0.0020	69.850	2.7500	0.46	0.018	5.0	0.200	51.4	113.3	620000	137000	415000	93000
175BIC680	444.500	17.5000	0.046	0.0018	596.900	23.5000	0.051	0.0020	76.200	3.0000	0.46	0.018	5.0	0.200	63.8	140.8	710000	160000	455000	102000
180BIC687	457.200	18.0000	0.046	0.0018	609.600	24.0000	0.051	0.0020	76.200	3.0000	0.46	0.018	5.0	0.200	65.3	144.0	710000	160000	455000	102000
185BIC695	469.900	18.5000	0.046	0.0018	622.300	24.5000	0.051	0.0020	76.200	3.0000	0.46	0.018	5.0	0.200	66.8	147.3	710000	160000	455000	102000
190BIC696	482.600	19.0000	0.046	0.0018	647.700	25.5000	0.076	0.0030	82.550	3.2500	0.46	0.018	5.0	0.200	80.7	177.9	800000	180000	500000	112000
195BIC710	495.300	19.5000	0.051	0.0020	660.400	26.0000	0.076	0.0030	82.550	3.2500	0.46	0.018	5.0	0.200	82.4	181.7	800000	180000	500000	112000
200BIC717	508.000	20.0000	0.051	0.0020	673.100	26.5000	0.076	0.0030	82.550	3.2500	0.51	0.020	5.0	0.200	84.3	185.9	850000	190000	510000	114000
205BIC725	520.700	20.5000	0.051	0.0020	698.500	27.5000	0.076	0.0030	88.900	3.5000	0.51	0.020	5.0	0.200	97.5	215.0	965000	216000	570000	129000
210BIC726	533.400	21.0000	0.051	0.0020	711.200	28.0000	0.076	0.0030	88.900	3.5000	0.51	0.020	5.0	0.200	99.7	219.8	1020000	228000	585000	132000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.

[2] Based on 10^6 revolutions of calculated fatigue life.

BIH SERIES – MAXIMUM CAPACITY TYPE

- An inch-dimension series with extra large diameters.
- Maximum capacity design.
- Feature a counterbored outer ring to permit increased number of balls.
- Can carry thrust in one direction only, against the full shouldered side of the outer race.
- Compact sections for adaptability to applications where space is restricted.



DIMENSIONS – TOLERANCES BIH SERIES

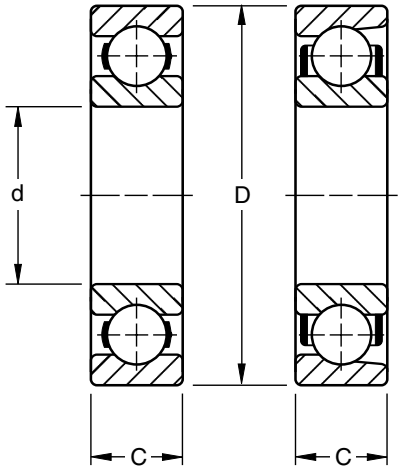
Bearing Number	Bore d		tolerance +0.000 mm +0.0000" to minus		Outside Diameter D		tolerance +0.000 mm +0.0000" to minus		Width C		tolerance +0.000 mm +0.0000" to minus		Fillet Radius[1]		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E[2]	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
41BIH196	104.775	4.1250	0.020	0.0008	152.400	6.0000	0.025	0.0010	22.23	0.8750	0.20	0.008	2.5	0.10	1.411	3.11	63000	14000	65500	14600
42BIH196	107.950	4.2500	0.020	0.0008	152.400	6.0000	0.025	0.0010	22.23	0.8750	0.20	0.008	2.5	0.10	1.321	2.91	71000	16000	72000	16300
43BIH206	111.125	4.3750	0.020	0.0008	158.750	6.2500	0.025	0.0010	22.23	0.8750	0.20	0.008	2.5	0.10	1.483	3.27	51000	11400	57000	12900
45BIH206	114.300	4.5000	0.020	0.0008	158.750	6.2500	0.025	0.0010	22.23	0.8750	0.20	0.008	2.5	0.10	1.383	3.05	75000	16600	73500	16600
46BIH216	117.475	4.6250	0.020	0.0008	165.100	6.5000	0.025	0.0010	22.23	0.8750	0.20	0.008	2.5	0.10	1.561	3.44	80000	18000	76500	17300
48BIH225	123.825	4.8750	0.025	0.0010	177.800	7.0000	0.025	0.0010	25.40	1.0000	0.25	0.010	2.5	0.10	2.209	4.87	104000	23200	100000	22400
50BIH225	127.000	5.0000	0.025	0.0010	177.800	7.0000	0.025	0.0010	25.40	1.0000	0.25	0.010	2.5	0.10	2.3	5.0	104000	23200	100000	22400
51BIH240	130.175	5.1250	0.025	0.0010	184.150	7.2500	0.030	0.0012	25.40	1.0000	0.25	0.010	2.5	0.10	2.5	5.5	108000	24000	102000	22800
52BIH240	133.350	5.2500	0.025	0.0010	184.150	7.2500	0.030	0.0012	25.40	1.0000	0.25	0.010	2.5	0.10	2.4	5.2	104000	23200	100000	22400
53BIH247	136.525	5.3750	0.025	0.0010	190.500	7.5000	0.030	0.0012	25.40	1.0000	0.25	0.010	2.5	0.10	2.6	5.7	112000	25000	104000	23200
55BIH247	139.700	5.5000	0.025	0.0010	190.500	7.5000	0.030	0.0012	25.40	1.0000	0.25	0.010	2.5	0.10	2.5	5.4	112000	25000	104000	23200
56BIH251	142.875	5.6250	0.025	0.0010	196.850	7.7500	0.030	0.0012	25.40	1.0000	0.25	0.010	2.5	0.10	2.7	5.9	116000	26000	106000	23600
57BIH251	146.050	5.7500	0.025	0.0010	196.850	7.7500	0.030	0.0012	25.40	1.0000	0.25	0.010	2.5	0.10	2.5	5.6	116000	26000	106000	23600
58BIH258	149.225	5.8750	0.025	0.0010	203.200	8.0000	0.030	0.0012	25.40	1.0000	0.25	0.010	2.5	0.10	2.8	6.1	118000	26500	108000	24000
60BIH258	152.400	6.0000	0.025	0.0010	203.200	8.0000	0.030	0.0012	25.40	1.0000	0.25	0.010	2.5	0.10	2.6	5.8	118000	26500	108000	24000
62BIH290	158.750	6.2500	0.025	0.0010	215.900	8.5000	0.030	0.0012	28.575	1.1250	0.25	0.010	3.0	0.12	3.5	7.7	146000	33500	134000	30000
65BIH298	165.100	6.5000	0.025	0.0010	222.250	8.7500	0.030	0.0012	28.575	1.1250	0.25	0.010	3.0	0.12	3.6	7.9	153000	34500	137000	30500
67BIH301	171.450	6.7500	0.025	0.0010	228.600	9.0000	0.030	0.0012	28.575	1.1250	0.25	0.010	3.0	0.12	3.7	8.2	160000	35500	137000	31000
70BIH309	177.800	7.0000	0.025	0.0010	241.300	9.5000	0.030	0.0012	31.750	1.2500	0.25	0.010	3.0	0.12	4.8	10.6	180000	40500	160000	35500
72BIH340	184.150	7.2500	0.030	0.0012	247.650	9.7500	0.030	0.0012	31.750	1.2500	0.31	0.012	3.0	0.12	4.9	10.8	186000	42500	160000	36000
75BIH348	190.500	7.5000	0.030	0.0012	254.000	10.0000	0.036	0.0014	31.750	1.2500	0.31	0.012	3.0	0.12	5.0	11.1	193000	43000	163000	36500
77BIH351	196.850	7.7500	0.030	0.0012	266.700	10.5000	0.036	0.0014	34.925	1.3750	0.31	0.012	3.0	0.12	6.3	13.9	228000	51000	193000	44000
80BIH359	203.200	8.0000	0.030	0.0012	273.050	10.7500	0.036	0.0014	34.925	1.3750	0.31	0.012	3.0	0.12	6.5	14.2	236000	53000	200000	45000
82BIH390	209.550	8.2500	0.030	0.0012	279.400	11.0000	0.036	0.0014	34.925	1.3750	0.31	0.012	3.0	0.12	6.6	10.6	245000	55000	200000	45500
85BIH391	215.900	8.5000	0.030	0.0012	292.100	11.5000	0.036	0.0014	38.100	1.5000	0.31	0.012	3.0	0.12	8.2	18.0	270000	61000	224000	50000
87BIH393	222.250	8.7500	0.030	0.0012	298.450	11.7500	0.036	0.0014	38.100	1.5000	0.31	0.012	3.0	0.12	8.4	18.5	270000	61000	224000	50000
90BIH401	228.600	9.0000	0.030	0.0012	304.800	12.0000	0.036	0.0014	38.100	1.5000	0.31	0.012	3.0	0.12	8.6	18.9	280000	63000	228000	51000
95BIH430	241.300	9.5000	0.030	0.0012	323.850	12.7500	0.036	0.0014	41.275	1.6250	0.36	0.014	4.0	0.16	10.6	23.4	315000	71000	255000	57000
100BIH439	254.00	10.0000	0.036	0.0014	336.550	13.2500	0.041	0.0016	41.275	1.6250	0.36	0.014	4.0	0.16	11.1	24.4	325000	73500	260000	58500
105BIH470	266.700	10.5000	0.036	0.0014	355.600	14.0000	0.041	0.0016	44.450	1.7500	0.36	0.014	4.0	0.16	13.5	29.8	400000	90000	300000	68000
110BIH479	279.400	11.0000	0.036	0.0014	368.300	14.5000	0.041	0.0016	44.450	1.7500	0.36	0.014	4.0	0.16	14.1	31.0	415000	93000	305000	69500
115BIH510	292.100	11.5000	0.036	0.0014	387.350	15.2500	0.041	0.0016	47.625	1.8750	0.36	0.014	5.0	0.20	16.9	37.2	465000	104000	335000	75000
120BIH519	304.800	12.0000	0.036	0.0014	406.400	16.0000	0.046	0.0018	50.800	2.0000	0.36	0.014	5.0	0.20	20.0	44.1	510000	116000	355000	80000
135BIH580	342.900	13.5000	0.041	0.0016	457.200	18.0000	0.046	0.0018	57.150	2.2500	0.41	0.016	5.0	0.20	27.9	61.6	655000	146000	425000	95000
140BIH588	355.600	14.0000	0.041	0.0016	469.900	18.5000	0.046	0.0018	57.150	2.2500	0.41	0.016	5.0	0.20	28.8	63.4	680000	150000	430000	96500

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

(2) Based on 10^6 revolutions of calculated fatigue life.

EXTRA LARGE 100 SERIES

- Dimensions originally established to meet specific design requirements, before standard dimensions were established by the American Bearing Manufacturers Association (ABMA).
- A metric series.
- Available in the 100 Series (extra light).
- Available in a radially-fitted counterbore type, having a maximum complement of balls.
- Identified by the suffix "WI," these are designed to take thrust in one direction only.



Filling-Slot Type Counterbore Type

DIMENSIONS – TOLERANCES

Bearing Number			Bore d				Outside Diameter D				Width C		Fillet Radius[1]		Wt.						Static Load Rating C_0		Extended Dynamic Load C_E[5]	
Filling-slot Type	Counter-bore Type	One Shield D			tolerance +0.000 mm +0.0000" to minus				tolerance +0.000 mm +0.0000" to minus		+0.00 mm -.25 mm +0.000" -.010"				Filling-slot Type		Counter-bore Type		Shielded Type					
			mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	kg	lbs.	kg	lbs.	N	lbs.	N	lbs.
120W2	—	120WD2N	100	3.9370	0.020	0.0008	160	6.2992	0.025	0.0010	28	1.102[4]	2.01	0.079	2.041	4.50	—	—	2.041	4.50	75000	17000	106000	24000
122W	122WI	122WD2N[3]	110	4.3307	0.020	0.0008	175	6.8898	0.025	0.0010	30	1.181[4]	2.01	0.079	2.762	6.09	2.835	6.25	3.157	6.96	80000	18000	116000	26000
124W	124WI	124WD	120	4.7244	0.020	0.0008	190	7.4803	0.030	0.0012	32	1.260[4]	2.01	0.079	3.475	7.66	3.538	7.80	3.466	7.64	98000	22400	140000	31500
126W	126WI	126WD	130	5.1181	0.025	0.0010	205	8.0709	0.030	0.0012	34	1.339	2.01	0.079	4.336	9.56	4.318	9.52	4.332	9.55	110000	24500	146000	33500
128W	128WI	128WD	140	5.5118	0.025	0.0010	220	8.6614	0.030	0.0012	36	1.417	2.01	0.079	5.239	11.55	5.244	11.56	5.294	11.67	122000	27000	163000	36500
130W	—	130WD	150	5.9055	0.025	0.0010	235	9.2520	0.030	0.0012	38	1.496	2.01	0.079	6.278	13.84	—	—	6.437	14.19	140000	31500	183000	41500
132W	—	132WD	160	6.2992	0.025	0.0010	250	9.8425	0.030	0.0012	40	1.575	2.49	0.098	7.394	16.30	—	—	7.484	16.50	160000	35500	208000	46500
134W	—	—	170	6.6929	0.025	0.0010	265	10.4331	0.035	0.0014	42	1.654	2.49	0.098	9.049	19.95	—	—	—	—	180000	40000	224000	51000
—	—	136WD2N	180	7.0866	0.025	0.0010	280	11.0236	0.035	0.0014	49	1.929	2.49	0.098	—	—	—	—	11.004	24.26	200000	45000	245000	55000
138W	—	—	190	7.4803	0.03	0.0120	300	11.8110	0.035	0.0014	46	1.811[2]	2.49	0.098	12.928	28.50	—	—	—	—	245000	56000	285000	64000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.
[2] +.00 mm, -25 mm (+000", -.010").
[3] 35 mm width.
[4] Width tolerance is +.00 mm, -.20 mm (+.000", -.008").
[5] Based on 10^6 revolutions of calculated fatigue life.

7000WN PRODUCT FAMILY

INTRODUCTION

The high performance 7000WN Angular Contact Product Family is specifically designed to support heavy thrust loads at lower operating temperatures at high speeds. Included in the angular contact series are the following design features:

- Refined bore diameter tolerance
- Increased thrust capacity
- Extended load capacity
- Lower operating temperatures
- Better than ABEC 1 bore diameter tolerances
- High operating contact angle
- Improved ball section ratio
- Low shoulder inner and outer rings improve oil flow

A feature of this series is the refined bore diameter tolerance. The closer bore tolerance in the WN product family reduces the broad range of interference and thus prevents the development of undesirable high preload in mounted duplex pairs. As a result, longer bearing life is achieved and high operating temperatures are avoided.

This product family can support heavy thrust loads by combining high shoulders on the thrust side of both rings with a high operating angle. In addition, uniformity of load per ball under combined loads is more favorable with a high contact angle and results in longer bearing life.

Maximum clearance between the one-piece brass or bronze cage and the land diameters of both rings is achieved in the WN construction. Utilizing low shoulder diameters on the non-thrust sides of inner and outer rings promotes efficient oil passage through the bearing resulting in lower operating temperatures and longer bearing life.

The 7000WN Product Family is divided into several designs. Sizes 7207-7218WN and 7304-7318WN have a 40 degree contact angle and a one-piece, ball-piloted, pressed brass cage. Sizes 7219-7230WN and 7319-7330WN have a 40 degree contact angle and a one-piece, outer ring-piloted, high-strength machined bronze cage. The 7412WN and 7415WN both have a 40 degree contact angle and a one-piece conical, high-strength machined bronze cage.

The 7000WN Product Family is available as single bearings and duplex sets. A single with the suffix "SU" is flush ground on both faces for universal mounting. Such bearings can be used as singles or duplex mounted back-to-back (DB), face-to-face (DF) or tandem (DT), depending on the functional requirements of the design. The mounting of duplex "SU" bearings will result in a preload range of minimum internal clearance to a solid preload.

Bearings without the "SU" designation are not flush ground and are intended to be used as singles. These bearings are used to support thrust from one direction and are often accompanied by a preload spring.

Bearings with the suffix "DU" are flush ground on both faces for universal mounting. A duplex pair of "DU" bearings can be mounted (DB, DF, or DT), depending on the functional requirements of the design. These bearings, after mounting, will result in a range of positive light preload.

APPLICATIONS

These design features are advantageous in applications such as oil refining pump systems where higher productivity and longer system life is important. Other applications where these features are equally suited are deep well pump motors, vertical and horizontal pumps, worm gear and right angle drives, spindles, live centers and gearboxes. For applications requiring a high degree of axial and radial rigidity, these bearings are suggested in preloaded duplex mountings.

MOUNTING

Although each 7000WN Product Family bearing is a self-contained unit, the construction is such that they are frequently mounted as two bearings opposed, so that thrust can be carried in either direction.

Unlike the radial type, the angular contact bearing, when mounted alone, requires adjustment and must be installed with care. As the bearing is relatively loose axially before mounting, it is important that the design incorporate some means to move the outer ring axially into its correct position relative to the inner ring. This adjustment should be made when the bearing is mounted. A common method is to place a preload spring or shims at one bearing location.

The correct adjustment of the single bearing is obtained when the initial axial looseness of the assembly is removed. This eliminates the possibility of premature bearing damage due to excessive preloading or looseness through improper adjustment.

Bearings designated "SU" are ground on both surfaces to permit universal mounting. These duplex sets are ideally suited for applications which involve a combination of radial loads from either direction. "SU" bearings are flush ground so that under a specific axial gage load the inner ring will protrude beyond the face of the outer ring. This design results in an internal axial clearance within the bearing pair that helps to minimize build-up of excessive preload within the bearings when mounted on a shaft with maximum interference.

To assure correct mounting of bearings in the 7000WN Product Family, the word THRUST is marked on the thrust face of both the inner and outer rings. This face should abut against the housing shoulder or the end cover, depending on the required direction of "thrust".

ORDERING INFORMATION

"SU" Suffix: All bearings are packaged singly.
To obtain a pair of SU flush ground bearings for duplex mounting, specify two bearings.
Example: (2) 7210WN SU bearings.

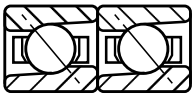
"DU" Suffix: All bearings are packaged as a pair in a single box.
To obtain a pair of DU flush ground bearings for duplex mounting, specify one pair.
Example: one pair-7219WN MBR-DU.

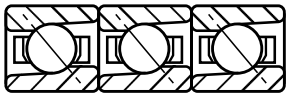
No Suffix: All bearings are packaged singly.
No other designation is required to obtain

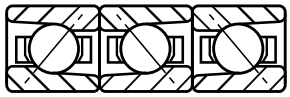
MOUNTING ARRANGEMENTS


Duplex- DB
Back-to-Back


Duplex- DF
Face-to-Face

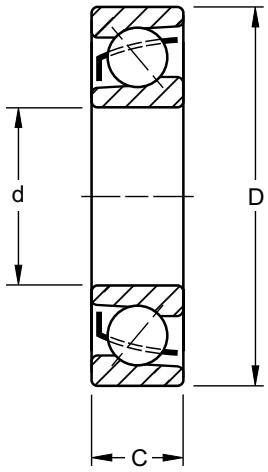

Duplex- DT Tandem


Three Bearings in Tandem

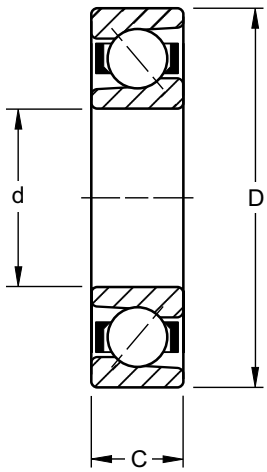

Two in Tandem Opposed
with a Single Bearing

LIGHT 7200WN SERIES

- Dimensionally interchangeable with the radial 200 Series.
- 7000WN Product Family includes a refined bore diameter.
- A single bearing is suggested for applications in which the thrust load is in one direction or, in the case of combined loads, the thrust load is high in relation to the radial load.
- A duplex pair is suggested for applications where thrust is present in both directions or where axial displacement of the shaft must be restricted.
- For exceptionally high thrust loads in one direction, a tandem pair can be used, opposed by a third bearing.
- Sizes 7201K through 7203WN have a 20 degree contact angle and a nylon cage.
- Sizes 7204WN through 7218WN have a 40 degree contact angle and a one-piece, ball-piloted, pressed brass cage.
- Larger sizes 7219WN through 7230WN have a 40 degree contact angle and a one-piece, outer ring piloted high-strength machined bronze cage.



7207-7218WN
40° Contact Angle



7219-7230WN MBR
40° Contact Angle

DIMENSIONS – TOLERANCES

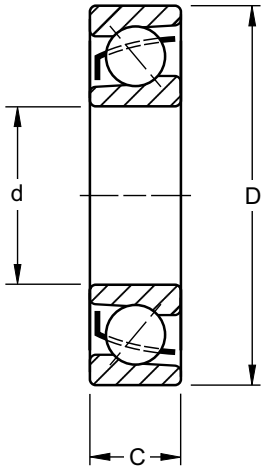
Bearing Number	Bore d tolerance +0.000 mm +0.0000" to minus				Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width C tolerance +0.000 mm +0.0000" to minus				Fillet Radius[1]		Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E[4]	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
7201K	12	0.4724	0.008	0.0003	32	1.2598	0.011	0.00043	10	0.3937	0.12	0.005	0.6	0.024	0.036	0.08	2790	630	7100	1600
7202W	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00043	11	0.4331	0.12	0.005	0.6	0.024	0.045	0.10	4700	1060	10300	2320
7203W	17	0.6693	0.008	0.0003	40	1.5748	0.011	0.00043	12	0.4727	0.12	0.005	0.6	0.024	0.068	0.15	6930	1560	14200	3200
7204WN[2][3]	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00043	14	0.5512	0.12	0.005	1.0	0.039	0.104	0.23	8100	1830	16800	3800
7205WN[3]	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.0005	15	0.5906	0.12	0.005	1.0	0.039	0.132	0.29	9400	2120	16600	3750
7206WN	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	16	0.6299	0.12	0.005	1.0	0.039	0.209	0.46	13500	3050	23000	5200
7207WN	35	1.3780	0.010	0.0004	72	2.8346	0.013	0.0005	17	0.6693	0.12	0.005	1.0	0.039	0.286	0.63	18000	4150	30800	6950
7208WN	40	1.5748	0.010	0.0004	80	3.1496	0.013	0.0005	18	0.7087	0.12	0.005	1.0	0.039	0.331	0.73	23000	5200	36000	8150
7209WN	45	1.7717	0.010	0.0004	85	3.3465	0.015	0.0006	19	0.7480	0.12	0.005	1.0	0.039	0.435	0.96	25900	5850	40500	9150
7210WN	50	1.9685	0.010	0.0004	90	3.5433	0.015	0.0006	20	0.7874	0.12	0.005	1.0	0.039	0.508	1.12	28400	6400	42500	9500
7211WN	55	2.1654	0.010	0.0004	100	3.9370	0.015	0.0006	21	0.8268	0.15	0.006	1.5	0.059	0.635	1.40	36200	8150	52000	11800
7212WN	60	2.3622	0.010	0.0004	110	4.3307	0.015	0.0006	22	0.8661	0.15	0.006	1.5	0.059	0.835	1.84	44000	10000	63000	14300
7213WN	65	2.5591	0.010	0.0004	120	4.7244	0.015	0.0006	23	0.9055	0.15	0.006	1.5	0.059	1.061	2.34	52400	11800	72400	16300
7214WN	70	2.7559	0.010	0.0004	125	4.9213	0.018	0.0007	24	0.9449	0.15	0.006	1.5	0.059	1.171	2.58	57300	12900	78000	17600
7215WN	75	2.9528	0.010	0.0004	130	5.1181	0.018	0.0007	25	0.9843	0.15	0.006	1.5	0.059	1.271	2.80	58000	13200	78000	17600
7216WN	80	3.1496	0.010	0.0004	140	5.5118	0.018	0.0007	26	1.0236	0.15	0.006	2.0	0.079	1.483	3.27	65500	15600	91500	20400
7217WN	85	3.3465	0.013	0.0005	150	5.9055	0.018	0.0007	28	1.1024	0.20	0.008	2.0	0.079	2.096	4.62	76500	18300	106000	23600
7218WN	90	3.5433	0.013	0.0005	160	6.2992	0.025	0.0010	30	1.1811	0.20	0.008	2.0	0.079	2.567	5.66	88000	21200	119000	27000
7219WN MBR	95	3.7402	0.013	0.0005	170	6.6929	0.025	0.0010	32	1.2600	0.20	0.008	2.0	0.079	3.025	6.67	93000	22800	133000	30000
7220WN MBR	100	3.9370	0.013	0.0005	180	7.0866	0.025	0.0010	34	1.3390	0.20	0.008	2.0	0.079	3.460	7.62	106000	25500	146000	33500
7222WN MBR	110	4.3307	0.013	0.0005	200	7.8740	0.030	0.0012	38	1.4960	0.20	0.008	2.0	0.079	5.162	11.38	134000	32500	173000	39000
7224WN MBR	120	4.7244	0.013	0.0005	215	8.4646	0.030	0.0012	40	1.5750	0.20	0.008	2.0	0.079	6.354	14.01	160000	36500	188000	42500
7226WN MBR	130	5.1181	0.018	0.0007	230	9.0551	0.030	0.0012	40	1.5750	0.25	0.010	2.5	0.098	7.543	16.63	176000	43000	211000	47500
7228WN MBR	140	5.5118	0.018	0.0007	250	9.8425	0.030	0.0012	42	1.6540	0.25	0.010	2.5	0.098	9.634	21.24	200000	47500	224000	50000
7230WN MBR	150	5.9055	0.018	0.0007	270	10.6299	0.035	0.0014	45	1.7720	0.25	0.010	2.5	0.098	11.731	25.84	240000	56000	248000	56000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.
[2] Also available as W design.
[3] Also available with 20° contact angle and nylon cage.
[4] Based on 10^6 revolutions of calculated fatigue life.

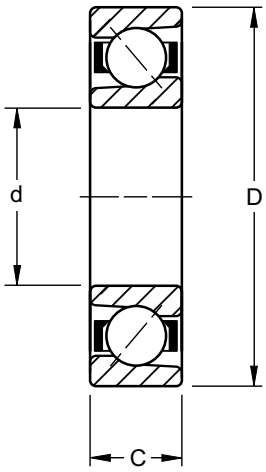
Note: 7208WN-7212WN also available with a one-piece, high-strength machined bronze retainer (MBR). This cage can be quoted on the other sizes by request.

MEDIUM 7300WN SERIES

- Dimensionally interchangeable with the radial 300 Series.
- The 7000WN Product Family includes a refined bore diameter. The 7300WN Series can sustain heavier thrust and combined loads than the 7200WN Series.
- A single bearing is suggested for applications in which the thrust load is in one direction or, in the case of combined loads, the thrust load is high in relation to the radial load.
- A duplex pair is suggested for applications where thrust is present in both directions or where axial displacement of the shaft must be restricted.
- For exceptionally high thrust loads in one direction, a tandem pair can be used, opposed by a third bearing.
- Size 7303W has a 20 degree contact angle and a steel cage.
- Sizes 7304WN through 7318WN have a 40 degree contact angle and a one-piece, ball-piloted, pressed brass cage.
- Larger sizes 7319WN through 7330WN have a 40 degree contact angle and a one-piece, outer ring piloted high-strength machined bronze cage.
- Sizes 7306WN to 7318WN also available with a one-piece, high-strength, machined bronze retainer.



7304-7318WN
40° Contact Angle



7319-7330WN MBR
40° Contact Angle

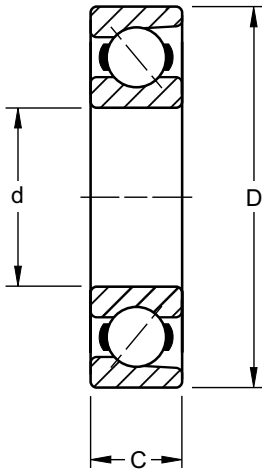
DIMENSIONS – TOLERANCES

Bearing Number	Bore d tolerance +0.000 mm +0.0000" to minus				Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width C tolerance +0.000 mm +0.0000" to minus				Fillet Radius[1]		Wt.		Static Load Rating C_0		Extended Dynamic Load Rating C_E[2]	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
7303W	17	0.6693	0.008	0.0003	47	1.8504	0.011	0.00045	14	0.5512	0.12	0.005	1.0	0.039	0.118	0.26	9200	2080	20200	4550
7304WN	20	0.7874	0.010	0.0004	52	2.0472	0.013	0.0005	15	0.5906	0.12	0.005	1.0	0.039	0.150	0.33	9590	2160	19500	4400
7305WN	25	0.9843	0.010	0.0004	62	2.4409	0.013	0.0005	17	0.6693	0.12	0.005	1.0	0.039	0.241	0.53	13300	3000	26500	5850
7306WN	30	1.1811	0.010	0.0004	72	2.8346	0.013	0.0005	19	0.7480	0.12	0.005	1.0	0.039	0.363	0.80	20800	4650	34600	7800
7307WN	35	1.3780	0.010	0.0004	80	3.1496	0.013	0.0005	21	0.8268	0.12	0.005	1.5	0.059	0.408	0.90	23900	5400	41300	9300
7308WN	40	1.5748	0.010	0.0004	90	3.5433	0.015	0.0006	23	0.9055	0.12	0.005	1.5	0.059	0.667	1.47	30200	6800	50600	11400
7309WN	45	1.7717	0.010	0.0004	100	3.9370	0.015	0.0006	25	0.9843	0.12	0.005	1.5	0.059	0.885	1.95	39900	9000	66600	15000
7310WN	50	1.9685	0.010	0.0004	110	4.3307	0.015	0.0006	27	1.0630	0.12	0.005	2.0	0.079	1.139	2.51	47900	10800	76800	17300
7311WN	55	2.1654	0.010	0.0004	120	4.7244	0.015	0.0006	29	1.1417	0.15	0.006	2.0	0.079	1.592	3.51	56400	12700	88800	20000
7312WN	60	2.3622	0.010	0.0004	130	5.1181	0.018	0.0007	31	1.2205	0.15	0.006	2.0	0.079	1.969	4.34	64800	14600	101000	22800
7313WN	65	2.5591	0.010	0.0004	140	5.5118	0.018	0.0007	33	1.2992	0.15	0.006	2.0	0.079	2.477	5.46	75500	17000	115000	26000
7314WN	70	2.7559	0.010	0.0004	150	5.9055	0.018	0.0007	35	1.3780	0.15	0.006	2.0	0.079	2.676	5.90	85700	19300	128000	29000
7315WN	75	2.9528	0.010	0.0004	160	6.2992	0.025	0.0010	37	1.4567	0.15	0.006	2.0	0.079	3.452	7.61	98000	22000	142000	32000
7316WN	80	3.1496	0.010	0.0004	170	6.6929	0.025	0.0010	39	1.5354	0.15	0.006	2.0	0.079	4.504	9.92	108000	24500	153000	34500
7317WN	85	3.3465	0.013	0.0005	180	7.0866	0.025	0.0010	41	1.6124	0.20	0.008	2.5	0.098	4.940	10.88	122000	27500	166000	37500
7318WN	90	3.5433	0.013	0.0005	190	7.4803	0.030	0.0012	43	1.6929	0.20	0.008	2.5	0.098	6.247	13.76	135000	30500	177000	40000
7319WN MBR	95	3.7402	0.013	0.0005	200	7.8740	0.030	0.0012	45	1.7717	0.20	0.008	2.5	0.098	6.706	14.77	148000	33500	191000	43000
7320WN MBR	100	3.9370	0.013	0.0005	215	8.4646	0.030	0.0012	47	1.8504	0.20	0.008	2.5	0.098	8.227	18.12	177000	40000	217000	49000
7321WN MBR	105	4.1339	0.013	0.0005	225	8.8583	0.030	0.0012	49	1.9291	0.20	0.008	2.5	0.098	9.498	20.92	191000	43000	226000	51000
7322WN MBR	110	4.3307	0.013	0.0005	240	9.4488	0.030	0.0012	50	1.9685	0.20	0.008	2.5	0.098	10.892	23.99	226000	51000	253000	57000
7324WN MBR	120	4.7244	0.013	0.0005	260	10.2362	0.035	0.0014	55	2.1654	0.20	0.008	2.5	0.098	14.356	31.62	259000	58500	284000	64000
7326WN MBR	130	5.1181	0.018	0.0007	280	11.0236	0.035	0.0014	58	2.2835	0.25	0.010	3.0	0.118	17.339	38.19	302000	68000	315000	71000
7328WN MBR	140	5.5118	0.018	0.0007	300	11.8110	0.035	0.0014	62	2.4409	0.25	0.010	3.0	0.118	20.294	44.70	346000	78000	339000	76500
7330WN MBR	150	5.9055	0.018	0.0007	320	12.5984	0.040	0.0016	65	2.5591	0.25	0.010	3.0	0.118	24.907	54.86	390000	88000	368000	83000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.
[2] Based on 10^6 revolutions of calculated fatigue life.

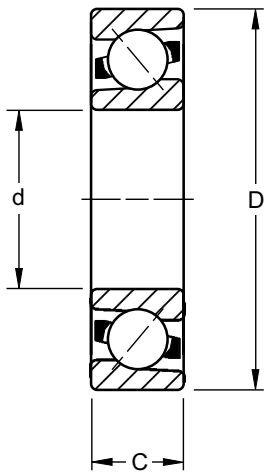
HEAVY 7400 SERIES

- Dimensionally interchangeable with the radial 400 Series.
- Sizes with a "WN" suffix include a refined bore diameter tolerance.
- Can sustain heavier thrust and combined loads than the 7300WN Series.
- A single bearing is suggested for applications in which the thrust load is in one direction or, in the case of combined loads, the thrust load is high in relation to the radial load.
- A duplex pair is suggested for applications where thrust is present in both directions or where axial displacement of the shaft must be restricted.
- For exceptionally high thrust loads in one direction, a tandem pair can be used, opposed by a third bearing.
- Sizes with a suffix "W" have a 20 degree contact angle and a steel retainer.
- Sizes with a suffix "PW" have a 35 degree contact angle and a steel retainer.
- Sizes with a "WN" suffix have a 40 degree contact angle and a one-piece, high-strength machined bronze cage.



7405W-7409W
20° Contact Angle

7410PW-7420PW
35° Contact Angle



7412WN and 7415WN MBR
40° Contact Angle

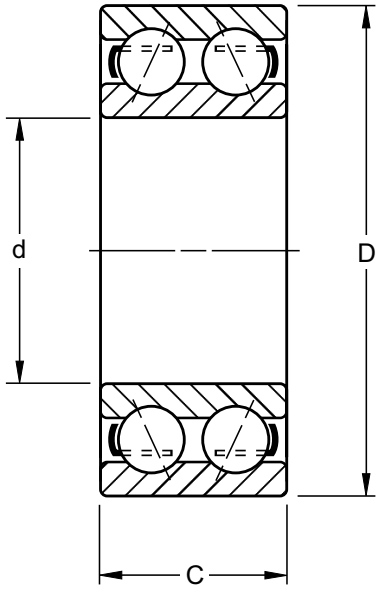
DIMENSIONS – TOLERANCES

Bearing Number	Bore d tolerance +0.000 mm +0.0000" to minus				Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width C tolerance +0.000 mm +0.0000" to minus				Fillet Radius[1]		Wt.		Static Load Rating C_0		Extended Dynamic Load Rating C_E[2]	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.
7405W	25	0.9843	0.010	0.0004	80	3.1496	0.013	0.0005	21	0.8268	0.12	0.005	1.5	0.060	0.925	2.04	25900	5850	53300	12000
7406W	30	1.1811	0.010	0.0004	90	3.5433	0.015	0.0006	23	0.9055	0.12	0.005	1.5	0.060	0.957	2.11	35500	8000	69000	15600
7407W	35	1.3780	0.012	0.00045	100	3.9370	0.015	0.0006	25	0.9843	0.12	0.005	1.5	0.060	1.002	2.21	42800	9650	79900	18000
7408W	40	1.5748	0.012	0.00045	110	4.3307	0.015	0.0006	27	1.0630	0.12	0.005	2.0	0.080	1.311	2.89	56400	12700	99500	22400
7409W	45	1.7717	0.012	0.00045	120	4.7244	0.015	0.0006	29	1.1417	0.12	0.005	2.0	0.080	1.647	3.63	62000	14000	106000	24000
7410WN	50	1.9685	0.012	0.00045	130	5.1181	0.018	0.0007	31	1.2205	0.12	0.005	2.0	0.080	2.195	4.84	66600	15000	115000	26000
7411PW	55	2.1654	0.015	0.0006	140	5.5118	0.018	0.0007	33	1.2992	0.15	0.006	2.0	0.080	2.681	5.91	71000	16000	122000	27500
7412WN	60	2.3622	0.010	0.0004	150	5.9055	0.018	0.0007	35	1.3780	0.15	0.006	2.0	0.080	3.257	7.18	85700	19300	135000	30500
7413WN	65	2.5591	0.015	0.0006	160	6.2992	0.025	0.0010	37	1.4567	0.15	0.006	2.0	0.080	3.896	8.59	91500	20400	142000	32000
7414WN	70	2.7559	0.015	0.0006	180	7.0866	0.025	0.0010	42	1.6535	0.15	0.006	2.5	0.100	5.688	12.54	115500	26000	173000	39000
7415WN	75	2.9528	0.010	0.0004	190	7.4803	0.030	0.0012	45	1.7717	0.15	0.006	2.5	0.100	6.745	14.87	148000	33500	202000	45500
7416WN	80	3.1496	0.015	0.0006	200	7.8740	0.030	0.0012	48	1.8898	0.15	0.006	2.5	0.100	7.747	17.08	153000	34500	206000	46500
7418PW	90	3.5433	0.020	0.0008	225	8.8583	0.030	0.0012	54	2.1268	0.20	0.008	3.0	0.120	11.159	24.60	200000	45000	236000	53000
7420PW	100	3.9370	0.020	0.0008	265	10.4331	0.036	0.0014	60	2.3622	0.20	0.008	3.0	0.120	18.643	41.10	279000	63000	315000	71000

[1] Maximum shaft or housing fillet radius that bearing corners will clear.
[2] Based on 10^6 revolutions of calculated fatigue life.

LIGHT 5200 SERIES

- Features the same bores and outside diameters as the corresponding bearings in the 200 Series single-row radial type.
- Double-row angular contact ball bearings meet the demand for increased axial and radial rigidity in applications where the design limits space.
- Available in both Conrad and maximum capacity types.
- Suffix “K” denotes Conrad (example: 5203K).
- Suffix “W” or no suffix denotes maximum capacity type (example: 5212W, 5213).
- Please note: these double-row series bearings are not prelubricated.



DIMENSIONS – TOLERANCES

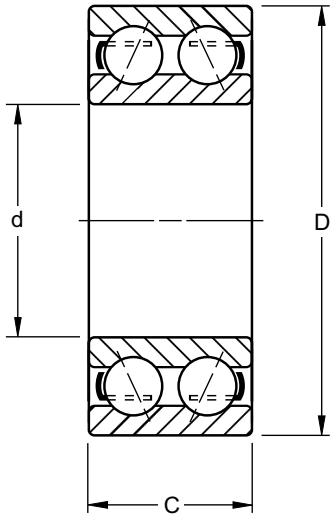
Bearing Number	Bore d tolerance +0.000 mm +0.0000" to minus				Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width C +0.00 mm, -0.12 mm +0.000", -0.005"			Fillet Radius(1)		Contact Angle	Wt.		Static Load Rating C_o		Extended Dynamic Load Rating C_E(6)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	in.	mm	in.		kg	lbs.	N	lbs.	N	lbs.
5200K(2)	10	0.3937	0.008	0.0003	30	1.1811	0.009	0.00035	14.27	0.562	9/16	0.6	0.024	20°	0.054	0.12	5060	1140	10600	2400
5201K(2)	12	0.4724	0.008	0.0003	32	1.2598	0.012	0.00045	15.88	0.625	5/8	0.6	0.024	20°	0.068	0.15	4700	1060	9060	2040
5202K(2)	15	0.5906	0.008	0.0003	35	1.3780	0.012	0.00045	15.88	0.625	5/8	0.6	0.024	20°	0.073	0.16	7100	1600	13500	3050
5203K(2)	17	0.6693	0.008	0.0003	40	1.5748	0.012	0.00045	17.48	0.688	11/16	0.6	0.024	20°	0.104	0.23	9200	2080	16800	3800
5204K(2)	20	0.7874	0.010	0.0004	47	1.8504	0.012	0.00045	20.62	0.812	13/16	1.0	0.039	20°	0.163	0.36	12600	2850	22600	5100
5205K(2)	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.0005	20.62	0.812	13/16	1.0	0.039	20°	0.186	0.41	15100	3400	24800	5600
5206K	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	23.83	0.938	15/16	1.0	0.039	20°	0.295	0.65	21700	4900	34600	7800
5206W	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	23.83	0.938	15/16	1.0	0.039	30°	0.295	0.65	27000	6100	39000	8800
5207K	35	1.3780	0.012	0.00047	72	2.8346	0.013	0.0005	26.97	1.062	1 1/16	1.0	0.039	20°	0.481	1.06	29000	6550	45000	10200
5207W	35	1.3780	0.012	0.00047	72	2.8346	0.013	0.0005	26.97	1.062	1 1/16	1.0	0.039	30°	0.481	1.06	36800	8300	51500	11600
5208K	40	1.5748	0.012	0.00047	80	3.1496	0.013	0.0005	30.17	1.188	1 3/16	1.0	0.039	20°	0.566	1.32	33900	7650	51500	11600
5208W	40	1.5748	0.012	0.00047	80	3.1496	0.013	0.0005	30.17	1.188	1 3/16	1.0	0.039	30°	0.599	1.32	47000	10600	62000	14000
5209K	45	1.7717	0.012	0.00047	85	3.3456	0.015	0.0006	30.17	1.188	1 3/16	1.0	0.039	20°	0.699	1.54	39000	8800	57000	12900
5209W	45	1.7717	0.012	0.00047	85	3.3456	0.015	0.0006	30.17	1.188	1 3/16	1.0	0.039	30°	0.699	1.54	51500	11600	64800	14600
5210K	50	1.9685	0.012	0.00047	90	3.5433	0.015	0.0006	30.17	1.188	1 3/16	1.0	0.039	20°	0.753	1.66	44400	10000	62000	14000
5210W	50	1.9685	0.012	0.00047	90	3.5433	0.015	0.0006	30.17	1.188	1 3/16	1.0	0.039	30°	0.753	1.66	56000	12700	66600	15000
5211K	55	2.1654	0.015	0.0006	100	3.9370	0.015	0.0006	33.32	1.312(4)	1 5/16	1.5	0.059	20°	1.039	2.29	71000	12700	76000	17300
5211W	55	2.1654	0.015	0.0006	100	3.9370	0.015	0.0006	33.32	1.312(4)	1 5/16	1.5	0.059	30°	1.039	2.29	62000	16000	84000	19000
5212K	60	2.3622	0.015	0.0006	110	4.3307	0.015	0.0006	36.53	1.438(4)	1 7/16	1.5	0.059	20°	1.388	3.06	88800	14000	85000	19300
5212W	60	2.3622	0.015	0.0006	110	4.3307	0.015	0.0006	36.53	1.438(4)	1 7/16	1.5	0.059	30°	1.388	3.06	72000	20000	103000	23800
5213K	65	2.5591	0.015	0.0006	120	4.7244	0.015	0.0006	38.10	1.500(4)	1 1/2	1.5	0.059	20°	1.923	4.24	76800	17300	101000	22800
5213(3)	65	2.5591	0.015	0.0006	120	4.7244	0.015	0.0006	38.10	1.500(4)	1 1/2	1.5	0.059	30°	1.923	4.24	92000	20800	99500	22400
5214K	70	2.7559	0.015	0.0006	125	4.9213	0.018	0.0007	39.67	1.562(4)	1 9/16	1.5	0.059	20°	2.096	4.62	84000	19000	108000	24500
5214(3)	70	2.7559	0.015	0.0006	125	4.9213	0.018	0.0007	39.67	1.562(4)	1 9/16	1.5	0.059	30°	2.096	4.62	126000	28500	139000	31500
5215K	75	2.9528	0.015	0.0006	130	5.1181	0.018	0.0007	41.28	1.625(4)	1 5/8	1.5	0.059	20°	2.336	5.15	85700	19300	108000	24500
5215(3)	75	2.9528	0.015	0.0006	130	5.1181	0.018	0.0007	41.28	1.625(4)	1 5/8	1.5	0.059	30°	2.336	5.15	137000	31000	144000	32500
5216(3)	80	3.1496	0.015	0.0006	140	5.5118	0.018	0.0007	44.45	1.750(4)	1 3/4	2.0	0.079	30°	2.867	6.32	162000	36500	168000	38000
5217(3)	85	3.3465	0.020	0.0008	150	5.9055	0.018	0.0007	49.23	1.938(5)	1 15/16	2.0	0.079	30°	3.629	8.00	177000	40000	188000	42500
5218W	90	3.5433	0.020	0.0008	160	6.2992	0.025	0.0010	52.37	2.062(5)	2 1/16	2.0	0.079	20°	4.518	9.96	191000	43000	202000	45500
5219(3)	95	3.7402	0.020	0.0008	170	6.6929	0.025	0.0010	55.58	2.188(5)	2 3/16	2.0	0.079	30°	5.411	11.93	235000	53000	244000	55000
5220W	100	3.9370	0.020	0.0008	180	7.0866	0.025	0.0010	60.32	2.375(5)	2 3/8	2.0	0.079	20°	6.541	14.42	253000	57000	259000	58500
5221W	105	4.1339	0.020	0.0008	190	7.4803	0.030	0.0012	65.10	2.563(5)	2 9/16	2.0	0.079	20°	7.537	16.60	301000	67600	300000	67500
5222(3)	110	4.3307	0.020	0.0008	200	7.8740	0.030	0.0012	69.85	2.750(5)	2 3/4	2.0	0.079	30°	9.503	20.95	339000	76500	326000	73500

(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Sizes have PRB molded nylon retainers.
(3) These sizes have contact angle converging inside the bearing.
(4) Width tolerance is +.00 mm to -.15 mm (+.000 to -.006").
(5) Width tolerance is +.00 mm to -.20 mm (+.000 to -.008").
(6) Based on 10^6 revolutions of calculated fatigue life.

Note: See page D45 for Shield and Snap Ring Combinations.

MEDIUM 5300 SERIES

- Features the same bores and outside diameters as corresponding bearings in the 300 Series single-row radial type.
- Double-row angular contact ball bearings meet the demand for increased axial and radial rigidity in applications where design limits space.
- Available in Conrad and maximum capacity types.
- Suffix “K” denotes Conrad type (example: 5303K).
- Suffix “W” or no suffix denotes maximum capacity type (examples: 5312W, 5319).
- Please note that these double-row series bearings are not prelubricated.



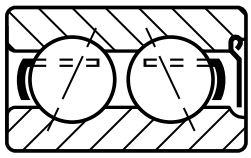
DIMENSIONS – TOLERANCES

Bearing Number	Bore d tolerance +0.000 mm +0.0000" to minus				Outside Diameter D tolerance +0.000 mm +0.0000" to minus				Width C +0.00 mm, -0.12 mm +0.000", -0.005"			Fillet Radius(1)		Contact Angle	Wt.		Static Load Rating C_0		Extended Dynamic Load Rating C_E(6)	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	in.	mm	in.		kg	lbs.	N	lbs.	N	lbs.
5302	15	0.5906	0.008	0.0003	42	1.6535	0.012	0.00045	19.05	0.75	3/4	1.0	0.039	20°	0.141	0.31	9200	2080	16800	3800
5303K	17	0.6693	0.008	0.0003	47	1.8504	0.012	0.00045	22.22	0.875	7/8	1.0	0.039	20°	0.191	0.42	12600	2850	22600	5100
5304K(2)	20	0.7874	0.010	0.0004	52	2.0472	0.013	0.0005	22.22	0.875	7/8	1.0	0.039	20°	0.222	0.49	15300	3450	28400	6400
5305K(2)	25	0.9843	0.010	0.0004	62	2.4409	0.013	0.0005	25.4	1.000	1	1.0	0.039	20°	0.367	0.81	21100	4750	37700	8500
5306K	30	1.1811	0.010	0.0004	72	2.8346	0.013	0.0005	30.17	1.188	1 3/16	1.0	0.039	20°	0.612	1.35	29000	6550	47000	10600
5306W	30	1.1811	0.010	0.0004	72	2.8346	0.013	0.0005	30.17	1.188	1 3/16	1.0	0.039	30°	0.612	1.35	41000	9300	62000	14000
5307K	35	1.3780	0.012	0.00047	80	3.1496	0.013	0.0005	34.93	1.375	1 3/8	1.5	0.059	20°	0.871	1.92	36000	8300	59500	13400
5307W	35	1.3780	0.012	0.00047	80	3.1496	0.013	0.0005	34.93	1.375	1 3/8	1.5	0.059	30°	0.871	1.92	47900	10800	69200	15600
5308K	40	1.5748	0.012	0.00047	90	3.5433	0.015	0.0006	36.53	1.438	1 7/16	1.5	0.059	20°	1.139	2.51	46000	10400	72400	16300
5308W	40	1.5748	0.012	0.00047	90	3.5433	0.015	0.0006	36.53	1.438	1 7/16	1.5	0.059	30°	1.139	2.51	66600	15000	90600	20400
5309K	45	1.7717	0.012	0.00047	100	3.9370	0.015	0.0006	39.67	1.562	1 9/16	1.5	0.059	20°	1.433	3.16	56400	12700	87000	19600
5309W	45	1.7717	0.012	0.00047	100	3.9370	0.015	0.0006	39.67	1.562	1 9/16	1.5	0.059	30°	1.433	3.16	81000	18300	106000	24000
5310K	50	1.9685	0.012	0.00047	110	4.3307	0.015	0.0006	44.45	1.750	1 3/4	2.0	0.079	20°	2.091	4.61	73000	16600	111000	25000
5310W	50	1.9685	0.012	0.00047	110	4.3307	0.015	0.0006	44.45	1.750	1 3/4	2.0	0.079	30°	2.091	4.61	97000	22000	126000	28500
5311K	55	2.1654	0.015	0.0006	120	4.7244	0.015	0.0006	49.22	1.938(3)	1 15/16	2.0	0.079	20°	2.722	6.00	86700	19500	124400	28000
5311W	55	2.1654	0.015	0.0006	120	4.7244	0.015	0.0006	49.22	1.938(3)	1 15/16	2.0	0.079	20°	2.722	6.00	113000	25500	144000	32500
5312W	60	2.3622	0.015	0.0006	130	5.1181	0.018	0.0007	53.98	2.125(3)	2 1/8	2.0	0.079	20°	3.423	7.54	151000	34000	191000	43000
5313W	65	2.5591	0.015	0.0006	140	5.5118	0.018	0.0007	58.72	2.312(3)	2 5/16	2.0	0.079	20°	4.163	9.17	173000	39000	213000	48000
5314W	70	2.7559	0.015	0.0006	150	5.9055	0.018	0.0007	63.50	2.500(3)	2 1/2	2.0	0.079	20°	5.362	11.82	195000	44000	239000	54000
5315W	75	2.9528	0.015	0.0006	160	6.2992	0.025	0.0010	68.30	2.689(3)	2 11/16	2.0	0.079	20°	6.428	14.17	222000	50000	266000	60000
5316W	80	3.1496	0.015	0.0006	170	6.6929	0.025	0.0010	68.28	2.688(3)	2 11/16	2.0	0.079	20°	7.366	16.24	248000	56000	284000	64000
5317W	85	3.3465	0.020	0.0008	180	7.0866	0.025	0.0010	73.02	2.875(4)	2 7/8	2.5	0.098	20°	8.827	19.46	279000	63000	308000	69500
5318W	90	3.5433	0.020	0.0008	190	7.4803	0.030	0.0012	73.02	2.875(4)	2 7/8	2.5	0.098	20°	9.616	21.20	308000	69500	333000	75000
5319W	95	3.7402	0.020	0.0008	200	7.8740	0.030	0.0012	77.77	3.062(4)	3 1/16	2.5	0.098	30°	11.562	25.49	319000	72000	333000	75000
5320W	100	3.9370	0.020	0.0008	215	8.4646	0.030	0.0012	82.55	3.250(4)	3 1/4	2.5	0.098	20°	14.333	31.57	377000	85000	377000	85000
5322W	110	4.3307	0.020	0.0008	240	9.4488	0.030	0.0012	92.08	3.625(4)	3 5/8	2.5	0.098	20°	20.153	44.43	479000	108000	453000	102000
5324W	120	4.7244	0.020	0.0008	260	10.2362	0.035	0.0014	104.78	4.125(4)	4 1/8	2.5	0.098	20°	28.291	62.37	555000	125000	497000	112000
5328W	140	5.5118	0.025	0.0010	300	11.8110	0.035	0.0014	114.30	4.500(5)	4 1/2	3.0	0.118	20°	38.102	84.00	630000	140000	570000	129000

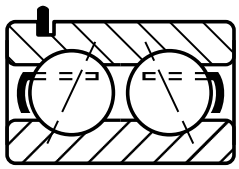
(1) Maximum shaft or housing fillet radius that bearing corners will clear.
(2) Sizes have PRB molded nylon retainers.
(3) Width tolerance is +.00 mm to -.15 mm (+.000 to -.006").
(4) Width tolerance is +.00 mm to -.20 mm (+.000 to -.008").
(5) Width tolerance is +.00 mm to -.25 mm (+.000 to -.010").
(6) Based on 10^6 revolutions of calculated fatigue life.

Note: See opposite page for shield and snap ring combinations.

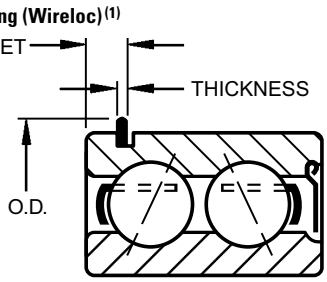
SHIELD AND SNAP RING COMBINATIONS



One Shield D



Open Type G



One Shield DG

5200 SERIES

Bearing Number	Width +0.00 mm, -.12 mm +0.000", -.005"		Wt.		Bearing Number	Snap Ring(1) O.D.		Thickness		Offset		Wt.	
	mm	in.	in.	kg	lbs.		mm	in.	mm	in.	mm	in.	kg	lbs.
5200KDD2	15.88	0.625(3)	5/8	0.054	0.12	—	34.5	1 23/64	1.07	0.042	3.05	0.120	—	—
5201KD(DD)	15.88	0.625	5/8	0.064	0.14	—	36.5	1 7/16	1.07	0.042	3.05	0.120	—	—
—	—	—	—	—	—	—	39.3	1 35/64	1.07	0.042	3.05	0.120	—	—
5203KD(KDD3)	17.48	0.688	11/16	0.159	0.35	5203KDG	44.4	1 3/4	1.07	0.042	3.05	0.120	0.127	0.28
5204KD	20.62	0.812	13/16	0.118	0.26	5204KG	52.4	2 1/16	1.07	0.042	3.45	0.136	0.150	0.33
5205KD	22.22	0.875	7/8	0.204	0.45	5205KG	57.5	2 17/64	1.07	0.042	3.45	0.136	0.200	0.44
5206WD	26.97	1.062	1 1/16	0.336	0.74	5206WG(KG)	67.5	2 21/32	1.65	0.065	4.83	0.190	0.331	0.73
5207WD	30.17	1.188	1 3/16	0.546	1.21	5207KG	78.2	3 5/64	1.65	0.065	4.83	0.190	—	—
5208WD	30.17	1.188	1 3/16	0.662	1.46	—	86.5	3 13/32	1.65	0.065	4.83	0.190	—	—
5209WD	30.17	1.188	1 3/16	0.712	1.57	5209WG(KG)	91.3	3 19/32	1.65	0.065	4.83	0.190	0.721	1.59
5210WD	33.32	1.312	1 5/16	0.816	1.80	5210WG(KG)	96.4	3 51/64	2.41	0.095	5.59	0.220	0.771	1.70
5211WD	33.32	1.312	1 5/16	1.043	2.30	5211WG(KG)	106.4	4 3/16	2.41	0.095	5.59	0.220	1.066	2.35
5212WD	39.67	1.562	1 9/16	1.497	3.30	5212WG(KG)	116.3	4 37/64	2.41	0.095	5.59	0.220	1.424	3.14
5213WD	—	—	—	—	—	—	129.4	5 3/32	2.77	0.109	6.73	0.265	—	—
5214WD(2)	39.67	1.562	1 9/16	2.137	4.71	—	134.5	5 19/64	2.77	0.109	6.73	0.265	—	—
—	—	—	—	—	—	5215G(2)	139.7	5 1/2	2.77	0.109	6.73	0.265	2.327	5.13
5216DD(2)	47.62	1.875	1 7/8	3.062	6.75	5216G(2)	149.6	5 57/64	2.77	0.109	7.54	0.297	2.962	6.53
—	—	—	—	—	—	5217G(2)	159.5	6 9/32	2.77	0.109	7.54	0.297	3.724	8.21
5218WD	52.37	2.062	2 1/16	4.504	9.93	—	169.5	6 43/64	2.77	0.109	7.54	0.297	—	—
—	—	—	—	—	—	5219G(2)	182.6	7 3/16	3.05	0.120	8.61	0.339	5.498	12.12

5300 SERIES

Bearing Number	Width +0.00 mm, -.12 mm +0.000", -.005"		Wt.		Bearing(4) Number	Snap Ring(1) O.D.		Thickness		Offset		Wt.	
	mm	in.	in.	kg	lbs.		mm	in.	mm	in.	mm	in.	kg	lbs.
5303KDD	22.25	0.875	7/8	—	—	5303KG	52.4	2 1/16	1.07	0.042	3.45	0.136	0.227	0.50
5304KDD	22.25	0.875	7/8	—	—	5304KG	57.6	2 17/64	1.07	0.042	3.45	0.136	0.231	0.51
5305KDD2	25.4	1.000	1	—	—	5305KG	67.5	2 21/32	1.65	0.065	4.83	0.190	0.376	0.83
5306WD	33.32	1.312	1 5/16	0.640	1.41	5306WG(KG)	78.2	3 5/64	1.65	0.065	4.83	0.190	0.608	1.34
5307WD	38.10	1.500	1 1/2	0.857	1.89	5307WG(KG)	86.5	3 13/32	1.65	0.065	4.83	0.190	0.807	1.78
5308WD	39.67	1.562	1 9/16	1.143	2.52	5308WG(KG)	96.4	3 51/64	2.41	0.095	5.59	0.220	1.102	2.43
5309WD	42.88	1.688	1 11/16	1.665	3.67	5309WG(KG)	106.4	4 3/16	2.41	0.095	5.59	0.220	1.461	3.22
5310WD	47.62	1.875	1 7/8	2.019	4.45	5310WG(KG)	116.3	4 37/64	2.41	0.095	5.59	0.220	1.932	4.26
5311D(4)	52.37	2.062	2 1/16	2.826	6.23	5311WG(KG)	129.4	5 3/32	2.77	0.109	6.73	0.265	2.789	6.15
5312D(4)	57.15	2.250	2 1/4	3.423	7.54	5312WG(KG)	139.7	5 1/2	2.77	0.109	6.73	0.265	3.493	7.70
5313D(4)	61.72	2.438	2 7/16	4.663	10.28	5313WG(KG)	149.6	5 57/64	2.77	0.109	7.54	0.297	4.291	9.46
—	—	—	—	—	—	5314WG(KG)	159.5	6 9/32	2.77	0.109	7.54	0.297	5.466	12.05
						5315KG	169.6	6 43/64	2.77	0.109	7.54	0.297	—	—

(1) The snap ring is normally packaged separately in the box with the bearing.
(2) These sizes have contact angle converging inside bearing (30°).
(3) Inner ring width is 19.05 mm (.7500").
(4) Ring widths are different for these parts. Contact a Timken sales engineer to validate size.

NOTES

WIDE INNER RING

Overview: Wide inner ring ball bearings consist of a single-row ball bearing and an extended inner ring. They carry radial, axial and combination loads. The extended inner ring slips onto the shaft and secures with a locking mechanism.

- **Sizes:** Standard series: 15 mm - 75 mm shaft (0.59 in. - 2.9528 in.).
  Medium and heavy-duty series go larger.
- **Markets:** Agriculture, fans and blowers, food processing and conveyors.
- **Features:** Available with a variety of shaft locking systems: eccentric locking collars, setscrews and concentric locking collars.
- **Benefits:** Designed for ease of mounting and maximum shaft support.

Wide Inner Ring Ball Bearings

Prefixes:
Basic Series and Additional Features

C	concentric collar
E	metric bore
G	relubricatable
1	standard series (200 series bearings)
L	light series
N	heavy series (300 series bearings)
RA	extended inner ring, one side only
SM	standard series (open-type bearings)
SMN	heavy series (open-type bearings)
ER, YA	setscrew locking device series
M	medium duty setscrew lock series

Suffixes:
Internal Construction

K	Conrad, non-filling slot-type
W	maximum capacity filling slot-type

G1 **103** **K** **RRB**

Numbers:
Last three numbers indicate bore size — first in inches, last two in sixteenths

015	$^{15}/_{16}$ in.
103	$1\,^{3}/_{16}$ in.
203	$2\,^{3}/_{16}$ in.
25	25 mm (metric)
40	40 mm (metric)

Additional Features

L	one Mechani-seal
LL	two Mechani-seals
PP	two seals
R	one land-riding rubber seal
RR	two land-riding rubber seals
B	spherical outside diameter
S	external self-aligning
PP2, 3, 4, etc., -	Tri-Ply seals (if preceded by K)
TDC	thin dense chrome plate
F	food grade grease

Wide Inner Ring Ball Bearings

INTRODUCTION

Wide inner ring bearing design for ball bearings that are easily mounted on straight shafts and positioned without shoulders, locknuts or adapters.

The internal bearing construction is basically the same as the deep race, single row radial type with ability to carry radial, thrust and combined loads, while providing low friction qualities. The inner ring is generally extended on both sides of the race to provide additional shaft support, and is locked to the shaft by specially designed setscrews, an eccentric self-locking collar, or a concentric collar. The wide inner ring bearings are also available with cylindrical or spherical outside diameters. The cylindrical or straight O.D. type is used for mounting in straight-bored housings. The spherical O.D. type must be mounted in a corresponding spherical seat and is used to compensate for shaft or housing misalignments.

WIDE INNER RING BEARINGS WITH ECCENTRIC LOCKING COLLARS

The following series are available with the cam (self-locking) collar.

RR SERIES

These bearings feature the flareout, contact type R-Seal which encloses a synthetic rubber impregnated washer between two metal caps. Most sizes incorporate the Shroud-Seal design. R-Seal wide inner ring bearings are available in the following non-relubricatable variations: KR (one seal, cylindrical O.D.), KRR and KRRB (two seals). Relubricatable versions are: G-KRR, G-KRRB and GN-KRRB (heavy-duty).

RR Series

LL SERIES

These bearings are dimensionally interchangeable with the RR Series, but have non-contact labyrinth seals and steel cages for low-torque, high speed and higher temperature service (up to 350° F.)

RA-RR SERIES

The RA-RR Series features an extended inner ring and self-locking collar for simple and effective shaft retention in a standard series bearing. The positive contact, land-riding R-Seal provides improved protection against the heavy contamination encountered in many applications. All sizes have a heat stabilized, moisture conditioned 6/6 nylon retainer which has proven effective under conditions of misalignment. RA-RR extended inner ring bearings are available as RA-RR (two-seals, straight O.D.) and RA-RRB (two seals, spherical O.D.). Relubricatable versions are GRA-RR and GRA-RRB.

RA-RR Series

TRI-PLY-SEAL SERIES

Tri-Ply Seal bearings are designed for environments where severe conditions and moisture are present. The one-piece Tri-Ply Seals incorporate a highly effective seal design molded to an exterior shroud cap. The shroud cap protects the seal lips from fiber wrap and abrasion while enhancing the overall sealing effectiveness of the unit. All units incorporate the self-locking collar and have a nylon retainer. Tri-Ply Seal bearings are available in both a non-relubricatable (KPPB) and relubricatable version (G-KPPB).

Tri-Ply Seal Series

EXTERNAL SELF-ALIGNING SERIES

The construction of this series permits the inner assembly, which contains an open type ball bearing with spherical O.D. to align in the seat of the mating outer ring. The seat of this outer ring is matched with the spherical O.D. of the ball bearing outer ring providing unrestricted self-alignment and allowing the inner assembly to become square and true with the shaft. Self-aligning units are available in both standard SM-S or heavy SMN-S Series.

External Self-Aligning Series

RA-DD SERIES BEARINGS

The RA-DD Series bearings are extended inner ring type with cam locking collars. They incorporate two close fitting non-contact grease shields to effectively retain lubricant and provide protection against harmful contaminants. The non-contact metallic shields provide improved high speed and low-torque performance required for high speed printing press applications. The 6/6 molded nylon retainer has proven effective under conditions of misalignment. These bearings are dimensionally interchangeable and have the same load capacities as the RA-RR Series. (Available in 5/8 in. -1 1/2 in. shaft sizes.)

RA-DD Series

WIDE INNER RING BEARINGS WITH SETSCREW LOCKING DEVICE

The following series are available with the setscrew locking device with special setscrews that are resistant to loosening during operation.

Y SERIES

Full width inner ring Y Series bearings increase shaft support in HVAC, conveyors and other industrial applications. They feature superfinished raceways, grade 10 balls and anti-backout nylon patch setscrews. Flexible 6/6 nylon retainers and land-riding shroud seals also ensure excellent performance. They are factory prelubricated and relubricatable setscrew mounting feature is ideal for reversing applications.

Y Series

YA SERIES

The YA Series relubricatable and non-relubricatable bearings are an extended inner ring type with specially designed setscrews. Positive contact land-riding R-Seals provide protection against harmful contaminants and retain lubricant.

Setscrew series bearings are available in both non-relubricatable version YA and relubricatable version GYA-RRB. Both types have nylon retainers.

YA Series

ER SERIES

This series offers industry standard mounting dimensions and standard nomenclature for a large variety of sizes of relubricatable, extended inner ring bearings for through-bored housings. All bearings in this series have nylon retainers and are equipped with snap rings, eliminating the need for machining housing shoulders. ER bearings are designed with a unique setscrew locking device that locks bearing to shaft and is resistant to loosening during operation. Positive contact land-riding R-Seals provide protection against harmful contaminants and retain lubricant. All ER bearings are black oxide coated for corrosion resistance. Ideal for low-starting and running torque applications.

ER Series

WIDE INNER RING BEARINGS WITH CONCENTRIC COLLARS

GC SERIES

The GC Series wide inner ring bearings are relubricatable with spherical outside diameters, nylon retainers and shroud seals. The metal shroud maintains tight seal contact against the inner ring and shields the rubber seals from damage due to dirt or fiber wrap. The concentric collar is locked to the shaft by two setscrews, located 120 degrees apart, mated with threaded holes in the collar and drilled holes in the bearing inner ring.

GC Series

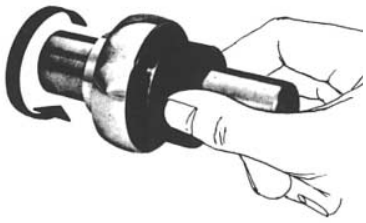
YM MEDIUM DUTY SERIES

The Timken Medium Duty Series offers reliable performance and extended life for applications which see heavier loads. This series has been designed with a combination of premium features – such as superfinished raceways and a nylon patch setscrew locking device, as an ideal package for demanding conditions. These superior bearing inserts will operate with reduced levels in noise, vibration and friction and are the choice antifriction component for saw and paper mill applications, as well as fan and blower assemblies, food and grain handling and conveyor systems.

YM Series

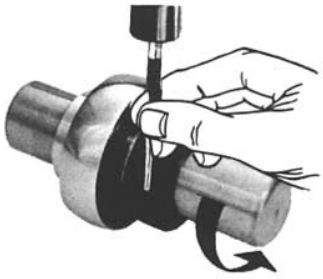
CAM (SELF-LOCKING) COLLAR

1. Observe cam design of the wide inner ring and self-locking collar.



2. Mate the cam of the collar with the cam of the wide inner ring.

3. Press the locking collar against the wide inner ring and turn in the direction of shaft rotation until tightly engaged.



4. With drift pin in collar hole, strike in direction of shaft rotation to lock.

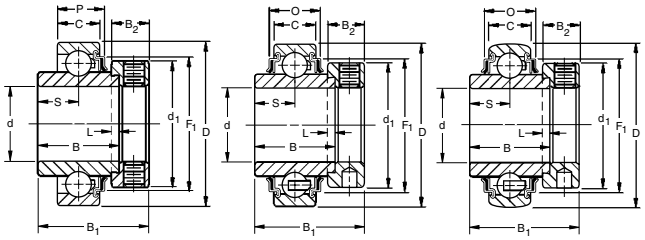
   For stationary shafts and outer ring rotation, turn the collar in opposite direction of rotation.

5. Tighten setscrew in collar.

KR, KRR, KRRB INDUSTRIAL SERIES NON-RELUBRICATABLE TYPES

- Designed for extremely dirty or wet conditions.
- Feature R-Seals with flared lips that firmly contact the ground O.D. of the inner ring.
- R-Seals provide a positive seal against dirt and other contaminants while effectively retaining the lubricant.
- Equipped with Shroud-Seals, providing extra effectiveness and protection.
- Extra-wide design provides additional shaft support and extra-large grease capacity.

Suggested shaft tolerances: 1/2"-1 15/16", nominal to -.013 mm, -.0005"; 2"- 2 15/16", nominal to - .025 mm, -.0010".



KR One Seal Cylindrical O.D. | KRR Two Seals Cylindical O.D. | KRRB Two Seals Spherical O.D.

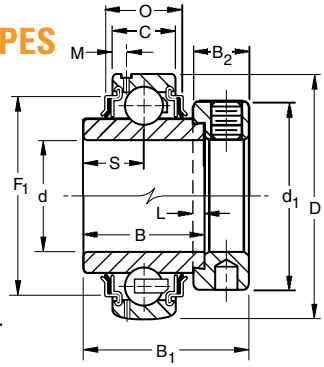
TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: 1103KRRB + COL.

Bearing Number Spherical O.D.			Collar Number	Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	L	d_1	B_2	B_1	F_1	O	P	Brg. & Collar Wt.		Static Load Rating C_0	Extended Dynamic Load Rating C_E
					mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	kg	lbs.	N / lbs.	N / lbs.
–	1008KRR	(KRRB)	S1008K		1/2												0.154	0.34		
1010KR	1010KRR	(KRRB)	S1010K	203	5/8	40	27.78	12	13.9	4.0	28.6	13.5	37.3	34.01	16.56	14.27	0.145	0.32	4700	10700
–	1011KRR	(KRRB)	S1011K		11/16	1.5748	1 3/32	0.472	35/64	5/32	1 1/8	17/32	1 15/32	1.339	0.652	0.562	0.122	0.27	1060	2400
–	E17KRR	(KRRB)	SE17K		17												0.122	0.27		
1012KR	1012KRR	(KRRB)	S1012K	204	3/4	47	34.13	14	17.1	4.0	33.3	13.5	43.7	38.91	16.56	15.29	0.204	0.45	6200	14300
–	E20KRR	(KRRB)	SE20K		20	1.8504	1 11/32	0.551	43/64	5/32	1 5/16	17/32	1 23/32	1.532	0.652	0.602	0.204	0.45	1400	3200
–	1013KRR	(KRRB)	S1013K		13/16												0.286	0.63		
–	1014KRR	(KRRB)	S1014K	205	7/8												0.272	0.6		
1015KR	1015KRR	(KRRB)	S1015K		15/16	52	34.92	15	17.5	4.0	38.1	13.5	44.1	45.19	16.66	15.82	0.254	0.56	7700	15800
1100KR	1100KRR	(KRRB)	S1100K		1	2.0472	1 3/8	0.591	11/16	5/32	1 1/2	17/32	1 47/64	1.779	0.656	0.623	0.231	0.51	1730	3550
–	E25KRR	(KRRB)	SE25K		25												0.231	0.51		
–	1101	(KRRB)	S1101K		1 1/16												0.413	0.91		
1102KR	1102KRR	(KRRB)	S1102K		1 1/8	62	36.51	16	18.3	4.0	44.4	15.9	48.4	52.53	19.56	17.78	0.404	0.89	11100	21200
1103KR	1103KRR	(KRRB)	S1103K	206	1 3/16	2.4409	1 7/16	0.630(2)	23/32	5/32	1 3/4	5/8	1 29/32	2.068	0.770	0.700	0.376	0.83	2500	4900
–	1103KRR3	(KRRB3)	S1103K3		1 1/4												0.349	0.77		
–	E30KRR	(KRRB)	SE30K		30												0.376	0.83		
1104KR	1104KRR	(KRRB)	S1104K		1 1/4												0.653	1.44		
–	1105KRR	(KRRB)	S1105K	207	1 5/16	72	37.70	17	18.85	4.0	54.0	17.1	51.2	60.55	19.69	18.34	0.603	1.33	15100	28500
–	1106KRR	(KRRB)	S1106K		1 3/8	2.8346	1 31/64	0.669(3)	0.742	5/32	2 1/8	43/64	2 1/64	2.384	0.775	0.722	0.572	1.26	3400	6400
1107KR	1107KRR	(KRRB)	S1107K		1 7/16												0.544	1.2		
–	E35KRR	(KRRB)	SE35K		35												0.572	1.26		
1108KR	1108KRR	(KRRB)	S1108KT		1 1/2	80	42.86	18	21.4	4.8	60.3	18.3	56.4	67.79	20.45	19.28	0.789	1.74	19600	36000
–	1109KRR	(KRRB)	S1109KT	208	1 9/16	3.1496	1 11/16	0.709(4)	27/32	3/16	2 3/8	23/32	2 7/32	2.669	0.805	0.757	0.739	1.63	4400	8150
–	E40KRR	(KRRB)	SE40K		40												0.739	1.63		
–	1110KRR	(KRRB)	S1110K		1 5/8												0.898	1.98		
1111KR	1111KRR	(KRRB)	S1111K	209	1 11/16	85	42.86	19	21.4	4.8	63.5	18.3	56.4	73.86	24.18	21.59	0.848	1.87	20000	36000
1112KR	1112KRR	(KRRB)	S1112K		1 3/4	3.3465	1 11/16	0.748	27/32	3/16	2 1/2	23/32	2 7/32	2.908	0.952	0.850	0.825	1.82	4500	8150
–	E45KRR	(KRRB)	SE45K		45												0.825	1.82		
–	1114KRR	(KRRB)	S1114K		1 7/8	90	49.21	20 (5)	24.6	4.8	69.9	18.3	62.7	77.7	24.51	22.25	1.057	2.33	22709	39000
1115KR(6)	1115KRR	(KRRB)	S1115K	210	1 15/16	3.5433	1 15/16	0.787(5)	31/32	3/16	2 3/4	23/32	2 15/32	3.059	0.965	0.876	1.000	2.18	5100	8800
–	E50KRR	(KRRB)	SE50K		50												1.000	2.18		
1200KR	1200KRR	(KRRB)	S1200K		2												1.520	3.35		
–	1202KRR	(KRRB)	S1202K	211	2 1/8	100	55.56	21	27.8	4.8	76.2	20.6	71.4	87.17	27.41	24.21	1.356	2.99	28500	48000
1203KR	1203KRR	(KRRB)	S1203K		2 3/16	3.9370	2 3/16	0.827	1 3/32	3/16	3	13/16	2 13/16	3.432	1.079	0.953	1.306	2.88	6400	10800
–	E55KRR	(KRRB)	SE55K		55												1.306	2.88		
–	1204KRR	(KRRB)	S1204K		2 1/4	110	61.91	22	31	6.4	84.1	22.2	77.8	94.89	30.02	26.01	1.715	3.78	35600	58500
1207KR	1207KRR	(KRRB)	S1207K	212	2 7/16	4.3307	2 7/16	0.866	1 7/32	1/4	3 5/16	7/8	3 1/16	3.736	1.182	1.024	1.565	3.45	8000	13200
–	E60KRR	(KRRB)	SE60K		60												1.615	3.56		
–	1215KRR	(KRRB)	S1215K	215	2 15/16	130	74.61	25	37.3	6.4	101.6	23.8	91.2	113.13	34.03	—	2.640	5.82	43600	69500
–	E75KRR	(KRRB)	SE75K		75	5.1181	2 15/16	0.984	1 15/32	1/4	4	15/16	3 5/8	4.454	1.340	—	2.640	5.82	9800	15600

(1) Bore tolerances: 1/2" - 2 3/16" nominal to .013 mm, +.0005; 2 1/4" - 2 15/16" nominal to +.015 mm, +.0006".
(2) Spherical O.D. outer ring width is 18 mm, .709".
(3) Spherical O.D. outer ring width is 19 mm, .748".
(4) Spherical O.D. outer ring width is 21 mm, .827".
(5) Spherical O.D. outer ring width is 22 mm, .866".
(6) Available with spherical O.D. To order, add suffix B. Example 1115KRRB.

G-KRR, G-KRRB INDUSTRIAL SERIES RELUBRICATABLE TYPES

- The G-KRR Series wide inner ring bearings are the same as RR Series and have a provision for relubrication.
- Designed for extremely dirty or wet conditions.
- Includes R-Seals with flared lips that firmly contact the ground O.D. of the inner ring. The inner ring provides a positive seal against dust, dirt and other contaminants and effectively retains the lubricant.
- G-KRR Series bearings are equipped with Shroud-Seals, providing extra effectiveness and protection.
- Extra-wide design provides additional shaft support and extra-large grease capacity.



G-KRR Two Seals Cylindrical O.D.

G-KRRB Two Seals Spherical O.D.

Suggested shaft tolerances: 1/2" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 15/16", nominal to -.025 mm, -.0010".

TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: G1010KRRB + COL.

Bearing Number		Collar Number	Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths		S	L	d_1	B_2	B_1	F_1	O	P	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
Cylindrical O.D.	Spherical O.D.					B Inner	C Outer												
				mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
—	G1008KRRB	S1008K		1/2												0.154	0.34		
—	G1009KRRB	S1009K		9/16												0.141	0.31		
G1010KRR	G1010KRRB	S1010K	203	5/8	40	27.78	12	13.9	4.0	28.6	13.5	2.72	37.3	34.01	16.56	0.141	0.31	4700	10700
G1011KRR	G1011KRRB	S1011K		11/16	1.5748	1 3/32	0.472	35/64	5/32	1 1/8	17/32	0.107	1 15/32	1.339	0.652	0.118	0.26	1060	2400
GE17KRR	GE17KRRB	SE17K		17												0.118	0.26		
G1012KRR	G1012KRRB	S1012K	204	3/4	47	34.13	14	17.1	4.0	33.3	13.5	3.43	43.7	38.91	17.3	0.204	0.45	6200	14300
GE20KRR	GE20KRRB	SE20K		20	1.8504	1 11/32	0.551	43/64	5/32	1 5/16	17/32	0.135	1 23/32	1.532	0.681	0.204	0.45	1400	3200
—	G1013KRRB	S1013K		13/16												0.286	0.63		
G1014KRR	G1014KRRB	S1014K	205	7/8	52	34.92	15	17.5	4.0	38.1	13.5	3.86	44.4	45.19	16.66	0.263	0.58	7700	15800
G1015KRR	G1015KRRB	S1015K		15/16	2.0472	1 3/8	0.591	11/16	5/32	1 1/2	17/32	0.152	1 3/4	1.779	0.656	0.240	0.53	1730	3550
G1100KRR	G1100KRRB	S1100K		1												0.227	0.50		
GE25KRR	GE25KRRB	SE25K		25												0.227	0.50		
G1101KRR	G1101KRRB	S1101K		1 1/16												0.417	0.92		
G1102KRR	G1102KRRB	S1102K		1 1/8	62	36.51	18	18.3	4.0	44.1	15.9	3.96	48.4	52.53	21.56	0.404	0.89	11100	21800
G1103KRR	G1103KRRB	S1103K	206	1 3/16	2.4409	1 7/16	0.709	23/32	5/32	1 47/64	5/8	0.156	1 29/32	2.068	0.849	0.376	0.83	2500	4900
—	G1103KRRB3	S1103K3		1 1/4												0.349	0.77		
GE30KRR	GE30KRRB	SE30K		30												0.376	0.83		
G1104KRR	G1104KRRB	S1104K		1 1/4												0.653	1.44		
—	G1105KRRB	S1105K	207	1 5/16	72	37.70	19	18.85	4.0	54.0	17.1	3.68	51.2	60.55	21.74	0.617	1.36	15100	28500
G1106KRR	G1106KRRB	S1106K		1 3/8	2.8346	1 31/64	0.748	0.742	5/32	2 1/8	43/64	0.145	2 1/64	2.384	0.856	0.585	1.29	3400	6400
G1107KRR	G1107KRRB	S1107K		1 7/16												0.562	1.24		
GE35KRR	GE35KRRB	SE35K		35												0.585	1.29		
G1108KRR	G1108KRRB	S1108KT		1 1/2	80	42.86	21	21.4	4.8	60.3	18.3	4.06	56.4	67.79	23.44	0.812	1.79	19600	36000
—	G1109KRRB	S1109KT	208	1 9/16	3.1496	1 11/16	0.827	27/32	3/16	2 3/8	23/32	0.16	2 7/32	2.669	0.923	0.771	1.70	4400	8150
GE40KRR	GE40KRRB	SE40K		40												0.771	1.70		
G1110KRR	G1110KRRB	S1110K		1 5/8												0.925	2.04		
G1111KRR	G1111KRRB	S1111K	209	1 11/16	85	42.86	22	21.4	4.8	63.5	18.3	4.55	56.4	73.86	27.18	0.880	1.94	20000	36000
G1112KRR	G1112KRRB	S1112K		1 3/4	3.3465	1 11/16	0.866	27/32	3/16	2 1/2	23/32	0.179	2 7/32	2.908	1.07	0.835	1.84	4500	8150
GE45KRR	GE45KRRB	SE45K		45												0.835	1.84		
—	G1113KRR	S1113K		1 13/16												1.116	2.46		
—	G1114KRRB	S1114K		1 7/8	90	49.21	23	24.6	4.8	69.9	18.3	4.7	62.7	77.7	27.51	1.034	2.28	22700	39200
G1115KRR	G1115KRRB	S1115K	210	1 15/16	3.5433	1 15/16	0.903(2)	31/32	3/16	2 3/4	23/32	0.185	2 15/32	3.059	1.083	1.016	2.24	5100	8800
GE50KRR	GE50KRRB	SE50K		50												1.016	2.24		
G1200KRR	G1200KRRB	S1200K		2												1.583	3.49		
—	G1201KRRB	S1201K		2 1/16	100	55.56	25	27.8	4.8	76.2	20.6	5.0	71.4	87.17	29.01	1.470	3.24	28500	48000
—	G1202KRRB	S1202K	211	2 1/8	3.937	2 3/16	0.983(3)	1 3/32	3/16	3	13/16	0.197	2 13/16	3.432	1.142	1.406	3.10	6400	10800
G1203KRR	G1203KRRB	S1203K		2 3/16												1.365	3.01		
GE55KRR	GE55KRRB	SE55K		55												1.365	3.01		
—	G1204KRRB	S1204K		2 1/4												2.041	4.50		
—	G1205KRRB	S1205K	212	2 5/16	110	61.91	27	31	6.4	84.1	22.2	5.13	77.8	94.89	35.03	1.923	4.24	35600	58800
—	G1206KRRB	S1206K		2 3/8	4.3307	2 7/16	1.063	1 7/32	1/4	3 5/16	7/8	0.202	3 1/16	3.736	1.379	1.846	4.07	8000	13200
G1207KRR	G1207KRRB	S1207K		2 7/16												1.778	3.92		
GE60KRR	GE60KRRB	SE60K		60												1.846	4.07		
—	G1210KRRB	S1210K		2 5/8	125	68.26	28	34.1	6.4	96.8	23.8	5.08	79.4	109.17	35.94	2.681	5.91	43000	69500
—	G1211KRRB	S1211K	214	2 11/16	4.9213	2 11/16	1.102	1 11/32	1/4	3 13/16	15/16	0.2	3 1/8	4.298	1.415	2.585	5.70	9650	15600
—	GE70KRRB	SE70K		70												2.585	5.70		
—	G1212KRRB	S1212K		2 3/4												3.084	6.80		
—	G1213KRRB	S1213K	215	2 13/16	130	74.61	29	37.3	6.4	101.6	23.8	5.56	92.1	113.13	38.03	2.976	6.56	43600	69500
—	G1214KRRB	S1214K		2 7/8	5.1181	2 15/16	1.142	1 15/32	1/4	4	15/16	0.219	3 5/8	4.454	1.497	2.867	6.32	9800	15600
—	G1215KRRB	S1215K		2 15/16												2.753	6.07		
—	GE75KRRB	SE75K		75												2.753	6.07		

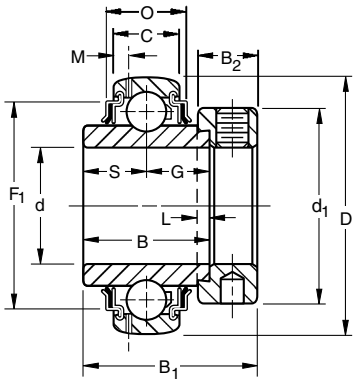
(1) Bore tolerances: 1/2" - 2 3/16", nominal to .013 mm, +.0005". 2 1/4" - 2 15/16", nominal to .015 mm, +.0006".

(2) Spherical O.D. outer ring width is 22 mm, .866".

(3) Spherical O.D. outer ring width is 24 mm, .945".

GN-KRRB HEAVY SERIES RELUBRICATABLE TYPE

- The heavy series R-Seal bearings are similar to the standard series and designed to withstand continuous, heavy or shock loads.
- This series has heavier section 300 Series bearings. They include a considerably thicker sealing member in the contact-type diaphragm seal.
- The design of the series assures complete retention of the lubricant and positive exclusion of all contaminants.



Suggested shaft tolerances: 1 3/16" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 3 15/16", nominal to -.025 mm, -.0010".

TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: GN303KRRB + COL.

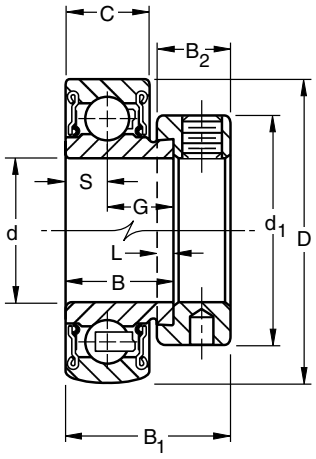
Bearing Number	Collar Number	Basic Outer Ring Size	Bore[1] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	G	L	d_1	B_2	M	B_1	F_1	O	Brg. & Collar Wt.		Static Load Rating C_0	Extended Dynamic Load Rating C_E
			in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
GN103KRRB	SN103K	306	1 3/16	72 2.8346	36.51 1 7/16	20 0.787	17.5 11/16	19.1 3/4	4 5/32	49.2 1 15/16	17.5 11/16	3.61 0.142	50 1 31/32	60.17 2.369	23.5 0.925	0.553	1.22	15600 3550	33500 7500
GN104KRRB	SN104K		1 1/4													0.762	1.68		
GN105KRRB	SN105K	307	1 5/16	80	38.10	22	18.3	19.8	4	55.6	17.5	3.96	51.6	67.01	27	0.744	1.64	20000	40500
GN106KRRB	SN106K		1 3/8	3.1496	1 1/2	0.866	23/32	25/32	5/32	2 3/16	11/16	0.156	2 1/32	2.638	1.063	0.726	1.6	4500	9150
GN107KRRB	SN107K		1 7/16													0.708	1.56		
GN108KRRB[2]	SN108K	308	1 1/2	90 3.5433	41.28 1 5/8	25 0.984	19.8 25/32	21.4 27/32	4.8 3/16	63.5 2 1/2	20.6 13/16	4.62 0.182	57.2 2 1/4	75.06 2.955	26.67 1.05	1.152	2.54	24500 5500	49000 11000
GN110KRRB	SN110K	309	1 5/8	100	42.86	27	19.8	23	4.8	69.9	20.6	5	58.7	82.58	28.52	1.656	3.65	30000	58500
GN111KRRB	SN111K		1 11/16	3.9370	1 11/16	1.063	25/32	29/32	3/16	2 3/4	13/16	0.197	2 5/16	3.251	1.123	1.456	3.21	6700	13200
GN112KRRB	SN112K		1 3/4													1.388	2.95		
GN114KRRB	SN114K	310	1 7/8	110	49.21	29	24.6	24.6	4.8	75.8	22.2	5.36	66.7	82.87	30.86	1.973	4.35	35500	68000
GN115KRRB	SN115K		1 15/16	4.3307	1 15/16	1.142	31/32	31/32	3/16	2 63/64	7/8	0.211	2 5/8	3.654	1.215	1.905	4.2	8000	15300
GN200KRRB	SN200K	311	2	120	55.56	31	27.8	27.8	4.8	82.6	22.2	5.49	73	101.78	37.47	2.132	4.7	41500	80000
GN203KRRB	SN203K		2 3/16	4.7244	2 3/16	1.22	1 3/32	1 3/32	3/16	3 1/4	7/8	0.216	2 7/8	4.007	1.475	2.368	5.22	9300	18000
GN207KRRB	SN207K	312	2 7/16	130	61.91	33	31	31	6.4	88.9	23.8	5.84	79.4	108.52	38.99	2.839	6.26	48000	90000
				5.1181	2 7/16	1.299	1 7/32	1 7/32	1/4	3 1/2	15/16	0.23	3 1/8	4.312	1.535			10800	20400
GN211KRRB	SO211K	314	2 11/16	150	68.26	37	34.1	34.1	6.4	101.6	27	6.73	88.9	126.31	44.96	4.509	9.94	63000	116000
				5.9055	2 11/16	1.457	1 11/32	1 11/32	1/4	4	1 1/16	0.265	3 1/2	4.973	1.77			14300	26000
GN215KRRB	SN215K	315	2 15/16	160	74.61	39	37.3	37.3	6.4	112.7	31.8	6.48	100	133.02	51.13	5.634	12.42	71000	125000
				6.2992	2 15/16	1.535	1 15/32	1 15/32	1/4	4 7/16	1 1/4	0.255	3 15/16	5.273	2.013			16000	28500
GN303KRRB	SN303K	316	3 3/16	170	80.96	41	40.5	40.5	6.4	119.1	31.8	7.26	106.4	142.82	51.05	7.126	15.71	80000	137000
				6.6929	3 3/16	1.614	1 19/32	1 19/32	1/4	4 11/16	1 1/4	0.286	4 3/16	5.623	2.010			18000	30500
GN307KRRB	SN307K	318	3 7/16	190	87.31	45	42.1	42.1	7.9	133.4	36.5	8.18	115.9	161.37	52.63	9.19	20.26	98000	156000
				7.4803	3 7/16	1.772	1 21/32	1 21/32	5/16	5 1/4	1 7/16	0.322	4 9/16	6.353	2.072			22400	33500
GN315KRRB	SN315K	320	3 15/16	215	100.01	49	50	50	7.9	146.1	36.5	7.82	129.6	182.85	59.36	12.233	26.97	132000	193000
				8.4646	3 15/16	1.929	1 31/32	1 31/32	5/16	5 3/4	1 7/16	0.308	5 1/16	7.199	2.337			22900	43000

[1] Bore tolerances: 1 3/16" - 2 3/16", nominal to .013 mm, +.0005"; 2 1/4" - 3 3/16", nominal to .015 mm, +.0006".
[2] Also available with cylindrical O.D. Delete suffix "B". Example: GN108KRR.

RA-RR, RA-RRB STANDARD SERIES NON-RELUBRICATABLE TYPES

- Bearings are an extended inner ring type with self-locking collar.
- Due to the positive contact, the land-riding R-Seal provides improved protection against harmful contaminants and retains lubricant under severe operating conditions.
- RA-RR Series are factory prelubricated and have cylindrical outside diameters.
- RA-RRB Series have spherical outside diameters for use in housings with corresponding spherical inside surfaces to provide unrestricted initial alignment.

Suggested shaft tolerances: 1/2"- 1 15/16", nominal to -.013 mm, -.0005";
2" - 2 3/16", nominal to -.025 mm, -.0010".



RA-RR Two Seals
Cylindrical O.D.

RA-RRB Two Seals
Spherical O.D.

TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: RA100RRB + COL.

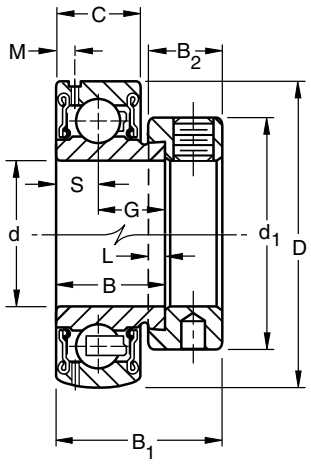
Bearing Number Cylindrical O.D.	Bearing Number Spherical O.D.	Collar Number	Basic Outer Ring Size	Bore[1] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	G	L	d_1	B_2	B_1	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
				mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
RA008RR	RA008RRB	S1008K		1/2										0.154	0.34		
RA009RR	RA009RRB	S1009K		9/16	40	19.05	13	6.5	12.55	4.0	28.6	13.5	28.6	0.145	0.32	4700	10600
RA010RR	RA010RRB	S1010K	203	5/8	1.5748	0.750	0.512[2]	0.256	0.494	5/32	1 1/8	17/32	1 1/8	0.127	0.28	1060	2360
RAE17RR	RAE17RRB	SE17K		17										0.127	0.28		
RA012RR	RA012RRB	S1012K	204	3/4	47	21.44	15	7.49	13.92	4.0	33.3	13.5	31	0.132	0.29	6200	14300
RAE20RR	RAE20RRB	SE20K		20	1.8504	0.844	0.591[3]	0.295	0.548	5/32	1 5/16	17/32	1 7/32	0.132	0.29	1400	3200
RA013RR	RA013RRB	S1013K		13/16										0.231	0.51		
RA014RR	RA014RRB	S1014K	205	7/8	52	21.44	15	7.49	13.92	4.0	38.1	13.5	31	0.213	0.47	7700	15800
RA015RR	RA015RRB	S1015K		15/16	2.0472	0.844	0.591	0.295	0.548	5/32	1 1/2	17/32	1 7/32	0.2	0.44	1730	3550
RA100RR	RA100RRB	S1100K		1										0.186	0.41		
RAE25RR	RAE25RRB	SE25K		25										0.186	0.41		
RA101RR	RA101RRB	S1101K		1 1/16										0.349	0.77		
RA102RR	RA102RRB	S1102K		1 1/8	62	23.82	18	8.99	14.81	4.0	44.1	15.9	35.7	0.327	0.72	11100	21800
RA103RR	RA103RRB	S1103K	206	1 3/16	2.4409	0.938	0.709	0.354	0.583	5/32	1 47/64	5/8	1 13/32	0.318	0.7	2500	4900
RA103RR2	RA103RRB2	S1103K3		1 1/4										0.295	0.65		
RAE30RR	RAE30RRB	SE30K		30										0.318	0.7		
RA104RR	RA104RRB	S1104K		1 1/4										0.562	1.24		
RA105RR	RA105RRB	S1105K	207	1 5/16	72	25.4	19	9.5	15.9	4.0	54.40	17.1	38.9	0.54	1.19	15100	28500
RA106RR	RA106RRB	S1106K		1 3/8	2.8346	1.000	0.748	0.374	0.626	5/32	2 1/8	43/64	1 17/32	0.513	1.13	3400	6400
RA107RR	RA107RRB	S1107K		1 7/16										0.476	1.05		
RAE35RR	RAE35RRB	SE35K		35										0.513	1.13		
RA108RR	RA108RRB	S1108K		1 1/2	80	30.18	22	11	19.18	4.8	60.3	18.3	43.7	0.694	1.53	19600	36000
RA109RR	RA109RRB	S1109K	208	1 9/16	3.1496	1.188	0.866[4]	0.433	0.755	3/16	2 3/8	23/32	1 23/32	0.649	1.43	4400	8150
RAE40RR	RAE40RRB	SE40K		40										0.649	1.43		
RA110RR	RA110RRB	S1110K		1 5/8										0.78	1.72		
RA111RR	RA111RRB	S1111K	209	1 11/16	85	30.18	22	11	19.18	4.8	63.5	18.3	43.7	0.735	1.62	20000	36000
RA112RR	RA112RRB	S1112K		1 3/4	3.3465	1.188	0.866	0.433	0.755	3/16	2 1/2	23/32	1 23/32	0.68	1.5	4500	8150
RAE45RR	RAE45RRB	SE45K		45										0.68	1.5		
RA113RR	RA113RRB	S1113K		1 13/16										0.88	1.94		
RA114RR	RA114RRB	S1114K		1 7/8	90	30.18	22	11	19.18	4.8	69.9	18.3	43.7	0.83	1.83	22700	39200
RA115RR	RA115RRB	S1115K	210	1 15/16	3.5433	1.188	0.866	0.433	0.755	3/16	2 3/4	23/32	1 23/32	0.771	1.70	5100	8800
RA115RR2	RA115RRB2	S1115K2		2										0.717	1.58		
RAE50RR	RAE50RRB	SE50K		50										0.771	1.79		
RA200RR	RA200RRB	S1200K		2										0.962	2.12		
RA201RR	RA201RRB	S1201K		2 1/16	100	32.54	24	11.99	20.55	4.8	76.2	20.6	48.4	0.898	1.98		
RA202RR	RA202RRB	S1202K	211	2 1/8	3.9370	1.281	0.945	0.472	0.809	3/16	3	13/16	1 29/32	0.857	1.89	28500	48000
RA203RR	RA203RRB	S1203K		2 3/16										0.807	1.78	6400	10800
RAE55RR	RAE55RRB	SE55K		55										0.807	1.78		

[1] Bore tolerance is nominal to .013 mm, +.0005".
[2] Spherical O.D. outer ring width is 12 mm, .472".
[3] Spherical O.D. outer ring width is 14 mm, .551".
[4] Spherical O.D. outer ring width is 21 mm, .827".

GRA-RR, GRA-RRB STANDARD SERIES RELUBRICATABLE TYPES

- GRA-RR Series bearings are the same as the RA-RR Series and have a provision for relubrication.
- GRA-RR Series have cylindrical outside diameters.
- GRA-RRB have spherical outside diameters

Suggested shaft tolerances: **$^1/_2$" - 1 $^{15}/_{16}$", nominal to -0.13 mm, -.0005";**
2" - 2 $^{15}/_{16}$", nominal to -.025 mm, -.0010".



GRA-RR Two Seals
Cylindrical O.D.

GRA-RRB Two Seals
Spherical O.D.

TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: GRA100RRB + COL.

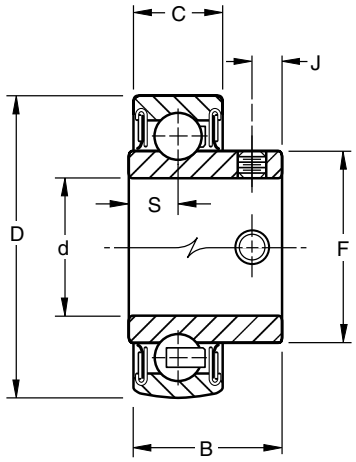
Bearing Number		Collar Number	Basic Outer Ring Size	Bore[1] d	O.D. D	Ring Widths		S	G	L	d_1	B_2	M	B_1	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
Cylindrical O.D.	Spherical O.D.					B Inner	C Outer											
				mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
GRA008RR	GRA008RRB	S1008K		1/2											0.154	0.34		
—	GRA009RRB	S1009K		9/16	40	19.05	13	6.5	12.55	4.0	28.6	13.5	2.72	28.6	0.145	0.32	4700	10600
GRA010RR	GRA010RRB	S1010K	203	5/8	1.5748	0.750	0.512[2]	0.256	0.494	5/32	1 1/8	17/32	0.107	1 1/8	0.127	0.28	1060	2360
GRAE17RR	GRAE17RRB	SE17K		17											0.127	0.28		
GRA012RR	GRA012RRB	S1012K	204	3/4	47	21.44	15	7.49	13.92	4.0	33.3	13.5	3.05	31	0.132	0.29	6200	14300
GRAE20RR	GRAE20RRB	SE20K		20	1.8504	0.844	0.591[3]	0.295	0.548	5/32	1 5/16	17/32	0.12	1 7/32	0.132	0.29	1400	3200
—	GRA013RRB	S1013K		13/16											0.231	0.51		
GRA014RR	GRA014RRB	S1014K	205	7/8	52	21.44	15	7.49	13.92	4.0	38.1	13.5	3.61	31	0.213	0.47	7700	15800
—	GRA015RRB	S1015K		15/16	2.0472	0.844	0.591	0.295	0.548	5/32	1 1/2	17/32	0.142	1 7/32	0.2	0.44	1730	3550
GRA100RR	GRA100RRB	S1100K		1											0.186	0.41		
GRAE25RR	GRAE25RRB	SE25K		25											0.186	0.41		
GRA101RR	GRA101RRB	S1101K		1 1/16											0.349	0.77		
GRA102RR	GRA102RRB	S1102K		1 1/8	62	23.83	18	8.99	14.81	4.0	44.1	15.9	4.17	35.7	0.327	0.72	11100	21800
GRA103RR	GRA103RRB	S1103K	206	1 3/16	2.4409	0.938	0.709	0.354	0.583	5/32	1 47/64	5/8	0.164	1 13/32	0.318	0.7	2500	4900
GRA103RR2	GRA103RRB2	S1103K3		1 1/4											0.295	0.65		
GRAE30RR	GRAE30RRB	SE30K		30											0.318	0.7		
GRA104RR	GRA104RRB	S1104K		1 1/4											0.562	1.24		
—	GRA105RRB	S1105K	207	1 5/16	72	25.4	19	9.5	15.9	4.0	54.0	17.1	3.68	38.9	0.54	1.19	15100	28500
—	GRA106RRB	S1106K		1 3/8	2.8346	1.000	0.748	0.374	0.626	5/32	2 1/8	43/64	0.145	1 17/32	0.513	1.13	3400	6400
—	GRA107RRB	S1107K		1 7/16											0.476	1.05		
GRAE35RR	GRAE35RRB	SE35K		35											0.513	1.13		
GRA108RR	GRA108RRB	S1108K		1 1/2	80	30.18	22	11	19.18	4.8	60.3	18.3	4.17	43.7	0.694	1.53	19600	36000
—	GRA109RRB	S1109K	208	1 9/16	3.1496	1.188	0.866[4]	0.433	0.755	3/16	2 3/8	23/32	0.164	1 23/32	0.649	1.43	4400	8150
GRAE40RR	GRAE40RRB	SE40K		40											0.649	1.43		
—	GRA110RRB	S1110K		1 5/8											0.78	1.72		
—	GRA111RRB	S1111K	209	1 11/16	85	30.18	22	11	19.18	4.8	63.5	18.3	4.55	43.7	0.735	1.62	20500	36300
—	GRA112RRB	S1112K		1 3/4	3.3465	1.188	0.866	0.433	0.755	3/16	2 1/2	23/32	0.179	1 23/32	0.68	1.5	4600	8160
—	GRAE45RRB	SE45K		45											0.68	1.5		
—	GRA113RRB	S1113K		1 13/16											0.88	1.94		
—	GRA114RRB	S1114K		1 7/8	90	30.18	22	11	19.18	4.8	69.9	18.3	4.44	43.7	0.83	1.83	22700	39200
—	GRA115RRB	S1115K	210	1 15/16	3.5433	1.188	0.866	0.433	0.755	3/16	2 3/4	23/32	0.175	1 23/32	0.771	1.70	5100	8800
—	GRA115RRB2	S1115K2		2											0.717	1.58		
—	GRAE50RRB	SE50K		50											0.771	1.79		
—	GRA200RRB	S1200K		2											0.962	2.12		
—	GRA201RRB	S1201K		2 1/16	100	32.54	24	11.99	20.55	4.8	76.2	20.6	4.9	48.4	0.898	1.98	28500	48000
—	GRA202RRB	S1202K	211	2 1/8	3.9370	1.281	0.945	0.472	0.809	3/16	3	13/16	0.193	1 29/32	0.857	1.89	6400	10800
—	GRA203RRB	S1203K		2 3/16											0.807	1.78		
—	GRAE55RRB	SE55K		55											0.807	1.78		

[1] Bore tolerance is nominal to .013 mm, +.0005".
[2] Spherical O.D. outer ring width is 12 mm, .472".
[3] Spherical O.D. outer ring width is 14 mm, .551".
[4] Spherical O.D. outer ring width is 21 mm, .827".

YA-RR, YA-RRB STANDARD SERIES NON-RELUBRICATABLE TYPES

- Bearings are an extended inner ring type and have specially designed setscrews with unique thread form.
- Thread form in both series locks bearing to shaft so they are resistant to loosening during operation.
- A positive contact, land-riding R-Seal provides improved protection against harmful contaminants in both series and retains lubricant under severe operating conditions.
- A 6/6 molded nylon retainer has proved effective under conditions of misalignment.
- YA-RR Series has cylindrical outside diameters.
- YA-RRB Series has spherical outside diameters for use in housings with corresponding spherical inside surfaces. This provides unrestricted initial self-alignment.

Suggested shaft tolerances: **1/2" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 15/16", nominal to -.025 mm, -.0010".



YA-RR Cylindrical O.D.

YA-RRB Spherical O.D.

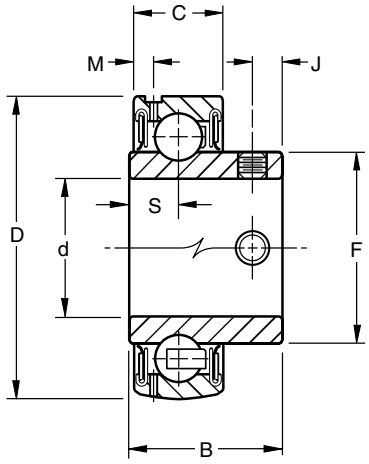
Bearing Number Cylindrical O.D.	Bearing Number Spherical O.D.	Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	F	J	Setscrew Size	Brg. Wt.	Static Load Rating C_o	Extended Dynamic Load Rating C_E
			mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	kg / lbs.	N / lbs.	N / lbs.
YA008RR	YA008RRB		1/2	40	23.8	13	7.95	24.6	4.75	M5X.8	0.09	4700	10600
YA010RR	YA010RRB	203	5/8	1.5748	0.938	0.512(2)	0.313	31/32	0.187	10-32	0.19	1060	2360
YAE17RR	YAE17RRB		17										
YA012RR	YA012RRB	204	3/4	47	27	15	8.86	29	6.02	M6X1	0.14	6200	14300
YAE20RR	YAE20RRB		20	1.8504	1.063	0.591(3)	0.349	1 9/64	0.237	1/4-28	0.3	1400	3200
YA014RR	YA014RRB	205	7/8										
YA015RR	YA015RRB		15/16	52	28.2	15	8.84	33.7	6.35	M6X1	0.17	7700	15800
YA100RR	YA100RRB		1	2.0472	1.109	0.591	0.348	1 21/64	0.250	1/4-28	0.38	1730	3550
YAE25RR	YAE25RRB		25										
YA102RR	YA102RRB		1 1/8										
YA103RR	YA103RRB	206	1 3/16	62	32.5	18	9.65	40.1	7.87	M8X1.25	0.26	11100	21800
YA103RR2	YA103RRB2		1 1/4	2.4409	1.281	0.709	0.38	1 37/64	0.310	5/16-24(4)	0.58	2500	4900
YAE30RR	YAE30RRB		30										
YA104RR	YA104RRB		1 1/4										
YA106RR	YA106RRB	207	1 3/8	72	36.5	19	10.85	46.8	7.87	M8X1.25	0.42	15100	28500
YA107RR	YA107RRB		1 7/16	2.8346	1.444	0.748	0.427	1 27/32	0.310	5/16-24	0.93	3400	6400
YAE35RR	YAE35RRB		35										
YA108RR	YA108RRB	208	1 1/2	80	39.3	22	11.63	52.4	7.87	M8X1.25	0.56	17600	36000
YAE40RR	YAE40RRB		40	3.1496	1.538	0.8661(5)	0.458	2 1/16	0.310	5/16-24	1.24	4000	8150
YA110RR	YA110RRB		1 5/8										
YA111RR	YA111RRB	209	1 11/16	85	42	22	13.46	57.9	7.87	M8X1.25	0.54	20500	36300
YA112RR	YA112RRB		1 3/4	3.3465	1.655	0.8861	0.53	2 9/32	0.310	5/16-24	1.18	4500	8160
YAE45RR	YAE45RRB		45										
YA115RR	YA115RRB	210	1 15/16	90	44.3	22	13.46	62.7	9.02	M10X1.5	0.57	22700	39200
YA115RR2	YA115RRB2		2	3.5433	1.746	0.8661	0.53	2 15/32	0.355	3/8-24	1.25	5100	8800
YAE50RR	YAE50RRB		50										
YA200RR	YA200RRB	211	2	100	46.6	24	14.6	69.8	9.02	M10X1.5	0.58	28500	48000
YA203RR	YA203RRB		2 3/16	3.9370	1.833	0.9449	0.575	2 3/4	0.355	3/8-24	1.27	6400	10800
YAE55RR	YAE55RRB		55										

(1) Bore tolerance is nominal to .013 mm, +.0005".
(2) Spherical O.D. outer ring width is 12 mm, .4724".
(3) Spherical O.D. outer ring width is 14 mm, .5512".
(4) YA103RR2 and YA103RRB2 use 1/4 - 28" setscrew.
(5) Spherical O.D. outer ring width is 21 mm, .8268".

GYA-RR, GYA-RRB STANDARD SERIES RELUBRICATABLE TYPES

- GYA-RR Series bearings are dimensionally interchangeable with the YA-RR Series.
- Both series have cylindrical outside diameters and can be used in standard cylindrical housings.
- GYA-RRB Series have spherical outside diameters, providing unrestricted initial alignment. This series is used in housings with corresponding spherical inside surfaces.

Suggested shaft tolerances: 1/2"- 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 15/16", nominal to -.025 mm, -.0010".



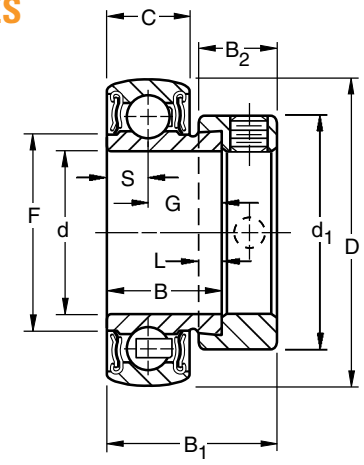
Bearing Number Cylindrical O.D.	Bearing Number Spherical O.D.	Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	F	M	J	Setscrew Size	Brg. Wt.	Static Load Rating C_o	Extended Dynamic Load Rating C_E
			mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	N lbs.	N lbs.
GYA008RR	GYA008RRB		1/2	40	23.8	12	7.95	24.6	2.72	4.75	M5X.8	0.09	4700	10600
GYA010RR	GYA010RRB	203	5/8	1.5748	0.938	0.472	0.313	31/32	0.107	0.187	10-32	0.19	1060	2360
GYAE17RR	GYAE17RRB		17											
GYA012RR	GYA012RRB	204	3/4	47	27	14	8.86	29	3.05	6.02	M6X1	0.14	6200	14300
GYAE20RR	GYAE20RRB		20	1.8504	1.063	0.551	0.349	1 9/64	0.12	0.237	1/4-28	0.3	1400	3200
GYA014RR	GYA014RRB	205	7/8											
GYA015RR	GYA015RRB		15/16	52	28.2	15	8.84	33.7	3.61	6.35	M6X1	0.17	7700	15800
GYA100RR	GYA100RRB		1	2.0472	1.109	0.591	0.348	1 21/64	0.142	0.250	1/4-28	0.38	1730	3550
GYAE25RR	GYAE25RRB		25											
GYA102RR	GYA102RRB		1 1/8											
GYA103RR	GYA103RRB	206	1 3/16	62	32.5	18	9.65	40.1	4.17	7.87	M8X1.25	0.26	11100	21800
GYA103RR2	GYA103RRB2		1 1/4	2.4409	1.281	0.709	0.38	1 37/64	0.164	0.310	5/16-24(2)	0.58	2500	4900
GYAE30RR	GYAE30RRB		30											
GYA104RR	GYA104RRB		1 1/4											
GYA106RR	GYA106RRB	207	1 3/8	72	36.5	19	10.85	46.8	3.68	7.87	M8X1.25	0.42	15100	28500
GYA107RR	GYA107RRB		1 7/16	2.8346	1.444	0.748	0.427	1 27/32	0.145	0.310	5/16-24	0.93	3400	6400
GYAE35RR	GYAE35RRB		35											
GYA108RR	GYA108RRB	208	1 1/2	80	39.3	22	11.63	52.4	4.17	7.87	M8X1.25	0.56	17600	36000
GYAE40RR	GYAE40RRB		40	3.1496	1.538	0.8661	0.458	2 1/16	0.164	0.310	5/16-24	1.24	4000	8150
GYA110RR	GYA110RRB		1 5/8											
GYA111RR	GYA111RRB	209	1 11/16	85	42	22	13.46	57.9	4.54	7.87	M8X1.25	0.54	20000	36000
GYA112RR	GYA112RRB		1 3/4	3.3465	1.655	0.8661	0.53	2 9/32	0.179	0.310	5/16-24	1.18	4500	8150
GYAE45RR	GYAE45RRB		45											
GYA115RR	GYA115RRB	210	1 15/16	90	44.3	22	13.46	62.7	4.44	9.02	M10X1.5	0.57	22700	39200
GYA115RR2	GYA115RRB2		2	3.5433	1.746	0.8661	0.53	2 15/32	0.175	0.355	3/8-24	1.25	5100	8800
GYAE50RR	GYAE50RRB		50											
GYA200RR	GYA200RRB	211	2	100	46.6	24	14.6	69.8	4.9	9.02	M10X1.5	0.58	28500	48000
GYA203RR	GYA203RRB		2 3/16	3.9370	1.833	0.9449	0.575	2 3/4	0.193	0.355	3/8-24	1.27	6400	10800
GYAE55RR	GYAE55RRB		55											

(1) Bore tolerance is nominal to .013 mm, +.0005".
(2) GYA103RR2 and GYA103RRB2 use 1/4 - 28" setscrew.

RAL-NPPB STANDARD SERIES NON-RELUBRICATABLE TYPES

- RAL Series are high-quality, compact, low-cost bearings and are intended for use in lightly loaded applications.
- RAL Series are extended inner ring type with self-locking collars.
- Prelubricated RAL Series incorporate the positive contact, land-riding R-Seal. The seal has proved effective in the retention of lubricants and exclusion of foreign matter under extreme service conditions.
- RAL-NPPD Series bearings have spherical outside diameters providing unrestricted initial alignment.
- Used in housings with corresponding spherical inside surfaces.

Suggested shaft tolerances: 1/2" - 1 1/4", nominal to -.013 mm, -.0005".



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: RAL100NPPB + COL.

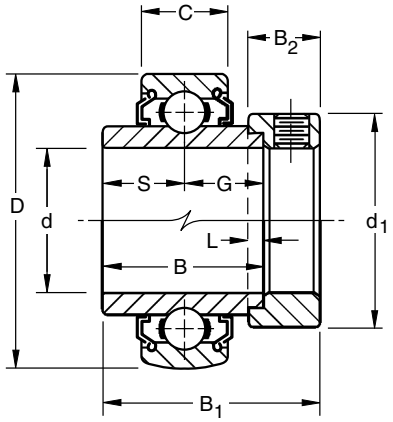
Bearing Number	Collar Number	Basic Outer Ring Size	Bore(2) d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	G	F	L	d_1	B_2	B_1	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
			in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kg	lbs.	N lbs.	N lbs.
RAL008NPPB(1)	LS008K		1/2	35	15.88	11	5.502	10.373	20.07	4	25.4	11.1	23.8	–	–	3000	7500
RAL009NPPB	LS009K	202	9/16	1.3780	5/8	0.433	0.2116	0.4084	0.790	5/32	1	7/16	15/16	–	–	680	1700
RAL010NPPB(1)	LS010K		5/8											0.06	0.13		
RAL012NPPB(1)	LS012K	9104	3/4	42	16.67	12	6	10.663	25.15	3.2	29.8	11.1	24.6	0.09	0.20	4400	10400
				1.6535	21/32	0.472	0.2362	0.4198	0.990	1/8	1 11/64	7/16	31/32			1000	2320
RAL013NPPB	LS013K		13/16											–	–		
RAL014NPPB	LS014K	9105	7/8	47	17.46	12	6	11.476	29.67	4	36.1	11.9	25.4	0.11	0.24	4900	11000
RAL015NPPB	LS015K		15/16	1.8504	11/16	0.472	0.2362	0.4518	1.168	5/32	1 27/64	15/32	1	–	–	1120	2500
RAL100NPPB(1)	LS100K		1											0.10	0.22		
RAL101NPPB	LS101K		1 1/16											–	–		
RAL102NPPB	LS102K	9106	1 1/8	55	18.27	13	6.5	11.755	36.32	4	42.5	11.9	26.2	0.13	0.29	6950	14600
RAL103NPPB	LS103K		1 3/16	2.1654	23/32	0.512	0.2559	0.4628	1.43	5/32	1 43/64	15/32	1 1/32	0.13	0.28	1560	3350
RAL103NPPB2(1)	LS103K2		1 1/4											0.13	0.28		

(1) Also available with cylindrical O.D. (Delete suffix "B").
(2) Bore tolerance is nominal to .013 mm, +.0005".

KL, KLB, KLL, KLLB SPECIAL SERIES NON-RELUBRICATABLE TYPES

- These wide inner ring ball bearings have either one or two Mechani-Seals.
- Types KLB and KLLB have spherical outside diameters permitting self-alignment when mounted in a housing with a corresponding spherical seat.
- All four types are prelubricated at the factory and require no further lubrication.
- Suitable for higher speed and/or higher temperature applications.
- Because they incorporate non-contact seals, these bearings have very low rotational torque.

Suggested shaft tolerances: $1/2$" - $1\ 15/16$", nominal to -.013 mm, -.0005";
2" - $2\ 15/16$", nominal to -.025 mm, -.0010".



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: 1100KLL + COL.

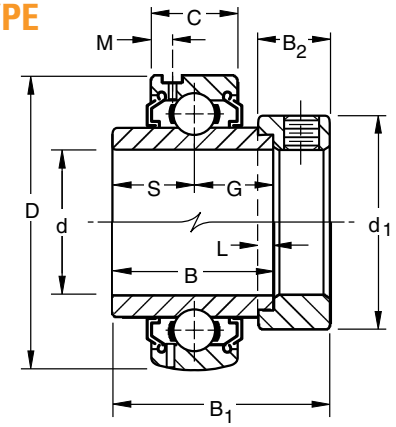
Bearing Number Cylindrical O.D.		Cylindrical O.D.	Spherical O.D.	Collar Number	Basic Outer Ring Size	Bore[4] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S&G	L	d_1	B_2	B_1	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
						in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
1008KL		1008KLL	(KLLB)	S1008K		1/2									0.168	0.37		
—		1009KLL		S1009K	203	9/16	40	27.78	12	13.89	3.97	28.58	13.49	37.31	0.163	0.36	4700	10700
1010KL		1010KLL	(KLLB)	S1010K		5/8	1.5748	1 3/32	0.4724	35/64	5/32	1 1/8	17/32	1 15/32	0.141	0.31	1060	2400
1011KL		1011KLL	(KLLB)	S1011K		11/16									0.122	0.27		
1012KL		1012KLL	(KLLB)	S1012K	204	3/4	47	34.13	14	17.06	3.97	33.34	13.5	43.7	0.209	0.46	6200	14300
							1.8504	1 11/32	0.5512	43/64	5/32	1 5/16	17/32	1 23/32			1400	3200
—		—		S1013K		13/16									0.286	0.63		
1014KL		1014KLL	(KLLB)	S1014K	205	7/8	52	34.92	15	17.46	3.97	38.1	13.49	44.45	0.277	0.61	7700	15800
1015KL		1015KLL	(KLLB)	S1015K		15/16	2.0472	1 3/8	0.5906	11/16	5/32	1 1/2	17/32	1 47/64	0.254	0.56	1730	3550
1100KL	(KLB)	1100KLL	(KLLB)	S1100K		1									0.25	0.55		
1101KL		—		S1101K		1 1/16									0.417	0.92		
1102KL		1102KLL	(KLLB)	S1102K	206	1 1/8	62	36.51	16[1]	18.26	3.97	44.1	15.88	48.42	0.413	0.91	11100	21800
1103KL	(KLB)	1103KLL	(KLLB)	S1103K		1 3/16	2.4409	1 7/16	0.6299	23/32	5/32	1 3/4	5/8	1 29/32	0.372	0.82	2500	4900
1103KL3		1103KLL3	(KLLB3)	S1103K3		1 1/4									0.358	0.79		
1104KL		1104KLL	(KLLB)	S1104K		1 1/4									0.649	1.43		
—		1105KLL	(KLLB)	S1105K	207	1 5/16	72	37.70	17[2]	18.85	3.97	54.0	17.46	51.2	0.617	1.36	15100	28500
1106KL		1106KLL	(KLLB)	S1106K		1 3/8	2.8346	1 31/64	0.6693	0.742	5/32	2 1/8	43/64	2 1/64	0.581	1.28	3400	6400
1107KL	(KLB)	1107KLL	(KLLB)	S1107K		1 7/16									0.544	1.2		
1108KL	(KLB)	1108KLL	(KLLB)	S1108K	208	1 1/2	80	42.86	18[3]	21.43	4.76	60.32	18.26	56.36	0.821	1.81	17600	36200
—		1109KLL	(KLLB)	S1109K		1 9/16	3.1496	1 11/16	0.7087	27/32	3/16	2 3/8	23/32	2 7/32	0.767	1.69	4000	8130
1110KL		1110KLL	(KLLB)	S1110K		1 5/8	85	42.86	19	21.43	4.76	60.35	18.26	56.36	0.934	2.06	20000	36300
1111KL		1111KLL	(KLLB)	S1111K	209	1 11/16	3.3465	1 11/16	0.7480	27/32	3/16	2 1/2	23/32	2 7/32	0.89	1.96	4500	8160
1112KL	(KLB)	1112KLL	(KLLB)	S1112K		1 3/4									0.844	1.86		
1114KL		1114KLL	(KLLB)	S1114K	210	1 7/8	90	49.21	20	24.61	4.76	69.9	18.26	62.71	1.075	2.37	22700	39000
1115KL	(KLB)	1115KLL	(KLLB)	S1115K		1 15/16	3.5433	1 15/16	0.7874	31/32	3/16	2 3/4	23/32	2 15/32	1.021	2.25	5100	8800
1200KL	(KLB)	1200KLL	(KLLB)	S1200K		2	100	55.56	21	27.98	4.76	76.2	20.64	71.44	1.54	3.4	28500	48000
—		1202KLL	(KLLB)	S1202K	211	2 1/8	3.9370	2 3/16	0.8268	1 3/32	3/16	3	13/16	2 13/16	1.406	3.1	6400	10800
1203KL		1203KLL	(KLLB)	S1203K		2 3/16									1.347	2.97		
1207KL		—		S1207K	212	2 7/16	110	61.91	22	30.96	6.35	84.14	22.22	77.79	1.66	3.66	35600	58500
							4.3307	2 7/16	0.8661	1 7/32	1/4	3 5/16	7/8	3 1/16			8000	13200
—		1215KLL	(KLLB)	S1215K	215	2 15/16	130	74.61	25	37.31	6.35	101.6	23.81	91.08	2.268	5	43600	69500
							5.1181	2 15/16	0.9843	1 15/32	1/4	4	15/16	3 5/8			9800	15600

[1] Spherical O.D. outer ring width is 18 mm, .7087".
[2] Spherical O.D. outer ring width is 19 mm, .7480".
[3] Spherical O.D. outer ring width is 21 mm, .8268".
[4] Bore tolerance: $1/2$"- $2\ 3/16$", nominal to .013 mm, +.0005".
$2\ 7/16$"- $2\ 15/16$", nominal to .015 mm, +.0006".

G-KLL, G-KLLB SPECIAL SERIES RELUBRICATABLE TYPE

- These wide inner ring ball bearings have two Mechani-Seals and a provision for relubrication.
- Type G-KLL has a cylindrical outside diameter
- Type G-KLLB has a spherical outside diameter.
- Both are generally suitable for higher speed and/or higher temperature applications.
- Because they incorporate non-contact seals, these bearings have very low rotational torque.
- Consult your Timken representative for suggestions.

Suggested shaft tolerances: 1/2" - 1 15/16", nominal to -.013 mm, -.0005";
2" - 2 15/16", nominal to -.025 mm, -.0010".



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: G1015KLL + COL.

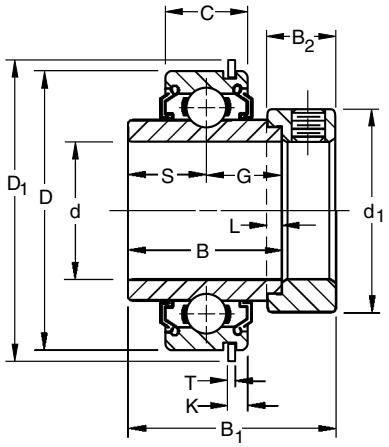
Bearing Number		Collar Number	Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths		S&G	L	d_1	B_2	M	B_1	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
Cylindrical O.D.	Spherical O.D.					B Inner	C Outer										
				in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
—	G1008KLLB	S1008K		1/2										0.15	0.33		
—	G1009KLLB	S1009K	203	9/16	40	27.78	12	13.9	4.0	28.6	13.5	2.72	37.3	0.136	0.3	4700	10700
G1010KLL	G1010KLLB	S1010K		5/8	1.5748	1 3/32	0.4724	35/64	5/32	1 1/8	17/32	0.107	1 15/32	0.141	0.31	1060	2400
G1011KLL	G1011KLLB	S1011K		11/16										0.118	0.26		
G1012KLL	G1012KLLB	S1012K	204	3/4	47	34.13	14	17.1	4.0	33.3	13.5	3.43	43.7	0.2	0.44	6200	14300
					1.8504	1 11/32	0.5512	43/64	5/32	1 5/16	17/32	0.135	1 23/32			1400	3200
—	G1013KLLB	S1013K		13/16										0.286	0.63		
G1014KLL	G1014KLLB	S1014K	205	7/8	52	34.92	15	17.5	4.0	38.1	13.5	3.86	44.45	0.263	0.58	7700	15800
G1015KLL	G1015KLLB	S1015K		15/16	2.0472	1 3/8	0.5906	11/16	5/32	1 1/2	17/32	0.152	1 3/4	0.245	0.54	1730	3550
G1100KLL	G1100KLLB	S1100K		1										0.222	0.49		
G1101KLL	—	S1101K		1 1/16										0.422	0.93		
G1102KLL	G1102KLLB	S1102K	206	1 1/8	62	36.51	18	18.3	4.0	44.4	15.9	3.96	48.4	0.413	0.91	11100	21800
G1103KLL	G1103KLLB	S1103K		1 3/16	2.4409	1 7/16	0.7087	23/32	5/32	1 3/4	5/8	0.156	1 29/32	0.395	0.87	2500	4900
—	G1103KLLB3	S1103K3		1 1/4										0.34	0.75		
G1104KLL	G1104KLLB	S1104K		1 1/4										0.649	1.43		
—	G1105KLLB	S1105K	207	1 5/16	72	37.70	19	18.85	4.0	54.0	17.46	3.43	51.2	0.622	1.37	15100	28500
G1106KLL	G1106KLLB	S1106K		1 3/8	2.8346	1 31/64	0.7480	0.742	5/32	2 1/8	11/16	0.135	2 1/64	0.59	1.3	3400	6400
G1107KLL	G1107KLLB	S1107K		1 7/16										0.549	1.21		
G1108KLL	G1108KLLB	S1108KT	208	1 1/2	80	42.86	21	21.4	4.8	60.3	18.3	4.06	56.4	0.826	1.82	17600	36200
G1109KLL	G1109KLLB	S1109KT		1 9/16	3.1496	1 11/16	0.8268	27/32	3/16	2 3/8	23/32	0.16	2 7/32	0.785	1.73	4000	8130
G1110KLL	G1110KLLB	S1110K		1 5/8	85	42.86	22	21.4	4.8	63.5	18.3	0.179	56.4	0.949	2.09	20000	36300
G1111KLL	G1111KLLB	S1111K	209	1 11/16	3.3465	1 11/16	0.8661	27/32	3/16	2 1/2	23/32	4.55	2 7/32	0.899	1.98	4500	8160
G1112KLL	G1112KLLB	S1112K		1 3/4										0.853	1.88		
—	G1113KLLB	S1113K		1 13/16	90	49.21	23	24.6	4.8	69.9	18.3	4.7	62.7	1.148	2.53	22700	39000
G1114KLL	G1114KLLB	S1114K	210	1 7/8	3.5433	1 15/16	0.9055	31/32	3/16	2 3/4	23/32	0.185	2 15/32	1.09	2.4	5100	8800
G1115KLL	G1115KLLB	S1115K		1 15/16										1.031	2.27		
G1200KLL	G1200KLLB	S1200K		2										1.593	3.51		
—	G1201KLLB	S1201K	211	2 1/16	100	55.56	24	27.8	4.8	76.2	20.6	5	71.4	1.512	3.33	28500	48000
—	G1202KLLB	S1202K		2 1/8	3.9370	2 3/16	0.9450	1 3/32	3/16	3	13/16	0.197	2 13/16	1.416	3.12	6400	10800
G1203KLL	G1203KLLB	S1203K		2 3/16										1.285	2.83		
G1204KLL	G1204KLLB	S1204K	212	2 1/4										2.03	4.47		
—	G1205KLLB	S1205K		2 5/16	110	61.91	27	31	6.4	84.1	22.2	5.13	77.8	1.938	4.27	35600	58500
—	G1206KLLB	S1206K		2 3/8	4.3307	2 7/16	1.0630	1 7/32	1/4	3 5/16	7/8	0.202	3 1/16	1.852	4.08	8000	13200
—	G1207KLLB	S1207K		2 7/16										1.789	3.94		
—	G1215KLLB	S1215K	215	2 15/16	130	74.61	25	37.3	6.4	101.6	23.8	5.56	91.2	2.837	6.25	43600	69500
					5.1181	2 15/16	0.9843	1 15/32	1/4	4	15/16	0.219	3 5/8			9800	15600

(1) Bore tolerance: 1/2" - 2 3/16", nominal to .013 mm, +.0005".
2 1/4" - 2 15/16", nominal to .015 mm, +.0006".

KLLG SPECIAL SERIES WITH WIRELOC

- KLLG wide inner ring bearings are the same as the KLL Type, except for a snap ring or Wireloc in the outer ring.
- The Wireloc mounting provides a convenient method of positively locating a bearing axially.

Suggested shaft tolerances: 1/2" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 7/16", nominal to -.025 mm, -.0010".



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: 1008KLLG + COL.

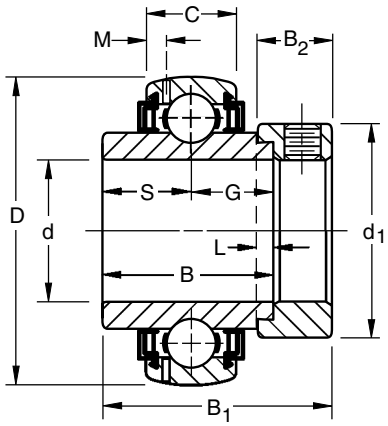
Bearing Number	Collar Number	Basic Outer Ring Size	Bore[1] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S&G	L	d_1	B_2	B_1	Snap Wire Dimensions D_1	Snap Wire Dimensions T	Snap Wire Dimensions K	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
			in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
1008KLLG	S1008K		1/2												0.173	0.38		
1009KLLG	S1009K	203	9/16	40	27.78	12	13.9	4.0	28.6	13.5	37.3	44.45	1.07	3.05	0.154	0.34	4700	10700
1010KLLG	S1010K		5/8	1.5748	1 3/32	0.4724	35/64	5/32	1 1/8	17/32	1 15/32	1 3/4	0.042	0.12	0.141	0.31	1060	2400
1011KLLG	S1011K		11/16												0.132	0.29		
1012KLLG	S1012K	204	3/4	47	34.13	14	17.1	4.0	33.3	13.5	43.7	52.39	1.07	3.45	0.204	0.45	6200	14300
				1.8504	1 11/32	0.5512	43/64	5/32	1 5/16	17/32	1 23/32	2 1/16	0.042	0.136			1400	3200
1013KLLG	S1013K		13/16												0.272	0.6		
1014KLLG	S1014K	205	7/8	52	34.92	15	17.5	4.0	38.1	13.5	44.1	57.55	1.07	3.45	0.263	0.58	7700	15800
1015KLLG	S1015K		15/16	2.0472	1 3/8	0.5906	11/16	5/32	1 1/2	17/32	1 47/64	2 17/64	0.042	0.136	0.245	0.54	1730	3550
1100KLLG	S1100K		1												0.227	0.5		
1101KLLG	S1101K		1 1/16	62	36.51	16	18.3	4.0	44.4	15.9	48.4	67.47	1.65	4.83	0.427	0.94	11100	21800
1102KLLG	S1102K	206	1 1/8	2.4409	1 7/16	0.6299	23/32	5/32	1 3/4	5/8	1 29/32	2 21/32	0.065	0.190	0.386	0.85	2500	4900
1103KLLG	S1103K		1 3/16												0.386	0.85		
1104KLLG	S1104K		1 1/4												0.645	1.42		
1105KLLG	S1105K	207	1 5/16	72	37.70	17	18.85	4.0	54.0	17.1	51.2	78.18	1.65	4.83	0.604	1.33	15100	28500
1106KLLG	S1106K		1 3/8	2.8346	1 31/64	0.6693	0.742	5/32	2 1/8	43/64	2 1/64	3 5/64	0.065	0.190	0.577	1.27	3400	6400
1107KLLG	S1107K		1 7/16												0.54	1.19		
1108KLLG	S1108KT	208	1 1/2	80	42.86	18	21.4	4.8	60.3	18.3	56.4	86.52	1.65	4.83	0.826	1.82	17600	36200
1109KLLG	S1109KT		1 9/16	3.1496	1 11/16	0.7087	27/32	3/16	2 3/8	23/32	2 7/32	3 13/32	0.065	0.190	0.785	1.73	4000	8130
1110KLLG	S1110K		1 5/8	85	42.86	19	21.4	4.8	63.5	18.3	56.4	91.28	1.65	4.83	0.922	2.03	20000	36300
1111KLLG	S1111K	209	1 11/16	3.3465	1 11/16	0.7480	27/32	3/16	2 1/2	23/32	2 7/32	3 19/32	0.065	0.190	0.881	1.94	4500	8160
1112KLLG	S1112K		1 3/4												0.844	1.86		
1113KLLG	S1113K		1 13/16	90	49.21	20	24.6	4.8	69.9	18.3	62.7	96.44	2.41	5.59	1.035	2.28	22700	39000
1114KLLG	S1114K	210	1 7/8	3.5433	1 15/16	0.7874	31/32	3/16	2 3/4	23/32	2 15/32	3 51/64	0.095	0.22	1.003	2.21	5100	8800
1115KLLG	S1115K		1 15/16												0.971	2.14		
1200KLLG	S1200K		2												1.475	3.25		
1201KLLG	S1201K	211	2 1/16	100	55.56	21	27.8	4.8	76.2	20.6	71.4	106.36	2.41	5.59	1.444	3.18	28500	48000
1202KLLG	S1202K		2 1/8	3.9370	2 3/16	0.8268	1 3/32	3/16	3	13/16	2 13/16	4 3/16	0.095	0.22	1.38	3.08	6400	10800
1203KLLG	S1203K		2 3/16												1.353	2.98		
1204KLLG	S1204K	212	2 1/4												1.793	3.95		
1205KLLG	S1205K		2 5/16	110	61.91	22	30.96	6.4	84.1	22.2	77.8	116.28	2.41	5.59	1.743	3.84	35600	58500
1206KLLG	S1206K		2 3/8	4.3307	2 7/16	0.8661	1 7/32	1/4	3 5/16	7/8	3 1/16	4 37/64	0.095	0.22	1.711	3.77	8000	13200
1207KLLG	S1207K		2 7/16												1.684	3.71		

[1] Bore tolerance: 1/2" - 2 3/16", nominal to .013 mm, +.0005".
2 1/4" - 2 7/16", nominal to .015 mm, +.0006".

GN-KLLB HEAVY SERIES/SPECIAL DUTY

- The GN-KLLB Series ball bearings are heavy and are similar in design to the standard LL (Mechani-Seal) wide inner ring bearings.
- The GN-KLLB Series have heavier section 300 Series bearings.
- Unlike standard series, the seal in this heavy series is a three-piece construction and includes two fixed inner members and an external rotation slinger.

Suggested shaft tolerances: **$^1/_8$" - 1 $^{15}/_{16}$", nominal to -.013 mm, -.0005";**
2" - 2 $^{15}/_{16}$", nominal to -.025 mm, -.0010".



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: GN104KLLB + COL.

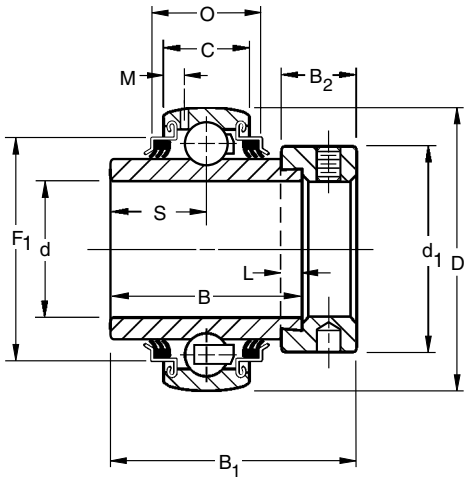
Bearing Number	Collar Number	Basic Outer Ring Size	Bore[1] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer N-KLL	Ring Widths C Outer GN-KLLB	S	G	L	d_1	B_2	M	B_1	Brg. & Collar Wt.		Static Load Rating Rating	Extended Dynamic Load C_E
															C_o			
			in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
GN102KLLB	SN102K		1 1/8	72	36.51	19	20	17.46	19.05	3.9	49.21	17.46	3.61	1.97	0.554	1.22	15800	33500
GN103KLLB	SN103K	306	1 3/16	2.8346	1 7/16	0.7480	0.7874	11/16	3/4	5/32	1 15/16	11/16	0.142	1 31/32	0.604	1.33	3550	7500
GN104KLLB	SN104K		1 1/4	80	38.10	21	22	18.3	19.84	3.9	55.6	17.46	3.96	51.59	0.649	1.43		
GN106KLLB	SN106K	307	1 3/8		1 1/2	0.8268	0.8661	23/32	25/32	5/32	2 3/16	11/16	0.156	2 1/32	0.699	1.54	21200	40500
GN107KLLB	SN107K		1 7/16	3.1496											0.731	1.61	4750	9150
GN108KLLB	SN108K	308	1 1/2	90	41.28	23	25	19.84	21.43	4.8	63.5	20.64	4.62	57.15	1.153	2.54	26100	49000
				3.5433	1 5/8	0.9055	0.9843	25/32	27/32	3/16	2 1/2	13/16	0.182	2 1/4			5850	11000
GN111KLLB	SN111K	309	1 11/16	100	42.86	25	27	19.84	23.02	4.8	69.85	20.64	4.8	58.74	1.457	3.21	31600	58500
GN112KLLB	SN112K		1 3/4	3.9370	1 11/16	0.9843	1.063	25/32	29/32	3/16	2 3/4	13/16	0.189	2 5/16	1.657	3.65	7100	13200
GN115KLLB	SN115K	310	1 15/16	110	50	27	29	24.6	24.6	4.8	76.2	22.23	5.16	66.68	1.907	4.2	37900	68000
				4.3307	1 31/32	1.063	1.1417	31/32	31/32	3/16	3	7/8	0.203	2 5/8			8500	15300
GN203KLLB	SN203K	311	2 3/16	120	55.56	29	31	27.8	29.37	4.8	82.55	22.23	5.49	73.02	2.37	5.22	43600	80000
				4.7244	2 3/16	1.1417	1.2205	1 3/32	1 5/32	3/16	3 1/4	7/8	0.216	2 7/8			9800	18000
GN207KLLB	SN207K	312	2 7/16	130	61.91	31	33	30.96	30.96	6.4	88.9	23.8	5.84	79.38	2.841	6.26	51700	90000
				5.1181	2 7/16	1.2205	1.2992	1 7/32	1 7/32	1/4	3 1/2	15/16	0.23	3 1/8			11600	20400
GN211KLLB	SN211K	314	2 11/16	150	68.26	35	37	34.13	34.13	6.4	101.6	26.99	6.73	88.9	4.512	9.94	66800	116000
				5.9055	2 11/16	1.378	1.4567	1 11/32	1 11/32	1/4	4	1 1/16	0.265	3 1/2			15000	26000
GN215KLLB	SN215K	315	2 15/16	160	74.61	—	39	37.3	37.3	6.4	112.71	31.75	6.48	100.01	5.638	12.42	75700	125000
				6.2992	2 15/16	—	1.5354	1 15/32	1 15/32	1/4	4 7/16	1 1/4	0.255	3 15/16			17000	28500

[1] Bore tolerance: 1/2" - 2 3/16", nominal to .013 mm, +.0005".
2 7/16" - 2 15/16", nominal to .015 mm, +.0006".

TRI-PLY SEAL INDUSTRIAL SERIES NON-RELUBRICATABLE AND RELUBRICATABLE TYPES

- Tri-Ply Seal bearings are dimensionally interchangeable with KRRB bearings and can be used with standard housings.
- One-piece Tri-Ply Seals incorporate a highly effective seal design molded to an exterior shroud cap. The shroud cap protects the seal lip from fiber wrap and abrasion.
- Supplied with a self-locking collar, the bearings are most effective in environments with severe contamination and moisture.
- Relubricatable Tri-Ply Seal bearings are dimensionally interchangeable with G-KRRB bearings.
- This design can be used with standard housings.

Suggested shaft tolerances: **a. heavy loads - nominal to -.025 mm, -.001";**
b. light loads - nominal to -.050 mm, -.002".



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: G1115KPPB3 + COL.

Bearing Number		Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths		L	d1	B2	S	B1	M(2)	F1	O	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
Spherical O.D.	Spherical O.D.				B Inner	C Outer												
Relubricatable Type	Non-Relubricatable Type		mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
G1013KPPB3	1013KPPB3		13/16												0.286	0.63		
G1014KPPB3	1014KPPB3	205	7/8	52	34.92	15	3.9	38.1	13.5	17.5	44.4	3.61	45.19	16.66	0.272	0.60	7700	15800
G1015KPPB3	1015KPPB3		15/16	2.0472	1 3/8	0.591	5/32	1 1/2	17/32	11/16	1 3/4	0.142	1.779	0.656	0.254	0.56	1730	3550
G1100KPPB3	1100KPPB3		1												0.231	0.51		
GE25KPPB3	E25KPPB3		25												0.231	0.51		
G1101KPPB3	1101KPPB3		1 1/16												0.413	0.91		
G1102KPPB3	1102KPPB3		1 1/8	62	36.51	18	3.9	44.4	15.9	18.3	48.4	4.19	52.53	21.56	0.404	0.89	11100	21800
G1103KPPB3	1103KPPB3	206	1 3/16	2.4409	1 7/16	0.709	5/32	1 3/4	5/8	23/32	1 29/32	0.156	2.068	0.849	0.376	0.83	2500	4900
G1103KPPB4	1103KPPB4		1 1/4												0.349	0.77		
GE30KPPB3	E30KPPB3		30												0.376	0.83		
G1104KPPB2	1104KPPB2		1 1/4												0.653	1.44		
G1105KPPB2	1105KPPB2	207	1 5/16	72	37.70	19	3.9	54.0	17.1	18.85	51.2	3.68	60.35	25.40	0.603	1.33	15100	28500
G1106KPPB2	1106KPPB2		1 3/8	2.8346	1 31/64	0.748	5/32	2 1/8	43/64	0.742	2 1/64	0.145	2.376	1.00	0.572	1.26	3400	6400
G1107KPPB2	1107KPPB2		1 7/16												0.544	1.20		
GE35KPPB2	E35KPPB2		35												0.572	1.26		
G1108KPPB3	1108KPPB3		1 1/2	80	42.86	21	4.8	60.3	18.3	21.4	56.4	5.66	67.79	23.44	0.789	1.74	19800	20500
G1109KPPB3	1109KPPB3	208	1 9/16	3.1496	1 11/16	0.827	3/16	2 3/8	23/32	27/32	2 7/32	0.223	2.669	0.923	0.739	1.63	4460	4600
GE40KPPB3	E40KPPB3		40												0.739	1.63		
G1110KPPB4	1110KPPB4		1 5/8												0.898	1.98		
G1111KPPB4	1111KPPB4	209	1 11/16	85	42.86	22	4.8	63.5	18.3	21.4	56.4	4.55	72.44	27.48	0.848	1.87	36200	36300
G1112KPPB4	1112KPPB4		1 3/4	3.3465	1 11/16	0.866	3/16	2 1/2	23/32	27/32	2 7/32	0.179	2.852	1.082	0.826	1.82	8130	8160
GE45KPPB4	E45KPPB4		45												0.826	1.82		
G1113KPPB3	1113KPPB3		1 13/16												1.116	2.46		
G1114KPPB3	1114KPPB3		1 7/8	90	49.21	23	4.8	69.9	18.3	24.6	62.7	4.7	77.7	27.51	1.034	2.28	22700	39200
G1115KPPB3	1115KPPB3	210	1 15/16	3.5433	1 15/16	0.906	3/16	2 3/4	23/32	31/32	2 15/32	0.185	3.059	1.083	1.016	2.24	5100	8800
GE50KPPB3	E50KPPB3		50												1.016	2.24		
G1200KPPB4	1200KPPB4		2												1.583	3.49		
G1201KPPB4	1201KPPB4		2 1/16	100	55.56	24	4.8	76.2	20.6	27.8	71.4	5.41	87.17	29.01	1.47	3.24	28500	48100
G1202KPPB4	1202KPPB4	211	2 1/8	3.9370	2 3/16	0.945	3/16	3	13/16	1 3/32	2 13/16	0.213	3.432	1.142	1.406	3.10	6400	10800
G1203KPPB4	1203KPPB4		2 3/16												1.365	3.01		
GE55KPPB4	E55KPPB4		55												1.365	3.01		

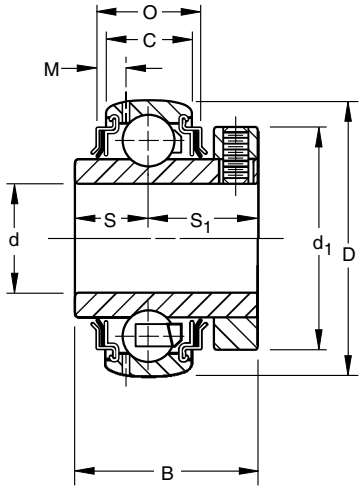
(1) Bore tolerance: 13/16" - 2 3/16", nominal to .013 mm, +.0005".
(2) Applies to relubricatable type only.

Note: Suggested max speed - 500 RPM.

GC-KRRB INDUSTRIAL SERIES CONCENTRIC COLLAR RELUBRICATABLE TYPE

- Relubricatable with spherical outside diameters and shroud seals.
- Metal shroud maintains tight seal contact against the inner ring and shields the rubber seals from damage because of dirt or fiber wrap.
- The concentric collar is locked to the shaft by two setscrews located 120 degrees apart, mated with threaded holes in the collar and drilled holes in the bearing inner ring.
- The extra-wide design provides additional shaft support and extra-large grease capacity.

Suggested shaft tolerances: **$1/2$" - $1\ 15/16$", nominal to -.013 mm, -.0005";**
2" - $2\ 15/16$", nominal to -.025 mm, -.0010".



TO ORDER, SPECIFY BEARING NUMBER. Example: GC1103KRRB + COL.

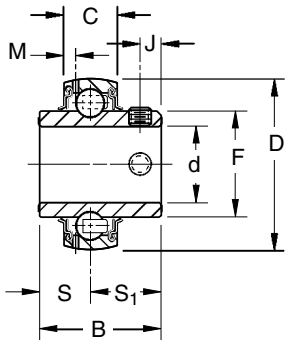
Bearing Number (Spherical O.D.)	Collar Number	Basic Outer Ring Size	Bore[1] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	S_1	d_1	M	O	Setscrew Size	Brg. & Collar Wt.	Static Load Rating C_o	Extended Dynamic Load Rating C_E
			mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	kg / lbs.	N / lbs.	N / lbs.
GC1008KRRB	C203		1/2										0.154 0.34		
GC1010KRRB	C203	203	5/8	40	26.59	12	11.1	15.5	34.1	2.72	14.71	M5x0.8	0.145 0.32	4700	10600
GC1011KRRB	C203		11/16	1.5748	1 3/64	0.472	7/16	39/64	11/32	0.107	0.579	10-32	0.122 0.27	1060	2360
GCE17KRRB			17										0.122 0.27		
GC1012KRRB	C204	204	3/4	47	30.96	14	12.3	18.7	38.1	3.43	20.68	M5x0.8	0.204 0.45	6200	14300
GCE20KRRB			20	1.8504	1 7/32	0.551	31/64	47/64	1 1/2	0.135	0.814	10-32	0.204 0.45	1400	3200
GC1014KRRB	C205	205	7/8										0.272 0.6		
GC1015KRRB	C205		15/16	52	34.13	15	13.9	20.2	44.4	3.61	19.74	M6x1	0.254 0.56	7700	15800
GC1100KRRB	C205		1	2.0472	1 11/32	0.5905	35/64	51/64	1 3/4	0.142	0.777	1/4-28	0.231 0.51	1730	3550
GCE25KRRB			25										0.231 0.51		
GC1102KRRB	C206	206	1 1/8										0.404 0.89		
GC1103KRRB	C206		1 3/16	62	37.31	18	14.7	22.6	52.4	4.19	24.51	M6x1	0.376 0.83	11100	21800
GC1103KRRB3	C206		1 1/4	2.4409	1 15/32	0.709	37/64	57/64	2 1/16	0.156	0.965	1/4-28	0.349 0.77	2500	4900
GCE30KRRB			30										0.376 0.83		
GC1104KRRB	C207		1 1/4										0.653 1.44		
GC1106KRRB	C207	207	1 3/8	72	41.28	19	15.9	25.4	59.5	3.68	25.86	M6x1	0.572 1.26	15100	28500
GC1107KRRB	C207		1 7/16	2.8346	1 5/8	0.7481	5/8	1	2 11/32	0.145	1.018	1/4-28	0.544 1.20	3400	6400
GCE35KRRB			35										0.572 1.26		
GC1108KRRB	C208	208	1 1/2	80	44.05	21	16.7	27.4	68.3	5.66	28.42	M8x1.25	0.789 1.74	19800	20500
GCE40KRRB			40	3.1496	1 47/64	0.827	21/32	1 5/64	2 11/16	0.223	1.119	5/16-24	0.739 1.63	4460	4600
GC1110KRRB	C209-2		1 5/8										0.898 1.98		
GC1111KRRB	C209	209	1 11/16	85	46.83	22	17.5	29.4	73	4.55	32.21	M8x1.25	0.848 1.87	36200	36300
GC1112KRRB	C209		1 3/4	3.3465	1 27/32	0.866	1 11/16	1 5/32	2 7/8	0.179	1.268	5/16-24	0.826 1.82	8130	8160
GCE45KRRB			45										0.826 1.82		
GC1115KRRB	C210	210	1 15/16	90	48.42	23	18.3	30.2	79.4	4.7	32.23	M8x1.25	0.990 2.18	22700	39200
GCE50KRRB			50	3.5433	1 29/32	0.906	23/32	1 3/16	3 1/8	0.185	1.269	5/16-24	0.990 2.18	5100	8800
GC1200KRRB	C211		2	100	53.97	24	20.6	33.3	88.9	5.41	33.73	M10x1.5	1.52 3.35	28500	48000
GC1203KRRB	C211	211	2 3/16	3.9370	2 1/8	0.945	13/16	1 5/16	3 1/2	0.213	1.328	3/8-24	1.306 2.88	6400	10800
GCE55KRRB			55										1.306 2.88		
GC1207KRRB	C212	212	2 7/16	110	60.32	27	23.0	37.3	95.3	5.13	35.03	M10x1.5	1.565 3.45	35600	58800
GCE60KRRB			60	4.3307	2 3/8	1.063	29/32	1 15/32	3 3/4	0.202	1.379	3/8-24		8000	13200
GC1215KRRB	C215	215	2 15/16	130	70.64	29	27.0	43.7	114.3	5.59	38.25	M10x1.5	2.64 5.82	43600	69500
GCE75KRRB			75	5.1181	2 25/32	1.142	1 1/16	1 23/32	4 1/2	0.219	1.506	3/8-20		9800	15600

[1] Bore tolerances: $1\ 3/16$" - $2\ 3/16$", nominal to .013 mm, +.0005".
$2\ 1/4$" - $3\ 3/16$", nominal to .015 mm, +.0006".

GY-KRRB SETSCREW INDUSTRIAL SERIES

- The Y-Series setscrew bearing has increased shaft support for HVAC and other industrial applications.
- Featuring superfinished raceways, grade 10 balls and anti-back-out nylon patch setscrews, they are factory prelubricated and are relubricatable.
- Setscrew mounting feature is ideal for reversing load applications.

Suggested shaft tolerances: $1/2$"-1 $15/16$", nominal to -.013 mm, -.0005";
2" - 2 $15/16$", nominal to -.025 mm, -.0010".



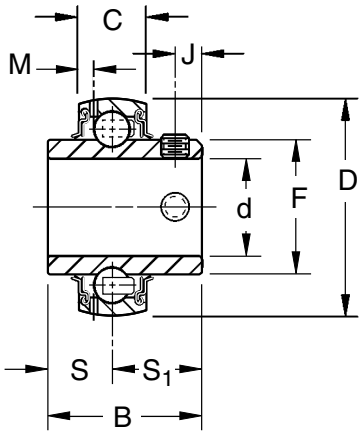
Bearing Number	Basic Outer Ring Size	Bore[1] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	S_1	F	M	J	Setscrew Size	Static Load Rating C_o	Extended Dynamic Load Rating C_E
		mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	N lbs.	N lbs.
GY1008KRRB		1/2											
GY1009KRRB	203	9/16	40	27.38	12	11.5	15.88	22.86	2.72	4.55	M5X.8	4400	10600
GY1010KRRB		5/8	1.5748	1.078	0.472	0.453	0.625	0.9	0.107	0.179	10-32	1000	2360
GY1011KRRB		11/16											
GYE15KRRB		15											
GYE17KRRB		17											
GY1012KRRB	204	3/4	47	30.96	14	12.7	18.26	27.56	3.43	5.13	M5X.8	6200	14300
GYE20KRRB		20	1.8504	1.219	0.55	0.5	0.719	1.085	0.135	0.202	10-32	1400	3200
GY1013KRRB		13/16											
GY1014KRRB		7/8	52	34.11	15	14.27	19.91	33.83	3.86	6.3	M6X1	7700	15800
GY1015KRRB	205	15/16	2.0472	1.343	0.591	0.562	0.781	1.332	0.152	0.248	1/4-28	1730	3550
GY1100KRRB		1											
GYE25KRRB		25											
GY1101KRRB		1 1/16											
GY1102KRRB	206	1 1/8	62	38.1	18	15.88	22.22	40.31	3.96	7.62	M6X1	11000	21600
GY1103KRRB		1 3/16	2.4409	1.500	0.709	0.625	0.875	1.587	0.156	0.300	1/4-28	2500	4800
GY1103KRRB3		1 1/4											
GYE30KRRB		30											
GY1104KRRB		1 1/4											
GY1105KRRB	207	1 5/16	72	42.87	19	17.48	25.4	46.18	3.68	7.82	M8X1.25	15100	28500
GY1106KRRB		1 3/8	2.8346	1.688	0.748	0.688	1	1.816	0.145	0.308	5/16-24	3400	6400
GY1107KRRB		1 7/16											
GYE35KRRB		35											
GY1108KRRB	208	1 1/2	80	49.22	21	19.05	30.17	52.27	4.06	8	M8X1.25	19600	36000
GY1109KRRB		1 9/16	3.1496	1.938	0.827	0.75	1.188	2.058	0.16	0.315	5/16-24	4400	8150
GYE40KRRB		40											
GY1110KRRB		1 5/8											
GY1111KRRB	209	1 11/16	85	49.22	22	19.05	30.17	57.92	4.55	8	M8X1.25	20000	36000
GY1112KRRB		1 3/4	3.3465	1.938	0.8661	0.75	1.188	2.28	0.179	0.315	5/16-24	4500	8150
GYE45KRRB		45											
GY1113KRRB		1 13/16											
GY1114KRRB		1 7/8	90	51.59	22	19.05	32.54	62.84	4.7	10	M10X1.5	22700	39000
GY1115KRRB	210	1 15/16	3.5433	2.031	0.8661	0.75	1.281	2.474	0.185	0.394	3/8-24	5100	8800
GY1115KRRB3		2											
GYE50KRRB		50											
GY1200KRRB		2											
GY1201KRRB	211	2 1/16	100	55.55	24	22.22	33.32	69.77	5	10	M10X1.5	28500	48000
GY1202KRRB		2 1/8	3.9370	2.187	0.945	0.875	1.312	2.747	0.197	0.394	3/8-24	6400	10800
GY1203KRRB		2 3/16											
GYE55KRRB		55											
GY1204KRRB		2 1/4											
GY1205KRRB	212	2 5/16	110	65.07	27	25.4	39.67	76.48	5.13	10	M10X1.5	35600	58500
GY1206KRRB		2 3/8	4.3307	2.562	1.063	1	1.562	3.011	0.202	0.394	3/8-24	8000	13200
GY1207KRRB		2 7/16											
GYE60KRRB		60											
GY1210KRRB		2 5/8	1.25	69.85	28	26.97	42.84	86.92	5.08	12	M12X1.75	37500	69500
GY1211KRRB	214	2 11/16	4.9213	2.75	1.102	1.062	1.687	3.422	0.2	0.472	7/16-20	8500	15600
GYE70KRRB		70											
GY1212KRRB		2 3/4											
GY1214KRRB	215	2 7/8	130	77.8	29	33.32	44.45	91.92	5.56	12	M12X1.75	43600	69500
GY1215KRRB		2 15/16	5.1181	3.063	1.142	1.312	1.75	3.619	0.219	0.472	7/16-20	9800	15600
GYE75KRRB		75											

[1] Bore tolerances: $1/2$" - 2 $3/16$", nominal to .013 mm, +.0005".
2 $1/4$" - 3 $15/16$", nominal to .015 mm, +.0006".

MEDIUM-DUTY GYM-KRRB INSERTS SETSCREW LOCK

- This series is designed to offer extended bearing life despite demanding industrial environments.
- Insert features a full width inner ring, providing extra support along the shaft.
- The extra support feature, coupled with a flexible nylon retainer, allows the inserts to operate for extended periods with undersized shafts or in misalignment conditions.
- Inserts are equipped with a three-piece seal, protecting against corrosion, contamination and fiber wrap.
- Inserts also include nylon patch setscrews, resisting setscrew back-out and providing superior holding power in applications with severe vibration.

Suggested shaft tolerances: 1" - 1 15/16", nominal to -.013 mm, -.0005";
2" - 3", nominal to -.025 mm, -.0010".



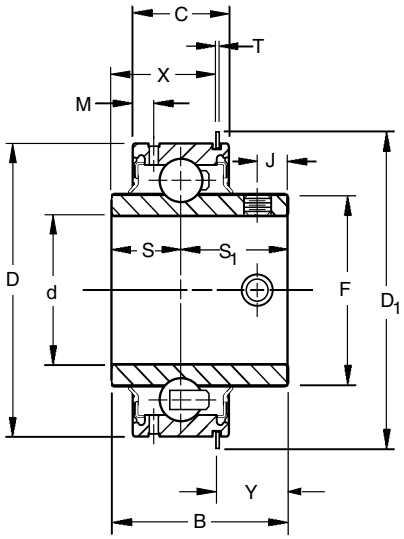
Bearing Number Spherical O.D.	Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	S_1	F	M	J	Setscrew Size	Bearing Wt.	Static Load Rating C_o	Extended Dynamic Load Rating C_E
		in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	N lbs.	N lbs.
GYM1100KRRB	206	1	62 2.4409	38.10 1.500	18 0.709	15.88 0.625	22.22 0.875	40.31 1.587	3.96 0.156	7.62 0.300	M6 x 1 1/4 -28	0.427 0.94	11100 2500	21800 4900
GYM1103KRRB	207	1 3/16	72 2.8346	42.87 1.688	19 0.748	17.48 0.688	25.40 1.000	46.18 1.816	3.68 0.145	7.82 0.308	M8 x 1.25 5/16 -24	0.704 1.55	15100 3400	28500 6400
GYM1107KRRB	208	1 7/16	80 3.1496	49.22 1.938	21 0.827	19.05 0.750	30.17 1.188	52.27 2.058	4.06 0.160	8.00 0.315	M8 x 1.25 5/16 -24	0.817 1.8	19600 4400	36300 8150
GYM1108KRRB	209	1 1/2	85 3.3465	49.22 1.938	22 0.866	19.05 0.750	30.17 1.188	52.27 2.280	4.55 0.179	8.00 0.315	M8 x 1.25 5/16 -24	0.885 1.95	20000 4500	36300 8150
GYM1111KRRB GYM1112KRRB	210	1 11/16 1 3/4	90 3.5433	51.59 2.031	22 0.866	19.05 0.750	32.54 1.281	62.84 2.474	4.70 0.185	10.00 0.394	M10 x 1.5 3/8 -24	1.271 2.8 1.203 2.65	22700 5100 22700 5100	39200 8800 39200 8800
GYM1115KRRB GY1200KRRB	211	1 15/16 2	100 3.9370	55.55 2.187	24 0.945	22.22 0.875	33.32 1.312	69.77 2.747	5.00 0.197	10.00 0.394	M10 x 1.5 3/8 -24	1.634 3.6 1.498 3.3	28500 6400 28500 6400	48100 10800 48100 10800
GYM1203KRRB GY1204KRRB	212	2 3/16 2 1/4	110 4.3307	65.07 2.562	27 1.063	25.40 1.000	39.67 1.562	76.48 3.011	5.13 0.202	10.00 0.394	M10 x 1.5 3/8 -24	2.225 4.9 1.952 4.3	35600 8000 35600 8000	58800 13200 58800 13200
GYM1207KRRB GYM1208KRRB	214	2 7/16 2 1/2	125 4.9213	69.85 2.750	28 1.102	26.97 1.062	42.84 1.687	76.48 3.422	5.08 0.200	12.00 0.472	M12 x 1.75 7/16 -20	2.996 6.6 2.86 6.3	43000 9650 43000 9650	69500 15600 69500 15600
GYM1211KRRB	215	2 11/16	130 5.1181	77.80 3.063	29 1.142	33.32 1.312	44.45 1.750	91.92 3.619	5.56 0.219	12.00 0.472	M12 x 1.75 7/16 -20	3.042 6.7	43600 9800	69500 15600
GYM1215KRRB GYM1300KRRB	216	2 15/16 3	140 5.5118	77.80 3.063	29 1.142	33.32 1.312	44.45 1.750	91.92 3.619	5.56 0.219	12.00 0.472	M12 x 1.75 7/16 -20	3.087 6.8	53400 12000 53400 12000	80200 18000 80200 18000

(1) Bore tolerance: 1/2" - 2 3/16", nominal to .013 mm, +.0005".
2 1/4" - 3 15/16", nominal to .015 mm, +.0006".

ER INDUSTRIAL SERIES RELUBRICATABLE TYPE

- Designed for use in applications where low starting torque and low running torque are necessary.
- ER-DD Series is for applications where extremely low-torque is required.
- Test results indicate an average of 95 percent reductions in start-up torque when using ER-DD over the standard ER bearing. Running torque is reduced up to 85 - 90 percent.

Suggested shaft tolerances: 1/2" - 1 15/16", nominal to -.013 mm, -.0005";
2" - 2 15/16", nominal to -.025 mm, -.0010".



Bearing Number	Basic Outer Ring	Bore(1) d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	S1	F	J	D1	Y ref	T	M	X ref	Setscrew Size	Bearing Wt.		Cross Reference Number(2)
		in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	
ER08*		1/2														0.190	0.42	
ER10*	204	5/8	47	30.96	15.88	12.7	18.26	28.17	5.16	52.4	16.61	1.2	3.97	14.35	M5X.8	0.167	0.37	SM1012K
ER12*		3/4	1.8504	1 7/32	5/8	1/2	23/32	1 7/64	13/64	2 1/16	21/32	3/64	5/32	9/16	10 - 32	0.141	0.31	
ER14*		7/8														0.218	0.48	
ER15	205	15/16	52	34.13	19.05	14.29	19.84	33.73	6.35	57.5	16.61	1.2	3.57	17.50	M6X1	0.195	0.43	SM1013K
ER16*		1	2.0472	1 11/32	3/4	9/16	25/32	1 21/64	1/4	2 17/64	21/32	3/64	9/64	11/16	1/4 - 28	0.181	0.40	
ER18	206	1 1/8	62	38.1	22.23	15.87	22.22	40.48	7.54	67.5	17.93	1.6	5.56	20.17	M6X1	0.340	0.75	SM1101K
ER19		1 3/16	2.4409	1 1/2	7/8	5/8	7/8	1 19/32	19/64	2 21/32	45/64	1/16	7/32	51/64	1/4 - 28	0.313	0.69	
ER20*		1 1/4														0.567	1.25	
ER22*	207	1 3/8	72	42.86	23.81	17.46	25.4	46.83	7.94	78.2	19.76	1.6	5.56	23.11	M8X1.25	0.499	1.10	SM1104K
ER23*		1 7/16	2.8346	1 11/16	15/16	11/16	1	1 27/32	5/16	3 5/64	25/32	1/16	7/32	29/32	5/16 - 24	0.476	1.05	
ER24*	208	1 1/2	80	49.21	27.78	19.05	30.16	52.38	7.94	86.5	21.16	1.6	6.35	28.07	M8X1.25	0.671	1.48	SM1108K
			3.1496	1 15/16	1 3/32	3/4	1 3/16	2 1/16	5/16	3 13/32	53/64	1/16	1/4	1 7/64	5/16 - 24			
ER27	209	1 11/16	85	49.21	27.78	19.05	30.16	57.94	7.94	91.3	21.16	1.6	6.35	28.07	M8X1.25	0.735	1.62	SM1110K
ER28*		1 3/4	3.3465	1 15/16	1 3/32	3/4	1 3/16	2 9/64	5/16	3 19/32	53/64	1/16	1/4	1 7/64	5/16 - 24	0.690	1.52	
ER30	210	1 7/8	90	51.59	28.58	19.05	32.54	55.66	9.92	96.4	24.66	2.4	7.14	27.31	M10X1.5	0.853	1.88	SM1113K
ER31		1 15/16	3.5433	2 1/32	1 1/8	3/4	1 9/32	2 7/16	25/64	3 51/64	31/32	3/32	9/32	1 5/64	3/8 - 24	0.834	1.84	
ER32*	211	2	100	55.56	30.16	22.22	33.34	69.85	9.92	106.4	24.28	2.4	7.14	31.27	M10X1.5	1.300	2.87	SM1200K
ER35		2 3/16	3.9370	2 3/16	1 3/16	7/8	1 5/16	2 3/4	25/64	4 3/16	61/64	3/32	9/32	1 15/64	3/8 - 24	1.084	2.39	
ER39*	212	2 7/16	110	65.09	31.75	25.4	39.69	76.60	9.92	116.3	28.24	2.4	6.75	36.83	M10X1.5	1.450	3.20	SM1204K
			4.3307	2 9/16	1 1/4	1	1 9/16	3 1/64	25/64	4 37/64	1 7/64	3/32	1 7/64	1 29/64	3/8 - 24			
ER47	215	2 5/16	130	77.79	38.1	33.33	44.45	91.68	11.91	139.7	33.02	2.8	6.35	44.78	M12X1.75	2.210	4.88	SM1213K
			5.1180	3 1/16	1 1/2	1 5/16	1 3/4	3 39/64	15/32	5 1/2	1 19/64	7/64	1/4	1 49/64	7/16 - 20			
ER51	216	3 3/16	140	77.79	42.86	28.58	49.21	98.43	13.49	149.6	35.32	2.8	11.11	42.47	M12X1.75	3.450	7.61	SM1303K
			5.5110	3 1/16	1 11/16	1 1/8	1 15/16	3 7/8	17/32	5 57/64	1 25/64	7/64	7/16	1 43/64	7/16 - 20			
ER55	217	3 7/16	150	85.72	49.21	34.16	51.57	104.84	11.91	159.5	34.53	2.8	11.02	51.21	M12X1.75	—	—	SM1307K
			5.9051	3 3/8	1 15/16	1 11/32	2 1/32	4 1/8	7/16	6 1/4	1 23/64	7/64	7/16	2 1/64	7/16 - 20			

(1) Bore tolerance: 1/2" - 2 3/16", nominal to .013 mm, +.0005".
2 1/4" - 2 15/16", nominal to .015 mm, +.0006".

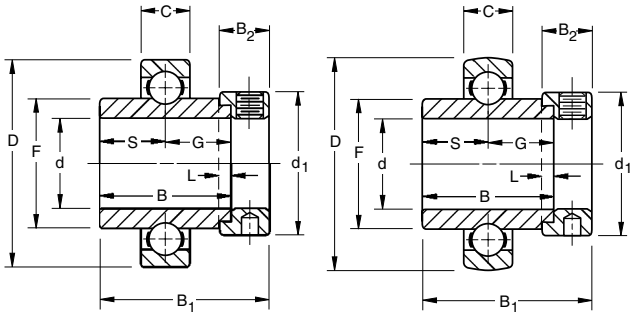
(2) Use cross reference bearing numbers to locate Load Ratings on page D70.

*ER-DD low drag/low-torque version available.

SM INDUSTRIAL SERIES A AND B TYPES/MUA-B INSERTS[6]

- Standard SM Series A and B have the same ring tolerances and corner radii as equivalent 200 Series single-row radial ball bearings.
- Type A has cylindrical outside diameters; type B has spherical outside diameters. The letter B appears on the outer ring only.
- Bearings are not prelubricated.

Suggested shaft tolerances: 1/2" - 1 15/16", nominal to -.013 mm, -0005"; 2" - 3 15/16", nominal to -.025 mm, -.0010".



Type A Type B

TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL".
Example: SM1207KB + COL.

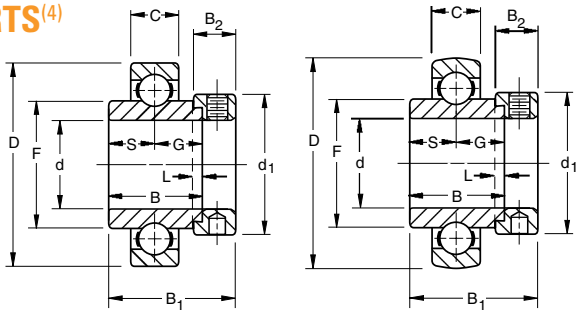
Bearing Number A Type[7]	Bearing Number B Type	Collar Number	Basic Outer Ring Size	Bore[4] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S&G	F	L	d_1	B_1	B_2	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
				in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
SM1008K	SM1008KB	S1008K		1/2										0.145	0.32		
SM1009K	SM1009KB	S1009K	203	9/16	40	27.78	12	13.9	22.86	4.0	28.6	13.5	37.3	0.131	0.29	4700	10600
SM1010K	SM1010KB	S1010K		5/8	1.5748	1 3/32	0.4724	35/64	0.900	5/32	1 1/8	17/32	1 15/32	0.136	0.3	1600	2360
SM1011K	SM1011KB	S1011K		11/16										0.113	0.25		
SM1012K	SM1012KB	S1012K	204	3/4	47	34.13	14	17.1	27.56	4.0	33.3	13.5	48.66	0.195	0.43	6200	14300
					1.8504	1 11/32	0.5512	43/64	1.085	5/32	1 5/16	17/32	1 23/32			1400	3200
SM1013K	SM1013KB	S1013K		13/16										0.276	0.61		
SM1014K	SM1014KB	S1014K	205	7/8	52	34.93	15	17.5	33.83	4.0	38.1	13.5	44.45	0.254	0.56	6950	15600
SM1015K	SM1015KB	S1015K		15/16	2.0472	1 3/8	0.5906	11/16	1.332	5/32	1 1/2	17/32	1 3/4	0.236	0.52	1730	3450
SM1100K	SM1100KB	S1100K		1										0.217	0.48		
SM1101K	SM1101KB	S1101K		1 1/16	62	36.51	16[1]	18.3	40.31	4.0	44.4	15.9	48.4	0.399	0.88	11100	21600
SM1102K	SM1102KB	S1102K	206	1 1/8	2.4409	1 7/16	0.6299	23/32	1.587	5/32	1 3/4	5/8	1 29/32	0.367	0.81	2500	4800
SM1103K	SM1103KB	S1103K		1 3/16										0.331	0.73		
SM1104K	SM1104KB	S1104K		1 1/4										0.621	1.37		
SM1105K	SM1105KB	S1105K	207	1 5/16	72	37.70	17[2]	18.85	46.13	4.0	54.0	17.46	51.2	0.589	1.3	15100	28500
SM1106K	SM1106KB	S1106K		1 3/8	2.8346	1 31/64	0.6693	0.742	1.816	5/32	2 1/8	11/16	2 1/64	0.562	1.24	3400	6400
SM1107K	SM1107KB	S1107K		1 7/16										0.539	1.19		
SM1108KT	SM1108KB	S1108KT	208	1 1/2	80	42.86	18[3]	21.4	52.27	4.8	60.3	18.3	56.4	0.761	1.68	19600	36000
SM1109KT		S1109KT		1 9/16	3.1496	1 11/16	0.7087	27/32	2.058	3/16	2 3/8	23/32	2 7/32	0.716	1.58	4400	8150
SM1110K	SM1110KB	S1110K		1 5/8	85	42.86	19	21.4	57.92	4.8	63.5	18.3	56.4	0.875	1.93	20000	36000
SM1111K	SM1111KB	S1111K	209	1 11/16	3.3465	1 11/16	0.7480	27/32	2.28	3/16	2 1/2	23/32	2 7/32	0.857	1.89	4500	8150
SM1112K	SM1112KB	S1112K		1 3/4										0.803	1.77		
SM1113K	SM1113KB	S1113K		1 13/16	90	49.21	20	24.6	62.84	4.8	69.9	18.3	62.7	1.075	2.37	22700	39000
SM1114K	SM1114KB	S1114K	210	1 7/8	3.5433	1 15/16	0.7874	31/32	2.474	3/16	2 3/4	23/32	2 15/32	1.012	2.23	5100	8800
SM1115K	SM1115KB	S1115K		1 15/16										0.962	2.12		
SM1200K	SM1200KB	S1200K		2										1.51	3.33		
SM1201K	SM1201KB	S1201K	211	2 1/16	100	55.56	21	27.8	69.77	4.8	76.2	20.6	71.4	1.397	3.08	28500	48000
SM1202K	SM1202KB	S1202K		2 1/8	3.9370	2 9/16	0.8268	1 3/32	2.747	3/16	3	13/16	2 13/16	1.438	3.17	6400	10800
SM1203K	SM1203KB	S1203K		2 3/16										1.256	2.77		
SM1204K	SM1204KB	S1204K	212	2 1/4										1.86	4.1		
SM1205K	SM1205KB	S1205K		2 5/16	110	61.91	22	30.96	76.48	6.4	84.14	22.33	77.8	1.787	3.94	35600	58500
SM1206K	SM1206KB	S1206K		2 3/8	4.3307	2 7/16	0.8661	1 7/32	3.011	1/4	3 5/16	7/8	3 1/16	1.692	3.73	8000	13200
SM1207K	SM1207KB	S1207K		2 7/16										1.374	3.03		
SM1208K	SM1208KB	S1208K	213	2 1/2	120	68.26	23	34.13	84.58	6.4	96.84	23.81	85.73	2.472	5.45	39200	63000
					4.7244	2 11/16	0.9055	1 11/32	3.33	1/4	3 13/16	15/16	3 3/8			8800	14300
SM1211KT	SM1211KTB	S1211KT	214	2 11/16	125	68.26	24	34.13	86.92	6.4	96.84	23.81	85.73	2.418	5.33	43000	69500
					4.9213	2 11/16	0.9449	1 11/32	3.422	1/4	3 13/16	15/16	3 3/8			9650	15600
SM1213K	SM1213KB	S1213K	215	2 13/16	130	74.61	25	37.3	91.92	6.4	101.6	23.81	92.08	2.858	6.3	43600	68000
SM1215K	SM1215KB	S1215K		2 15/16	5.1181	2 15/16	0.9843	1 15/32	3.619	1/4	4	15/16	3 5/8	2.803	6.18	9800	15300
SM1303K	SM1303KB	S1303K	216	3 3/16	140	80.96	26	40.48	98.4	6.4	111.13	25.4	100.01	3.452	7.61	53400	80000
					5.5118	3 3/16	1.0236	1 19/32	3.874	1/4	4 3/8	1	3 15/16			12000	18000
SM1307K	SM1307KB	S1307K	217	3 7/16	150	87.31	28	43.66	104.83	6.4	112.71	25.4	106.36	3.901	8.6	61000	93000
					5.9055	3 7/16	1.1024	1 23/32	4.127	1/4	4 7/16	1	4 3/16			13700	20800
SM1311W-BR	SM1311WB-BR[5]	S1311K	219	3 11/16	170	93.66	32	46.83	118.34	6.4	127	26.99	114.3	6.078	13.4	113600	150000
					6.6929	3 11/16	1.2598	1 27/32	4.659	1/4	5	1 1/16	4 1/2			25500	34000
SM1315W-BR	SM1315WB-BR[5]	S1315	220	3 15/16	180	100.01	34	50	123.85	6.4	139.7	31.75	125.41	7.335	16.17	126900	170000
					7.0866	3 15/16	1.3386	1 31/32	4.876	1/4	5 1/2	1 1/4	4 15/16			28500	38000

[1] Spherical O.D. outer ring width is 18 mm, .7087".
[2] Spherical O.D. outer ring width is 19 mm, .7480".
[3] Spherical O.D. outer ring width is 21 mm, .8268".
[4] Bore tolerance: 1/2" - 2 3/16", nominal to .013 mm, +.0005".
2 1/4" - 3 3/16", nominal to .015 mm, +.0006".
3 1/4" - 3 15/16", nominal to .018 mm, +.0007".
[5] For applications where thrust load exceeds 60% of radial load, consult your Timken representative.
[6] See page D140.
[7] Order as MUA assembly suggested.

SMN HEAVY SERIES A AND B TYPES/MUOA-B INSERTS[4]

- SMN Series types A and B have the same ring tolerances and corner radii as equivalent 300 Series single-row radial ball bearings.
- Type A has cylindrical outside diameters; Type B has spherical outside diameters. The letter B appears on the outer ring only.
- Bearings are not prelubricated.

Suggested shaft tolerances: **5/8" - 1 15/16", nominal to -.013 mm, -.0005";**
2 3/16" - 3 15/16", nominal to -.025 mm, -.0010".
For larger sizes, contact your Timken representative.



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: SMN102K + COL.

Bearing Number A Type[3]	Bearing Number B Type	Collar Number	Basic Outer Ring Size	Bore[1] d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	G	F	L	d_1	B_2	B_1	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
				in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	lbs.	N lbs.	N
SMN010K	SMN010KB	SN010K	303	5/8	47	34.13	14	17.07	17.07	25.93	4.0	34.93	15.88	46.05	0.24	0.53	6550	15000
SMN011K	SMN011KB	SN011K		11/16	1.8504	1 11/32	0.5512	43/64	43/64	1.021	5/32	1 3/8	5/8	1 13/16	0.218	0.48	1460	3350
SMN012K	SMN012KB	SN012K	304	3/4	52	34.93	15	15.9	19.05	29.24	4.0	36.51	15.88	46.83	0.227	0.5	7800	17600
					2.0472	1 3/8	0.5906	5/8	3/4	1.151	5/32	1 7/16	5/8	1 27/32			1760	4000
SMN013K	SMN013KB	SN013K		13/16											0.445	0.98		
SMN014K	SMN014KB	SN014K	305	7/8	62	34.93	17	16.67	18.26	36.5	4.0	42.86	15.88	46.83	0.431	0.95	12200	26000
SMN015K	SMN015KB	SN015K		15/16	2.4409	1 3/8	0.6693	21/32	23/32	1.437	5/32	1 11/16	5/8	1 27/32	0.413	0.91	2750	5850
SMN100K	SMN100KB	SN100K		1											0.404	0.86		
SMN101K	SMN101KB	SN101K		1 1/16	72	36.51	19	17.46	19.05	43.23	4.0	49.21	17.46	50	0.608	1.34	15600	33500
SMN102K	SMN102KB	SN102K	306	1 1/8	2.8346	1 7/16	0.7480	11/16	3/4	1.702	5/32	1 15/16	11/16	1 31/32	0.585	1.29	3550	7500
SMN103K	SMN103KB	SN103K		1 3/16											0.567	1.25		
SMN104K	SMN104KB	SN104K		1 1/4											0.803	1.77		
SMN105K	SMN105KB	SN105K	307	1 15/16	80	38.10	21	18.26	19.84	48.95	4.0	55.6	17.46	51.59	0.757	1.67	21200	40500
SMN106K	SMN106KB	SN106K		1 3/8	3.1496	1 1/2	0.8268	23/32	25/32	1.927	5/32	2 3/16	11/16	2 1/32	0.726	1.6	4750	9150
SMN107K	SMN107KB	SN107K		1 7/16											0.721	1.56		
SMN108K	SMN108KB	SN108K	308	1 1/2	90	41.28	23	19.84	21.43	55.5	4.8	63.5	20.64	57.15	1.089	2.4	26100	49000
SMN109K	SMN109KB	SN109K		1 9/16	3.5433	1 5/8	0.9055	25/32	27/32	2.185	3/16	2 1/2	13/16	2 1/4	1.025	2.26	5850	11000
SMN110K	SMN110KB	SN110K		1 5/8	100	42.86	25	19.84	23.02	62.05	4.8	69.9	20.64	58.74	1.433	3.16	31600	58500
SMN111K	SMN111KB	SN111K	309	1 11/16	3.9370	1 11/16	0.9843	25/32	29/32	2.443	3/16	2 3/4	13/16	25/16	1.361	3	7100	13200
SMN112K	SMN112KB	SN112K		1 3/4											1.361	3		
SMN113K	SMN113KB	SN113K		1 13/16	110	49.21	27	24.61	24.61	68.78	4.8	76.2	22.2	66.68	1.896	4.18	37900	68000
SMN114K	SMN114KB	SN114K	310	1 7/8	4.3307	1 15/16	1.063	31/32	31/32	2.708	3/16	3	7/8	2 5/8	1.805	3.98	8500	15300
SMN115K	SMN115KB	SN115K		1 15/16											1.737	3.83		
SMN200K	SMN200KB	SN200K		2											2.413	5.32		
SMN201K	SMN201KB	SN201K	311	2 1/16	120	55.56	29	27.78	27.78	75.01	4.8	82.55	22.2	73.03	2.395	5.28	43600	80000
SMN202K	SMN202KB	SN202K		2 1/8	4.7244	2 3/16	1.1417	1 3/32	1 3/32	2.953	3/16	3 1/4	7/8	2 7/8	2.331	5.14	9800	18000
SMN203K	SMN203KB	SN203K		2 3/16											2.209	4.87		
SMN204K	SMN204KB	SN204K	312W	2 1/4											3.084	6.8		
SMN205K	SMN205KB	SN205K		2 5/16	130	61.91	31	31	31	81.53	6.4	88.9	23.81	79.38	3.012	6.64	51480	89800
SMN206K	SMN206KB	SN206K		2 3/8	5.1181	2 7/16	1.2205	1 7/32	1 7/32	3.21	1/4	3 1/2	15/16	3 1/8	2.908	6.41	11700	20400
SMN207K	SMN207KB	SN207K		2 7/16											2.812	6.2		
SMN211K	SMN211KB	SO211K	314	2 11/16	150	2.69	35	34.13	34.13	94.78	6.4	101.6	26.99	92.08	4.205	9.27	66800	116000
					5.9055	2 11/16	1.378	1 11/32	1 11/32	3.731	1/4	4	1 1/16	3 5/8			15000	26000
SMN215K	SMN215KB	SN215K	315	2 15/16	160	74.61	37	37.31	37.31	100.38	6.4	112.71	31.75	100.01	5.856	12.91	75700	125000
					6.2992	2 15/16	1.4567	1 15/32	1 15/32	3.952	1/4	4 7/16	1 1/4	3 15/16			17000	28500
SMN303K	SMN303KB	SN303K	316	3 3/16	170	80.96	39	40.48	40.48	106.91	6.4	119.06	31.75	106.36	6.704	14.78	86000	137000
					6.6929	3 3/16	1.5354	1 19/32	1 19/32	4.209	1/4	4 11/16	1 1/4	4 3/16			19300	30500
SMN307K	SMN307KB	SN307K	318	3 7/16	190	87.31	43	43.66	43.66	120.12	7.94	133.35	36.51	115.89	9.984	22.01	106900	156000
					7.4803	3 7/16	1.6929	1 23/32	123/32	4.729	5/16	5 1/4	1 7/16	4 9/16			24000	35500
SM0311W-BR[2]	SM0311WB-BR[2]	SO311K	319	3 11/16	200	93.66	45	38.89	54.77	126.67	7.94	139.7	36.51	122.24	11.09	24.45	173700	224000
					7.874	3 11/16	1.7717	1 17/32	2 5/32	4.987	5/16	5 1/2	1 7/16	4 13/16			39000	50000
SMN315K	SMN315KB	SN315K	320	3 15/16	215	100.01	47	50	50	134.77	7.94	146.05	36.51	128.59	13.068	28.81	140300	193000
					8.4646	3 15/16	1.8504	1 31/32	131/32	5.306	5/16	5 3/4	1 7/16	5 1/16			31500	43000
SMN403W-BR[2]	SMN403WB-BR	SN403K	321	4 3/16	225	104.78	49	48.42	56.36	141.22	7.94	157.16	42.86	139.7	15.508	34.19	202700	250000
					8.8583	4 1/8	1.9291	1 29/32	2 7/32	5.56	5/16	6 3/16	1 11/16	5 1/2			45500	56000
SMN407W-BR[2]	SMN407WB-BR[2]	SN407K	322	4 7/16	240	106.36	50	49.21	57.15	142.75	7.94	165.1	42.86	141.29	19.051	42	245000	285100
					9.4488	4 3/16	1.9685	1 15/16	2 1/4	5.92	5/16	6 1/2	1 11/16	5 9/16			55000	64000
SMN415W-BR[2]	SMN415WB-BR[2]	SN415K	326	4 15/16	280	106.36	59	53.98	61.91	176.56	7.94	206.38	42.86	150.81	29.66	65.39	327400	347400
					11.0236	4 3/16	2.3228	2 1/8	2 7/16	6.951	5/16	8 1/8	1 11/16	5 15/16			73500	78000

[1] Bore tolerance: 5/8" - 2 3/16", nominal to .013 mm, +.0005".
3 1/4" - 4 3/16", nominal to .018 mm, +.0007".
4 7/16" - 4 15/16", nominal to .020 mm, +.0008".

[2] For applications where thrust load exceeds 60% of radial load, consult your Timken representative.

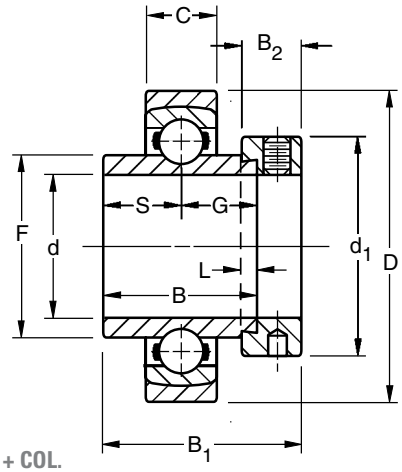
[3] Order as MUOA assembly suggested.

[4] See page D140.

SM-S INDUSTRIAL SERIES

- Standard SM-S Series permits the inner assembly to swivel in the outer aligning ring.
- Unrestricted self-alignment is achieved allowing the inner ring to become square and true with the shaft and assembly.
- The external S-Ring is uniquely ground and closely matched to its respective outer bearing ring. The S-Ring of one bearing will not fit the outer ring of another bearing.
- Bearings are not prelubricated.

Suggested shaft tolerances: 1" - 1 15/16", nominal to -.013 mm, -.0005";
2" - 3 15/16", nominal to -.025 mm, -.0010".



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: SM1100KS + COL.

Bearing Number	Collar Number	Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S&G	F	L	d_1	B_2	B_1	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
			in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
SM1100KS	S1100K	205	1	57 2.2441	34.93 1 3/8	15 0.591	17.46 11/16	33.83 1.332	4.0 5/32	38.1 1 1/2	13.5 17/32	44.1 1 47/64	0.263	0.58	7700 1730	15600 3450
SM1103KS	S1103K	206	1 3/16	68 2.6772	36.51 1 7/16	16 0.6300	18.3 23/32	39.12 1.54	4.0 5/32	44.4 1 3/4	15.9 5/8	48.4 1 29/32	0.418	0.92	11100 2500	21600 4800
SM1104KS SM1107KS	S1104K S1107K	207	1 1/4 1 7/16	79 3.1102	37.70 1 31/64	17 0.669	18.85 0.742	46.13 1.816	4.0 5/32	54.4 2 1/8	17.46 11/16	51.2 2 1/64	0.726 0.658	1.6 1.45	11500 3400	28500 6400
SM1108KS	S1108KT	208	1 1/2	88 3.4646	42.86 1 11/16	18 0.709	21.4 27/32	52.27 2.058	4.8 3/16	60.3 2 3/8	18.3 23/32	56.4 2 7/32	0.903	1.99	19600 4400	36000 8150
SM1115KS	S1115K	210	1 15/16	100 3.9370	49.21 1 15/16	20 0.7874	24.6 31/32	62.84 2.474	4.8 3/16	69.9 2 3/4	18.3 23/32	62.7 2 15/32	1.185	2.61	22700 5100	39000 8800
SM1203KS	S1203K	211	2 3/16	110 4.3307	55.56 2 3/16	21 0.8268	27.8 1 3/32	69.77 2.747	4.8 3/16	76.2 3	20.6 13/16	71.4 2 13/16	1.748	3.85	28500 6400	48000 10800
SM1207KS	S1207K	212	2 7/16	120 4.7244	61.91 2 7/16	22 0.8661	30.96 1 7/32	76.48 3.011	6.4 1/4	84.14 3 5/16	22.2 7/8	77.8 3 1/16	1.907	4.2	35600 8000	58500 13200
SM1211KS	S1211KT	214	2 11/16	140 5.5118	68.26 2 11/16	24 0.9449	34.13 1 11/32	86.92 3.422	6.4 1/4	96.84 3 13/16	23.81 15/16	79.4 3 3/8	2.974	6.55	43000 9650	69500 15600
SM1215KS	S1215K	215	2 15/16	145 5.7087	74.61 2 15/16	25 0.9843	37.3 1 15/32	91.92 3.619	6.4 1/4	101.6 4	23.81 15/16	92.08 3 5/8	3.541	7.8	43600 9800	68000 15300
SM1303KS	S1303K	216	3 3/16	155 6.1024	80.96 3 3/16	26 1.0236	40.48 1 19/32	98.4 3.874	6.4 1/4	111.13 4 3/8	25.4 1	100.01 3 15/16	4.15	9.14	53400 12000	80000 18000
SM1307KS	S1307K	217	3 7/16	165 6.4961	87.31 3 7/16	28 1.1024	43.66 1 23/32	104.83 4.127	6.4 1/4	112.71 4 7/16	25.4 1	106.36 4 3/16	4.69	10.33	61000 13700	93000 20800
SM1315WS(2)	S1315K	220	3 15/16	200 7.874	100.01 3 15/16	34 1.3386	50 1 31/32	123.85 4.876	6.4 1/4	139.7 5 1/2	31.75 1 1/4	125.41 4 15/16	8.939	19.69	126900 28500	170000 38000

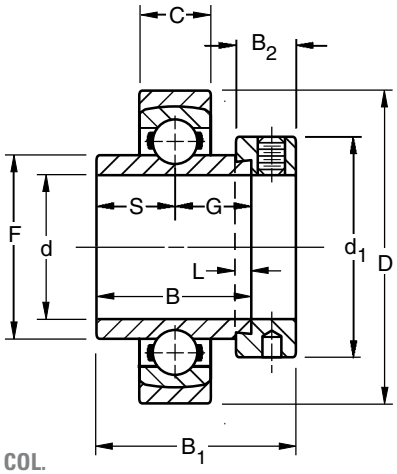
(1) Bore tolerance: 1" - 2 3/16", nominal to .013 mm, +.0005".
2 1/4" - 3 3/16", nominal to .015 mm, +.0006".
3 1/4" - 3 15/16", nominal to .018 mm, +.0007".

(2) For applications where thrust load exceeds 60% of radial load, consult your Timken representative.

SMN-S HEAVY SERIES

- Construction permits inner assembly to swivel in the outer aligning ring.
- Unrestricted self-alignment is achieved, allowing the inner ring to become square and true with the shaft and assembly.
- The external S-Ring is uniquely ground and closely matched to its respective outer bearing ring so that the S-Ring of one bearing will not fit the outer ring of another bearing.
- Has the basic 300 Series load capacities.
- Bearings are not prelubricated.

Suggested shaft tolerances: 1 3/16" - 1 15/16", nominal to -.013 mm, -.0005";
2" - 3 15/16", nominal to -.025 mm, -.0010".



TO ORDER, SPECIFY BEARING NUMBER FOLLOWED BY "+ COL". Example: SMN103KS + COL.

Bearing Number	Collar Number	Basic Outer Ring Size	Bore(1) d	O.D. D	Ring Widths B Inner	Ring Widths C Outer	S	G	F	L	d_1	B_2	B_1	Brg. & Collar Wt.		Static Load Rating C_o	Extended Dynamic Load Rating C_E
			in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg	lbs.	N lbs.	N lbs.
SMN103KS	SN103K	306	1 3/16	80 3.1496	36.51 1 7/16	19 0.748	17.5 11/16	19.1 3/4	43.23 1.702	4.0 5/32	49.2 1 15/16	17.5 11/16	50.0 1 31/32	0.654	1.44	15600 3550	33500 7550
SMN107KS	SN107K	307	1 7/16	88 3.4646	38.10 1 1/2	21 0.8268	18.30 23/32	19.8 25/32	48.95 1.927	4.0 5/32	55.6 2 3/16	17.5 11/16	51.6 2 1/32	0.849	1.87	21200 4750	40500 9150
SMN108KS	SN108KT	308	1 1/2	100 3.9370	41.28 1 5/8	23 0.9055	19.80 25/32	21.4 27/32	55.5 2.185	4.8 3/16	63.5 2 1/2	20.6 13/16	57.2 2 1/4	1.344	2.96	26100 5850	49000 11000
SMN111KS	SN111K	309	1 11/16	110 4.3307	42.86 1 11/16	25 0.9843	19.80 25/32	23.0 29/32	62.05 2.443	4.8 3/16	69.9 2 3/4	20.6 13/16	58.7 2 5/16	1.693	3.73	31600 7100	58500 13200
SMN115KS	SN115K	310	1 15/16	120 4.7244	49.21 1 15/16	27 1.063	24.6 31/32	24.6 31/32	68.78 2.708	4.8 3/16	76.2 3	22.2 7/8	66.7 2 5/8	2.147	4.73	37900 8500	68000 15300
SMN203KS	SN203K	311	2 3/16	130 5.1181	55.56 2 3/16	29 1.1417	27.8 1 3/32	27.8 1 3/32	75.01 2.953	4.8 3/16	82.6 3 1/4	22.2 7/8	73.00 2 7/8	2.769	6.1	43600 9800	80000 18000
SMN207KS	SN207K	312	2 7/16	145 5.7087	61.91 2 7/16	31 1.2205	31 1 7/32	31 1 7/32	81.53 3.21	6.4 1/4	88.9 3 1/2	23.8 15/16	79.4 3 1/8	3.405	7.5	51700 11600	90000 20400
SMN211KS	SO211K	314	2 11/16	165 6.4961	68.26 2 11/16	35 1.378	34.10 1 11/32	34.1 1 11/32	94.7 3.731	6.4 1/4	101.6 4	27.0 1 1/16	92.1 3 5/8	5.185	11.42	66800 15000	116000 26000
SMN215KS	SN215K	315	2 15/16	175 6.8898	74.61 2 15/16	37 1.4567	37.3 1 15/32	37.3 1 15/32	100.38 3.952	6.4 1/4	112.7 4 7/16	31.8 1 1/4	100.0 3 15/16	6.456	14.22	75700 17000	125000 28500
SMN303KS	SN303K	316	3 3/16	190 7.4803	80.96 3 3/16	39 1.5354	40.5 1 19/32	40.5 1 19/32	106.91 4.209	6.4 1/4	119.10 4 11/16	31.8 1 1/4	106.4 4 3/16	8.04	17.71	86000 19300	137000 30500
SMN307KS	SN307K	318	3 7/16	210 8.2677	87.31 3 7/16	43 1.6929	43.7 1 23/32	43.7 1 23/32	120.12 4.729	7.9 5/16	133.4 5 1/4	36.5 1 7/16	115.9 4 9/16	1.79	25.97	106900 24000	156000 35500
SMO311WS-BR	SO311K	319	3 11/16	220 8.6608	93.66 3 11/16	45 1.768	38.89 1 17/32	54.77 2 5/32	126.53 4.982	7.94 5/16	139.7 5 1/2	36.51 1 7/16	122.24 4 13/16	16.3	33.0	166000 37500	224000 50000
SMN315KS	SN315K	320	3 15/16	235 9.252	100.01 3 15/16	47 1.8504	50 1 31/32	50 1 31/32	134.77 5.306	7.9 5/16	146.0 5 3/4	36.5 1 7/16	128.6 5 1/16	15.822	34.85	140300 31500	193000 43000
SMN407WS-BR(2)	SN407K	322	4 7/16	265 10.4331	106.36 4 3/16	50 1.9685	49.20 1 15/16	57.2 2 1/4	150.37 5.92	7.9 5/16	168.3 6 1/2	42.9 1 11/16	141.3 5 9/16	21.465	47.28	245000 55000	280000 63000
SMN415WS-BR(2)	SN415K	326	4 15/16	300 11.811	115.89 4 9/16	59 2.3228	54.0 2 1/8	61.9 2 7/16	176.56 6.951	7.9 5/16	206.4 8 1/8	42.9 1 11/16	150.8 5 15/16	33.773	74.39	327400 73500	345000 78000

(1) Bore tolerance: 15/16" - 2 3/16", nominal to .013 mm, +.0005".
2 1/4" - 3 3/16", nominal to .015 mm, +.0006".
3 1/4" - 4 3/16", nominal to .018 mm, +.0007".
4 7/16" - 4 15/16", nominal to .020 mm, +.0008".

(2) For applications where thrust load exceeds 60% of radial load, consult your Timken representative.

NOTES

HOUSED UNITS

Overview: Timken housed units are available in a wide variety of types and sizes to accommodate a complete range of operating conditions.

- **Sizes:** 12.7 mm - 75.4 mm shaft size (0.50 in. - 2.968 in.).
- **Markets:** Agriculture, fans and blowers, food processing and conveyors.
- **Features:** Most popular design features cast iron housing. Other material options include malleable iron, polymer, pressed-steel or rubber.
- **Benefits:** Combines bearing, housing, seal and locking system into one device for easy installation. Operates even when the shaft is not perfectly aligned with the mounting surface.

D

Wide Inner Ring Ball Bearings Housed Units

AK	low base
AO	heavy series
AS	high base
C	cylindrical cartridge
CJ	four-bolt mount
CJT	two-bolt mount
AS	high base
TU	take-up unit

***Options:**

C	concentric collar
H	heavy housing
L	expansion unit
M	medium-duty

PT	polymer housing with TDC® bearing
NT	nickel-plated with TDC bearing
PS	polymer housing w/ stainless steel bearing

R **AK** ***** **1** **NT**

L	labyrinth seal with self-locking collar
R	contact shroud seal with self-locking collar
S	contact shroud seal, narrow inner ring, setscrew lock
T	Tri-Ply shroud seal with self-locking collar
V	contact shroud seal, narrow inner ring, self-locking collar
Y	contact shroud seal, with wide inner ring, setscrew lock

Bore Size
inch ½ in. - $3^{15}/_{16}$ in.
metric 15 - 75 mm

Wide Inner Ring Ball Bearings
Housed Units

INTRODUCTION

Ball bearing housed units are available in a wide variety of types and sizes to accommodate a complete range of operating conditions.

These units generally have cast iron housings and are designed for mounting on straight shafts with a slip fit. The self-locking collar and the setscrew inner bearing designs provide ease in mounting. Bolt holes in housings take standard bolts for assembling these units to machinery frames. Several series are also available with the concentric locking collar.

Most units are made with a self-aligning feature, and it is unnecessary for the user to refine the design in excess of practical limits. Units incorporating prelubricated wide inner ring bearings may be furnished without grease fittings.

Several basic types of housed units are available: pillow blocks, flanged cartridges, flangette units, cylindrical cartridges and take-up units. The type required is determined by its application and mounting requirements. Within the basic type selected, variations allow for load factors, shaft sizes, mounting surface dimensions, base to shaft centerline heights and lubrication requirements.

PILLOW BLOCKS

Pillow blocks, the most commonly used type of mounted units, are designed to provide shaft support where the mounting surface is parallel to the shaft axis. The bolt holes are usually slotted for adjustment during mounting.

Pillow blocks are supplied in a variety of configurations. Pressed steel and rubber pillow blocks are also available for light-duty applications.

FLANGED CARTRIDGES

Flanged cartridges are used where a shaft passes through the machine frame at a right angle. A four-bolt mounting is the most common, however, where the mounting area is restricted, three- and two-bolt versions are available. A piloted flanged cartridge provides additional mounting accuracy and support.

Flanged cartridges are supplied in both standard and heavy-duty series. Iron and rubber flanged cartridges are also available.

A complete line of flangette units, or pressed-steel flanged cartridges, provides an economical solution to light-duty applications. Two-, three- and four-bolt mountings are available along with a relubricable version.

CYLINDRICAL CARTRIDGES

Cylindrical cartridges, like flanged cartridges, provide shaft support where the shaft axis is perpendicular to and passing through a machined housing which is generally very thick. The outside diameter of the cylindrical cartridges permits mounting with a press fit into a straight, through-bored housing.

Cylindrical cartridges have a machined spherical bearing seat to provide initial shaft alignment in standard-duty applications. Synthetic, conductive rubber cylindrical cartridges are available for applications where low-cost, light-duty, low-noise operation is essential.

TAKE-UP UNITS

Take-up units are used where shaft adjustment and belt tightening devices are required, such as conveyor applications. Frames for take-up units provide for either side or top mounting.

Take-up units are available in cast iron for standard-duty and pressed steel for economical, light-duty applications.

TIMKEN SELF-LOCKING COLLAR INSTALLATION

Most Timken housed units come equipped with the self-locking collar to facilitate the mounting of wide inner ring bearings. This self-locking collar eliminates the need for locknuts, washers, shoulders, sleeves, and adapters.

The locking collar has a counterbored recess made purposely eccentric to the bore. The collar recess and the end of the bearing inner ring with which it engages are both machined so that they act as mating cams when on the shaft.

When the collar is engaged to the inner ring, it grips the shaft tightly with a positive binding action that increases with use. No adjustments of any kind are necessary.

1. Slip the shaft through the pillow block or other Timken housed unit incorporating the wide inner ring bearing. Be certain the bearing is aligned in position along the shaft to eliminate any possibility of cramping loads.

2. Fasten the unit securely to the base using the proper bolt size.

3. Place the self-locking collar on the shaft with its cam adjacent to the cam on the end of the bearing's inner ring. The eccentric recessed cam will slide over and engage the corresponding cam on the bearing inner ring. Turn the collar in the direction of shaft rotation.

4. Using a lightweight hammer and a drift pin inserted in the drift pin hole strike in the direction of shaft rotation to positively engage the collar. The wide inner ring is now locked to the shaft.

5. As a final step, fully tighten the setscrew. It exerts a wedging action to hold the collar always in the engaged position, even under shock load. This design will operate effectively after the cams are tightly locked in most cases with no setscrews at all.

CONCENTRIC COLLAR

For simplified installation of Timken housed units equipped with concentric collar bearings, the collar is normally assembled to the wide inner ring for shipment. Slip the complete unit on the shaft following steps 1 and 2 described for the self-locking collar procedure, and tighten both setscrews.

TIMKEN SETSCREW LOCKING BEARING

Steps 1 and 2 can be repeated from the self-locking collar installation above. To lock the setscrew bearing, simply tighten each inner ring setscrew to the suggested torque listed by shaft size. See chart below.

Shaft Size (in.)	mm	SUGGESTED Torque in lbs.	(n • m)
1/2 - 11/16	17 mm	35 in lbs.	4 (n • m)
3/4 - 1	20-25 mm	80 in lbs.	9 (n • m)
1 1/16 - 1 3/4	30-45 mm	155 in lbs.	18 (n • m)
1 13/16 - 2 3/16	50-55 mm	275 in lbs.	31 (n • m)

It may be necessary to rotate the shaft to provide an easy access of the setscrew wrench to the setscrews. To disassemble, loosen the setscrews.

TIMKEN SURVIVOR™ PT SERIES

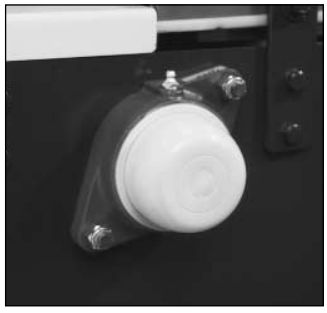
Timken's SURVIVOR™ Series housed units have been created to handle stringent food handling requirements and serve in highly corrosive applications. All assembly components have been carefully selected to comply with federal food processing requirements without compromising bearing performance needs.

The patented SURVIVOR PT polymer housed units have been tested to withstand a wide range of highly corrosive chemicals commonly found in food and beverage processing industries. These units are dimensionally stable under load and can operate in continuous temperatures up to 250° F (brief exposure up to 350° F) and the finish will not scrape or flake off during use.

The bearing inserts, given the proprietary Timken thin dense chrome coating, are combined with stainless steel locking collars to provide superior corrosion protection. This coating is a thin, dense chrome coating that will not crack or peel under known application conditions. The bearing housings are available as high-base and low-base pillow blocks, and 2-bolt and 4-bolt flanged cartridges for popular shaft sizes of $^{3}/_{4}$ in. through 1 $^{1}/_{2}$ in. and 20 mm through 40 mm diameters. Bearing inserts are available with the self-locking collar or the setscrew locking device. The SURVIVOR PT assemblies are dimensionally interchangeable with the current line of Timken cast iron housed units.

The SURVIVOR Series provides extraordinary corrosion resistance for food and beverage industries, materials handling operations, dairy and refrigeration applications, as well as HVAC, chemical, maritime and other highly corrosive environments.

All materials used in the SURVIVOR assemblies, including the grease, are approved for USDA and FDA compliant industries.



ORDERING INFORMATION

To order complete SURVIVOR polymer assemblies, simply add the "PT" suffix to the current cast iron housed unit designations.

Example:

YCJT 1 PT or RAK $^{3}/_{4}$ PT

Refer to the corresponding cast iron housing design for dimensional data. Consult your Timken sales representative or an authorized distributor for shaft size availability.

SURVIVOR inserts can be ordered using Timken's standard part number for wide inner ring bearings with a "TDCF" suffix. Example:

GY1100KRRB TDCF or G1100KRRB + COL TDCF

PT SERIES	
COMPONENT	**MATERIAL**
Balls	Stainless Steel
Ball Retainer	Nylon
Collar	Stainless Steel
Crush Bushing	Stainless Steel
Grease	FDA Approved
Housing	Polymer
Grease Fitting	Stainless Steel
Grease Fitting Cover	Nylon
Rings	TDC plated
Seals	Synthetic Rubber
Seal Caps	Stainless Steel
Setscrew	Stainless Steel

TIMKEN SURVIVOR™ NT SERIES

Timken SURVIVOR NT Series is designed to stand up to the demands of the food handling industries and for use in highly corrosive applications. The NT Series provides outstanding protection in combination with thin dense chrome coating ball bearing inserts, collar and the electroless nickel-plated housing.

The SURVIVOR NT Series units are available as high-base and low-base pillow blocks, and 2-bolt and 4-bolt flanged cartridges for popular shaft sizes of $^{1}/_{2}$ in. through 2 $^{15}/_{16}$ in. (and selected metric diameters). Timken also produces a take-up unit in the SURVIVOR NT Series in limited shaft sizes (RTU-NT). The bearing inserts are available with self-locking collars. The SURVIVOR NT Series is dimensionally interchangeable with the current line of Timken cast iron housed units.

The SURVIVOR NT Series provides extraordinary corrosion resistance in a durable package suitable for food and beverage industries, materials handling operations, dairy and refrigeration applications, as well as HVAC, chemical, maritime and other highly corrosive environments.

All materials used in the SURVIVOR assemblies, including the grease, are approved for USDA and FDA compliant industries.

ORDERING INFORMATION

To order complete SURVIVOR nickel-plated assemblies, simply add the "NT" suffix to the cast iron housed unit designations. Example:

RCJT 1 NT or RAK $^{3}/_{4}$ NT

Refer to the corresponding cast iron housing design for dimensional data. Consult your Timken sales representative or an authorized distributor for shaft size availability.

SURVIVOR inserts can be ordered using Timken's standard part number for wide inner ring bearings with a "TDCF" suffix. Example:

G1100KRRB + COL TDCF

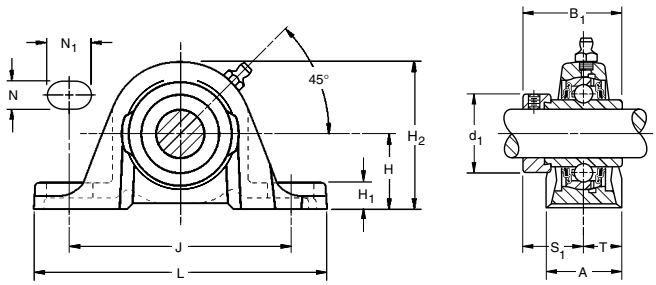
NT SERIES	
COMPONENT	**MATERIAL**
Balls	Stainless Steel
Ball Retainer	Nylon
Collar	Stainless Steel
Rings	TDC plated
Grease	FDA Approved
Housing Finish	Nickel Plating
Grease Fitting	Stainless Steel
Grease Fitting Cover	Nylon
Seals	Synthetic Rubber
Seal Caps	Stainless Steel
Setscrew[1]	Stainless Steel

[1] Standard SURVIVOR NT units are only available in the "R" series, self-locking collar types. Setscrew lock series ("Y") units are available for minimum quantity orders.

RAK, TAK, LAK INDUSTRIAL SERIES

Timken RAK, TAK and LAK pillow blocks are suggested for industrial applications where normal loads are encountered.

- A compact, one-piece housing that can be mounted in any position.
- Pillow blocks self-align at mounting with the spherical outside diameter of the bearing fitting into corresponding spherical housing seat.
- Units are prelubricated and ready for immediate installation.
- Grease fitting is provided for relubrication.
- Self-locking collars are supplied with all units.
- RAK pillow block is equipped with G-KRRB (R-Seal) wide inner ring bearings, the TAK with G-KPPB (Tri-Ply Seal) wide inner ring bearings and the LAK with the G-KLLB (Mechani-Seal) wide inner ring bearings.
- **Contact a Timken representative to discuss highly corrosive applications (food processing, chemical exposure) where Timken thin dense chrome coated bearings can be utilized.**



Suggested shaft tolerances: **½"- 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 15/16", nominal to -.025 mm, -.0010".

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RAK	G.KRRB	Page D54
TAK	G.KPPB	Page D65
LAK	G.KLLB	Page D62

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RAK 1 7/16". POPULAR SIZES ARE IN BOLD.

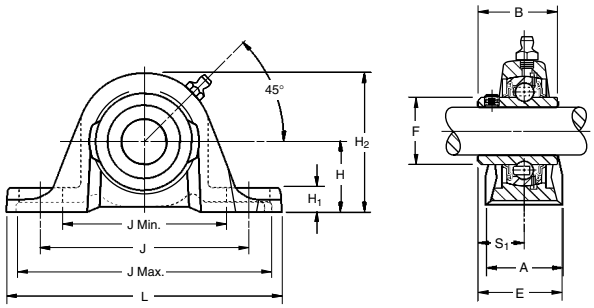
Unit	Shaft Dia.	H	H_2	B_1	J	L	A	H_1	N	N_1	d_1	S_1	T	Bolt Size	Bearing Number[1]		Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	RAK	(TAK/LAK)		new (old)	kg lbs.
RAK, LAK	1/2	26.99	53.2	37.3	92.1	123.8	30.2	8.7	11.1	22.2	28.6	23.4	15.1	10	G1008KRRB	(KLLB)	S1008K	T-40238	0.454
RAK, LAK	5/8	1 1/16	2 3/32	1 15/32	3 5/8	4 7/8	1 3/16	11/32	7/16	7/8	1 1/8	59/64	19/32	3/8	G1010KRRB	(KLLB)	S1010K	(T-30595)	1
RAK	11/16														G1011KRRB		S1011K		
RAK	17														GE17KRRB		SE17K		
RAK, LAK	**3/4**	31.75	62.7	43.7	96	127	31.8	11.9	11.1	19.8	33.3	26.6	15.9	10	G1012KRRB	(KLLB)	S1012K	T-40239	0.635
RAK	20	1 1/4	2 15/32	1 23/32	3 25/32	5	1 1/4	15/32	7/16	25/32	1 5/16	1 3/64	5/8	3/8	GE20KRRB		SE20K	(T-30555)	1.4
RAK, TAK	7/8														G1014KRRB	(KPPB3)	S1014K		
RAK, TAK, LAK	15/16	33.34	68.3	44.4	104.8	139.7	35.7	11.9	11.1	20.6	38.1	27	17.9	10	G1015KRRB	(KPPB3/KLLB)	S1015K	T-30365	0.803
RAK, TAK, LAK	**1**	1 5/16	2 11/16	1 3/4	4 1/8	5 1/2	1 13/32	15/32	7/16	13/16	1 1/2	1 1/16	45/64	3/8	G1100KRRB	(KPPB3/KLLB)	S1100K		1.77
RAK, TAK	25														GE25KRRB	(KPPB3)	SE25K		
RAK, TAK	1 1/16														G1101KRRB	(KPPB3)	S1101K		
RAK, TAK, LAK	1 1/8	39.69	80.2	48.4	117.5	157.2	39.7	13.5	14.3	23.8	44.1	30.2	19.9	12	G1102KRRB	(KPPB3/KLLB)	S1102K	T-40241	1.297
RAK, TAK, LAK	1 3/16	1 9/16	3 5/32	1 29/32	4 5/8	6 3/16	1 9/16	17/32	9/16	15/16	1 47/64	1 3/16	25/32	1/2	G1103KRRB	(KPPB3/KLLB)	S1103K	(T-30300)	2.86
RAK, TAK	30														GE30KRRB	(KPPB3)	SE30K		
RAK, TAK, LAK	1 1/4														G1104KRRB	(KPPB2/KLLB)	S1104K		
RAK, TAK	1 5/16	46.04	92.1	51.2	130.2	166.7	45.2	16.7	14.3	24.6	54	32.5	22.7	12	G1105KRRB	(KPPB2)	S1105K	T-40242	1.674
RAK, TAK	1 3/8	1 13/16	3 5/8	2 1/64	5 1/8	6 9/16	1 25/32	21/32	9/16	31/32	2 1/8	1 9/32	57/64	1/2	G1106KRRB	(KPPB2)	S1106K	(T-30410)	3.69
RAK, TAK, LAK	**1 7/16**														G1107KRRB	(KPPB2/KLLB)	S1107K		
RAK, TAK	35														GE35KRRB	(KPPB2)	SE35K		
RAK, TAK, LAK	**1 1/2**	49.21	100	56.4	136.5	179.4	47.6	19	14.3	26.2	60.3	34.9	23.8	12	G1108KRRB	(KPPB3/KLLB)	S1108KT	T-40243	2.15
RAK, TAK	1 9/16	1 15/16	3 15/16	2 7/32	5 3/8	7 1/16	1 7/8	3/4	9/16	1 1/32	2 3/8	1 3/8	15/16	1/2	G1109KRRB	(KPPB3)	S1109KT	(T-30484)	4.74
RAK, TAK	40														GE40KRRB	(KPPB3)	SE40K		
RAK, TAK	1 5/8														G1110KRRB	(KPPB4)	S1110K		
RAK, TAK, LAK	**1 11/16**	52.39	104.8	56.4	149.2	191.3	50.8	17.5	14.3	28.6	63.5	34.9	25.4	12	G1111KRRB	(KPPB4/KLLB)	S1111K	T-40244	2.409
RAK, TAK, LAK	1 3/4	2 1/16	4 1/8	2 7/32	5 7/8	7 17/32	2	11/16	9/16	1 1/8	2 1/2	1 3/8	1	1/2	G1112KRRB	(KPPB4/KLLB)	S1112K	(T-30682)	5.31
RAK, TAK	45														GE45KRRB	(KPPB4)	SE45K		
RAK, TAK	1 7/8	55.56	112.7	62.7	158	200	55.6	17.5	17.5	23.8	69.8	38.1	27.8	16	G1114KRRB	(KPPB3)	S1114K	T-40245	3.003
RAK, TAK, LAK	**1 15/16**	2 3/16	4 7/16	2 15/32	6 7/32	7 7/8	2 3/16	11/16	11/16	15/16	2 3/4	1 1/2	1 3/32	5/8	G1115KRRB	(KPPB3/KLLB)	S1115K	(T-30706)	6.62
RAK, TAK	50														GE50KRRB	(KPPB3)	SE50K		
RAK, TAK	2														G1200KRRB	(KPPB4)	S1200K	T-40246	3.901
RAK, TAK	2 1/8	61.91	124.6	71.4	176.2	222.3	58.7	19	18.3	29.4	76.2	43.7	29.4	16	G1202KRRB	(KPPB4)	S1202K	(T-30738)	8.6
RAK, TAK, LAK	**2 3/16**	2 7/16	4 29/32	2 13/16	6 15/16	8 3/4	2 5/16	3/4	23/32	1 5/32	3	1 23/32	1 5/32	5/8	G1203KRRB	(KPPB4/KLLB)	S1203K		
RAK, TAK	55														GE55KRRB	(KPPB4)	SE55K		
RAK	2 1/4														G1204KRRB		S1204K	T-40247	5.511
RAK	2 3/8	68.26	137.3	77.8	188.1	239.7	60.3	22.2	17.5	29.4	84.1	46.8	30.2	16	G1206KRRB		S1206K	(T-31244)	12.15
RAK, LAK	**2 7/16**	2 11/16	5 13/32	3 1/16	7 13/32	9 7/16	2 3/8	7/8	11/16	1 5/32	3 5/16	1 27/32	1 3/16	5/8	G1207KRRB	(KLLB)	S1207K		
RAK	60														GE60KRRB		SE60K		
RAK	2 11/16	76.2	154	85.7	203.2	266.7	73	33.3	20.6	34.9	96.8	45.2	36.5	20	G1211KRRB		S1211KT	T-22503	7.92
RAK	70	3	6 1/16	3 3/8	8	10 1/2	2 7/8	1 5/16	13/16	1 3/8	3 13/16	1 25/32	1 7/16	3/4	GE70KRRB		SE70K		17.46
RAK	2 15/16	84.14	163.5	92.1	241.3	304.8	82.6	38.1	22.2	31.8	101.6	54.8	41.3	20	G1215KRRB		S1215K	T-20134	9.026
RAK	75	3 5/16	6 7/16	3 5/8	9 1/2	12	3 1/4	1 1/2	7/8	1 1/4	4	2 5/32	1 5/8	3/4	GE75KRRB		SE75K		19.9

[1] Bearing number for RAK is G-KRRB. TAK uses G-KPPB type LAK uses G-KLLB. Note: All units have 1/8 pipe thread grease fitting except 1/2-11/16 and 3/4 units which have 1/4-28 fitting.

YAK INDUSTRIAL SERIES SETSCREW UNITS

- Timken Series low-base setscrew pillow blocks feature the GY-KRRB bearing.
- Well-suited for industrial applications with normal loads, due to its full width inner ring setscrew.
- **Contact a Timken representative to discuss highly corrosive applications (food processing, chemical exposure) where Timken thin dense chrome coated bearings can be utilized.**

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 15/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
YAK	GY-KRRB	Page D67

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: YAK 1 7/16". POPULAR SIZES ARE IN BOLD.

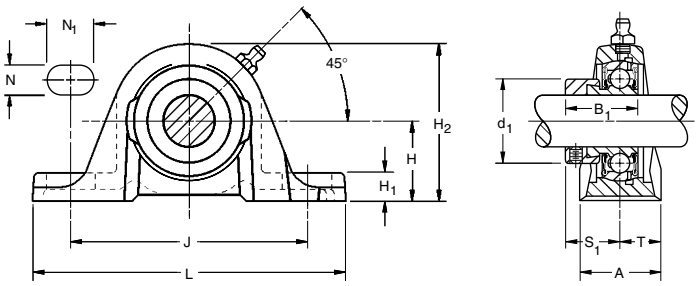
Unit	Shaft Dia. mm	Shaft Dia. in.	H mm / in.	H_2 mm / in.	B mm / in.	L mm / in.	J mm / in.	J Min. mm / in.	J Max. mm / in.	A mm / in.	H_1 mm / in.	F mm / in.	S_1 mm / in.	E mm / in.	Bolt Size in.	Bearing
YAK		1/2	26.99	53.2	27.4	123.8	92.1	69.8	114.4	30.2	8.7	22.86	15.9	30.95	10	GY1008KRRB
YAK		5/8	1 1/16	2 3/32	1 5/64	4 7/8	3 5/8	2 3/4	4 1/2	1 3/16	11/32	0.9	5/8	1 7/32	3/8	GY1010KRRB
YAK	17															GYE17KRRB
YAK		**3/4**	31.75	62.7	30.9	127	96	76.2	155.8	31.8	11.9	27.56	18.3	34.13	10	GY1012KRRB
YAK	20		1 1/4	2 15/32	1 7/32	5	3 25/32	3	4 9/16	1 1/4	15/32	1.085	23/32	1 11/32	3/8	GYE20KRRB
YAK		7/8														GY1014KRRB
YAK		15/16	33.34	68.3	34.1	139.7	104.8	84.1	125.4	35.7	11.9	33.83	19.8	37.7	10	GY1015KRRB
YAK		**1**	1 5/16	2 11/16	1 11/32	5 1/2	4 1/8	3 5/16	4 15/16	1 13/32	15/32	1.332	25/32	1 31/64	3/8	GY1100KRRB
YAK	25															GYE25KRRB
YAK		1 1/8														GY1102KRRB
YAK		**1 3/16**	39.69	80.2	38.1	157.2	117.5	93.7	141.3	39.7	13.5	40.31	22.2	42.07	12	GY1103KRRB
YAK		1 1/4 S	1 9/16	3 5/32	1 1/2	6 3/16	4 5/8	3 11/16	5 9/16	1 9/16	17/32	1.587	7/8	1 21/32	1/2	GY1103KRRB3
YAK	30															GYE30KRRB
YAK		1 1/4														GY1104KRRB
YAK		1 3/8	46.04	92.1	42.9	166.7	130.2	105.6	154.8	45.2	16.7	46.13	25.4	48.02	12	GY1106KRRB
YAK		**1 7/16**	1 13/16	3 5/8	1 11/16	6 9/16	5 1/8	4 5/32	6 3/32	1 25/32	21/32	1.816	1	1 57/64	1/2	GY1107KRRB
YAK	35															GYE35KRRB
YAK		**1 1/2**	49.21	100	49.2	179.4	136.5	110.3	162.7	47.6	19	52.27	30.2	53.98	12	GY1108KRRB
YAK	40		1 15/16	3 15/16	1 15/16	7 1/16	5 3/8	4 11/32	6 13/32	1 7/8	3/4	2.058	1 3/16	2 1/8	1/2	GYE40KRRB
YAK		1 5/8														GY1110KRRB
YAK		**1 11/16**	52.39	104.8	49.2	191.3	149.2	120.7	177.8	50.8	17.5	57.92	30.2	55.56	12	GY1111KRRB
YAK		1 3/4	2 1/16	4 1/8	1 15/16	7 17/32	5 7/8	4 3/4	7	2	11/16	2.28	1 3/16	2 3/16	1/2	GY1112KRRB
YAK	45															GYE45KRRB
YAK		**1 15/16**	55.56	112.7	51.6	200	158	132.6	183.4	55.6	17.5	62.84	32.5	60.33	16	GY1115KRRB
YAK		2 S	2 3/16	4 7/16	2 1/32	7 7/8	6 7/32	5 7/32	7 7/32	2 3/16	11/16	2.474	1 9/32	2 3/8	5/8	GY1115KRRB3
YAK	50															GYE50KRRB
YAK		2	61.91	124.6	55.6	222.3	176.2	146.9	205.6	58.7	19	69.77	33.3	61.91	16	GY1200KRRB
YAK		**2 3/16**	2 7/16	4 29/32	2 3/16	8 3/4	6 15/16	5 25/32	8 3/32	2 5/16	3/4	2.747	1 5/16	2 7/16	5/8	GY1203KRRB
YAK	55															GYE55KRRB
YAK		2 1/4	68.26	137.3	65.1	239.7	188.1	158.8	217.5	60.3	22.2	76.48	39.1	69.85	16	GY1204KRRB
YAK		**2 7/16**	2 11/16	5 13/32	2 9/16	9 7/16	7 13/32	6 1/4	8 9/16	2 3/8	7/8	3.011	1 9/16	2 3/4	5/8	GY1207KRRB
YAK	60															GYE60KRRB
YAK		2 11/16	76.2	154	69.9	266.7	203.2	168.3	238.1	73	33.3	86.92	42.9	79.4	20	GY1211KRRB
YAK	70		3	6 1/16	2 3/4	10 1/2	8	6 5/8	9 3/8	2 7/8	1 5/16	3.422	1 11/16	3 1/8	3/4	GYE70KRRB
YAK		2 15/16	84.14	163.5	77.8	304.8	241.3	209.5	223.1	82.5	38.1	91.92	44.4	85.73	20	GY1215KRRB
YAK	75		3 5/16	6 7/16	3 1/16	12	9 1/2	8 1/4	10 3/4	3 1/4	1 1/2	3.619	1 3/4	3 3/8	3/4	GYE75KRRB

Shaft diameter with an S = smaller housing.

VAK STANDARD SERIES

- The streamlined and rugged VAK pillow block unit combines engineered housing and RA-RR extended inner ring bearing.
- RA-RR bearing employs a positive contact land-riding seal and a Timken originating self-locking collar. Collar assures positive shaft retention.
- Pillow block can be mounted to operate in any position.
- Bearing housed units are factory prelubricated, but a grease fitting is provided to allow for relubrication if required.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 3/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
VAK	GRA-KRRB	Page D57

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: VAK 1 7/16". POPULAR SIZES ARE IN BOLD.

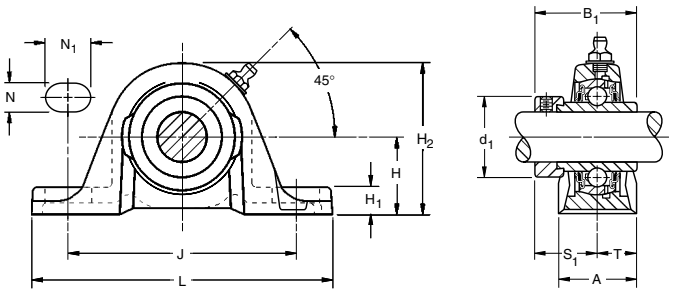
Unit	Shaft Dia.	H	H_2	B_1	J	L	A	H_1	N	N_1	d_1	S_1	T	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new (old)	kg lbs.
VAK	1/2	26.99	53.2	28.6	92.1	123.8	30.2	8.7	11.1	22.2	28.6	22.2	15.1	10	GRA008RRB	S1008K	T-40238	0.454
VAK	5/8	1 1/16	2 3/32	1 1/8	3 5/8	4 7/8	1 3/16	11/32	7/16	7/8	1 1/8	7/8	19/32	3/8	GRA010RRB	S1010K	(T-30595)	1
VAK	17														GRAE17RRB	SE17K		
VAK	**3/4**	31.75	62.7	31	96	127	31.8	11.9	11.1	19.8	33.3	23.4	15.9	10	GRA012RRB	S1012K	T-40239	0.563
VAK	20	1 1/4	2 15/32	1 7/32	3 25/32	5	1 1/4	15/32	7/16	25/32	1 5/16	59/64	5/8	3/8	GRAE20RRB	SE20K	(T-30555)	1.24
VAK	7/8														GRA014RRB	S1014K		
VAK	15/16	33.34	68.3	31	104.8	139.7	35.7	11.9	11.1	20.6	38.1	23.4	17.9	10	GRA015RRB	S1015K	T-30365	0.758
VAK	**1**	1 5/16	2 11/16	1 7/32	4 1/8	5 1/2	1 13/32	15/32	7/16	13/16	1 1/2	59/64	45/64	3/8	GRA100RRB	S1100K		1.67
VAK	25														GRAE25RRB	SE25K		
VAK	1 1/8														GRA102RRB	S1102K		
VAK	**1 3/16**	39.69	80.2	35.7	117.5	157.2	39.7	13.5	14.3	23.8	44.1	27	19.9	12	GRA103RRB	S1103K	T-40241	1.235
VAK	1 1/4 S	1 9/16	3 5/32	1 13/32	4 5/8	6 3/16	1 9/16	17/32	9/16	15/16	1 47/64	1 1/16	25/32	1/2	GRA103RRB2	S1103K3	(T-30300)	2.72
VAK	30														GRAE30RRB	SE30K		
VAK	1 1/4														GRA104RRB	S1104K		
VAK	1 3/8	46.04	92.1	38.9	130.2	166.7	45.2	16.7	14.3	24.6	54	29.4	22.7	12	GRA106RRB	S1106K	T-40242	1.594
VAK	**1 7/16**	1 13/16	3 5/8	1 17/32	5 1/8	6 9/16	1 25/32	21/32	9/16	31/32	2 1/8	1 5/32	57/64	1/2	GRA107RRB	S1107K	(T-30410)	3.51
VAK	35														GRAE35RRB	SE35K		
VAK	**1 1/2**	49.21	100	43.7	136.5	179.4	47.6	19	14.3	26.2	60.3	32.5	23.8	12	GRA108RRB	S1108KT	T-40243	2.034
VAK	1 9/16	1 15/16	3 15/16	1 23/32	5 3/8	7 1/16	1 7/8	3/4	9/16	1 1/32	2 3/8	1 9/32	15/16	1/2	GRA109RRB	S1109KT	(T-30484)	4.48
VAK	40														GRAE40RRB	SE40K		
VAK	1 5/8														GRA110RRB	S1110K		
VAK	**1 11/16**	52.39	104.8	43.7	149.2	191.3	50.8	17.5	14.3	28.6	63.5	32.5	25.4	12	GRA111RRB	S1111K	T-40244	2.261
VAK	1 3/4	2 1/16	4 1/8	1 23/32	5 7/8	7 17/32	2	11/16	9/16	1 1/8	2 1/2	1 9/32	1	1/2	GRA112RRB	S1112K	(T-30682)	4.98
VAK	45														GRAE45RRB	SE45K		
VAK	1 7/8														GRA114RRB	S1114K		
VAK	**1 15/16**	55.56	112.7	43.7	158	200	55.6	17.5	17.5	23.8	69.8	32.5	27.8	16	GRA115RRB	S1115K	T-40245	2.774
VAK	2 S	2 3/16	4 7/16	1 23/32	6 7/32	7 7/8	2 3/16	11/16	11/16	15/16	2 3/4	1 9/32	1 3/32	5/8	GRA115RRB2	S1115K2	(T-30706)	6.11
VAK	50														GRAE50RRB	SE50K		
VAK	2	61.91	124.6	48.4	176.2	222.3	58.7	19	18.3	29.4	76.2	36.5	29.4	16	GRA200RRB	S1200K	T-40246	3.328
VAK	**2 3/16**	2 7/16	4 29/32	1 29/32	6 15/16	8 3/4	2 5/16	3/4	23/32	1 5/32	3	1 7/16	1 5/32	5/8	GRA203RRB	S1203K	(T-30738)	7.33
VAK	55														GRAE55RRB	SE55K		

Note: All units have 1/8 pipe thread grease fitting except 1/2-11/16 and 3/4 units which have 1/4-28 fitting.
Shaft diameter with an S = smaller housing.

RAS, TAS, LAS INDUSTRIAL SERIES

- Timken RAS, TAS and LAS pillow blocks are similar in design and equal in load-carrying capacity to the RAK, TAK and LAK types.
- RAS, TAS, and LAS types have a slightly higher base-to-center height dimension than the RAK, TAK and LAK types, making them interchangeable with other competitive designs.
- RAS pillow block is equipped with G-KRRB (R-Seal) wide inner ring bearing, the TAS with G-KPPB (Tri-Ply Seal) wide inner ring bearings, and the LAS with the G-KLLB (Mechani-Seal) wide inner ring bearings.
- **Contact your Timken representative to discuss highly corrosive applications (food processing, chemical exposure) where Timken thin dense chrome coated bearings can be utilized.**

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 3/16", nominal to -.025 mm, -0010".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RAS	G-KRRB	Page D54
TAS	G-KPPB	Page D65
LAS	G-KLLB	Page D62

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RAS 1 3/16". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia.	H	H_2	B1	J	L	A	H_1	N	N_1	d_1	S_1	T	Bolt Size	Bearing Number[1]		Collar Number	Housing Number	Unit Wt.
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	RAK	(TAK/LAK)		(old)	kg
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.				new	lbs.
RAS	1/2														G1008KRRB		S1008K		
RAS	5/8	30.16	56.4	37.3	92.1	123.8	30.2	11.9	11.1	22.2	28.6	23.4	15.1	10	G1010KRRB		S1010K	T-40238	0.454
RAS	11/16	1 3/16	2 7/32	1 15/32	3 5/8	4 7/8	1 3/16	15/32	7/16	7/8	1 1/8	59/64	19/32	3/8	G1011KRRB		S1011K	(T-30595)	1.00
RAS	17														GE17KRRB		SE17K		
RAS	**3/4**	33.34	64.3	43.7	96	127	31.8	13.5	11.1	19.8	33.3	26.6	15.9	10	G1012KRRB		S1012K	T-40239	0.635
RAS	20	1 5/16	2 17/32	1 23/32	3 25/32	5	1 1/4	17/32	7/16	25/32	1 5/16	1 3/64	5/8	3/8	GE20KRRB		SE20K	(T-30555)	1.40
RAS,TAS	7/8														G1014KRRB	(KPPB3)	S1014K		
RAS,TAS	15/16	36.51	71.4	44.4	104.8	139.7	35.7	15.1	11.1	20.6	38.1	27	17.9	10	G1015KRRB	(KPPB3)	S1015K		0.803
RAS,TAS,LAS	**1**	1 7/16	2 13/16	1 3/4	4 1/8	5 1/2	1 13/32	19/32	7/16	13/16	1 1/2	1 1/16	45/64	3/8	G1100KRRB	(KPPB3)	S1100K	T-30365	1.77
RAS,TAS	25														GE25KRRB	(KPPB3)	SE25K		
RAS,TAS	1 1/16														G1101KRRB	(KPPB3)	S1101K		
RAS,TAS	1 1/8	42.86	83.3	48.4	117.5	157.2	39.7	16.7	14.3	23.8	49.5	30.2	19.9	12	G1102KRRB	(KPPB3)	S1102K	T-40241	1.297
RAS,TAS,LAS	**1 3/16**	1 11/16	3 9/32	1 29/32	4 5/8	6 3/16	1 9/16	21/32	9/16	15/16	1 3/4	1 3/16	25/32	1/2	G1103KRRB	(KPPB3)	S1103K	(T-30300)	2.86
RAS,TAS	30														GE30KRRB	(KPPB3)	SE30K		
RAS,TAS	1 1/4														G1104KRRB	(KPPB2)	S1104K		
RAS,TAS	1 5/16	47.62	93.7	51.2	130.2	166.7	45.2	18.3	14.3	24.6	54	32.5	22.7	12	G1105KRRB	(KPPB2)	S1105K	T-40242	1.674
RAS,TAS	1 3/8	1 7/8	3 11/16	2 1/64	5 1/8	6 9/16	1 25/32	23/32	9/16	31/32	2 1/8	1 9/32	57/64	1/2	G1106KRRB	(KPPB2)	S1106K	(T-30410)	3.69
RAS,TAS,LAS	**1 7/16**														G1107KRRB	(KPPB2)	S1107K		
RAS,TAS	35														GE35KRRB	(KPPB2)	SE35K		
RAS,TAS	**1 1/2**	49.21	100	56.4	136.5	179.4	47.6	19	14.3	26.2	60.3	34.9	23.8	12	G1108KRRB	(KPPB3)	S1108KT	T-40243	2.150
RAS,TAS	1 9/16	1 15/16	3 15/16	2 7/32	5 3/8	7 1/16	1 7/8	3/4	9/16	1 1/32	2 3/8	1 3/8	15/16	1/2	G1109KRRB	(KPPB3)	S1109KT	(T-30484)	4.74
RAS,TAS	40														GE40KRRB	(KPPB3)	SE40K		
RAS,TAS	1 5/8														G1110KRRB	(KPPB4)	S1110K		
RAS,TAS	**1 11/16**	53.98	106.4	56.4	149.2	191.3	50.8	19	14.3	28.6	63.5	34.9	25.4	12	G1111KRRB	(KPPB4)	S1111K	T-40244	2.409
RAS,TAS	1 3/4	2 1/8	4 3/16	2 7/32	5 7/8	7 17/32	2	3/4	9/16	1 1/8	2 1/2	1 3/8	1	1/2	G1112KRRB	(KPPB4)	S1112K	(T-30682)	5.31
RAS,TAS	45														GE45KRRB	(KPPB4)	SE45K		
RAS,TAS	1 7/8	57.15	114.3	62.7	158	200	55.6	19	17.5	23.8	69.8	38.1	27.8	16	G1114KRRB	(KPPB3)	S1114K	T-40245	3.003
RAS,TAS,LAS	1 15/16	2 1/4	4 1/2	2 15/16	6 7/32	7 7/8	2 3/16	3/4	11/16	15/16	2 3/4	1 1/2	1 3/32	5/8	G1115KRRB	(KPPB3)	S1115K	(T-30706)	6.62
RAS,TAS	50														GE50KRRB	(KPPB3)	SE50K		
RAS,TAS	2														G1200KRRB	(KPPB4)	S1200K		
RAS,TAS	2 1/8	63.5	126.2	71.4	176.2	222.3	58.7	20.6	18.3	29.4	76.2	43.7	29.4	16	G1202KRRB	(KPPB4)	S1202K	T-40246	3.901
RAS,TAS	**2 3/16**	2 1/2	4 31/32	2 13/16	6 15/16	8 3/4	2 5/16	13/16	23/32	1 5/32	3	1 23/32	1 5/32	5/8	G1203KRRB	(KPPB4)	S1203K	(T-30738)	8.60
RAS,TAS	55														GE55KRRB	(KPPB4)	SE55K		
RAS	2 1/4	69.85	138.9	77.8	188.1	239.7	60.3	23.8	18.3	29.4	84.1	46.8	30.2	16	G1204KRRB		S1204K	T-40247	5.511
RAS	2 3/8	2 3/4	5 15/32	3 1/16	7 13/32	9 7/16	2 3/8	15/16	23/32	1 5/32	3 5/16	1 27/32	1 3/16	5/8	G1206KRRB		S1206K	(T-31244)	12.15
RAS,LAS	**2 7/16**														G1207KRRB		S1207K		
RAS	60														GE60KRRB		SE60K		
RAS	2 15/16	82.55	164.3	92.1	215.9	269.9	69.9	25.4	22.2	31.8	101.6	54.8	34.9	20	G1215KRRB		S1215K	T-23423	9.026
RAS	75	3 1/4	6 15/32	3 5/8	8 1/2	10 5/8	2 3/4	1	7/8	1 1/4	4	2 5/32	1 3/8	3/4	GE75KRRB		SE75K		19.90

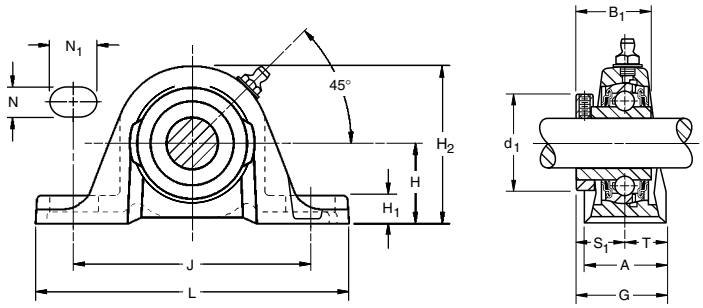
[1]Bearing number for RAS is G-KRRB. TAS uses G-KPPB, type LAS uses G-KLLB.

Note: All units have 1/8 pipe thread grease fitting except 1/2-11/16 and 3/4 units which have 1/4-28 fitting.

RASC INDUSTRIAL SERIES CONCENTRIC COLLAR

- All RASC pillow blocks are equipped with GC-KRRB (R-Seal) wide inner ring bearings with concentric collars.
- Pillow blocks self-align at mounting with the spherical outside diameter of the bearing fitting into a corresponding spherical housing seat.
- Units are prelubricated and ready for immediate installation.
- Grease fitting provides for relubrication if required.
- Concentric collars are supplied with all units.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 15/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RASC	GC-KRRB	Page D66

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RASC 1".

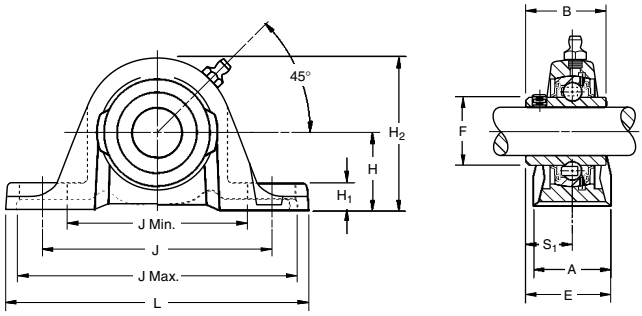
Unit	Shaft Dia.	H	H2	B1	J	L	A	H1	N	N1	d1	S1	T	G	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new (old)	kg lbs.
RASC	5/8	30.16	56.4	26.6	92.1	123.8	30.2	11.9	11.1	22.2	34.1	15.5	15.5	31	10	GC1010KRRB	C203	T-40238	0.454
		1 3/16	2 7/32	1 3/64	3 5/8	4 7/8	1 3/16	15/32	7/16	7/8	1 11/32	39/64	39/64	1 7/32	3/8			(T-30595)	1
RASC	3/4	33.34	64.3	31	96	127	31.8	13.5	11.1	19.8	38.1	18.7	17.1	35.7	10	GC1012KRRB	C204	T-40239	0.635
		1 5/16	2 17/32	1 7/32	3 25/32	5	1 1/4	17/32	7/16	25/32	1 1/2	47/64	43/64	1 13/32	3/8			(T-30555)	1.40
RASC	1	36.51	71.4	34.1	104.8	139.7	35.7	15.1	11.1	20.2	44.4	20.2	17.9	38.1	10	GC1100KRRB			0.803
		1 7/16	2 13/16	1 11/32	4 1/8	5 1/2	1 13/32	19/32	7/16	13/16	1 3/4	51/64	45/64	1 1/2	3/8		C205	T-30365	1.77
RASC	1 1/8	42.86	83.3	37.3	117.5	157.2	39.7	16.7	14.3	23.8	52.4	22.6	22.2	44.8	12	GC1102KRRB			
RASC	1 3/16	1 11/16	3 9/32	1 15/32	4 5/8	6 3/16	1 9/16	21/32	9/16	15/16	2 1/16	57/64	7/8	1 49/64	1/2	GC1103KRRB	C206	T-40241	1.297
RASC	1 1/4 S															GC1103KRRB3		(T-30300)	2.86
RASC	1 1/4	47.62	93.7	41.3	130.2	166.7	45.2	18.3	14.3	24.6	59.5	25.4	22.2	49.2	12	GC1104KRRB	C207	T-40242	1.674
RASC	1 3/8	1 7/8	3 11/16	1 5/8	5 1/8	6 9/16	1 25/32	23/32	9/16	31/32	2 11/32	1	7/8	1 15/16	1/2	GC1106KRRB		(T-30410)	3.69
RASC	1 7/16															GC1107KRRB			
RASC	1 1/2	49.21	100	44.1	136.5	179.4	47.6	19	14.3	26.2	68.3	27.4	24.6	52	12	GC1108KRRB	C208	T-40243	2.150
		1 15/16	3 15/16	1 47/64	5 3/8	7 1/16	1 7/8	3/4	9/16	1 1/32	2 11/16	1 5/64	31/32	2 3/64	1/2			(T-30484)	4.74
RASC	1 11/16	53.98	106.3	46.8	149.2	191.3	50.8	19	14.3	23	73	29.4	25.4	54.8	12	GC1111KRRB	C209	T-40244	2.409
RASC	1 3/4	2 1/8	4 3/16	1 27/32	5 7/8	7 17/32	2	3/4	9/16	29/32	2 7/8	1 5/32	1	2 5/32	1/2	GC1112KRRB		(T-30682)	5.31
RASC	1 15/16	57.15	114.3	48.4	158	200	55.6	19	17.5	23.8	79.4	30.2	27.8	57.9	16	GC1115KRRB	C210	T-40245	3.003
		2 1/4	4 1/2	1 29/32	6 7/32	7 7/8	2 3/16	3/4	11/16	15/16	3 1/8	1 3/16	1 3/32	2 9/32	5/8			(T-30706)	6.62
RASC	2	63.5	126.2	54	176.2	222.3	58.7	20.6	18.3	29.4	88.9	33.3	29.4	62.7	16	GC1200KRRB	C211	T-40246	3.901
RASC	2 3/16	2 1/2	4 31/32	2 1/8	6 15/16	8 3/4	2 5/16	13/16	23/32	1 5/32	3 1/2	1 5/16	1 5/32	2 15/32	5/8	GC1203KRRG		(T-30738)	8.60
RASC	2 7/16	69.85	138.9	60.3	188.1	239.7	60.3	23.8	18.3	29.4	95.2	37.3	31.8	69.1	16	GC1207KRRB	C212	T 40247	5.511
		2 3/4	5 15/32	2 3/8	7 13/32	9 7/16	2 3/8	15/16	23/32	1 5/32	3 3/4	1 15/32	1 1/4	2 23/32	5/8			(T 31244)	12.15
RASC	2 15/16	82.55	164.3	70.6	215.9	269.9	69.9	25.4	22.2	31.8	114.3	43.7	34.9	78.6	20	GC1215KRRB	C215	T 23423	9.06
		3 1/4	6 15/32	2 25/32	8 1/2	10 5/8	2 3/4	1	7/8	1 1/4	4 1/2	1 23/32	1 3/8	3 3/32	3/4				19.91

Note: All units have 1/8 pipe thread grease fitting except RASC 1/2-11/16 and 3/4 units which have 1/4-28 fitting.

YAS INDUSTRIAL SERIES SETSCREW UNITS

- Timken YAS Series high-base, setscrew, pillow blocks feature the GY-KRRB bearing.
- This full-width inner ring setscrew is well-suited for industrial applications involving wet or dirty environments.
- Housing is designed for two-bolt mounting in any position.
- **Contact your Timken representative to discuss highly corrosive applications (food processing, chemical exposure) where Timken thin dense chrome coated bearings can be utilized.**

Suggested shaft tolerances: **½" to 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 15/16", nominal to -.025 mm, -.0010".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
YAS	GY-KRRB	Page D67

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: YAS 1 7/16". POPULAR SIZES ARE IN BOLD.

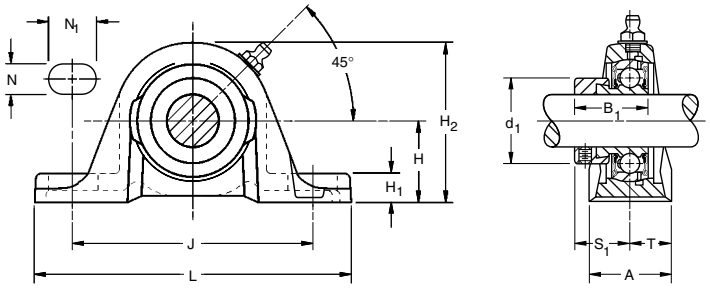
Unit	Shaft Dia. mm / in.	H mm / in.	H_2 mm / in.	B mm / in.	L mm / in.	J mm / in.	J Min. mm / in.	J Max. mm / in.	A mm / in.	H_1 mm / in.	F mm / in.	S_1 mm / in.	E mm / in.	Bolt Size mm / in.	Bearing
YAS	1/2	30.16	56.4	27.4	123.8	92.1	69.8	114.3	30.2	11.9	22.86	15.9	30.95	10	GY1008KRRB
YAS	5/8	1 3/16	2 7/32	1 5/64	4 7/8	3 5/8	2 3/4	4 1/2	1 3/16	15/32	0.9	5/8	1 7/32	3/8	GY1010KRRB
YAS	17														GYE17KRRB
YAS	**3/4**	33.34	64.3	30.9	127	96	76.2	155.8	31.8	13.5	27.56	18.3	34.13	10	GY1012KRRB
YAS	20	1 5/16	2 17/32	1 7/32	5	3 25/32	3	4 9/16	1 1/4	17/32	1.085	23/32	1 11/32	3/8	GYE20KRRB
YAS	7/8														GY1014KRRB
YAS	15/16	36.51	71.4	34.1	139.7	104.8	84.1	125.4	35.7	15.1	33.83	19.8	37.7	10	GY1015KRRB
YAS	**1**	1 7/16	2 13/16	1 11/32	5 1/2	4 1/8	3 5/16	4 15/16	1 13/32	19/32	1.332	25/32	1 31/64	3/8	GY1100KRRB
YAS	25														GYE25KRRB
YAS	1 1/8														GY1102KRRB
YAS	**1 3/16**	42.86	83.3	38.1	157.2	117.5	93.7	141.3	39.7	16.7	40.31	22.2	42.07	12	GY1103KRRB
YAS	1 1/4 S	1 11/16	3 9/32	1 1/2	6 3/16	4 5/8	3 11/16	5 9/16	1 9/16	21/32	1.587	7/8	1 21/32	1/2	GY1103KRRB3
YAS	30														GYE30KRRB
YAS	1 1/4														GY1104KRRB
YAS	1 3/8	47.62	93.6	42.9	166.7	130.2	105.6	154.8	45.2	18.3	46.13	25.4	48.02	12	GY1106KRRB
YAS	**1 7/16**	1 7/8	3 11/16	1 11/16	6 9/16	5 1/8	4 5/32	6 3/32	1 25/32	23/32	1.816	1	1 57/64	1/2	GY1107KRRB
YAS	35														GYE35KRRB
YAS	**1 1/2**	49.21	100	49.2	179.4	136.5	110.3	162.7	47.6	19.1	52.27	30.2	53.98	12	GY1108KRRB
YAS	40	1 15/16	3 15/16	1 15/16	7 1/16	5 3/8	4 11/32	6 13/32	1 7/8	3/4	2.058	1 3/16	2 1/8	1/2	GYE40KRRB
YAS	1 1/2 H	53.98	104.8	49.2	179.4	136.5	110.3	162.7	47.6	23	52.27	30.2	53.98	12	GY1108KRRB
		2 1/8	4 1/8	1 15/16	7 1/16	5 3/8	4 11/32	6 13/32	1 7/8	29/32	2.058	1 3/16	2 1/8	1/2	
YAS	1 5/8														GY1110KRRB
YAS	**1 11/16**	53.98	106.3	49.2	191.3	149.2	120.7	177.8	50.8	19.1	57.92	30.2	55.56	12	GY1111KRRB
YAS	1 3/4	2 1/8	4 3/16	1 15/16	7 17/32	5 7/8	4 3/4	7	2	3/4	2.28	1 3/16	2 3/16	1/2	GY1112KRRB
YAS	45														GYE45KRRB
YAS	**1 15/16**	57.15	114.3	51.6	200	158	132.6	183.4	55.6	19.1	62.84	32.5	60.33	16	GY1115KRRB
YAS	2 S	2 1/4	4 1/2	2 1/32	7 7/8	6 7/32	5 7/32	7 7/32	2 3/16	3/4	2.474	1 9/32	2 3/8	5/8	GY1115KRRB3
YAS	50														GYE50KRRB
YAS	2	63.5	126.2	55.6	222.3	176.2	146.9	205.6	58.7	20.6	69.77	33.3	61.91	16	GY1200KRRB
YAS	**2 3/16**	2 1/2	4 31/32	2 3/16	8 3/4	6 15/16	5 25/32	8 3/32	2 5/16	13/16	2.747	1 5/16	2 7/16	5/8	GY1203KRRB
YAS	55														GYE55KRRB
YAS	2 1/4	69.85	138.9	65.1	239.7	188.1	158.8	217.5	60.3	23.8	76.48	39.1	69.85	16	GY1204KRRB
YAS	**2 7/16**	2 3/4	5 15/32	2 9/16	9 7/16	7 13/32	6 1/4	8 9/16	2 3/8	15/16	3.011	1 9/16	2 3/4	5/8	GY1207KRRB
YAS	60														GYE60KRRB
YAS	2 15/16	82.55	164.3	77.8	269.9	215.9	184.2	247.7	69.9	25.4	91.92	44.4	79.38	20	GY1215KRRB
YAS	75	3 1/4	6 15/32	3 1/16	10 5/8	8 1/2	7 1/4	9 3/4	2 3/4	1	3.619	1 3/4	3 1/8	3/4	GYE75KRRB
YAS	2 15/16 H	88.9	177.8	77.8	330.2	228.6	177.8	279.4	88.9	31.75	91.92	44.4	88.9	20	GY1215KRRB
		3 1/2	7	3 1/16	13	9	7	11	3 1/2	1 1/4	3.619	1 3/4	3 1/2	3/4	

Shaft diameter with an S = Smaller housing; Shaft diameter with an H = heavier housing.

VAS STANDARD SERIES

- Timken pillow blocks are similar in design and features, and equal in load-carrying capacity to the VAK Series.
- Slightly different base-to-center height dimension make them interchangeable with certain other competitive designs.
- Units are prelubricated and ready for immediate installation.
- Grease fitting provides for relubrication if required.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 3/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
VAS	GRA-RRB	Page D57

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: VAS 1 3/16". POPULAR SIZES ARE IN BOLD.

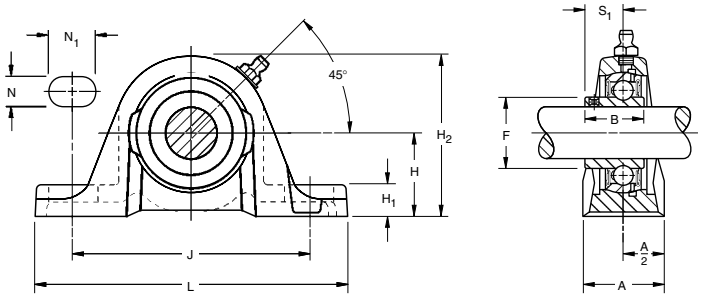
Unit	Shaft Dia.	H	H_2	B_1	J	L	A	H_1	N	N_1	d_1	S_1	T	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new (old)	kg lbs.
VAS	1/2	30.16	56.4	28.6	92.1	123.8	30.2	11.9	11.1	22.2	28.6	22.2	15.1	10	GRA008RRB	S1008K	T-40238	0.454
VAS	5/8	1 3/16	2 7/32	1 1/8	3 5/8	4 7/8	1 3/16	15/32	7/16	7/8	1 1/8	7/8	19/32	3/8	GRA010RRB	S1010K	(T-30595)	1
VAS	17														GRAE17RRB	SE17K		
VAS	**3/4**	33.34	64.3	31	96	127	31.8	13.5	11.1	19.8	33.3	23.4	15.9	10	GRA012RRB	S1012K	T-40239	0.563
VAS	20	1 5/16	2 17/32	1 7/32	3 25/32	5	1 1/4	17/32	7/16	25/32	1 5/16	59/64	5/8	3/8	GRAE20RRB	SE20K	(T-30555)	1.24
VAS	7/8														GRA013RRB	S1013K		
VAS	15/16	36.51	71.4	31	104.8	139.7	35.7	15.1	11.1	20.6	38.1	23.4	17.9	10	GRA015RRB	S1015K		0.758
VAS	**1**	1 7/16	2 13/16	1 7/32	4 1/8	5 1/2	1 13/32	19/32	7/16	13/16	1 1/2	59/64	45/64	3/8	GRA100RRB	S1100K	T-30365	1.67
VAS	25														GRAE25RRB	SE25K		
VAS	1 1/8														GRA102RRB	S1102K		
VAS	**1 3/16**	42.86	83.3	35.7	117.5	157.2	39.7	16.7	14.3	23.8	44.1	27	19.9	12	GRA103RRB	S1103K	T-40241	1.235
VAS	1 1/4 S	1 11/16	3 9/32	1 13/32	4 5/8	6 3/16	1 9/16	21/32	9/16	15/16	1 47/64	1 1/16	25/32	1/2	GRA103RRB2	S1103K3	(T-30300)	2.72
VAS	30														GRAE30RRB	SE30K		
VAS	1 1/4	47.62	93.7	38.9	130.2	166.7	45.2	18.3	14.3	24.6	54	29.4	22.7	12	GRA104RRB	S1104K		
VAS	1 3/8	1 7/8	3 11/16	1 17/32	5 1/8	6 9/16	1 25/32	23/32	9/16	31/32	2 1/8	1 5/32	57/64	1/2	GRA106RRB	S1106K	T-40242	1.594
VAS	**1 7/16**														GRA107RRB	S1107K	(T-30410)	3.51
VAS	35														GRAE35RRB	SE35K		
VAS	**1 1/2**	49.21	100.0	43.7	136.5	179.4	47.6	19.0	14.3	26.2	60.3	32.5	23.8	12	GRA108RRB	S1108KT	T-40243	2.034
VAS	40	1 15/16	3 15/16	1 23/32	5 3/8	7 1/16	1 7/8	3/4	9/16	1 1/32	2 3/8	1 9/32	15/16	1/2	GRAE40RRB	SE40K	(T-30484)	4.48
VAS	1 5/8														GRA110RRB	S1110K		
VAS	**1 11/16**	53.98	106.4	43.7	149.2	191.3	50.8	19.0	14.3	28.6	63.5	32.5	25.4	12	GRA111RRB	S1111K	T-40244	2.261
VAS	1 3/4	2 1/8	4 3/16	1 23/32	5 7/8	7 17/32	2	3/4	9/16	1 1/8	2 1/2	1 9/32	1	1/2	GRA112RRB	S1112K	(T-30682)	4.98
VAS	45														GRAE45RRB	SE45K		
VAS	1 7/8														GRA114RRB	S1114K		
VAS	**1 15/16**	57.15	114.3	43.7	158	200	55.6	19.0	18.3	29.4	69.8	32.5	27.8	16	GRA115RRB	S1115K	T-40245	2.774
VAS	2 S	2 1/4	4 1/2	1 23/32	6 7/32	7 7/8	2 3/16	3/4	23/32	1 5/32	2 3/4	1 9/32	1 3/32	5/8	GRA115RRB2	S1115K2	(T-30706)	6.11
VAS	50														GRAE50RRB	SE50K		
VAS	2	63.5	126.2	48.4	176.2	222.3	58.7	20.6	18.3	29.4	76.2	36.5	29.4	16	GRA200RRB	S1200K	T-40246	3.328
VAS	**2 3/16**	2 1/2	4 31/32	1 29/32	6 15/16	8 3/4	2 5/16	13/16	23/32	1 5/32	3	1 7/16	1 5/32	5/8	GRA203RRB	S1203K	(T-30738)	7.33
VAS	55														GRAE55RRB	SE55K		

Note: All units have 1/8 pipe thread grease fitting except 1/2-11/16 and 3/4 units which have 1/4-28 fitting.

SAS STANDARD SERIES

- The SAS is a streamlined and a rugged one-piece pillow block unit that combines the Timken engineered housing and GYA-RRB setscrew bearing.
- GYA-RRB bearing employs a positive contact land-riding seal and specially designed setscrews.
- SAS pillow block can be mounted in and will operate in any position.
- Bearing housed units are factory prelubricated, but a grease fitting is provided to allow for relubrication if required.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 3/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
SAS	GYA-KRRB	Page D59

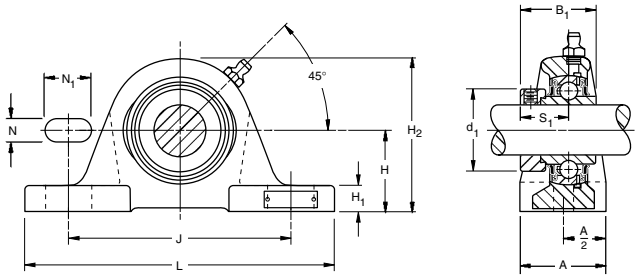
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: SAS 1". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia.	H	H_2	S_1	J	L	A	H_1	N	N_1	F	B	Bolt Size	Bearing Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	new (old)	kg lbs.
SAS	1/2	30.16	56.4	15.9	92.1	123.8	30.2	11.9	11.1	22.2	24.6	23.8	10	GYA008RRB	T-40238	0.42
SAS	5/8	1 3/16	2 7/32	5/8	3 5/8	4 7/8	1 3/16	15/32	7/16	7/8	31/32	15/16	3/8	GYA010RRB	(T-30595)	0.92
SAS	17													GYAE17RRB		
SAS	**3/4**	33.34	64.3	18.3	96	127	31.8	13.5	11.1	19.8	29	27	10	GYA012RRB	T-40239	0.57
SAS	20	1 5/16	2 17/32	23/32	3 25/32	5	1 1/4	17/32	7/16	25/32	1 9/64	1 1/16	3/8	GYAE20RRB	(T-30555)	1.25
SAS	7/8													GYA014RRB		
SAS	15/16	36.51	71.4	19.4	104.8	139.7	35.7	15.1	11.1	20.6	33.7	28.2	10	GYA015RRB	T-30365	0.75
SAS	**1**	1 7/16	2 13/16	49/64	4 1/8	5 1/2	1 13/32	19/32	7/16	13/16	1 21/64	1 7/64	3/8	GYA100RRB		1.67
SAS	25													GYAE25RRB		
SAS	1 1/8													GYA102RRB		
SAS	**1 3/16**	42.86	83.3	23	117.5	157.2	39.7	16.7	14.3	23.8	40.1	32.5	12	GYA103RRB	T-40241	1.14
SAS	1 1/4 S	1 11/16	3 9/32	29/32	4 5/8	6 3/16	1 9/16	21/32	9/16	15/16	1 37/64	1 9/32	1/2	GYA103RRB2	(T-30300)	2.52
SAS	30													GYAE30RRB		
SAS	1 1/4													GYA104RRB		
SAS	1 3/8	47.62	93.6	25.8	130.2	166.7	45.2	18.3	14.3	24.6	46.8	36.5	12	GYA106RRB	T-40242	1.52
SAS	**1 7/16**	1 7/8	3 11/16	1 1/64	5 1/8	6 9/16	1 25/32	23/32	9/16	31/32	1 27/32	1 7/16	1/2	GYA107RRB	(T-30410)	3.35
SAS	35													GYAE35RRB		
SAS	**1 1/2**	49.21	100	27.8	136.5	179.4	47.6	19	14.3	26.2	52.4	39.3	12	GYA108RRB	T-40243	1.85
SAS	40	1 15/16	3 15/16	1 3/32	5 3/8	7 1/16	1 7/8	3/4	9/16	1 1/32	2 1/16	1 35/64	1/2	GYAE40RRB	(T-30484)	4.08
SAS	**1 1/2 H**	53.90	100	27.8	136.5	179.4	47.6	19	14.3	26.2	52.4	39.3	12	GYA108RRB	T-39528	1.85
		2 1/8	3 15/16	1 3/32	5 3/8	7 1/16	1 7/8	3/4	9/16	1 1/32	2 1/16	1 35/64	1/2			4.08
SAS	1 5/8													GYA110RRB		
SAS	**1 11/16**	53.9	106.3	28.6	149.2	191.3	51.0	19	14.3	28.6	57.9	42.1	12	GYA111RRB	T-40244	2.06
SAS	1 3/4	2 1/8	4 3/16	1 1/8	5 7/8	7 17/32	2	3/4	9/16	1 1/8	2 9/32	1 21/32	1/2	GYA112RRB	(T-30682)	4.55
SAS	45													GYAE45RRB		
SAS	**1 15/16**	57.2	114.3	30.9	158	200	55.6	19	17.5	23.8	62.7	44.4	16	GYA115RRB	T-40245	2.54
SAS	2 S	2 1/4	4 1/2	1 7/32	6 7/32	7 7/8	2 3/16	3/4	11/16	15/16	2 15/32	1 3/4	5/8	GYA115RRB2	(T-30706)	5.6
SAS	50													GYAE50RRB		
SAS	2	63.5	126.2	31.7	176.2	222.3	58.7	20.6	18.3	29.4	69.8	46.4	16	GYA200RRB	T-40246	3.02
SAS	**2 3/16**	2 1/2	4 31/32	1 1/4	6 15/16	8 3/4	2 5/16	13/16	23/32	1 5/32	2 3/4	1 53/64	5/8	GYA203RRB	(T-30738)	6.66
SAS	55													GYAE55RRB		

Note: All units have 1/8 pipe thread grease fitting except 1/2-11/16 and 3/4 units which have 1/4-28 fitting.
Shaft diameter with an S = smaller housing; Shaft diameter with an H = heavier housing.

RAKH INDUSTRIAL SERIES

- Timken pillow blocks are similar in design to other standard series, but have slightly different dimensions to allow interchangeability with competitive designs.
- May be used independently or in connection with RAKHL expansion unit shown below. Used in this capacity, the RAKH pillow blocks provide fixed shaft location while the RAKHL expansion units allows for axial movement. Maximum operating temperature for the RAKH units is 250° F (121° C).
- Units are supplied with self-locking collars.
- **Contact your Timken representative to discuss highly corrosive applications (food processing, chemical exposure) where Timken thin dense chrome coated bearings can be utilized.**



Suggested shaft tolerances: **$^{13}/_{16}$" - 1 $^{15}/_{16}$", nominal to -.013 mm, -.0005"; 2" - 2 $^{15}/_{16}$", nominal to -.025 mm, -.0010".**

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RAKH	G-KRRB	Page D54

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RAKH 1 $^{7}/_{16}$".

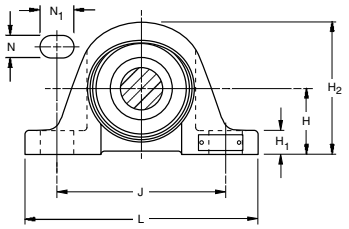
Unit[1]	Shaft Dia.	H	H_2	B_1	J	L	A	H_1	N	N_1	d_1	S_1	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new	kg lbs.
RAKH	1	44.45 1 3/4	82.6 3 1/4	44.4 1 3/4	119.1 4 11/16	158.8 6 1/4	50.8 2	15.9 5/8	14.3 9/16	25.4 1	38.1 1 1/2	27 1 1/16	9.5 3/8	G1100KRRB	S1100K	T-22295	1.689 3.72
RAKH	1 3/16	47.63 1 7/8	90.5 3 9/16	48.4 1 29/32	127 5	174.6 6 7/8	57.2 2 1/4	17.5 11/16	14.3 9/16	25.4 1	44.1 1 47/64	30.2 1 3/16	12.7 1/2	G1103KRRB	S1103K	T-22216	2.184 4.81
RAKH	1 1/4	53.98	101.6	51.2	144.5	203.2	57.2	19	14.3	30.2	54	32.5	12.7	G1104KRRB	S1104K	T-22212	2.915
RAKH	1 7/16	2 1/8	4	2 1/64	5 11/16	8	2 1/4	3/4	9/16	1 3/16	2 1/8	1 9/32	1/2	G1107KRRB	S1107K		6.42
RAKH	1 1/2	58.74 2 5/16	111.1 4 3/8	56.4 2 7/32	155.6 6 1/8	222.2 8 3/4	66.7 2 5/8	20.6 13/16	17.5 11/16	31.8 1 1/4	60.3 2 3/8	34.9 1 3/8	12.7 1/2	G1108KRRB	S1108KT T-22291		4.004 8.82
RAKH	1 11/16	58.74	114.3	56.4	155.6	222.2	66.7	20.6	17.5	33.3	63.5	34.9	12.7	G1111KRRB	S1111K	T-22293	4.032
RAKH	1 3/4	2 5/16	4 1/2	2 7/32	6 1/8	8 3/4	2 5/8	13/16	11/16	1 5/16	2 1/2	1 3/8	1/2	G1112KRRB	S1112K		8.88
RAKH	1 15/16	63.5 2 1/2	122.2 4 13/16	62.7 2 15/32	171.4 6 3/4	241.3 9 1/2	73 2 7/8	22.2 7/8	17.5 11/16	36.5 1 7/16	69.8 2 3/4	38.1 1 1/2	12.7 1/2	G1115KRRB	S1115K	T-22214	5.098 11.23
RAKH	2 3/16	69.85	136.5	71.4	184.2	260.4	79.4	27	20.6	36.5	76.2	43.7	15.9	G1203KRRB	S1203K	T-22297	6.728
RAKH	55	2 3/4	5 3/8	2 13/16	7 1/4	10 1/4	3 1/8	1 1/16	13/16	1 7/16	3	1 23/32	5/8	GE55KRRB	SE55K		14.82
RAKH	2 7/16	76.2 3	150.8 5 15/16	77.8 3 1/16	203.2 8	285.8 11 1/4	82.6 3 1/4	27 1 1/16	20.6 13/16	41.3 1 5/8	84.1 3 5/16	46.8 1 27/32	15.9 5/8	G1207KRRB	S1207K T-22299		8.217
RAKH	2 11/16	88.9 3 1/2	171.4 6 3/4	85.7 3 3/8	228.6 9	330.2 13	88.9 3 1/2	28.6 1 1/8	23.8 15/16	50.8 2	96.8 3 13/16	45.2 1 25/32	19 3/4	G1211KRRB	S1211K	T-22303	11.495 25.32
RAKH	2 15/16	88.9 3 1/2	177.8 7	92.1 3 5/8	228.6 9	330.2 13	88.9 3 1/2	31.8 1 1/4	23.8 15/16	50.8 2	101.6 4	54.8 2 5/32	19 3/4	G1215KRRB	S1215K T-22305		11.795 25.98

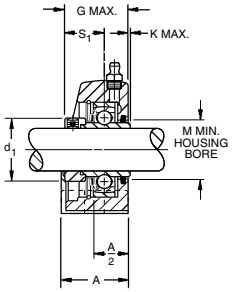
[1] When used with the expansion unit, specify both units, shaft diameter and suffix.

RAKHL EXPANSION SERIES

- Designed to allow axial shaft expansion caused by elevated temperatures or other conditions that lead to shaft movement.
- Designed for use with the RAKH pillow blocks.
- RAKH units provide axial shaft location and the RAKHL allows shaft floatation.
- Due to limitations of the lubricant and seal material, the maximum operating temperature for the RAKHL units is 250˚ F (121˚ C).
- Units are supplied with self-locking collars.
- Steel "S" ring assures axial expansion.

Suggested shaft tolerances: **$13/16$" - $1\ 15/16$", nominal to -.013 mm, -.0005"; 2" - $2\ 15/16$", nominal to -.025 mm, -.0010".**





BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RAKHL	KRS	Page D53

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RAKHL $2\ 7/16$".

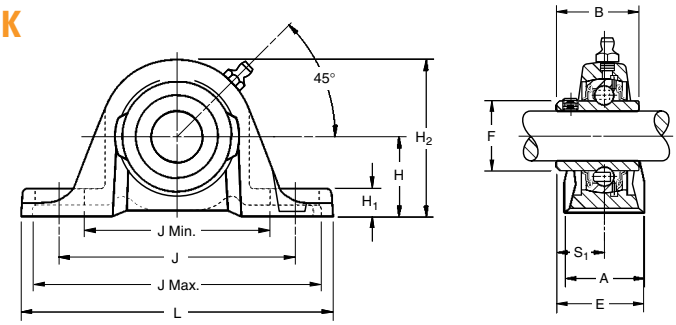
Unit	Shaft Dia.	Total Float	H	H_2	G	J	L	A	H_1	N	N_1	K	d_1	S_1	M	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new	kg lbs.
RAKHL	$1\ 3/16$	3.2 $1/8$	47.63 $1\ 7/8$	96.8 $3\ 13/16$	49.2 $1\ 15/16$	127 5	174.6 $6\ 7/8$	50.8 2	17.5 $11/16$	14.3 $9/16$	25.4 1	2.4 $3/32$	44.5 $1\ 3/4$	30.2 $1\ 3/16$	41.7 $1\ 41/64$	12.7 $1/2$	1103KRS	S1103K	A11414	2.182 4.81
RAKHL	$1\ 7/16$	4.8 $3/16$	53.98 $2\ 1/8$	106.4 $4\ 3/16$	55.2 $2\ 11/64$	144.5 $5\ 11/16$	201.6 $7\ 15/16$	51.6 $2\ 1/32$	19 $3/4$	14.3 $9/16$	30.2 $1\ 3/16$	3.2 $1/8$	54 $2\ 1/8$	32.5 $1\ 9/32$	48.02 $1\ 57/64$	12.7 $1/2$	1106KRS 1107KRS	S1106K S1107K	A11199	2.912 6.42
RAKHL	$1\ 15/16$	6.4 $1/4$	63.5 $2\ 1/2$	129.4 $5\ 3/32$	65.1 $2\ 9/16$	171.4 $6\ 3/4$	241.3 $9\ 1/2$	63.5 $2\ 1/2$	22.2 $7/8$	17.5 $11/16$	36.5 $1\ 7/16$	4 $5/32$	69.8 $2\ 3/4$	38.1 $1\ 1/2$	63.9 $2\ 33/64$	12.7 $1/2$	1115KRS	S1115K	A11357	5.094 11.23
RAKHL	$2\ 3/16$	6.4 $1/4$	69.85 $2\ 3/4$	142.9 $5\ 5/8$	73.4 $2\ 57/64$	184.2 $7\ 1/4$	260.4 $10\ 1/4$	76.2 3	27 $1\ 1/16$	20.6 $13/16$	36.5 $1\ 7/16$	4.4 $11/64$	76.2 3	43.7 $1\ 23/32$	71 $2\ 51/64$	15.9 $5/8$	1203KRS	S1203K	A11358	6.722 14.82
RAKHL[1]	$2\ 7/16$	6.4 $1/4$	76.2 3	158.8 $6\ 1/4$	78.6 $3\ 3/32$	203.2 8	285.8 $11\ 1/4$	82.6 $3\ 1/4$	27 $1\ 1/16$	20.6 $13/16$	41.3 $1\ 5/8$	4.8 $3/16$	84.1 $3\ 5/16$	46.8 $1\ 27/32$	78.2 $3\ 5/64$	15.9 $5/8$	1207KRS	S1207K	—	8.210 18.1
RAKHL	$2\ 15/16$	6.4 $1/4$	88.9 $3\ 1/2$	181 $7\ 1/4$	113.5 $3\ 15/32$	228.6 9	330.2 13	88.9 $3\ 1/2$	31.8 $1\ 1/4$	23.8 $15/16$	50.8 2	8.7 $11/32$	101.6 4	54.8 $2\ 5/32$	118.7 $3\ 43/64$	19 $3/4$	1215KRS	S1215K	T-28261	11.785 25.98

[1] Special order.

YASM MEDIUM DUTY SERIES SETSCREW LOCK

- Timken YASM medium-duty pillow blocks feature the GYM-KRRB bearing inserts.
- Ideal for conveyer, fan and blower, sawmill, and feed and grain handling applications.
- Cast iron housings are durable, powder-paint coated and maintain an excellent finish while resisting corrosion, chemicals and weather exposure.
- Incorporates premium features designed to extend bearing life.

Suggested shaft tolerances: **1" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 3", nominal to -.025 mm, -.0010".



BEARING DATA

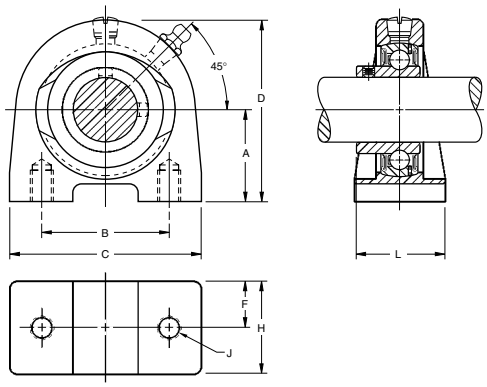
Unit	Bearing Number	Dimensions and Load Ratings
YASM	GYM-KRRB	Page D68

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: YASM 1 7/16".

Unit	Shaft Dia.	H	H_2	B	L	J	J Min.	J Max.	A	H_1	F	S_1	E	Bolt Size	Bearing Number
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	
YASM	1	42.86 1 11/16	83.3 3 9/32	38.1 1 1/2	157.2 6 3/16	117.5 4 5/8	93.7 3 11/16	141.3 5 9/16	39.7 1 9/16	16.7 21/32	40.31 1.587	22.2 7/8	42.07 1 21/32	12 1/2	GYM1100KRRB
YASM	1 3/16	47.62 1 7/8	93.6 3 11/16	42.9 1 11/16	166.7 6 9/16	130.2 5 1/8	105.6 4 5/32	154.8 6 3/32	45.2 1 25/32	18.3 23/32	48.84 1.844	25.4 1	48.02 1 57/64	12 1/2	GYM1103KRRB
YASM	1 7/16	53.98 2 1/8	104.8 4 1/8	49.2 1 15/16	179.4 7 1/16	136.5 5 3/8	110.3 4 11/32	162.7 6 13/16	47.6 1 7/8	23 29/32	52.27 2.058	30.2 1 3/16	53.98 2 1/8	12 1/2	GYM1107KRRB
YASM	1 1/2	53.98 2 1/8	106.3 4 3/16	49.2 1 15/16	191.3 7 17/32	149.2 5 7/8	120.7 4 3/4	177.8 7	50.8 2	19.1 3/4	57.92 2.28	30.2 1 3/16	55.56 2 3/16	12 1/2	GYM1108KRRB
YASM	1 11/16	57.15	114.3	51.6	200	157.9	134.1	183.4	55.6	19.1	62.84	32.5	60.33	16	GYM1111KRRB
YASM	1 3/4	2 1/4	4 1/2	2 1/32	7 7/8	6 7/32	5 9/32	7 5/32	2 3/16	3/4	2.474	1 9/32	2 3/8	5/8	GYM1112KRRB
YASM	1 15/16	63.5	126.2	55.6	222.3	176.2	146.9	205.6	54.8	20.6	69.77	33.3	61.91	16	GYM1115KRRB
YASM	2	2 1/2	4 31/32	2 3/16	8 3/4	6 15/16	5 25/32	8 3/32	2 5/32	13/16	2.747	1 5/16	2 7/16	5/8	GYM1200KRRB
YASM	2 3/16	69.85	138.9	65.1	239.7	188.1	158.8	217.5	60.3	23.8	76.48	39.1	69.85	16	GYM1203KRRB
YASM	2 1/4	2 3/4	5 15/32	2 9/16	9 7/16	7 13/32	6 1/4	8 9/16	2 3/8	15/16	3.011	1 9/16	2 3/4	5/8	GYM1204KRRB
YASM	2 7/16	76.2	153.99	77.78	266.7	203.2	168.28	238.13	73.02	33.34	86.92	42.86	79.375	20	GYM1207KRRB
YASM	2 1/2	3	6 1/16	3 1/16	10 1/2	8	6 5/8	9 3/8	2 7/8	1 5/16	3.422	1 11/16	3 1/8	3/4	GYM1208KRRB
YASM	2 11/16	88.9 3 1/2	177.8 7	93.66 3 11/16	330.2 13	228.6 9	177.8 7	279.4 11	88.90 3 1/2	31.75 1 1/4	91.90 3.618	44.45 1 3/4	93.66 3 11/16	20 3/4	GYM1211KRRB
YASM	2 15/16	88.9	177.8	93.66	330.2	228.6	177.8	279.4	88.90	31.75	91.90	44.45	93.66	20	GYM1215KRRB
YASM	3	3 1/2	7	3 11/16	13	9	7	11	3 1/2	1 1/4	3.618	1 3/4	3 11/16	3/4	GYM1300KRRB

STB SERIES

- STB two-bolt housed units come assembled and ready for mounting.
- Ideal for applications where space is limited, bolt screws are accessed from the bottom of the unit, loads are not severe and reversing moments are not encountered.
- Units are assembled with GYA-RRB bearings with positive contact land-riding seals and setscrew locking.
- Units are factory prelubricated, but a grease fitting is provided for relubrication if required.



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
STB	GYA-RRB	Page D59

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: STB 1″.

Unit	Shaft Dia.	A	B	C	D	F	H	J	L	Bearing Number	Housing Number
	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.		
STB	3/4	32.3	50.8	73.03	71.12	18.3	36.5	3/8-16	36.5	GYA012RRB	T-90001
STB	20	1 5/16	2	2 7/8	2 13/32	23/32	1 7/16		1 7/16	GYAE20RRB	
STB	7/8									GYA014RRB	
STB	15/16	36.5	50.8	76.2	71.44	18.3	36.5	3/8-16	37.7	GYA015RRB	T-39343
STB	1	1 7/16	2	3	2 13/16	23/32	1 7/16		1 31/64	GYA100RRB	
STB	25									GYAE25RRB	
STB	1 1/8									GYA102RRB	T-90003
STB	1 3/16	42.9	76.2	101.6	82.6	19.05	38.1	7/16-14	42.07	GYA103RRB	
STB	1 1/4 S	1 11/16	3	4	3 1/4	3/4	1 1/2		1 21/32	GYA103RRB2	
STB	30									GYAE30RRB	
STB	1 1/4									GYA104RRB	
STB	1 3/8	47.6	82.6	107.95	93.66	22.23	44.45	1/2-13	48.02	GYA106RRB	T-40256
STB	1 7/16	1 7/8	3 1/4	4 1/4	3 11/16	7/8	1 3/4		1 57/64	GYA107RRB3	
STB	35									GYAE35RRB	
STB	1 1/2	49.2	88.9	117.48	100.01	23.81	47.63	1/2-13	51.2	GYA108RRB	T-90005
STB	40	1 15/16	3 1/2	4 5/8	3 15/16	15/16	1 7/8		2 1/64	GYAE40RRB	
STB	1 5/8									GYA110RRB	
STB	1 11/16	54	95.25	127	107.95	25.4	50.8	1/2-13	53.98	GYA111RRB	T-90008
STB	1 3/4	2 1/8	3 3/4	5	4 1/4	1	2		2 1/8	GYA112RRB	
STB	45									GYAE45RRB	
STB	1 15/16	57.2	101.6	139.7	114.3	25.4	50.8	5/8-11	56.36	GYA115RRB	T-90010
STB	2	2 1/4	4	5 1/2	4 1/2	1	2		2 7/32	GYA200RRB	
STB	50									GYAE50RRB	

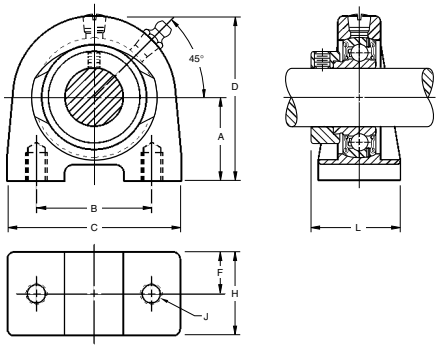
Shaft diameter with an S = smaller housing.

VTB SERIES

- VTB two-bolt housed units are nearly identical to the STB unit, except they are assembled with the GRA-RRB bearings and positive contact R-Seals and locking collar.

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
VTB	GRA-RRB	Page D57



TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: VTB 1″.

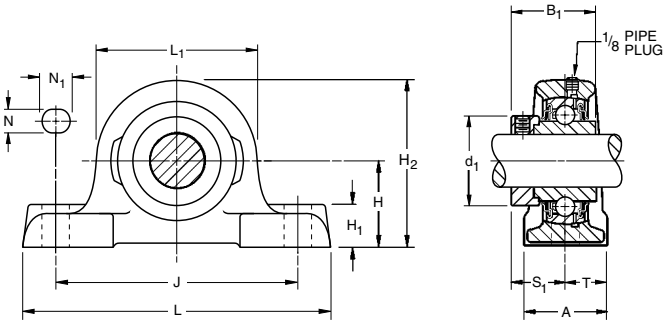
Unit	Shaft Dia. mm	Shaft Dia. in.	A mm / in.	B mm / in.	C mm / in.	D mm / in.	F mm / in.	H mm / in.	J mm / in.	L mm / in.	Bearing Number	Collar Number	Housing Number
VTB		3/4	32.3	50.8	73.03	71.12	18.3	36.5	3/8-16	41.67	GRA012RRB	S1012K	T-90001
VTB	20		1 5/16	2	2 7/8	2 13/32	23/32	1 7/16		1 41/64	GRAE20RRB	SE20K	
VTB		7/8									GRA014RRB	S1014K	
VTB		15/16	36.5	50.8	76.2	71.44	18.3	36.5	3/8-16	41.67	GRA015RRB	S1015K	T-39343
VTB		1	1 7/16	2	3	2 13/16	23/32	1 7/16		1 41/64	GRA100RRB	S1100K C2	
VTB	25										GRAE25RRB	SE25K	
VTB		1 1/8									GRA102RRB	S1102K	
VTB		1 3/16	42.9	76.2	101.6	82.6	19.05	38.1	7/16-14	45.64	GRA103RRB	S1103K	T-90003
VTB		1 1/4 S	1 11/16	3	4	3 1/4	3/4	1 1/2		1 51/64	GRA103RRB2	S1103K3	
VTB	30										GRAE30RRB	SE30K	
VTB		1 1/4									GRA104RRB	S1104K C1	
VTB		13/8	47.6	82.6	107.95	93.66	22.23	44.45	1/2-13	51.6	GRA106RRB	S1106K C1	T-40256
VTB		1 7/16	1 7/8	3 1/4	4 1/4	3 11/16	7/8	1 3/4		2 1/32	GRA107RRB3	S1107K C1	
VTB	35										GRAE35RRB	SE35K	
VTB		1 1/2	49.2	88.9	117.48	100.01	23.81	47.63	1/2-13	56.36	GRA108RRB	S1108KT	T-90005
VTB	40		1 15/16	3 1/2	4 5/8	3 15/16	15/16	1 7/8		2 7/32	GRAE40RRB	SE40K	
VTB		1 5/8									GRA110RRB	S1110K	
VTB		1 11/16	54	95.25	127	107.95	25.4	50.8	1/2-13	57.94	GRA111RRB	S1111K	T-90008
VTB		1 3/4	2 1/8	3 3/4	5	4 1/4	1	2		2 9/32	GRA112RRB	S1112K	
VTB	45										GRAE45RRB	SE45K	
VTB		1 15/16	57.2	101.6	139.7	114.3	25.4	50.8	5/8-11	57.94	GRA115RRB	S1115K	T-90010
VTB		2 S	2 1/4	4	5 1/2	4 1/2	1	2		2 9/32	GRA200RRB	S1115K2	
VTB	50										GRAE50RRB	SE50K	

Shaft diameter with an S = smaller housing.

RAO, LAO HEAVY SERIES

- Compact, economic, heavy-duty ball bearing housed unit.
- Incorporates the tested and proven features of the Timken standard RAK Series pillow block.
- RAO Series bearings are equipped to handle heavy capacity.
- LAO Series bearings are equipped with heavy series GN-KLLB wide inner ring bearings.
- Units are supplied with a self-locking collar that eliminate shaft shoulders, machining adapters and sleeves, and locknuts that provide easy mounting.

Suggested shaft tolerances: **1 3/16" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 15/16", nominal to -.025 mm, -.0010".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RAO	GN-KRRB	Page D55
LAO	GN-KLLB	Page D64

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RAO 1 7/16".

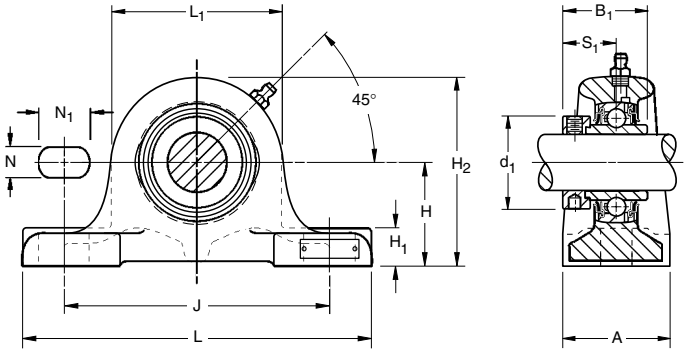
Unit[1]	Shaft Dia.	H	H_2	B_1	L_1	J	L	A	H_1	N	N_1	d_1	S_1	T	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new	kg lbs.
RAO	1 3/16	47.63 1 7/8	93.7 3 11/16	50 1 31/32	90.5 3 9/16	136.5 5 3/8	173 6 13/16	49.2 1 15/16	22.2 7/8	15.9 5/8	19 3/4	49.2 1 15/16	32.5 1 9/32	24.6 31/32	12.7 1/2	GN103KRRB	SN103K	T-18798	1.898 4.18
RAO	1 7/16	53.98 2 1/8	104 4 3/32	51.6 2 1/32	101.6 4	152.4 6	192.1 7 9/16	54 2 1/8	23.8 15/16	15.9 5/8	19 3/4	55.6 2 3/16	33.3 1 5/16	27 1 1/16	12.7 1/2	GN107KRRB	SN107K	T-18626	2.406 5.30
RAO	1 1/2	60.33 2 3/8	117.5 4 5/8	57.2 2 1/4	114.3 4 1/2	171.4 6 3/4	215.9 8 1/2	60.3 2 3/8	27 1 1/16	19 3/4	25.4 1	63.5 2 1/2	37.3 1 15/32	30.2 1 3/16	15.9 5/8	GN108KRRB	SN108K	T-18800	3.755 8.27
RAO	1 11/16	66.68 2 5/8	130.2 5 1/8	58.7 2 5/16	127 5	190.5 7 1/2	239.7 9 7/16	66.7 2 5/8	30.2 1 3/16	19 3/4	25.4 1	69.8 2 3/4	38.9 1 17/32	33.3 1 5/16	15.9 5/8	GN111KRRB	SN111K	T-18802	5.03 11.08
RAO	1 15/16	71.44 2 13/16	141.3 5 9/16	66.7 2 5/8	138.1 5 7/16	209.6 8 1/4	265.1 10 7/16	73 2 7/8	33.3 1 5/16	19 3/4	25.4 1	76.2 3	42.1 1 21/32	36.5 1 7/16	15.9 5/8	GN115KRRB	SN115K	T-18804	6.265 13.80
RAO	2 3/16	77.79 3 1/16	153.2 6 1/32	73 2 7/8	150.8 5 15/16	228.6 9	287.3 11 5/16	79.4 3 1/8	36.5 1 7/16	22.2 7/8	28.6 1 1/8	82.6 3 1/4	45.2 1 25/32	39.7 1 9/16	19 3/4	GN203KRRB	SN203K	T-18806	7.94 17.49
RAO	2 7/16	84.14 3 5/16	165.9 6 17/32	79.4 3 1/8	163.5 6 7/16	247.6 9 3/4	312.7 12 5/16	84.1 3 5/16	38.1 1 1/2	22.2 7/8	28.6 1 1/8	88.9 3 1/2	48.4 1 29/32	42.1 1 21/32	19 3/4	GN207KRRB	SN207K	T-18808	9.761 21.50
RAO	2 11/16	96.84 3 13/16	192.1 7 9/16	88.9 3 1/2	188.9 7 7/16	285.8 11 1/4	360.4 14 3/16	96 3 13/16	44.4 1 3/4	25.4 1	33.3 1 5/16	101.6 4	54.8 2 5/32	48.4 1 29/32	22.2 7/8	GN211KRRB	SO211K	T-18810	15.322 33.75
RAO	2 15/16	104.78 4 1/8	204.8 8 1/16	100 3 15/16	201.6 7 15/16	304.8 12	384.2 15 1/8	103.2 4 1/16	47.6 1 7/8	25.4 1	33.3 1 5/16	112.7 4 7/16	62.7 2 15/32	51.6 2 1/32	22.2 7/8	GN215KRRB	SN215K	T-18601	18.205 40.10

[1] LAO assembled with GN-KLLB bearing.

RSA, LSA INDUSTRIAL SERIES

- RSA Series are equipped with G-KRRB wide inner ring ball bearings.
- LSA Series are equipped with G-KLLB wide inner ring bearings.
- Pillow blocks are prelubricated and ready for immediate use.
- Grease fitting is provided for relubrication if required.
- All units are supplied with a self-locking collar.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 3 15/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RSA	G-KRRB	Page D54
LSA	G-KLLB	Page D62

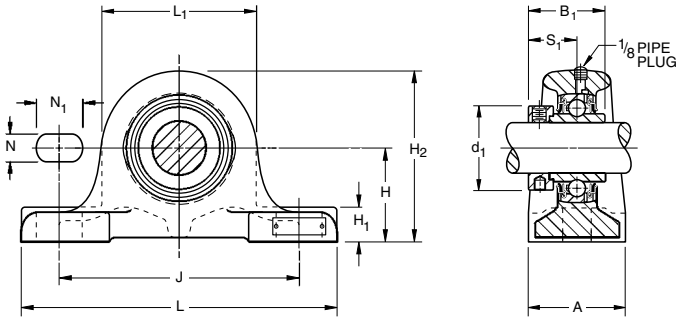
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RSA 1 7/16". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia.	H	H_2	B_1	L_1	J	L	A	H_1	N	N_1	d_1	S_1	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new	kg lbs.
RSA	1/2														G1008KRRB	S1008K		
RSA	5/8	31.75	58.7	37.3	54	96.8	122.2	31.8	12.7	11.1	14.3	30.2	23.4	9.5	G1010KRRB	S1010K	T-22784	0.681
RSA	11/16	1 1/4	2 5/16	1 15/32	2 1/8	3 13/16	4 13/16	1 1/4	1/2	7/16	9/16	1 3/16	59/64	3/8	G1011KRRB	S1011K		1.50
RSA	17														GE17KRRB	SE17K		
RSA	**3/4**	44.45	76.2	43.7	63.5	127.0	165.1	50.8	14.3	14.3	19	33.3	26.6	12.7	G1012KRRB	S1012K	T-22741	1.226
RSA	20	1 3/4	3	1 23/32	2 1/2	5	6 1/2	2	9/16	9/16	3/4	1 5/16	1 3/64	1/2	GE20KRRB	SE20K		2.70
RSA	7/8														G1014KRRB	S1014K		
RSA	15/16	50.80	85.7	44.4	69.8	139.7	177.8	54	15.9	14.3	19	38.1	27	12.7	G1015KRRB	S1015K	T-22716	1.521
RSA	**1**	2	3 3/8	1 3/4	2 3/4	5 1/2	7	2 1/8	5/8	9/16	3/4	1 1/2	1 1/16	1/2	G1100KRRB	S1100K		3.35
RSA	25														GE25KRRB	SE25K		
RSA	1 1/16														G1101KRRB	S1101K		
RSA	1 1/8	50.80	91.3	48.4	81	139.7	177.8	54	17.5	15.9	20.6	44.1	30.2	12.7	G1102KRRB	S1102K	T-22725	1.789
RSA, LSA	**1 3/16**	2	3 19/32	1 29/32	3 3/16	5 1/2	7	2 1/8	11/16	5/8	13/16	1 47/64	1 3/16	1/2	G1103KRRB	S1103K		3.94
RSA	30														GE30KRRB	SE30K		
RSA, LSA	1 1/4														G1104KRRB	S1104K		
RSA	1 5/16	60.33	111.1	51.2	101.6	158.8	209.6	66.7	22.2	19	31.8	54	32.5	15.9	G1105KRRB	S1105K	T-22382	3.260
RSA	1 3/8	2 3/8	4 3/8	2 1/64	4	6 1/4	8 1/4	2 5/8	7/8	3/4	1 1/4	2 1/8	1 9/32	5/8	G1106KRRB	S1106K		7.18
RSA, LSA	**1 7/16**														G1107KRRB	S1107K		
RSA	35														GE35KRRB	SE35K		
RSA	**1 1/2**	60.33	111.1	56.4	101.6	168.3	209.6	60.3	19	19	22.2	60.3	34.9	15.9	G1108KRRB	S1108KT	T-22752	2.928
RSA	1 9/16	2 3/8	4 3/8	2 7/32	4	6 5/8	8 1/4	2 3/8	3/4	3/4	7/8	2 3/8	1 3/8	5/8	G1109KRRB	S1109KT		6.45
RSA	40														GE40KRRB	SE40K		
RSA	1 5/8														G1110KRRB	S1110K		
RSA, LSA	**1 11/16**	60.33	114.3	56.4	108	168.3	209.6	60.3	20.6	19	23.8	63.5	34.9	15.9	G1111KRRB	S1111K	T-22701	3.064
RSA	1 3/4	2 3/8	4 1/2	2 7/32	4 1/4	6 5/8	8 1/4	2 3/8	13/16	3/4	15/16	2 1/2	1 3/8	5/8	G1112KRRB	S1112K		6.75
RSA	45														GE45KRRB	SE45K		
RSA	1 7/8	69.85	130.2	62.7	120.6	209.6	269.9	69.8	26.2	19	34.9	69.8	38.1	15.9	G1114KRRB	S1114K	T-22384	4.885
RSA, LSA	**1 15/16**	2 3/4	5 1/8	2 15/32	4 3/4	8 1/4	10 5/8	2 3/4	1 1/32	3/4	1 3/8	2 3/4	1 1/2	5/8	G1115KRRB	S1115K		10.76
RSA	50														GE50KRRB	SE50K		
RSA	2														G1200KRRB	S1200K		
RSA	2 1/8	79.38	142.1	71.4	125.4	228.6	288.9	79.4	25.4	19	33.3	76.2	43.7	15.9	G1202KRRB	S1202K	T-22696	6.022
RSA, LSA	**2 3/16**	3 1/8	5 19/32	2 13/16	4 15/16	9	11 3/8	3 1/8	1	3/4	1 5/16	3	1 23/32	5/8	G1203KRRB	S1203K		13.22
RSA	55														GE55KRRB	SE55K		
RSA	2 1/4														G1204KRRB	S1204K		
RSA	2 3/8	79.38	149.2	77.8	139.7	228.6	288.9	79.4	28.6	22.2	28.6	84.1	46.8	19	G1206KRRB	S1206K	T-22743	6.901
RSA, LSA	**2 7/16**	3 1/8	5 7/8	3 1/16	5 1/2	9	11 3/8	3 1/8	1 1/8	7/8	1 1/8	3 5/16	1 27/32	3/4	G1207KRRB	S1207K		15.20
RSA	60														GE60KRRB	SE60K		
RSA	2 11/16	95.25	173	82.6	155.6	260.4	320.7	88.9	33.3	22.2	34.9	96.8	45.2	19	G1211KRRB	S1211KT	T-22748	9.997
RSA	70	3 3/4	6 13/16	3 1/4	6 1/8	10 1/4	12 5/8	3 1/2	1 5/16	7/8	1 3/8	3 13/16	1 25/32	3/4	GE70KRRB	SE70K		22.02
RSA	2 15/16	95.25	177.8	92.1	196.1	206.4	320.7	88.9	38.1	22.2	31.8	101.6	54.8	19	G1215KRRB	S1215K	T-22386	10.683
RSA	75	3 3/4	7	3 5/8	7 23/32	10 1/4	12 5/8	3 1/2	1 1/2	7/8	1 1/4	4	2 5/32	3/4	GE75KRRB	SE75K		23.53

RSAO, LSAO HEAVY SERIES

- RSAO pillow blocks are equipped with GN-KRRB wide inner ring ball bearings.
- LSAO pillow blocks are equipped with GN-KLLB wide inner ring ball bearings.
- Suited for installations where the load is heavy in proportion to the shaft diameter or where considerable shock loads exist.
- For use in wet or extremely dirty conditions.
- Prelubricated and ready for immediate use and a grease fitting is provided for relubrication if required.
- All units are supplied with a self-locking collar.

Suggested shaft tolerances: **1 1/16", nominal to -.013 mm, -.0005";**
2"- 3 15/16", nominal to -.025 mm, -.0010".



BEARING DATA

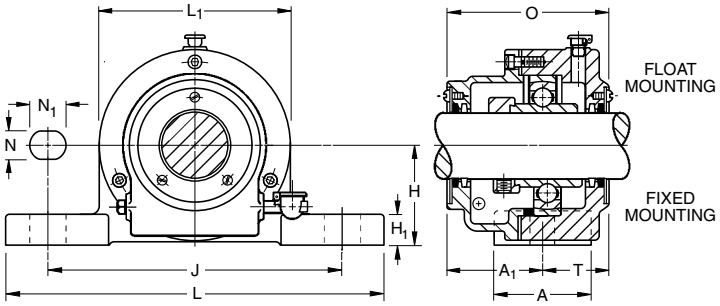
Unit	Bearing Number	Dimensions and Load Ratings
RSAO	GN-KRRB	Page D55
LSAO	GN-KLLB	Page D64

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RSAO 1 7/16".

Unit	Shaft Dia.	H ±.010"	H_2 ref.	B_1	L_1	J ±.010"	L ref.	A ref.	H_1 ref.	N ±.010"	N_1 ±.010"	d_1 ±.005"	S_1 ref.	Bolt Size	Bearing Number		Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	RSAO	LSAO		new	kg lbs.
RSAO, LSAO	1 3/16	60.33 2 3/8	108 4 1/4	50 1 31/32	95.2 3 3/4	168.3 6 5/8	209.6 8 1/4	60.3 2 3/8	22.2 7/8	15.9 5/8	25.4 1	48.7 1.918	32.5 1.280	12.7 1/2	GN103KRRB	(KLLB)	SN103K	T-22678	2.937 6.47
RSAO, LSAO	1 7/16	69.85 2 3/4	122.2 4 13/16	51.6 2 1/32	104.8 4 1/8	209.6 8 1/4	269.9 10 5/8	69.8 2 3/4	23.8 15/16	19 3/4	28.6 1 1/8	55.1 2.168	33.3 1 5/16	15.9 5/8	GN107KRRB	(KLLB)	SN107K	T-22496	4.154 9.15
RSAO, LSAO	1 1/2	79.38 3 1/8	136.6 5 3/8	57.2 2 1/4	114.3 4 1/2	228.6 9	288.9 11 3/8	79.4 3 1/8	27 1 1/16	19 3/4	28.6 1 1/8	63.0 2.480	37.3 1 15/32	15.9 5/8	GN108KRRB	(KLLB)	SN108K	T-22672	5.857 12.90
RSAO, LSAO RSAO	1 11/16 1 3/4	79.38 3 1/8	142.9 5 5/8	58.7 2 5/16	127.0 5	228.6 9	288.9 11 3/8	79.4 3 1/8	30.2 1 3/16	19 3/4	28.6 1 1/8	69.3 2.730	38.9 1 17/32	15.9 5/8	GN111KRRB GN112KRRB	(KLLB	SN111K SN112K	T-22498	6.56 14.45
RSAO, LSAO	1 15/16	79.38 3 1/8	148.4 5 27/32	66.7 2 5/8	138.1 5 7/16	228.6 9	288.9 11 3/8	79.4 3 1/8	33.3 1 5/16	19 3/4	28.6 1 1/8	75.7 2.980	42.1 1 21/32	15.9 5/8	GN115KRRB	(KLLB)	SN115K	T-22502	7.246 15.96
RSAO RSAO, LSAO	2 2 3/16	95.25 3 3/4	170.7 6 23/32	73 2 7/8	150.8 5 15/16	260.4 10 1/4	320.7 12 5/8	88.9 3 1/2	36.5 1 7/16	22.2 7/8	34.9 1 3/8	82.0 3.230	45.2 1 25/32	19 3/4	GN200KRRB GN203KRRB	(KLLB)	SN200K SN203K	T-22500	10.192 22.45
RSAO, LSAO	2 7/16	104.78 4 1/8	186.5 7 11/32	79.4 3 1/8	163.5 6 7/16	285.8 11 1/4	349.2 13 3/4	101.6 4	38.1 1 1/2	22.2 7/8	34.9 1 3/8	88.4 3.480	48.4 1 29/32	19 3/4	GN207KRRB	(KLLB)	SN207K	T-22494	16.144 35.56
RSAO, LSAO	2 11/16	115.89 4 9/16	210.3 8 9/32	88.9 3 1/2	188.9 7 7/16	304.8 12	390.5 15 3/8	111.1 4 3/8	44.4 1 3/4	25.4 1	34.9 1 3/8	101.1 3.980	54.8 2 5/32	22.2 7/8	GN211KRRB	(KLLB)	SO211K	T-22492	19.295 42.50
RSAO, LSAO	2 15/16	115.89 4 9/16	217.5 8 9/16	100 3 15/16	203.2 8	314.3 12 3/8	390.5 15 3/8	111.1 4 3/8	47.6 1 7/8	25.4 1	34.9 1 3/8	112.2 4.418	62.7 2 15/32	22.2 7/8	GN215KRRB	(KLLB)	SN215K	T-22490	20.09 44.25
RSAO	3 3/16	115.89 4 9/16	223 8 25/32	106.4 4 3/16	214.3 8 7/16	314.3 12 3/8	390.5 15 3/8	111.1 4 3/8	49.2 1 15/16	25.4 1	44.4 1 3/4	119.1 4.688	65.9 2 19/32	22.2 7/8	GN303KRRB		SN303K	T-22444	22.814 50.25
RSAO	3 7/16	130.18 5 1/8	250.8 9 7/8	115.9 4 9/16	241.3 9 1/2	339.7 13 3/8	409.6 16 1/8	120.6 4 3/4	57.2 2 1/4	28.6 1 1/8	54 2 1/8	133.4 5.250	73.8 2 29/32	25.4 1	GN307KRRB		SN307K	T-22446	30.986 68.25
RSAO	3 15/16	144.46 5 11/16	281 11 1/16	128.6 5 1/16	273 10 3/4	374.6 14 3/4	439.7 17 5/16	130.2 5 1/8	65.1 2 9/16	28.6 1 1/8	44.4 1 3/4	146 5.750	78.6 3 3/32	25.4 1	GN315KRRB		SN315K	T-22448	40.633 89.50

SAL INDUSTRIAL SERIES FIXED & FLOATING TYPES

- Designed for applications where normal to high temperatures are encountered and applications where one or more floating bearing units are required.
- The floating unit allows the bearing to move axially as the shaft expands due to rising temperatures. The fixed unit maintains shaft location.
- Bearings have loose internal fit.
- SAL unit is equipped with a self-aligning SM wide inner ring bearing and a self-locking collar.
- External aligning ring is fitted to the spherical surface of the outer ring.
- Equipped with oil-tight seals. Normally fitted for oil lubrication, but can be equipped for grease lubrication when specified.
- **Before installation, lubricate with high-grade automotive oil, turbine oil, or ball bearing grease.**
- Units are assembled with a spacer ring (fixed type). By removing spacer ring, the assembly becomes a floating unit.



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
SAL	SM-KS	Page D72

Suggested shaft tolerances: **1 3/16", - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 3 15/16", nominal to -.025 mm, -.0010".

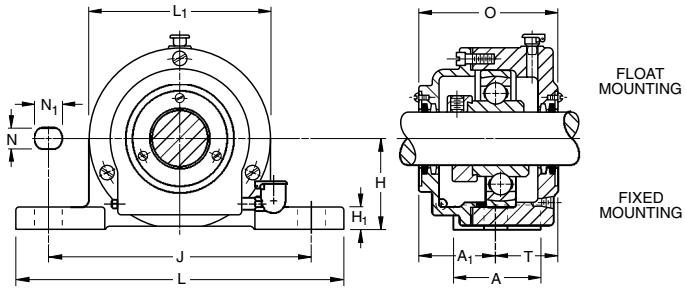
D

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER AND WHETHER FIXED OR FLOATING. Example: SAL 1 7/16" (one fixed, one floating).

Unit	Shaft Dia.	Total Float	H	O	L_1	A	J	L	N	N_1	H_1	A_1	T	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new	kg lbs.
SAL	1 3/16	6.4 1/4	50.8 2	97.6 3 27/32	96.8 3 13/16	54 2 1/8	139.7 5 1/2	177.8 7	15.9 5/8	19 3/4	17.5 11/16	56.4 2 7/32	41.3 1 5/8	12.7 1/2	SM1103KS	S1103K	T-12127	3.768 8.30
SAL	1 1/4	6.4 1/4	60.33 2 3/8	104.8 4 1/8	108 4 1/4	60.3 2 3/8	158.8 6 1/4	210 8 1/4	19 3/4	25.4 1	19 3/4	62.7 2 15/32	42.1 1 21/32	15.9 5/8	SM1104KS	S1104K	T-13108	5.239 11.54
SAL	1 7/16	6.4 1/4	60.33 2 3/8	104.8 4 1/8	108 4 1/4	60.3 2 3/8	158.8 6 1/4	210 8 1/4	19 3/4	25.4 1	19 3/4	62.7 2 15/32	42.1 1 21/32	15.9 5/8	SM1107KS	S1107K	T-13108	5.239 11.54
SAL	1 1/2	7.9 5/16	60.33 2 3/8	108 4 1/4	120.6 4 3/4	60.3 2 3/8	168.3 6 5/8	210 8 1/4	19 3/4	25.4 1	19 3/4	63.5 2 1/2	44.4 1 3/4	15.9 5/8	SM1108KTS	S1108KT	T-12121	6.143 13.53
SAL	1 11/16	7.9 5/16	60.33 2 3/8	110.3 4 11/32	120.6 4 3/4	60.3 2 3/8	168.3 6 5/8	210 8 1/4	19 3/4	25.4 1	19 3/4	65.9 2 19/32	44.4 1 3/4	15.9 5/8	SM1111KS	S1111K	T-12121	5.866 12.92
SAL	1 15/16	7.9 5/16	69.85 2 3/4	116.7 4 19/32	133.4 5 1/4	69.8 2 3/4	210 8 1/4	269.9 10 5/8	19 3/4	25.4 1	22.2 7/8	69.1 2 23/32	47.6 1 7/8	15.9 5/8	SM1115KS	S1115K	T-12313	8.113 17.87
SAL	2 3/16	7.9 5/16	79.38 3 1/8	137.3 5 13/32	146 5 3/4	79.4 3 1/8	228.6 9	288.9 11 3/8	19 3/4	25.4 1	22.2 7/8	79.4 3 1/8	57.9 2 9/32	15.9 5/8	SM1203KS	S1203K	A-5845	10.978 24.18
SAL	2 7/16	9.5 3/8	79.38 3 1/8	150 5 29/32	158.8 6 1/4	79.4 3 1/8	228.6 9	288.9 11 3/8	19 3/4	25.4 1	22.2 7/8	88.9 3 1/2	61.1 2 13/32	15.9 5/8	SM1207KS	S1207K	A-5083	12.894 28.40
SAL	2 11/16	7.1 9/32	95.25 3 3/4	156.4 6 5/32	171.4 6 3/4	88.9 3 1/2	259.7 10 1/4	320.7 12 5/8	22.2 7/8	28.6 1 1/8	27 1 1/16	92.1 3 5/8	64.3 2 17/32	19 3/4	SM1211KTS	S1211K	T-18940	15.889 35.02
SAL	2 15/16	9.9 25/64	95.25 3 3/4	173.8 6 27/32	190.5 7 1/2	88.9 3 1/2	259.7 10 1/4	320.7 12 5/8	22.2 7/8	28.6 1 1/8	27 1 1/16	100.8 3 31/32	73 2 7/8	19 3/4	SM1215KS	S1215K	A-5088	20.203 44.50
SAL	3 7/16	9.5 3/8	115.89 4 9/16	186.5 7 11/32	212.7 8 3/8	111.1 4 3/8	314.3 12 3/8	390.6 15 3/8	25.4 1	31.8 1 1/4	31.8 1 1/4	107.2 4 7/32	79.4 3 1/8	19 3/4	SM1307KS	S1307K	A-5206	33.482 73.75

SAOL HEAVY SERIES FIXED & FLOATING TYPES

- Designed for applications with higher than usual temperatures or where one or more floating bearing units are required.
- Floating unit allows the bearing to move axially as the shaft expands due to temperature rise. The fixed unit maintains shaft locations.
- Bearings have loose internal fit.
- SAOL unit is equipped with a self-aligning SMN wide inner ring bearing and a self-locking collar.
- External aligning ring is fitted to the spherical surface of the outer ring.
- Equipped with oil-type seals. Normally fitted for oil lubrication, but can be equipped for grease lubrication when specified.
- **Before installation, lubricate with high-grade automotive oil, turbine oil, or ball bearing grease.**
- Units are assembled with a spacer ring (fixed type). By removing the spacer ring, the assembly becomes a floating unit.



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
SAOL	SMN-KS	Page D73

Suggested shaft tolerances: **$1\,3/16$" - $1\,15/16$", nominal to -.013 mm,-.0005";**
2" - $3\,15/16$", nominal to -.025 mm, -.0010".
Larger sizes, consult your Timken representative.

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER AND WHETHER FIXED OR FLOATING. Example: SAOL $1\,7/16$" (one fixed, one floating).

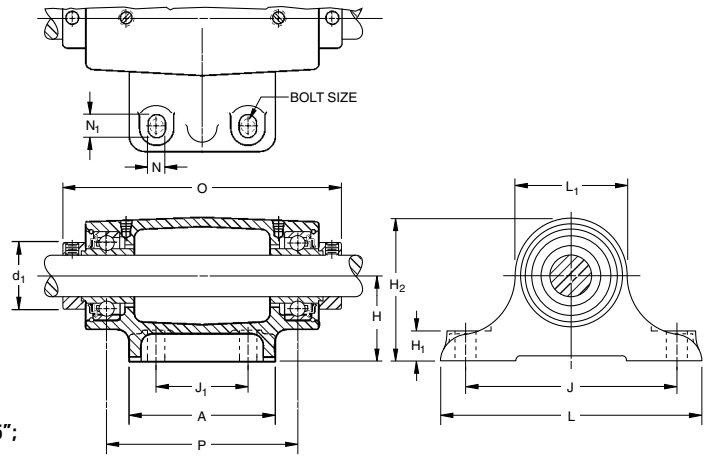
Unit	Shaft Dia.	Total Float	H	O	L_1	A	J	L	N	N_1	H_1	A_1	T	J_1[1]	Bolt No.	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.		mm in.			new	kg lbs.
SAOL	$1\,3/16$	7.9 $5/16$	60.33 $2\,3/8$	103.2 $4\,1/16$	111.1 $4\,3/8$	60.3 $2\,3/8$	168.3 $6\,5/8$	210 $8\,1/4$	15.9 $5/8$	22.2 $7/8$	17.5 $11/16$	60.3 $2\,3/8$	42.9 $1\,11/16$	— —	2	12.7 $1/2$	SMN103KS	SN103K	T-12389	5.521 12.16
SAOL	$1\,7/16$	9.1 $23/64$	69.8 $2\,3/4$	111.1 $4\,3/8$	120.6 $4\,3/4$	69.8 $2\,3/4$	209.6 $8\,1/4$	269.9 $10\,5/8$	19 $3/4$	25.4 1	20.6 $13/16$	69.1 $2\,23/32$	42.1 $1\,21/32$	— —	2	12.9 $5/8$	SMN107KS	SN107K	A-4779	7.037 15.5
SAOL	$1\,1/2$	9.5 $3/8$	79.4 $3\,1/8$	123.8 $4\,7/8$	146 $5\,3/4$	79.4 $3\,1/8$	228.6 9	288.9 $11\,3/8$	19 $3/4$	25.4 1	20.6 $13/16$	74.6 $2\,15/16$	49.2 $1\,15/16$	— —	2	12.9 $5/8$	SMN108KS	SN108K	A-4778A	11.35 25
SAOL	$1\,11/16$	9.5 $3/8$	79.4 $3\,1/8$	123.8 $4\,7/8$	146 $5\,3/4$	79.4 $3\,1/8$	228.6 9	288.9 $11\,3/8$	19 $3/4$	25.4 1	20.6 $13/16$	74.6 $2\,15/16$	49.2 $1\,15/16$	— —	2	12.9 $5/8$	SMN111KS	SN111K	A-4778	11.15 24.56
SAOL	$1\,15/16$	9.5 $3/8$	79.4 $3\,1/8$	122.2 $4\,13/16$	158.8 $6\,1/4$	79.4 $3\,1/8$	228.6 9	288.9 $11\,3/8$	19 $3/4$	25.4 1	20.6 $13/16$	73.8 $2\,29/32$	48.4 $1\,29/32$	— —	2	12.9 $5/8$	SMN115KS	SN115K	A-3818	12.462 27.45
SAOL	$2\,3/16$	9.1 $23/64$	95.25 $3\,3/4$	139.7 $5\,1/2$	171.4 $6\,3/4$	88.9 $3\,1/2$	259.7 $10\,1/4$	320.7 $12\,5/8$	22.2 $7/8$	31.8 $1\,1/4$	27 $1\,1/16$	82.6 $3\,1/4$	57.2 $2\,1/4$	— —	2	19 $3/4$	SMN203KS	SN203K	A-4755	15.409 33.94
SAOL	$2\,7/16$	8.7 $11/32$	104.8 $4\,1/8$	150 $5\,29/32$	190.5 $7\,1/2$	101.6 4	285.8 $11\,1/4$	349.2 $13\,3/4$	22.2 $7/8$	31.8 $1\,1/4$	27 $1\,1/16$	91.3 $3\,19/32$	58.7 $2\,5/16$	— —	2	19 $3/4$	SMN207KS	SN207K	A-3819	18.841 41.5
SAOL	$2\,11/16$	9.5 $3/8$	115.89 $4\,9/16$	174.6 $6\,7/8$	215.9 $8\,1/2$	111.1 $4\,3/8$	304.8 12	390.6 $15\,3/8$	25.4 1	31.8 $1\,1/4$	31.8 $1\,1/4$	109.5 $4\,5/16$	65.1 $2\,9/16$	— —	2	22.2 $7/8$	SMN211KS	SO211K	A-4709	26.332 58
SAOL	$2\,15/16$	12.7 $1/2$	115.89 $4\,9/16$	177.8 7	225.4 $8\,7/8$	111.1 $4\,3/8$	314.3 $12\,3/8$	390.6 $15\,3/8$	25.4 1	31.8 $1\,1/4$	31.8 $1\,1/4$	104.8 $4\,1/8$	73 $2\,7/8$	— —	2	22.2 $7/8$	SMN215KS	SN215K	A-4798	33.823 74.5
SAOL	$3\,3/16$	13.1 $33/64$	115.89 $4\,9/16$	184.2 $7\,1/4$	241.3 $9\,1/2$	111.1 $4\,3/8$	314.3 $12\,3/8$	390.6 $15\,3/8$	25.4 1	31.8 $1\,1/4$	31.8 $1\,1/4$	108 $4\,1/4$	76.2 3	57.2 $2\,1/4$	4	22.2 $7/8$	SMN303KS	SN303K	A-4780	35.298 77.75
SAOL	$3\,7/16$	13.5 $17/32$	130.2 $5\,1/8$	190.5 $7\,1/2$	260.4 $10\,1/4$	120.6 $4\,3/4$	339.7 $13\,3/8$	409.6 $16\,1/8$	25.4 1	31.8 $1\,1/4$	31.8 $1\,1/4$	111.1 $4\,3/8$	79.4 $3\,1/8$	76.2 3	4	22.2 $7/8$	SMN307KS	SN307K	A-4155	48.805 107.5
SAOL	$3\,11/16$	12.7 $1/2$	144.5 $5\,11/16$	213.5 $8\,13/32$	279.4 11	125.4 $4\,15/16$	374.6 $14\,3/4$	439.7 $17\,5/16$	28.6 $1\,1/8$	38.1 $1\,1/2$	31.8 $1\,1/4$	133.4 $5\,1/4$	80.2 $3\,5/32$	— —	2	25.4 1	SMO311WS	SO311K	A-4156	54.48 120
SAOL	$3\,15/16$	17.5 $11/16$	152.4 6	219.9 $8\,21/32$	298.4 $11\,3/4$	133.4 $5\,1/4$	393.1 $15\,1/2$	469.9 $18\,1/2$	28.6 $1\,1/8$	38.1 $1\,1/2$	34.9 $1\,3/8$	127 5	92.9 $3\,21/32$	82.6 $3\,1/4$	4	25.4 1	SMN315KS	SN315K	A-4795	70.824 156
SAOL	$4\,3/16$	15.9 $5/8$	165.1 $6\,1/2$	225.4 $8\,7/8$	317.5 $12\,1/2$	158.8 $6\,1/4$	449.3 $17\,11/16$	539.8 $21\,1/4$	28.6 $1\,1/8$	38.1 $1\,1/2$	38.1 $1\,1/2$	134.1 $5\,9/32$	91.3 $3\,19/32$	101.6 4	4	25.4 1	SMN403WS	SN403K	T-14342	88.076 194
SAOL	$4\,7/16$	14.3 $9/16$	177.8 7	228.6 9	327 $12\,7/8$	171.4 $6\,3/4$	449.3 $17\,11/16$	539.8 $21\,1/4$	31.8 $1\,1/4$	44.4 $1\,3/4$	44.4 $1\,3/4$	134.9 $5\,5/16$	93.6 $3\,11/16$	108 $4\,1/4$	4	28.6 $1\,1/8$	SMN407WS	SN407K	T-11469	95.34 210
SAOL	$4\,15/16$	31.4 $1\,15/64$	209.6 $8\,1/4$	261.9 $10\,5/16$	381 15	184.2 $7\,1/4$	514.4 $20\,1/4$	630.2 $24\,13/16$	31.8 $1\,1/4$	44.4 $1\,3/4$	50.8 2	152.4 6	109.5 $4\,5/16$	120.6 $4\,3/4$	4	28.6 $1\,1/8$	SMN415WS	SN415K	T-11783	160.262 353

[1] When four bolts are used, dimension J_1 is distance between centers, and A_1 and T are measured from center of base.

DRNR INDUSTRIAL SERIES

- This rigid double pillow block is designed to provide a sturdy two-bearing mounting for fans and blowers, bench grinders, buffers, vertical shafts and similar heavy-duty applications.
- Compact, one-piece housing is equipped with two wide inner ring bearings with integral R-Seals and self-locking collar.
- Individual grease chambers provided for each bearing.
- Close clearance baffles allow excess grease to work into the center chamber of the housing.
- Grease fittings that take the place of standard pipe plugs provide the means of relubrication.
- Can be mounted in any position, with ample radial and thrust capacity assured at all times.

Suggested shaft tolerances: **$^{15}/_{16}$" - 1 $^{15}/_{16}$", nominal to -.013 mm, -.0005"; 2" - 2 $^{3}/_{16}$", nominal to -.025 mm, -.0010".**



BEARING DATA

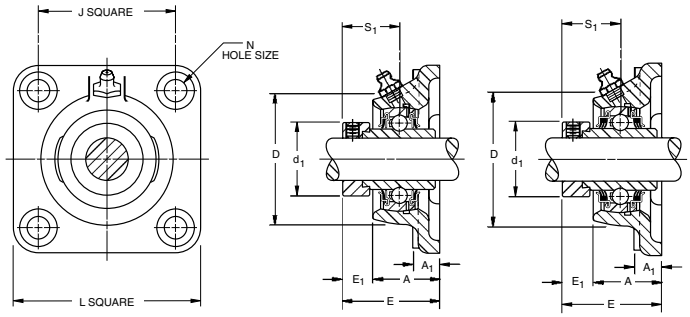
Unit	Bearing Number	Dimensions and Load Ratings
DRNR	KR	Page D53

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: DRNR 1 $^{7}/_{16}$".

Unit	Shaft Dia.	H	H_2	O	L_1	J	L	A	H_1	N	N_1	J_1	d_1	P	Bolt (4 req'd)	Bearing Number (2 req'd)	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new	kg lbs.
DRNR	$^{15}/_{16}$	63.5 2 1/2	99.2 3 29/32	200 7 7/8	71.4 2 13/16	158.8 6 1/4	196.8 7 3/4	108 4 1/4	19 3/4	12.7 1/2	15.9 5/8	69.8 2 3/4	38.1 1 1/2	146 5 3/4	9.5 3/8	1015KR	S1015K	T-19189	4.812 10.60
DRNR	1 $^{3}/_{16}$	63.5 2 1/2	105.6 4 5/32	203.2 8	84.1 3 5/16	158.8 6 1/4	196.8 7 3/4	108 4 1/4	22.2 7/8	12.7 1/2	15.9 5/8	69.8 2 3/4	44.1 1 47/64	142.9 5 5/8	9.5 3/8	1103KR	S1103K	T-19191	5.167 11.38
DRNR	1 $^{7}/_{16}$	76.2 3	123.8 4 7/8	276.2 10 7/8	95.2 3 3/4	203.2 8	254 10	139.7 5 1/2	25.4 1	15.9 5/8	22.2 7/8	88.9 3 1/2	54 2 1/8	211.5 8 21/64	12.7 1/2	1107KR	S1107K	T-19193	9.625 21.20
DRNR	1 $^{11}/_{16}$	76.2 3	133.4 5 1/4	279.4 11	114.3 4 1/2	203.2 8	254 10	139.7 5 1/2	25.4 1	15.9 5/8	22.2 7/8	88.9 3 1/2	63.5 2 1/2	209.6 8 1/4	12.7 1/2	1111KR	S1111K	T-19197	11.69 25.75
DRNR	1 $^{15}/_{16}$	88.9 3 1/2	150.8 5 5/16	352.4 13 7/8	123.8 4 7/8	241.3 9 1/2	304.8 12	177.8 7	28.5 1 1/8	17.5 11/16	28.5 1 1/8	114.3 4 1/2	69.8 2 3/4	276.2 10 7/8	15.9 5/8	1115KR	S1115K	T-19195	18.841 41.50
DRNR	2 $^{3}/_{16}$	88.9 3 1/2	158.8 6 1/4	355.6 14	133.4 5 1/4	241.3 9 1/2	304.8 12	177.8 7	31.8 1 1/4	17.5 11/16	28.5 1 1/8	114.3 4 1/2	76.2 3	268.3 10 9/16	15.9 5/8	1203KR	S1203K	A-9598	23.608 52.00

RCJ, TCJ, LCJ INDUSTRIAL SERIES

- Timken cartridges are used in applications where a minimum amount of machining is to be done.
- Each unit comes assembled and ready for mounting, with bolts through the flange.
- Wide inner ring bearings, self-aligning B-types, which compensate for shaft misalignment.
- RCJ flange cartridge is equipped with G-KRRB (R-Seal) wide inner ring bearings. The TCJ is equipped with G-KPPB (Tri-Ply Seal) wide inner ring bearings. The LCJ is equipped with the G-KLLB (Mechani-Seal) wide inner ring bearings.
- TCJ flange cartridges are identical to RCJ units, except they use the Tri-Ply seal bearing. Tri-Ply units offer the best protection in dirty environments.
- Units are factory prelubricated, but a grease fitting is provided for relubrication if required. Units are supplied with self-locking collars.
- **Contact a Timken representative to discuss highly corrosive applications (food processing, chemical exposure) where Timken thin dense chrome coated bearings can be used.**
- Safety end caps are available for selected sizes.



RCJ, LCJ TCJ

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RCJ	G-KRRB	Page D54
TCJ	G-KPPB	Page D65
LCJ	G-KLLB	Page D62

Suggested shaft tolerances: **1 13/15" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 3 15/16", nominal to -.025 mm, -.0010". Larger sizes, consult your Timken representative.**

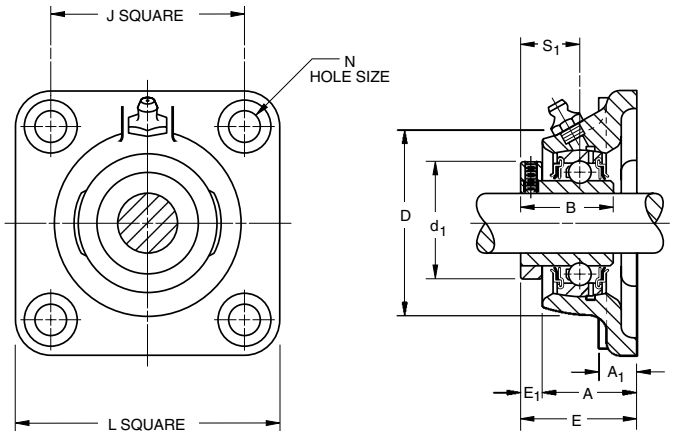
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RCJ 1 3/16". POPULAR SIZES ARE IN BOLD.

Unit[2]	Shaft Dia.	L ref.	J ref.	A_1 ref.	A ±.015"	E max.	N	E_1	S_1 ref.	D ref.	d_1 ±.005"	Bearing Number[1]		Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	RCJ	(TCJ)		new (old)	kg lbs.
RCJ	1/2											G1008KRRB		S1008K		
RCJ	5/8	76.2	54	9.5	23.6	40.6	10.7	13.9	23.4	52.4	28.1	G1010KRRB		S1010K	T-40278	0.526
RCJ	11/16	3	2 1/8	13/32	0.929	1.599	27/64	35/64	59/64	2 1/16	1.105	G1011KRRB		S1011K	(T-16659)	1.16
RCJ	17											GE17KRRB		SE17K		
RCJ	**3/4**	85.7	63.5	11.1	27.8	46.4	10.7	16.3	26.6	60.3	32.8	G1012KRRB		S1012K	T-40267	0.726
RCJ	20	3 3/8	2 1/2	7/16	1.094	1.828	27/64	41/64	1 3/64	2 3/8	1.292	GE20KRRB		SE20K	(T-16661)	1.6
RCJ, TCJ	7/8											G1014KRRB	(KPPB3)	S1014K		
RCJ, TCJ	15/16	95.2	69.8	12.7	27.9	46.6	11.5	15.9	27	65.1	37.6	G1015KRRB	(KPPB3)	S1015K	T-40262	0.939
RCJ, TCJ	**1**	3 3/4	2 3/4	1/2	1.100	1.834	29/64	5/8	1 1/16	2 9/16	1.480	G1100KRRB	(KPPB3)	S1100K	(T-16663)	2.07
RCJ, TCJ	25											GE25KRRB	(KPPB3)	SE25K		
RCJ, TCJ	1 1/16											G1101KRRB	(KPPB3)	S1101K		
RCJ, TCJ	1 1/8	107.9	82.6	13.5	29.9	50.5	11.5	17.5	30.2	76.2	43.9	G1102KRRB	(KPPB3)	S1102K	T-40266	1.302
RCJ, TCJ	**1 3/16**	4 1/4	3 1/4	17/32	1.178	1.990	29/64	11/16	1 3/16	3	1.730	G1103KRRB	(KPPB3)	S1103K	(T-16664)	2.87
RCJ, TCJ	30											GE30KRRB	(KPPB3)	SE30K		
RCJ, TCJ	1 1/4											G1104KRRB	(KPPB2)	S1104K		
RCJ, TCJ	1 5/16	117.5	92.1	13.5	31.8	53.5	13.1	19	32.5	88.9	53.6	G1105KRRB	(KPPB2)	S1105K	T-40253	1.787
RCJ, TCJ	1 3/8	4 5/8	3 5/8	17/32	1.254	2.106	33/64	3/4	1 9/32	3 1/2	2.112	G1106KRRB	(KPPB2)	S1106K	(T-16617)	3.94
RCJ, TCJ	**1 7/16**											G1107KRRB	(KPPB2)	S1107K		
RCJ, TCJ	35											GE35KRRB	(KPPB2)	SE35K		
RCJ, TCJ	**1 1/2**	130.2	101.6	14.3	38.1	59.3	13.1	20.6	34.9	98.4	58.2	G1108KRRB	(KPPB3)	S1108KT	T-40263	2.291
RCJ, TCJ	1 9/16	5 1/8	4	9/16	1.500	2.334	33/64	13/16	1 3/8	3 7/8	2.292	G1109KRRB	(KPPB3)	S1109KT	(T-16666)	5.05
RCJ, TCJ	40											GE40KRRB	(KPPB3)	SE40K		
RCJ, TCJ	1 5/8											G1110KRRB	(KPPB4)	S1110K		
RCJ, TCJ	**1 11/16**	136.5	104.8	14.3	38.9	59.3	13.1	19.8	34.9	104.8	63.0	G1111KRRB	(KPPB4)	S1111K	T-40264	2.585
RCJ, TCJ	1 3/4	5 3/8	4 1/8	9/16	1.531	2.334	33/64	25/32	1 3/8	4 1/8	2.480	G1112KRRB	(KPPB4)	S1112K	(T-16667)	5.7
RCJ, TCJ	45											GE45KRRB	(KPPB4)	SE45K		
RCJ, TCJ	1 7/8	142.9	111.1	14.3	42.9	66.4	17.1	23	38.1	112.7	69.3	G1114KRRB	(KPPB3)	S1114K	T-40265	3.016
RCJ, TCJ	**1 15/16**	5 5/8	4 3/8	9/16	1.688	2.615	43/64	29/32	1 1/2	4 7/16	2.730	G1115KRRB	(KPPB3)	S1115K	(T-16668)	6.65
RCJ, TCJ	50											GE50KRRB	(KPPB3)	SE50K		
RCJ, TCJ	2											G1200KRRB	(KPPB4)	S1200K		
RCJ, TCJ	2 1/8	161.9	130.2	16.7	46.8	75.1	17.1	27.8	43.7	120.6	75.7	G1202KRRB	(KPPB4)	S1202K	T-40268	3.842
RCJ, TCJ	**2 3/16**	6 3/8	5 1/8	21/32	1.844	2.958	43/64	1 3/32	1 23/32	4 3/4	2.980	G1203KRRB	(KPPB4)	S1203K	(T-16683)	8.47
RCJ, TCJ	55											GE55KRRB	(KPPB4)	SE55K		
RCJ	2 1/4											G1204KRRB		S1204K		
RCJ	2 3/8	174.6	142.9	17.5	49.2	81.6	17.1	31.8	46.8	136.5	83.6	G1206KRRB		S1206K	T-40269	5.048
RCJ	**2 7/16**	6 7/8	5 5/8	11/16	1.937	3.214	43/64	1 1/4	1 27/32	5 3/8	3.292	G1207KRRB		S1207K	(T-17648)	11.13
RCJ	60											GE60KRRB		SE60K		
RCJ	2 11/16	187.3	149.2	19.1	63.5	90.3	16.3	25.4	45.2	152.4	96.3	G1211KRRB		S1211K	T-22530	6.885
RCJ	70	7 3/8	5 7/8	3/4	2.500	3.557	41/64	1	1 25/32	6	3.792	GE70KRRB		SE70K	(T-22270)	15.18
RCJ	2 15/16	196.8	152.4	22.2	66.7	96.7	19.8	26.2	54.8	161.9	101.1	G1215KRRB		S1215K	T-21620	8.21
RCJ	75	7 3/4	6	7/8	2.625	3.807	25/32	1 1/32	2 5/32	6 3/8	3.980	GE75KRRB		SE75K	(T-21620)	18.1

(1) Bearing number for RCJ is G-KRRB. TCJ uses G-KPPB.
(2) Type LCJ uses G-KLLB.

RCJC INDUSTRIAL SERIES CONCENTRIC COLLAR

- The same basic design as the RCJ Series, except a concentric collar is used as the shaft locking device instead of a self-locking cam collar.
- All RCJC units are equipped with GC-KRRB wide inner ring, concentric collar bearings.
- Spherical outside diameter of the bearings mounted in corresponding machined housing seats provides the initial self-alignment.
- Bolt hole spacing dimensions are interchangeable with the RCJ Series and most competitive units.
- Units are factory prelubricated, but a grease fitting is provided for relubrication if required.
- Concentric collars are supplied with all units.
- Safety end caps are available for selected sizes.



Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 15/16", nominal to -.025 mm, -.0010".**

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RCJC	GC-KRRB	Page D66

D

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RCJC 1 3/16".

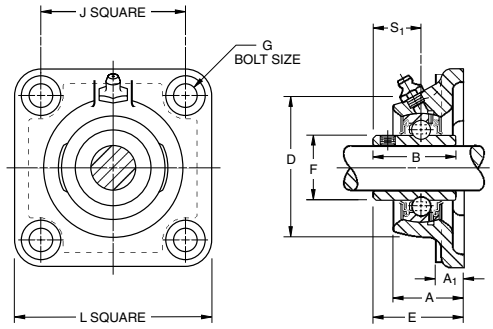
Unit	Shaft Dia.	L	J	A_1	A	E	N	E_1	B	D	d_1	S_1	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.				kg lbs.
RCJC	5/8	76.2 3	53.98 2 1/8	11.1 7/16	22.2 7/8	30.2 1 3/16	9.9 25/64	7.9 5/16	26.6 1 3/64	52.4 2 1/16	34.1 1 11/32	15.5 39/64	GC1010KRRB	C203	T-27113	0.486 1.07
RCJC	3/4	85.7 3 3/8	63.5 2 1/2	11.1 7/16	25.8 1 1/64	32.5 1 9/32	9.9 25/64	6.7 17/64	31 1 7/32	60.3 2 3/8	38.1 1 1/2	18.7 47/64	GC1012KRRB	C204	T-26605	0.645 1.42
RCJC	1	95.2 3 3/4	69.85 2 3/4	11.1 7/16	28.6 1 1/8	36.1 1 27/64	11.5 29/64	7.5 19/64	34.1 1 11/32	65.1 2 9/16	44.4 1 3/4	20.2 51/64	GC1100KRRB	C205	T-26614	0.781 1.72
RCJC RCJC RCJC	1 1/8 1 3/16 1 1/4 S	107.9 4 1/4	82.55 3 1/4	12.7 1/2	30.2 1 3/16	39.3 1 35/64	11.5 29/64	9.1 23/64	37.3 1 15/32	76.2 3	52.4 2 1/16	22.6 57/64	GC1102KRRB GC1103KRRB GC1103KRRB3	C206	T-26630	1.135 2.5
RCJC RCJC RCJC	1 1/4 1 3/8 1 7/16	117.5 4 5/8	92.08 3 5/8	14.3 9/16	34.1 1 11/32	44.4 1 3/4	13.1 33/64	10.3 13/32	41.3 1 5/8	88.9 3 1/2	59.5 2 11/32	25.4 1	GC1104KRRB GC1106KRRB GC1107KRRB	C207	T-26665	1.707 3.76
RCJC	1 1/2	130.2 5 1/8	101.6 4	17.5 11/16	40.5 1 19/32	51.2 2 1/64	13.1 33/64	10.7 27/64	44.1 1 47/64	98.4 3 7/8	68.3 2 11/16	27.4 1 5/64	GC1108KRRB	C208	T-16666A	2.238 4.93
RCJC RCJC	1 11/16 1 3/4	136.5 5 3/8	104.78 4 1/8	17.5 11/16	41.3 1 5/8	53.2 2 3/32	13.1 33/64	11.9 15/32	46.8 1 27/32	104.8 4 1/8	73 2 7/8	29.4 1 5/32	GC1111KRRB GC1112KRRB	C209	T-16667A	2.538 5.59
RCJC	1 15/16	142.9 5 5/8	111.12 4 3/8	15.9 5/8	42.1 1 21/32	54.8 2 5/32	17.1 43/64	12.7 1/2	48.4 1 29/32	112.7 4 7/16	79.4 3 1/8	30.2 1 3/16	GC1115KRRB	C210	T-26700	2.797 6.16
RCJC RCJC	2 2 3/16	161.9 6 3/8	130.18 5 1/8	19 3/4	44.4 1 3/4	58.7 2 5/16	17.1 43/64	14.3 9/16	54 2 1/8	120.6 4 3/4	88.9 3 1/2	33.33 1 5/16	GC1200KRRB GC1203KRRB	C211	T-26712	4.036 8.89
RCJC	2 7/16	174.6 6 7/8	142.88 5 5/8	19 3/4	47.6 1 7/8	65.9 2 19/32	16.3 41/64	18.3 23/32	60.3 2 3/8	136.5 5 3/8	95.2 3 3/4	37.3 1 15/32	GC1207KRRB	C212	T-26726	4.926 10.85
RCJC	2 15/16	196.8 7 3/4	152.4 6	22.2 7/8	54 2 1/8	75.4 2 31/32	19.8 25/32	21.4 27/32	70.6 2 25/32	161.9 6 3/8	114.3 4 1/2	43.7 1 23/32	GC1215KRRB	C215	T-27128	7.473 16.46

Shaft diameter with an S = smaller housing.

YCJ INDUSTRIAL SETSCREW SERIES

- The same basic design as the RCJ Series, except specially designed setscrews are used as the locking device instead of an eccentric collar.
- All units are equipped with GY-KRRB wide inner ring, setscrew bearings.
- Spherical outside diameter of the bearings mounted in the corresponding machined housing seats provides the initial self-alignment.
- Bolt hole spacing dimensions are interchangeable with the RCJ Series and most competitive units.
- Units are factory prelubricated, but a grease fitting is provided for relubrication if required.
- Safety end caps are available for selected sizes.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 15/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
YCJ	GY-KRRB	Page D67

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: YCJ 1 7/16".

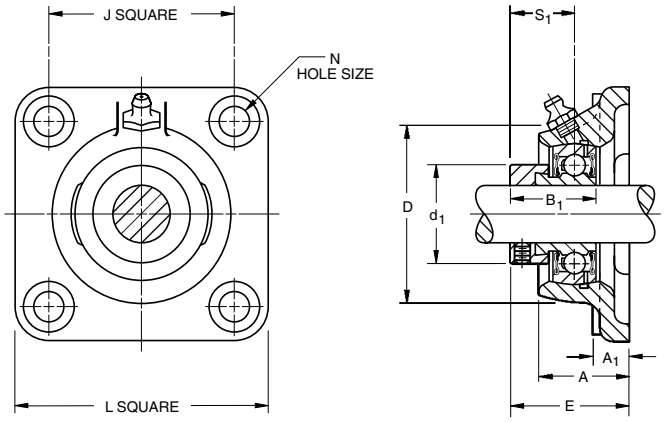
Unit	Shaft Dia. mm / in.	L ref. mm / in.	J ref. mm / in.	A_1 ref. mm / in.	A ±.015 mm / in.	E max. mm / in.	B mm / in.	D ref. mm / in.	F ±.001 mm / in.	S_1 ref. mm / in.	G Bolt Size mm / in.	Bearing Number
YCJ	1/2	76.2	54	10.3	23.6	32.5	27.4	52.4	23.90	15.9	10	GY1008KRRB
YCJ	5/8	3	2 1/8	13/32	0.929	1.296	1 5/64	2 1/16	0.941	5/8	3/8	GY1010KRRB
YCJ	17											GYE17KRRB
YCJ	3/4	85.7	63.5	11.1	27.8	37.7	31.0	60.3	27.56	18.3	10	GY1012KRRB
YCJ	20	3 3/8	2 1/2	7/16	1.094	1.484	1 7/32	2 3/8	1.085	23/32	3/8	GYE20KRRB
YCJ	7/8											GY1014KRRB
YCJ	15/16	95.2	69.8	12.7	27.9	39.3	34.1	65.1	33.88	19.8	10	GY1015KRRB
YCJ	1	3 3/4	2 49/64	1/2	1.100	1.546	1 11/32	2 9/16	1.331	25/32	3/8	GY1100KRRB
YCJ	25											GYE25KRRB
YCJ	1 1/8											GY1102KRRB
YCJ	1 3/16	107.9	82.6	13.5	29.9	42.4	38.1	76.2	40.31	22.2	10	GY1103KRRB
YCJ	1 1/4 S	4 1/4	3 1/4	17/32	1.178	1.671	1 1/2	3	1.587	7/8	3/8	GY1103KRRB3
YCJ	30											GYE30KRRB
YCJ	1 1/4											GY1104KRRB
YCJ	1 3/8	117.5	92.1	13.5	31.8	46.4	42.9	88.9	46.81	25.4	12	GY1106KRRB
YCJ	1 7/16	4 5/8	3 5/8	17/32	1.254	1.827	1 11/16	3 1/2	1.843	1	1/2	GY1107KRRB
YCJ	35											GYE35KRRB
YCJ	1 1/2	130.2	101.6	14.3	38.1	54.4	49.2	98.4	52.27	30.2	12	GY1108KRRB
YCJ	40	5 1/8	4	9/16	1.500	2.141	1 15/16	3 7/8	2.057	1 3/16	1/2	GYE40KRRB
YCJ	1 5/8											GY1110KRRB
YCJ	1 11/16	136.5	104.8	14.3	38.9	54.4	49.2	104.8	57.92	30.2	12	GY1111KRRB
YCJ	1 3/4	5 3/8	4 1/8	9/16	1.531	2.141	1 15/16	4 1/8	2.279	1 3/16	1/2	GY1112KRRB
YCJ	45											GYE45KRRB
YCJ	1 15/16	142.9	111.1	14.3	42.9	60.7	51.6	112.7	62.84	32.5	16	GY1115KRRB
YCJ	2 S											GY1115KRRB3
YCJ	50	5 5/8	4 3/8	9/16	1.688	2.390	2 1/32	4 7/16	2.473	1 9/32	5/8	GYE50KRRB
YCJ	2	161.9	130.2	16.7	46.8	64.7	55.6	120.7	69.77	33.3	16	GY1200KRRB
YCJ	2 3/16	6 3/8	5 1/8	21/32	1.844	2.546	2 3/16	4 3/4	2.747	1 5/16	5/8	GY1203KRRB
YCJ	55											GYE55KRRB
YCJ	2 7/16	174.6	142.9	17.5	49.2	74.2	65.1	136.5	76.48	39.1	16	GY1207KRRB
YCJ	60	6 7/8	5 5/8	11/16	1.937	2.921	2 9/16	5 3/8	3.011	1 9/16	5/8	GYE60KRRB
YCJ	2 11/16	187.3	149.2	19	63.5	81.4	69.9	152.4	86.92	42.9	16	GY1211KRRB
YCJ	70	7 3/8	5 7/8	3/4	2.500	3.204	2 3/4	6	3.422	1 11/16	5/8	GYE70KRRB
YCJ	2 15/16	196.8	152.4	23.8	66.7	86.2	77.8	161.9	91.92	44.4	20	GY1215KRRB
YCJ	75	7 3/4	6	15/16	2.625	3.392	3 1/16	6 3/8	3.619	1 3/4	3/4	GYE75KRRB

Shaft diameter with an S = smaller housing.

VCJ STANDARD SERIES

- Flange cartridges come assembled and ready for mounting by using four bolts through the flange.
- VCJ Series flange cartridges are ideal for applications where minimum machining is to be done.
- Units are assembled with GRA-RRB bearings with positive contact land-riding seals and self-locking collars.
- Units are factory prelubricated, but a grease fitting is provided for relubrication if required.
- Safety end caps are available for selected sizes.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 3/16", nominal to .025 mm, -.0010".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
VCJ	GRA-RRB	Page D57

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: VCJ 1". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia. mm / in.	L ref. mm / in.	J ref. mm / in.	A_1 ref. mm / in.	A ±.015" mm / in.	E max. mm / in.	N mm / in.	B_1 mm / in.	D ref. mm / in.	d_1 ±.005 mm / in.	S_1 ref. mm / in.	Bearing Number	Collar Number	Housing Number new / (old)	Unit Wt. kg / lbs.
VCJ	1/2	76.2	53.98	10.3	23.6	39.3	10.7	28.6	52.4	28.1	22.2	GRA008RRB	S1008K	T-40278	0.527
VCJ	5/8	3	2 1/8	13/32	0.929	1.548	27/64	1 1/8	2 1/16	1.105	7/8	GRA010RRB	S1010K	(T-16659)	1.16
VCJ	17											GRAE17RRB	SE17K		
VCJ	**3/4**	85.7	63.5	11.1	27.8	43.3	10.7	31	60.3	32.8	23.4	GRA012RRB	S1012K	T-40267	0.654
VCJ	20	3 3/8	2 1/2	7/16	1.094	1.706	27/64	1 7/32	2 3/8	1.292	59/64	GRAE20RRB	SE20K	(T-16661A)	1.44
VCJ	7/8											GRA014RRB	S1014K		
VCJ	15/16	95.2	69.85	12.7	27.9	43.1	11.5	31	65.1	37.6	23.4	GRA015RRB	S1015K	T-40262	0.894
VCJ	**1**	3 3/4	2 3/4	1/2	1.100	1.696	29/64	1 7/32	2 9/16	1.480	59/64	GRA100RRB	S1100K	(T-16663A)	1.97
VCJ	25											GRAE25RRB	SE25K		
VCJ	1 1/8											GRA102RRB	S1102K		
VCJ	**1 3/16**	107.9	82.55	13.5	29.9	47.1	11.5	35.7	76.2	43.9	27	GRA103RRB	S1103K	T-40266	1.239
VCJ	1 1/4 S	4 1/4	3 1/4	17/32	1.178	1.856	29/64	1 13/32	3	1.730	1 1/16	GRA103RRB2	S1103K3	(T-16664A)	2.73
VCJ	30											GRAE30RRB	SE30K		
VCJ	1 1/4	117.5	92.08	13.5	31.8	50.5	13.1	38.9	88.9	53.6	29.4	GRA104RRB	S1104K	T-40253	1.707
VCJ	1 3/8	4 5/8	3 5/8	17/32	1.254	1.989	33/64	1 17/32	3 1/2	2.112	1 5/32	GRA106RRB	S1106K	(T-16617A)	3.76
VCJ	**1 7/16**											GRA107RRB	S1107		
VCJ	35											GRAE35RRB	SE35K		
VCJ	1 1/2	130.2	101.6	14.3	38.1	58.3	13.1	43.7	98.4	58.2	32.5	GRA108RRB	S1108KT	T-40263	2.175
VCJ	40	5 1/8	4	9/16	1.500	2.297	33/64	1 23/32	3 7/8	2.292	1 9/32	GRAE40RRB	SE40K	(T-16666A)	4.79
VCJ	1 5/8											GRA110RRB	S1110K		
VCJ	**1 11/16**	136.5	104.78	14.3	38.9	57.0	13.1	43.7	104.8	63.0	32.5	GRA111RRB	S1111K	T-40264	2.438
VCJ	1 3/4	5 3/8	4 1/8	9/16	1.531	2.244	33/64	1 23/32	4 1/8	2.480	1 9/32	GRA112RRB	S1112K	(T-16667A)	5.37
VCJ	45											GRAE45RRB	SE45K		
VCJ	1 7/8											GRA114RRB	S1114K		
VCJ	**1 15/16**	142.9	111.12	14.3	42.9	61.0	17.1	43.7	112.7	69.3	32.5	GRA115RRB	S1115K	T-40265	2.788
VCJ	2 S	5 5/8	4 3/8	9/16	1.688	2.400	43/64	1 23/32	4 7/16	2.730	1 9/32	GRA115RRB2	S1115K2	(T-16668A)	6.14
VCJ	50											GRAE50RRB	SE50K		
VCJ	2	161.9	130.18	16.7	46.8	67.9	17.1	48.4	120.6	75.7	36.5	GRA200RRB	S1200K	T-40236	3.269
VCJ	**2 3/16**	6 3/8	5 1/8	21/32	1.844	2.672	43/64	1 29/32	4 3/4	2.980	1 7/16	GRA203RRB	S1203K	(T-16683A)	7.2
VCJ	55											GRAE55RRB	SE55K		

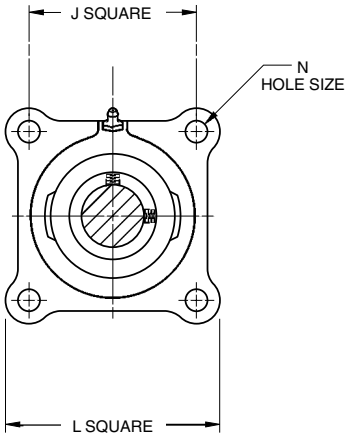
Shaft diameter with an S = smaller housing.

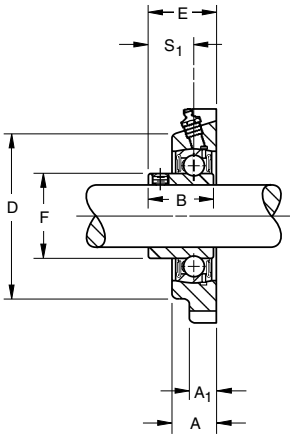
SCJ STANDARD SERIES

- Flange cartridges come assembled and ready for mounting by using four bolts through the flange.
- Ideal for applications where minimum shaft length is required.
- Units are assembled with GYA-RRB bearings with positive contact land-riding seals and setscrew locking.
- Units are factory prelubricated, but a grease fitting is provided for relubrication if required.
- Safety end caps available for selected sizes.

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
SCJ	GYA-RRB	Page D59





TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: SCJ 1″. POPULAR SIZES ARE IN BOLD.

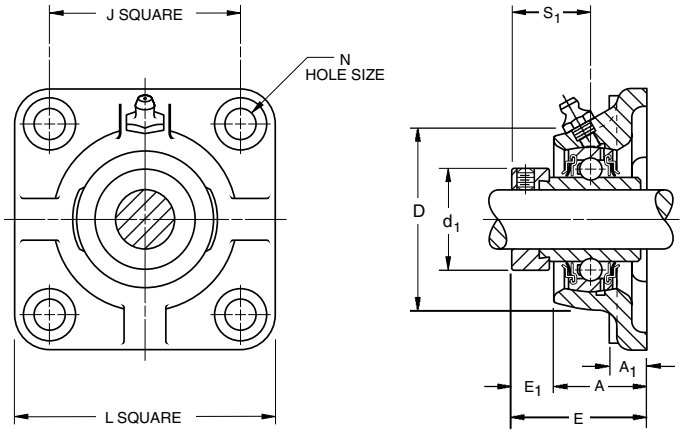
Unit	Shaft Dia.	L	J	A_1	A	E	N	B	D	F	S_1	Bearing Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			kg lbs.
SCJ	1/2	76.2	53.98	11.1	17.9	25.4	13.1	23.8	52.4	24.6	15.9	GYA008RRB	T-40124	0.47
SCJ	5/8	3	2 1/8	7/16	45/64	1	33/64	15/16	2 1/16	31/32	5/8	GYA010RRB		1.03
SCJ	17											GYAE17RRB		
SCJ	**3/4**	85.7	63.5	11.1	19	28.6	10.7	27	60.3	29	18.3	GYA012RRB	T-40126	0.52
SCJ	20	3 3/8	2 1/2	7/16	3/4	1 1/8	27/64	1 1/16	2 3/8	1 9/64	23/32	GYAE20RRB		1.14
SCJ	7/8											GYA014RRB		
SCJ	15/16	95.2	69.85	13.5	19.8	29.8	11.5	28.2	65.1	33.7	19.4	GYA015RRB	T-40128	0.68
SCJ	**1**	3 3/4	2 3/4	17/32	25/32	1 11/64	29/64	1 7/64	2 9/16	1 21/64	49/64	GYA100RRB		1.5
SCJ	25											GYAE25RRB		
SCJ	1 1/8											GYA102RRB		
SCJ	**1 3/16**	107.9	82.55	14.3	21.4	34.1	11.5	32.5	76.2	40.1	23	GYA103RRB	T-40130	1.19
SCJ	1 1/4 S	4 1/4	3 1/4	9/16	27/32	1 11/32	29/64	1 9/32	3	1 37/64	29/32	GYA103RRB2		2.62
SCJ	30											GYAE30RRB		
SCJ	1 1/4											GYA104RRB		
SCJ	1 3/8	117.5	92.08	15.1	24.6	38.1	13.1	36.5	88.9	46.8	25.8	GYA106RRB	T-40132	1.35
SCJ	**1 7/16**	4 5/8	3 5/8	19/32	31/32	1 1/2	33/64	1 7/16	3 1/2	1 27/32	1 1/64	GYA107RRB		2.98
SCJ	35											GYAE35RRB		
SCJ	1 1/2	130.2	101.6	15.9	26.2	40.9	13.1	39.3	98.4	52.4	27.8	GYA108RRB	T-40134	2.1
SCJ	40	5 1/8	4	5/8	1 1/32	1 39/64	33/64	1 35/64	3 7/8	2 1/16	1 3/32	GYAE40RRB		4.63
SCJ	1 5/8											GYA110RRB		
SCJ	**1 11/16**	136.5	104.78	15.9	28.6	43.6	13.1	42.1	104.8	57.9	28.6	GYA111RRB	T-40164	2.24
SCJ	1 3/4	5 3/8	4 1/8	5/8	1 1/8	1 23/32	33/64	1 21/32	4 1/8	2 9/32	1 1/8	GYA112RRB		4.94
SCJ	45											GYAE45RRB		
SCJ	**1 15/16**	142.9	111.12	16.7	28.6	46	17.1	44.4	112.7	62.6	30.9	GYA115RRB	T-40166	2.55
SCJ	2 S	5 5/8	4 3/8	21/32	1 1/8	1 13/16	43/64	1 3/4	4 7/16	2 15/32	1 7/32	GYA115RRB2		5.63
SCJ	50											GYAE50RRB		
SCJ	2	161.9	130.18	18.2	30.9	48	17.1	46.4	120.6	69.8	31.7	GYA200RRB	T-40168	2.96
SCJ	**2 3/16**	6 3/8	5 1/8	23/32	1 7/32	1 57/64	43/64	1 53/64	4 3/4	2 3/4	1 1/4	GYA203RRB		6.53
SCJ	55											GYAE55RRB		

Shaft diameter with an S = smaller housing.

RCJO, LCJO HEAVY SERIES

- Flange cartridges are similar in design to the standard series.
- Ideal for applications where minimum machining is to be done.
- Units come assembled and ready for mounting by using four bolts through the flange.
- RCJO units are assembled with GN-KRRB (R-Seal) wide inner ring bearings. LCJO units are equipped with GN-KLLB (L-Seal) wide inner ring bearings.
- Units are factory prelubricated, but a grease fitting is provided for relubrication if required.
- Units are supplied with self-locking collars and are dimensionally interchangeable.

Suggested shaft tolerances: **$1\,^{3}/_{16}$" - $1\,^{15}/_{16}$", nominal to -.013 mm,-.0005"; 2" - $3\,^{15}/_{16}$", nominal to -.025 mm, -.0010".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RCJO	GN-KRRB	Page D55
LCJO	GN-KLLB	Page D64

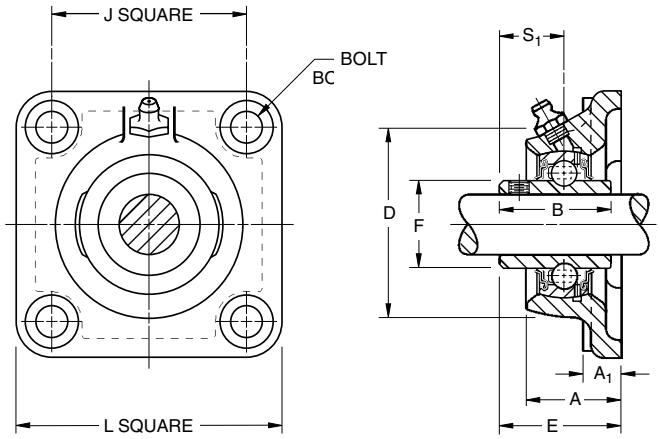
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RCJO $1\,^{7}/_{16}$", LCJO $1\,^{11}/_{16}$".

Unit	Shaft Dia.	L ref.	J ref.	A_1 ref.	A ±.010"	E max.	N	E_1 ref.	S_1 ref.	D ref.	d_1 ±.005"	Bolt Size	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	RCJO LCJO			kg lbs.
RCJO, LCJO	$1\,^{3}/_{16}$	120.6 $4\,^{3}/_{4}$	92.1 $3\,^{5}/_{8}$	14.3 $^{9}/_{16}$	38.1 1.500	53.7 2.115	14.3 $^{9}/_{16}$	15.1 $^{19}/_{32}$	32.5 $1\,^{9}/_{32}$	96.8 $3\,^{13}/_{16}$	48.7 1.918	12.7 $^{1}/_{2}$	GN103KRRB (KLLB)	SN103K	T-19165	1.816 4.0
RCJO, LCJO	$1\,^{7}/_{16}$	130.2 $5\,^{1}/_{8}$	101.6 4	15.9 $^{5}/_{8}$	40.5 1.594	55.3 2.177	14.3 $^{9}/_{16}$	14.3 $^{9}/_{16}$	33.3 $1\,^{5}/_{16}$	104.8 $4\,^{1}/_{8}$	55.1 2.168	12.7 $^{1}/_{2}$	GN107KRRB (KLLB)	SN107	T-19167	2.497 5.50
RCJO, LCJO	$1\,^{1}/_{2}$	136.5 $5\,^{3}/_{8}$	104.8 $4\,^{1}/_{8}$	15.9 $^{5}/_{8}$	44.4 1.750	60.8 2.396	15.9 $^{5}/_{8}$	15.9 $^{5}/_{8}$	37.3 $1\,^{15}/_{32}$	114.3 $4\,^{1}/_{2}$	63.0 2.480	14.3 $^{9}/_{16}$	GN108KRRB (KLLB)	SN108K	T-19169	3.133 6.90
RCJO, LCJO	$1\,^{11}/_{16}$	142.9 $5\,^{5}/_{8}$	111.1 $4\,^{3}/_{8}$	17.5 $^{11}/_{16}$	46.8 1.844	62.4 2.458	15.9 $^{5}/_{8}$	15.1 $^{19}/_{32}$	38.9 $1\,^{17}/_{32}$	123.8 $4\,^{7}/_{8}$	69.3 2.730	14.3 $^{9}/_{16}$	GN111KRRB (KLLB)	SN111K	T-19171	3.573 7.87
RCJO	$1\,^{15}/_{16}$	165.1 $6\,^{1}/_{2}$	130.2 $5\,^{1}/_{8}$	17.5 $^{11}/_{16}$	53.2 2.094	70.4 2.771	17.5 $^{11}/_{16}$	16.7 $^{21}/_{32}$	42.1 $1\,^{21}/_{32}$	141.3 $5\,^{9}/_{16}$	75.7 2.980	15.9 $^{5}/_{8}$	GN115KRRB	SN115K	T-19173	5.185 11.42
RCJO	$2\,^{3}/_{16}$	177.8 7	142.9 $5\,^{5}/_{8}$	17.5 $^{11}/_{16}$	58.7 2.312	76.7 3.021	17.5 $^{11}/_{16}$	17.5 $^{11}/_{16}$	45.2 $1\,^{25}/_{32}$	154 $6\,^{1}/_{16}$	82.0 3.230	15.9 $^{5}/_{8}$	GN203KRRB	SN203K	T-19175	6.424 14.15
RCJO	$2\,^{7}/_{16}$	190.5 $7\,^{1}/_{2}$	149.2 $5\,^{7}/_{8}$	19 $^{3}/_{4}$	65.1 2.562	84.7 3.333	20.6 $^{13}/_{16}$	19 $^{3}/_{4}$	48.4 $1\,^{29}/_{32}$	160.3 $6\,^{5}/_{16}$	88.4 3.480	19 $^{3}/_{4}$	GN207KRRB	SN207K	T-19177	7.409 16.32
RCJO	$2\,^{11}/_{16}$	225.4 $8\,^{7}/_{8}$	177.8 7	22.2 $^{7}/_{8}$	72.2 2.844	89.4 3.521	23.8 $^{15}/_{16}$	21.4 $^{27}/_{32}$	54.8 $2\,^{5}/_{32}$	185.7 $7\,^{5}/_{16}$	101.1 3.980	22.2 $^{7}/_{8}$	GN211KRRB	SO211K	T-19179	9.534 21.0
RCJO	$2\,^{15}/_{16}$	231.8 $9\,^{1}/_{8}$	184.2 $7\,^{1}/_{4}$	22.2 $^{7}/_{8}$	77.8 3.062	105.3 4.146	23.8 $^{15}/_{16}$	27 $1\,^{1}/_{16}$	62.7 $2\,^{15}/_{32}$	198.4 $7\,^{13}/_{16}$	112.2 4.418	22.2 $^{7}/_{8}$	GN215KRRB	SN215K	T-19181	14.128 31.12
RCJO	$3\,^{7}/_{16}$	279.4 11	215.9 $8\,^{1}/_{2}$	28.6 $1\,^{1}/_{8}$	84.1 3.312	121.2 4.770	27 $1\,^{1}/_{16}$	36.5 $1\,^{7}/_{16}$	73.8 $2\,^{29}/_{32}$	228.6 9	132.3 5.210	25.4 1	GN307KRRB	SN307K	T-24475	21.474 47.3
RCJO	$3\,^{15}/_{16}$	317.5 $12\,^{1}/_{2}$	241.3 $9\,^{1}/_{2}$	31.8 $1\,^{1}/_{4}$	96.8 3.812	133.6 5.260	30.2 $1\,^{3}/_{16}$	36.5 $1\,^{7}/_{16}$	78.6 $3\,^{3}/_{32}$	266.7 $10\,^{1}/_{2}$	145.5 5.730	28.6 $1\,^{1}/_{8}$	GN315KRRB	SN315K	T-24477	30.645 67.5

YCJM MEDIUM DUTY SERIES SETSCREW LOCK

- Four-bolt flanged cartridges featuring GYM-KRRB bearing inserts.
- Ideal for conveyor, fan and blower, sawmill, and feed and grain handling applications.
- Durable, cast iron housings are powder-paint coated and maintain an excellent finish while resisting corrosion, chemicals and weather exposure.
- Industrial-duty flanged cartridges incorporate premium features designed to extend bearing life.

Suggested shaft tolerances: **1" -1 15/16", nominal to -.013 mm, -.0005"; 2"- 3", nominal to -.025 mm, -.0010".**



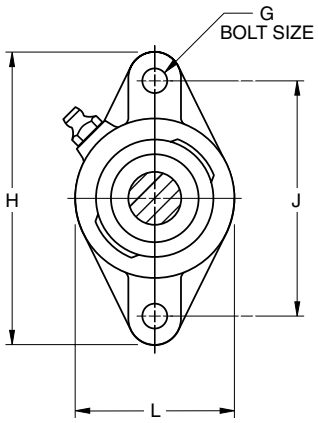
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: YCJM 1 7/16".

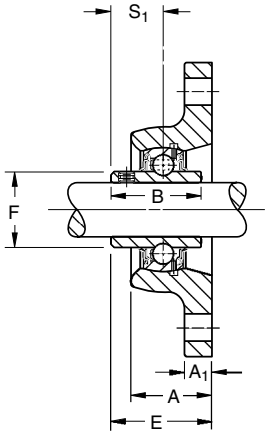
Unit	Shaft Dia.	L ref.	J ref.	A_1 ref.	A ±.015"	E max.	B	D ref.	F ±.001"	S_1 ref.	Bolt Size	Bearing Number
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	
YCJM	1	107.9 4 1/4	82.6 3 1/4	13.5 17/32	29.9 1.178	42.4 1.671	38.1 1 1/2	76.2 3	40.31 1.587	22.2 7/8	10 3/8	GYM1100KRRB
YCJM	1 3/16	117.5 4 5/8	92.1 3 5/8	13.5 17/32	31.8 1.254	46.4 1.827	42.9 1 11/16	88.9 3 1/2	46.81 1.843	25.4 1	12 1/2	GYM1103KRRB
YCJM	1 7/16	130.2 5 1/8	101.6 4	14.8 9/16	38.1 1.500	54.4 2.141	49.2 1 15/16	98.4 3 7/8	52.27 2.058	30.2 1 3/16	12 1/2	GYM1107KRRB
YCJM	1 1/2	136.5 5 3/8	104.8 4 1/8	14.3 9/16	38.9 1.531	54.4 2.141	49.2 1 15/16	104.8 4 1/8	57.92 2.28	30.2 1 3/16	12 1/2	GYM1108KRRB
YCJM	1 11/16	142.9 5 5/8	111.1 4 3/8	14.3 9/16	42.9 1.688	60.7 2.390	51.6 2 1/32	112.7 4 7/16	62.84 2.474	32.5 1 9/32	16 5/8	GYM1111KRRB
YCJM	1 3/4											GYM1112KRRB
YCJM	1 15/16	161.9 6 3/8	130.2 5 1/8	16.7 21/32	46.8 1.844	64.7 2.546	55.6 2 3/16	120.7 4 3/4	69.77 2.747	33.3 1 15/16	16 5/8	GYM1115KRRB
YCJM	2											GY1200KRRB
YCJM	2 3/16	174.6 6 7/8	142.9 5 5/8	17.5 11/16	49.2 1.937	74.3 2.926	65.1 2 9/16	136.5 5 3/8	76.48 3.011	39.1 1 9/16	16 5/8	GYM1203KRRB
YCJM	2 1/4											GY1204KRRB
YCJM	2 7/16	187.3 7 3/8	149.2 5 7/8	19.0 3/4	63.5 2.500	81.5 3.208	69.9 2 3/4	152.4 6	86.92 3.422	42.9 1 11/16	16 5/8	GYM1207KRRB
YCJM	2 1/2											GYM1208KRRB
YCJM	2 11/16	196.8 7 3/4	152.4 6	22.2 7/8	66.7 2.625	86.2 3.396	77.8 3 1/16	161.9 6 3/8	91.92 3.619	44.4 1 3/4	20 3/4	GYM1211KRRB
YCJM	2 15/16	196.8 7 3/4	152.4 6	22.2 7/8	66.7 2.625	90.8 3.576	77.8 3 1/16	179.4 7 1/16	98.37 3.873	44.4 1 15/16	20 3/4	GYM1215KRRB
YCJM	3											GYM1300KRRB
YCJM	3 7/16	214.3 8 7/16	242.1 9 17/32	25.4 1	70.5 2.776	101.1 3.981	95.94 3 25/32	196.8 7 3/4	111.68 4.397	56.4 2 7/32	20 3/4	GYM1307KRRB
YCJM	3 15/16	268.3 10 9/16	298.4 11 3/4	31.8 1 1/4	95.4 3.755	127.3 5.014	117.35 4 5/8	235.0 9 1/4	131.3 5.171	68.3 2 11/16	25 1	GYM1315KRRB

YCJTM MEDIUM DUTY SERIES SETSCREW LOCK

- Medium-duty, two-bolt flanged cartridges feature GYM-KRRB bearing inserts.
- Ideal for conveyor, fan and blower, sawmill, and feed and grain handling applications.
- Durable, cast iron housings are powder-paint coated and maintain an excellent finish while resisting corrosion, chemicals and weather exposure.
- Industrial-duty flanged cartridge units incorporate premium features designed to extend bearing life. They can replace competitive designs.

Suggested shaft tolerances: **1" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 3", nominal to -.025 mm, -.0010".**





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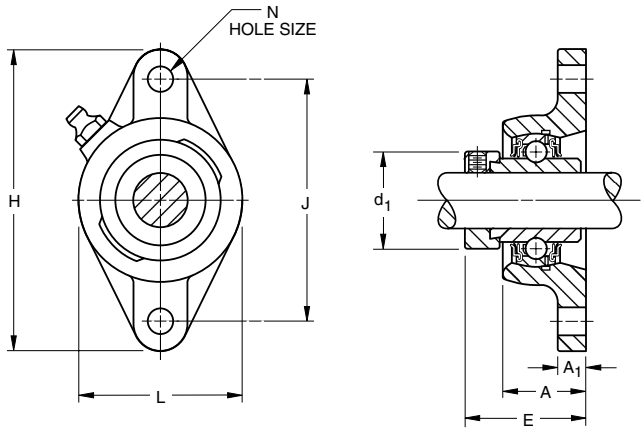
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: YCJTM 1 7/16".

Unit	Shaft Dia.	H ref.	J ±.010"	L ref.	A ±.015"	E max.	B	A_1 ref.	F ±.001"	S_1	Bolt G	Bearing Number
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	
YCJTM	1	141.3 5 9/16	116.7 4 19/32	79.5 3 1/8	29.9 1.178	42.4 1.671	38.1 1 1/2	13.5 17/32	40.31 1.587	22.2 7/8	10 3/8	GYM1100KRRB
YCJTM	1 3/16	155.6 6 1/8	130.2 5 1/8	92.1 3 5/8	31.8 1.254	46.4 1.827	42.9 1 11/16	11.9 15/32	46.79 1.843	25.4 1	12 1/2	GYM1103KRRB
YCJTM	1 7/16	171.5 6 3/4	143.7 5 21/32	104.8 4 1/8	38.1 1.500	54.4 2.141	49.2 1 15/16	12.7 1/2	52.27 2.058	30.2 1 3/16	12 1/2	GYM1107KRRB
YCJTM	1 1/2	179.4 7 1/16	148.4 5 27/32	111.1 4 3/8	38.9 1.531	54.4 2.141	49.2 1 15/16	12.7 1/2	57.92 2.280	30.2 1 3/16	12 1/2	GYM1108KRRB
YCJTM	1 11/16	188.9	157.2	115.9	42.9	60.7	51.6	12.7	62.81	32.5	16	GYM1111KRRB
YCJTM	1 3/4	7 7/16	6 3/16	4 9/16	1.688	2.390	2 1/32	1/2	2.473	1 9/32	5/8	GYM1112KRRB
YCJTM	1 15/16	215.9	184.2	127.0	46.8	64.7	55.6	16.7	69.77	33.3	16	GYM1115KRRB
YCJTM	2	8 1/2	7 1/4	5	1.844	2.546	2 3/16	21/32	2.747	1 15/16	5/8	GY1200KRRB

RCJT, TCJT, LCJT INDUSTRIAL SERIES

- Cartridges are the same basic design as RCJ, TCJ, and LCJ types, except they have two bolt holes instead of four.
- Primarily designed for applications where the mounting area is restricted.
- RCJT cartridge is equipped with G-KRRB (R-Seal) wide inner ring bearings. The TCJT is equipped with G-KPPB (Tri-Ply Seal) wide inner ring bearings. The LCJT is equipped with the G-KLLB (Mechani-Seal) wide inner ring bearings.
- Units are factory prelubricated, but a grease fitting is provided for relubrication.
- Safety end caps are available for selected sizes.



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RCJT	**G-KRRB**	**Page D54**
TCJT	**G-KPPB**	**Page D65**
LCJT	**G-KLLB**	**Page D62**

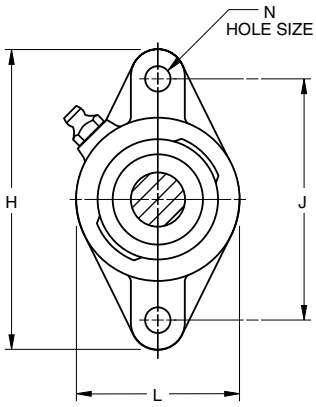
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RCJT 1 3/16", TCJT 1 3/16". POPULAR SIZES ARE IN BOLD.

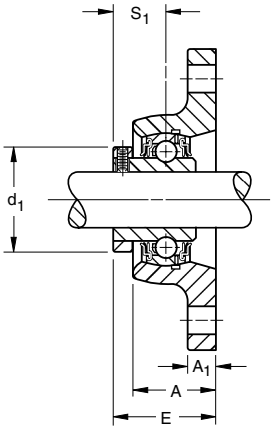
Unit	Shaft Dia. mm	Shaft Dia. in.	H ref. mm	H ref. in.	J ±.010" mm	J ±.010" in.	L ref. mm	L ref. in.	A ±.015" mm	A ±.015" in.	N mm	N in.	E max. mm	E max. in.	A_1 ref. mm	A_1 ref. in.	d_1 ±.005" mm	d_1 ±.005" in.	Bearing Number RCJT	Bearing Number TCJT	Collar Number	Housing Wt. new (old)	Unit kg lbs.
RCJT		1/2																	G1008KRRB	—	S1008K		
RCJT		5/8	98.4	3 7/8	76.2	3	54.0	2 1/8	23.6	0.929	10.7	27/64	40.6	1.599	10.3	13/32	28.1	1.105	G1010KRRB	—	S1010K	T-40219	0.590
RCJT		11/16																	G1011KRRB	—	S1011K		1.30
RCJT	17																		GE17KRRB	—	SE17K		
RCJT		**3/4**	111.9	4 13/32	89.7	3 17/32	60.5	2 3/8	27.8	1.094	10.7	27/64	46.4	1.828	11.1	7/16	32.8	1.292	G1012KRRB	—	S1012K	T-40220	0.590
RCJT	20																		GE20KRRB	—	SE20K		1.30
RCJT, TCJT		13/16																	G1013KRRB	G1013KPPB3	S1013K		
RCJT, TCJT		7/8	123.8	4 7/8	99.2	3 29/32	69.8	2 3/4	27.9	1.100	11.5	29/64	46.7	1.839	11.1	7/16	23.9	1.480	G1014KRRB	G1014KPPB3	S1014K	T-40221	0.785
RCJT, TCJT		15/16																	G1015KRRB	G1015KPPB3	S1015K	(T-21412P)	1.73
RCJT, TCJT		**1**																	G1100KRRB	G1100KPPB3	S1100K		
RCJT, TCJT	25																		GE25KRRB	GE25KPPB3	SE25K		
RCJT, TCJT		1 1/16																	G1101KRRB	G1101KPPB3	S1101K		
RCJT, TCJT		1 1/8	141.3	5 9/16	116.7	4 19/32	79.4	3 1/8	29.9	1.178	11.5	29/64	50.5	1.990	11.9	15/32	43.7	1.730	G1102KRRB	G1102KPPB3	S1102K	T-40222	1.09
RCJT, TCJT		**1 3/16**																	G1103KRRB	G1103KPPB3	S1103K	(T-21548P)	2.40
TCJT		1 1/4 S																	—	G1103KPPB4	S1103K3		
RCJT, TCJT	30																		GE30KRRB	GE30KPPB3	SE30K		
RCJT, TCJT		1 1/4																	G1104KRRB	G1104KPPB2	S1104K(1)		
RCJT, TCJT		1 5/16	155.6	6 1/8	130.2	5 1/8	92.1	3 5/8	31.8	1.254	13.1	33/64	53.5	2.106	11.9	15/32	53.6	2.112	G1105KRRB	G1105KPPB2	S1105K(1)	T-40223	1.444
RCJT, TCJT		1 3/8																	G1106KRRB	G1106KPPB2	S1106K(1)	(T-21414)	3.18
RCJT, TCJT		**1 7/16**																	G1107KRRB	G1107KPPB2	S1107K(1)		
RCJT, TCJT	35																		GE35KRRB	GE35KPPB2	SE35K		
RCJT, TCJT		1 1/2	171.4	6 3/4	143.6	5 21/32	104.7	4 1/8	38.1	1.500	13.1	33/64	59.3	2.334	12.7	1/2	58.2	2.292	G1108KRRB	G1108KPPB3	S1108KT	T-40224	2.193
RCJT, TCJT		1 9/16																	—	G1109KPPB3	S1109KT	(T-22529)	4.83
RCJT, TCJT	40																		GE40KRRB	GE40KPPB3	SE40K		
RCJT, TCJT		1 5/8																	G1110KRRB	G1110KPPB4	S1110K		
RCJT, TCJT		**1 11/16**	179.4	7 1/16	148	5 27/32	111.1	4 3/8	38.9	1.531	13.1	33/64	59.3	2.334	12.7	1/2	63.0	2.480	G1111KRRB	G1111KPPB4	S1111K	T-40225	2.379
RCJT, TCJT		1 3/4																	G1112KRRB	G1112KPPB4	S1112K	(T-21416)	5.24
RCJT, TCJT	45																		GE45KRRB	GE45KPPB4	SE45K		
RCJT, TCJT		1 7/8	188.9	7 7/16	157.2	6 3/16	115.9	4 9/16	42.9	1.688	17.1	43/64	66.4	2.615	12.7	1/2	69.3	2.730	G1114KRRB	G1114KPPB3	S1114K	T-40226	2.724
RCJT, TCJT		**1 15/16**																	G1115KRRB	G1115KPPB3	S1115K	(T-21418)	6
RCJT, TCJT	50																		GE50KRRB	GE50KPPB3	SE50K		
RCJT, TCJT		2																	G1200KRRB	G1200KPPB4	S1200K		
RCJT, TCJT		2 1/8	215.9	8 1/2	184.1	7 1/4	127	5	46.8	1.844	17.1	43/64	75.1	2.958	16.7	21/32	75.7	2.980	G1202KRRB	G1202KPPB4	S1202K	T-40227	3.668
RCJT, TCJT		2 3/16																	G1203KRRB	G1203KPPB4	S1203K	(T-23788)	8.08
RCJT, TCJT	55																		GE55KRRB	GE55KPPB4	SE55K		

(1) Add C1 suffix to collar numbers for G...KPPB2 bearings (TCJT).
Shaft diameter with an S = smaller housing.

RCJTC INDUSTRIAL SERIES CONCENTRIC COLLAR

- Same basic design as RCJT, except they use the concentric collar rather than the self-locking eccentric collar as the shaft locking device.
- All units are equipped with GC-KRRB wide inner ring concentric collars.
- The spherical outside diameter mounted in the corresponding machined housing seats provides the initial self-alignment.
- Bolt hole spacing dimensions are interchangeable with the RCJT Series and most competitive units.
- Units are factory prelubricated. A grease fitting is provided for relubrication.
- Safety end caps are available for selected sizes.





BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RCJTC	GC-KRRB	Page D66

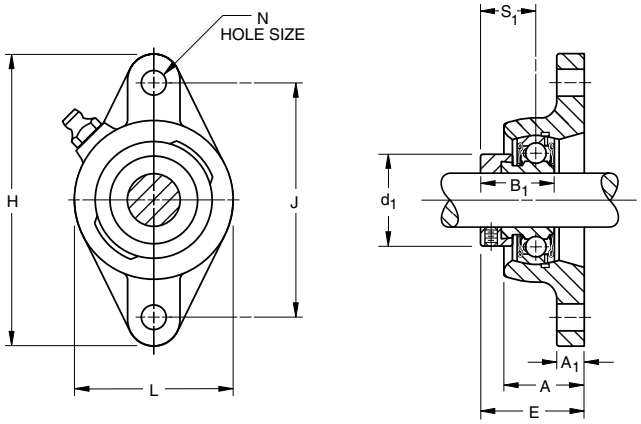
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RCJTC 1 3/16"

Unit	Shaft Dia.	H ref.	J ±.010"	L ref.	A ±.015"	E max.	N	A_1 ref.	d_1 ±.005"	S_1 ref.	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			new (old)	kg lbs.
RCJTC	5/8	98.4 3 7/8	76.2 3	60.3 2 3/8	23.6 0.929	32.7 1.287	9.9 25/64	8.3 21/64	33.8 1.329	15.5 39/64	GC1010KRRB	C203	T-40270 (T-27181)	0.368 0.81
RCJTC	3/4	111.9 4 13/32	89.7 3 17/32	60.3 2 3/8	27.8 1.094	38.2 1.502	9.9 25/64	11.1 7/16	37.7 1.485	18.7 47/64	GC1012KRRB	C204	T-40271 (T-27183)	0.545 1.2
RCJTC	1	123.8 4 7/8	98.81 3 57/64	69.8 2 3/4	27.9 1.100	39.8 1.569	11.9 15/32	13.5 17/32	44.1 1.735	20.2 51/64	GC1100KRRB	C205	T-40272 (T-27200)	0.717 1.58
RCJTC RCJTC RCJTC	1 1/8 1 3/16 1 1/4 S	141.3 5 9/16	116.7 4 19/32	81 3 3/16	29.9 1.178	43.0 1.693	11.5 29/64	13.5 17/32	52.3 2.058	22.6 57/64	GC1102KRRB GC1103KRRB GC1103KRRB3	C206	T-401273 (T-27197)	1.035 2.28
RCJTC RCJTC RCJTC	1 1/4 1 3/8 1 7/16	155.6 6 1/8	130.2 5 1/8	92.1 3 5/8	31.8 1.254	46.6 1.834	13.1 33/64	14.3 9/16	58.2 2.292	25.4 1	GC1104KRRB GC1106KRRB GC1107KRRB	C207	T-40252	1.498 3.30
RCJTC	1 11/16	179.4 7 1/16	148.4 5 27/32	111.1 4 3/8	38.9 1.531	53.7 2.116	13.1 33/64	14.3 9/16	72.9 2.871	29.4 1 5/32	GC1111KRRB	C209	T-40275	2.097 4.62
RCJTC	1 15/16	188.9 7 7/16	157.2 6 3/16	115.9 4 9/16	42.9 1.688	58.5 2.303	17.1 43/64	14.3 9/16	79.3 3.121	30.2 1 3/16	GC1115KRRB	C210	T-40276	2.497 5.50

Shaft diameter with an S = smaller housing.

VCJT STANDARD SERIES

- Same design and features as the VCJ Type, but has two bolt holes instead of four. This allows for mounting in restricted areas.
- Assembled with GRA-RRB bearings with positive contact land-riding seals and self-locking collars.
- Units are factory prelubricated. A grease fitting is provided for relubrication.
- Safety end caps are available for selected sizes.



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
VCJT	GRA-RRB	Page D57

Suggested shaft tolerances: **1/2" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 3/16", nominal to -.025 mm, -.0010".**

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: VCJT 1". POPULAR SIZES ARE IN BOLD.

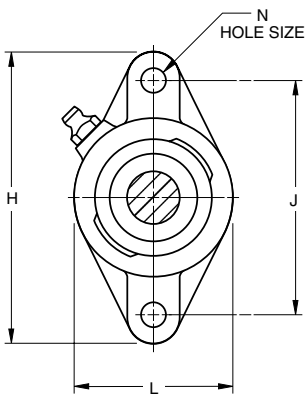
Unit	Shaft Dia. mm	Shaft Dia. in.	H ref. mm	H ref. in.	J ±.010 mm	J ±.010 in.	L ref. mm	L ref. in.	A ±.015" mm	A ±.015" in.	E max. mm	E max. in.	N mm	N in.	B_1 mm	B_1 in.	A_1 ref. mm	A_1 ref. in.	d_1 ±.005" mm	d_1 ±.005" in.	S_1 mm	S_1 in.	Bearing Number	Collar Number	Housing Number new (old)	Unit Wt. kg	Unit Wt. lbs.
VCJT		1/2	98.4	3 7/8	76.2	3	53.9	2 1/8	23.6	0.929	39.3	1.548	10.7	27/64	28.6	1 1/8	10.3	13/32	28.1	1.105	22.2	7/8	GRA008RRB	S1008K	T-40219	0.59	1.3
VCJT		5/8																					GRA010RRB	S1010K	(T-22244P)		
VCJT	17																						GRAE17RRB	SE17K			
VCJT		**3/4**	111.9	4 13/32	89.7	3 17/32	60.3	2 3/8	27.8	1.094	43.3	1.706	9.9	25/64	31	1 7/32	11.1	7/16	32.8	1.292	23.4	59/64	GRA012RRB	S1012K	T-40220	0.518	1.44
VCJT	20																						GRAE20RRB	SE20K	(T-21409P)		
VCJT		7/8																					GRA014RRB	S1014K			
VCJT		15/16	123.8	4 7/8	99.2	3 29/32	69.8	2 3/4	27.9	1.100	43.2	1.701	11.5	29/64	31	1 7/32	11.1	7/16	23.9	1.480	23.4	59/64	GRA015RRB	S1015K	T-40221	0.74	1.63
VCJT		**1**																					GRA100RRB	S1100K	(T-21412P)		
VCJT	25																						GRAE25RRB	SE25K			
VCJT		1 1/8																					GRA102RRB	S1102K			
VCJT		**1 3/16**	141.3	5 9/16	116.7	4 19/32	79.4	3 1/8	29.9	1.178	47.1	1.856	11.5	29/64	35.7	1 13/32	11.9	15/32	43.7	1.730	27	1 1/16	GRA103RRB	S1103K	T-40222	1.026	2.26
VCJT		1 1/4 S																					GRA103RRB2	S1103K3	(T-21548P)		
VCJT	30																						GRAE30RRB	SE30K			
VCJT		1 1/4																					GRA104RRB	S1104K			
VCJT		1 3/8	155.6	6 1/8	130.2	5 1/8	92.1	3 5/8	31.8	1.254	50.5	1.989	13.1	33/64	38.9	1 17/32	11.9	15/32	53.6	2.112	29.4	1 5/32	GRA106RRB	S1106K	T-40223	1.362	3
VCJT		**1 7/16**																					GRA107RRB	S1107K	(T-21414)		
VCJT	35																						GRAE35RRB	SE35K			
VCJT		**1 1/2**	171.4	6 3/4	143.6	5 21/32	104.7	4 1/8	38.1	1.500	56.9	2.243	13.1	33/64	43.7	1 23/32	12.7	1/2	58.2	2.292	32.5	1 9/32	GRA108RRB	S1108KT	T-40224	2.075	4.57
VCJT	40																						GRAE40RRB	SE40K	(T-22529)		
VCJT		1 5/8																					GRA110RRB	S1110K			
VCJT		**1 11/16**	179.4	7 1/16	148.0	5 27/32	111.1	4 3/8	38.9	1.531	57.0	2.244	13.1	33/64	43.7	1 23/32	12.7	1/2	63.0	2.480	32.5	1 9/32	GRA111RRB	S1111K	T-40225	2.229	4.91
VCJT		1 3/4																					GRA112RRB	S1112K	(T-21416)		
VCJT	45																						GRAE45RRB	SE45K			
VCJT		1 7/8																					GRA114RRB	S1114K			
VCJT		**1 15/16**	188.9	7 7/16	157.2	6 3/16	115.8	4 9/16	42.9	1.688	61.0	2.400	17.1	43/64	43.7	1 23/32	12.7	1/2	69.3	2.730	32.5	1 9/32	GRA115RRB	S1115K	T-40226	2.492	5.49
VCJT		2 S																					GRA115RRB2	S1115K2	(T-21418)		
VCJT	50																						GRAE50RRB	SE50K			
VCJT		2	215.9	8 1/2	184.1	7 1/4	127	5	46.8	1.844	67.9	2.672	17.1	43/64	48.4	1 29/32	16.7	21/32	75.7	2.980	36.5	2 7/16	GRA200RRB	S1200K	T-40227	3.092	6.81
VCJT		**2 3/16**																					GRA203RRB	S1203K	(T-23788)		
VCJT	55																						GRAE55RRB	SE55K			

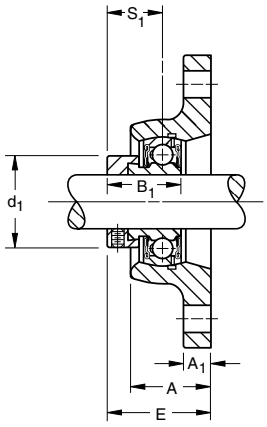
Shaft diameter with an S = smaller housing.

YCJT INDUSTRIAL SETSCREW SERIES

- Same design as the YCJ Series, but mounted with two bolts instead of four.
- All are equipped with GY-KRRB wide inner ring, setscrew bearings.
- Spherical outside diameter mounted in the corresponding machined housings seats provides the initial self-alignment.
- Units are factory prelubricated. A grease fitting is provided for relubrication.
- Safety end caps are available for selected sizes.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005"; 2"- 3/16", nominal to -.025 mm, -.0010".**





BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
YCJT	GY-KRRB	Page D67

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: YCJT 1 7/16". POPULAR SIZES ARE IN BOLD.

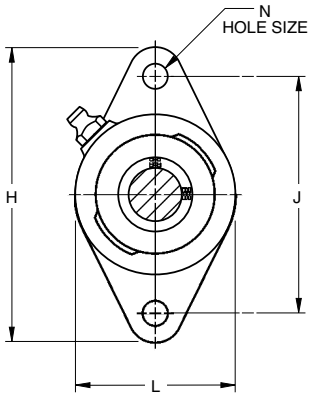
Unit	Shaft Dia. mm	Shaft Dia. in.	H ref. mm / in.	J ±.010" mm / in.	L ref. mm / in.	A ±.015" mm / in.	E max. mm / in.	B mm / in.	A_1 ref. mm / in.	F ±.001" mm / in.	S_1 ref. mm / in.	Hole Size mm / in.	Bearing Number
YCJT		1/2	98.4 / 3 7/8	76.2 / 3	54.0 / 2 1/8	23.6 / 0.929	32.9 / 1.296	27.4 / 1 5/64	11.1 / 7/16	23.9 / 0.941	15.9 / 5/8	10 / 27/64	GY1008KRRB
YCJT		5/8											GY1010KRRB
YCJT	17												GYE17KRRB
YCJT		**3/4**	111.9 / 4 13/32	89.7 / 3 17/32	60.3 / 2 3/8	27.8 / 1.094	37.7 / 1.484	30.9 / 1 7/32	11.1 / 7/16	27.6 / 1.085	18.3 / 23/32	10 / 27/64	GY1012KRRB
YCJT	20												GYE20KRRB
YCJT		7/8											GY1014KRRB
YCJT		15/16	123.8 / 4 7/8	99.2 / 3 29/32	69.9 / 2 3/4	27.9 / 1.100	39.3 / 1.546	34.1 / 1 11/32	11.1 / 7/16	33.8 / 1.331	19.8 / 25/32	11.5 / 29/64	GY1015KRRB
YCJT		**1**											GY1100KRRB
YCJT	25												GYE25KRRB
YCJT		1 1/8											GY1102KRRB
YCJT		**1 3/16**	141.3 / 5 9/16	116.7 / 4 19/32	79.45 / 3 1/8	29.9 / 1.178	42.4 / 1.671	38.1 / 1 1/2	11.9 / 15/32	40.3 / 1.587	22.2 / 7/8	11.5 / 29/64	GY1103KRRB
YCJT		1 1/4 S											GY1103KRRB3
YCJT	30												GYE30KRRB
YCJT		1 1/4											GY1104KRRB
YCJT		1 3/8	155.6 / 6 1/8	130.2 / 5 1/8	92.1 / 3 5/8	31.8 / 1.254	46.4 / 1.827	42.9 / 1 11/16	11.9 / 15/32	46.8 / 1.843	25.4 / 1	13 / 33/64	GY1106KRRB
YCJT		**1 7/16**											GY1107KRRB
YCJT	35												GYE35KRRB
YCJT		**1 1/2**	171.5 / 6 3/4	143.7 / 5 21/32	104.8 / 4 1/8	38.1 / 1.500	54.4 / 2.141	49.2 / 1 15/16	12.7 / 1/2	52.2 / 2.057	30.2 / 1 3/16	13 / 33/64	GY1108KRRB
YCJT	40												GYE40KRRB
YCJT		1 5/8											GY1110KRRB
YCJT		**1 11/16**	179.4 / 7 1/16	148.4 / 5 27/32	111.1 / 4 3/8	38.9 / 1.531	54.4 / 2.14	49.2 / 1 15/16	12.7 / 1/2	57.9 / 2.279	30.2 / 1 3/16	13 / 33/64	GY1111KRRB
YCJT		1 3/4											GY1112KRRB
YCJT	45												GYE45KRRB
YCJT		**1 15/16**	188.9 / 7 7/16	157.2 / 6 3/16	115.9 / 4 9/16	42.9 / 1.688	60.7 / 2.390	51.6 / 2 1/32	12.7 / 1/2	62.8 / 2.473	32.5 / 1 9/32	17 / 43/64	GY1115KRRB
YCJT		2 S											GY1115KRRB3
YCJT	50												GYE50KRRB
YCJT		2	215.9 / 8 1/2	184.2 / 7 1/4	127 / 5	46.8 / 1.844	64.7 / 2.547	55.6 / 2 3/16	16.7 / 21/32	69.7 / 2.745	33.3 / 1 15/16	17 / 43/64	GY1200KRRB
YCJT		**2 3/16**											GY1203KRRB
YCJT	55												GYE55KRRB

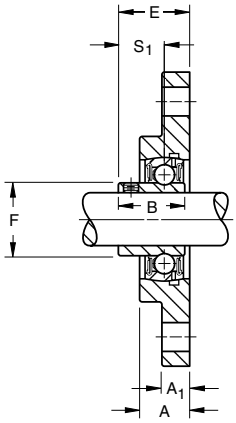
Shaft diameter with an S = smaller housing.

SCJT STANDARD SERIES

- Same construction and design as SCJ Type, but mounted with two bolts instead of four.
- Assembled with GYA-RRB bearings with positive contact land-riding seals and setscrew locking.
- Units are factory prelubricated. A grease fitting is provided for relubrication.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005"; 2"- 3/16", nominal to -.025 mm, -.0010".**





BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
SCJT	GYA-RRB	Page D59

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: SCJT 1". POPULAR SIZES ARE IN BOLD.

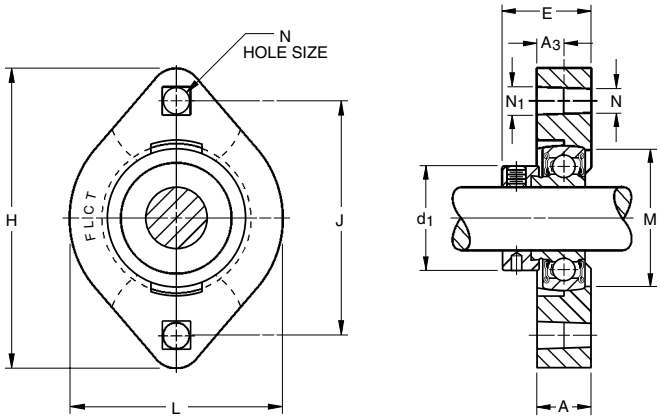
Unit	Shaft Dia. mm	Shaft Dia. in.	H mm / in.	J mm / in.	L mm / in.	A mm / in.	E mm / in.	N mm / in.	B mm / in.	A_1 mm / in.	F mm / in.	S_1 mm / in.	Bearing Number	Housing Number	Unit Wt. kg / lbs.
SCJT		1/2	98.4 / 3 7/8	76.2 / 3	60.3 / 2 3/8	17.9 / 45/64	25.4 / 1	9.9 / 25/64	23.8 / 15/16	11.1 / 7/16	24.6 / 31/32	15.9 / 5/8	GYA008RRB	T-40136	0.34
SCJT		5/8											GYA010RRB		0.75
SCJT	17												GYAE17RRB		
SCJT		**3/4**	111.9 / 4 13/32	89.69 / 3 17/32	65.1 / 2 9/16	19 / 3/4	28.6 / 1 1/8	9.9 / 25/64	27 / 1 1/16	11.1 / 7/16	29 / 1 9/64	18.3 / 23/32	GYA012RRB	T-40138	0.43
SCJT	20												GYAE20RRB		0.94
SCJT		7/8											GYA014RRB		
SCJT		15/16	123.8 / 4 7/8	98.82 / 3 57/64	69.9 / 2 3/4	19.8 / 25/32	29.8 / 1 11/64	11.9 / 15/32	28.2 / 1 7/64	11.1 / 7/16	33.7 / 1 21/64	19.4 / 49/64	GYA015RRB	T-40140	0.48
SCJT		**1**											GYA100RRB		1.07
SCJT	25												GYAE25RRB		
SCJT		1 1/8											GYA102RRB		
SCJT		**1 3/16**	141.3 / 5 9/16	116.68 / 4 19/32	79.4 / 3 1/8	21.4 / 27/32	34.1 / 1 11/32	11.5 / 29/64	32.5 / 1 9/32	13.5 / 17/32	40.1 / 1 37/64	23 / 29/32	GYA103RRB	T-40142	0.72
SCJT		1 1/4 S											GYA103RRB3		1.58
SCJT	30												GYAE30RRB		
SCJT		1 1/4											GYA104RRB		
SCJT		1 3/8	155.6 / 6 1/8	130.18 / 5 1/8	92.1 / 3 5/8	24.6 / 31/32	38.1 / 1 1/2	13.1 / 33/64	36.5 / 1 7/16	14.3 / 9/16	46.8 / 1 27/32	25.8 / 1 1/64	GYA106RRB	T-40144	1.08
SCJT		**1 7/16**											GYA107RRB		2.37
SCJT	35												GYAE35RRB		
SCJT		**1 1/2**	171.5 / 6 3/4	143.67 / 5 21/32	104.8 / 4 1/8	26.2 / 1 1/32	40.9 / 1 39/64	13.1 / 33/64	39.3 / 1 35/64	14.3 / 9/16	52.4 / 2 1/16	27.8 / 1 3/32	GYA108RRB	T-40146	1.97
SCJT	40												GYAE40RRB		4.34
SCJT		1 5/8											GYA110RRB		
SCJT		**1 11/16**	179.4 / 7 1/16	148.0 / 5 27/32	111.1 / 4 3/8	28.6 / 1 1/8	43.6 / 1 23/32	13.1 / 33/64	42.1 / 1 21/32	15.8 / 5/8	57.9 / 2 5/32	28.6 / 1 7/8	GYA111RRB	T-40170	2.03
SCJT		1 3/4											GYA112RRB		4.48
SCJT	45												GYAE45RRB		
SCJT		**1 15/16**	189.9 / 7 7/16	157.16 / 6 3/16	115.8 / 4 9/16	28.6 / 1 1/8	46 / 1 13/16	17.1 / 43/64	44.4 / 1 3/4	16.6 / 21/32	62.7 / 2 15/32	30.9 / 1 7/32	GYA115RRB	T-40172	2.26
SCJT		2 S											GYA115RRB2		4.98
SCJT	50												GYAE50RRB		
SCJT		2	215.9 / 8 1/2	184.15 / 7 1/4	127 / 5	30.9 / 1 7/32	48 / 1 57/64	17.1 / 43/64	46.4 / 1 53/64	18.2 / 23/32	69.8 / 2 3/4	31.7 / 1 1/4	GYA200RRB	T-40174	2.79
SCJT		**2 3/16**											GYA203RRB		6.14
SCJT	55												GYAE55RRB		

Shaft diameter with an S = smaller housing.

FLCT STANDARD SERIES

- Versatile power transmission units are designed to provide sturdy shaft support in minimum space at minimum cost.
- Space-saving, two-bolt unit mounts flush against the frame.
- Bolt hole spacing and size is the same as the pressed-steel flangette unit.
- Equipped with RA-RRB extended inner ring ball bearings with positive contact land-riding seals.
- Permanently prelubricated.
- Positively resistant against contaminants.

Suggested shaft tolerances: **nominal to -.013 mm, -.0005".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
FLCT	RA-RRB	Page D56

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: FLCT 1 3/16".

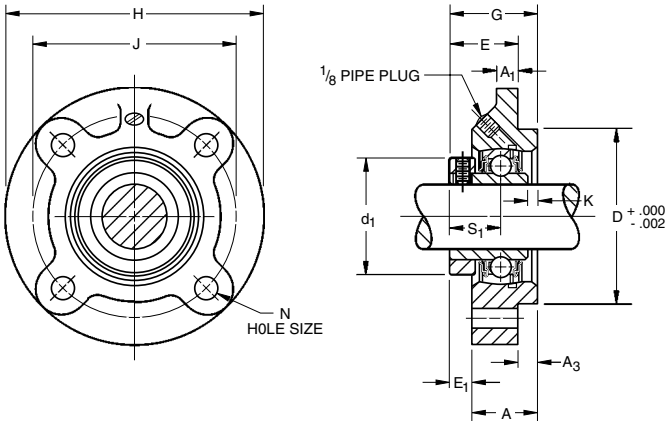
Unit	Shaft Dia.	H	J	L	E	A	A_3	N_1 Sq.	Bolt Diam.	d_1	M	Bearing Number	Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.				kg lbs.
FLCT	1/2	81	63.5	58.7	30.2	14.7	7.1	7.1	6.4	28.6	38.1	RA008RRB	S1008K	T-34124	0.322
FLCT	5/8	3 3/16	2 1/2	2 5/16	1 3/16	37/64	9/32	9/32	1/4	1 1/8	1 1/2	RA010RRB	S1010K		0.71
FLCT	17											RAE17RRB	SE17K		
FLCT	3/4	90.5	71.4	66.7	32.9	17.1	8.7	8.7	7.9	33.3	45.2	RA012RRB	S1012K	T-34122	0.445
FLCT	20	3 9/16	2 13/16	2 5/8	1 19/64	43/64	11/32	11/32	5/16	1 5/16	1 25/32	RAE20RRB	SE20K		0.98
FLCT	7/8											RA014RRB	S1014K		
FLCT	15/16	95.2	76.2	71	34.5	17.5	8.7	8.7	7.9	38.1	50.4	RA015RRB	S1015K	T-33753	0.499
FLCT	1	3 3/4	3	2 51/64	1 23/64	11/16	11/32	11/32	5/16	1 1/2	1 63/64	RA100RRB	S1100K		1.1
FLCT	25											RAE25RRB	SE25K		
FLCT	1 1/8											RA102RRB	S1102K		
FLCT	1 3/16	112.7	90.5	84.1	38.5	20.6	10.3	10.3	9.5	44.4	59.5	RA103RRB	S1103K	T-34120	0.835
FLCT	1 1/4 S	4 7/16	3 9/16	3 5/16	1 33/64	13/16	13/32	13/32	3/8	1 3/4	2 11/32	RA103RRB2	S1103K3		1.84
FLCT	30											RAE30RRB	SE30K		
FLCT	1 1/4											RA104RRB	S1104K		
FLCT	1 3/8	125.4	100	93.7	41.1	22.2	11.1	10.3	9.5	54	69.5	RA106RRB	S1106K	T-34118	1.075
FLCT	1 7/16	4 15/16	3 15/16	3 11/16	1 21/32	7/8	7/16	13/32	3/8	2 1/8	2 47/64	RA107RRB	S1107K		2.37
FLCT	35											RAE35RRB	SE35K		

Shaft diameter with an S = smaller housing.

RFC INDUSTRIAL PILOTED SERIES CONCENTRIC COLLAR

- Piloted flange cartridges assure accurate mounting fits and provide better support for heavy loads.
- Cast iron units are suited for applications such as material handling, industrial conveyor equipment, and farm and construction equipment.
- Assembled with R-Seal (GC-KRRB) bearings with a concentric locking collar.
- Units are factory prelubricated. A grease fitting is provided for relubrication if required.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, .0005";**
2" - 2 3/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RFC	GC-KRRB	Page D66

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RFC 1 7/16".

Unit	Shaft Dia.	D	J	H	S_1	K	N	G	A	E_1	A_3	E	A_1	d_1	Bearing Number	Collar Number	Housing Number	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.				kg lbs.
RFC	1	76.2 3	92.1 3 5/8	111.1 4 3/8	20.2 51/64	3.6 9/64	10.3 13/32	37.7 1 31/64	28.2 1 7/64	9.5 3/8	6.4 1/4	31.4 1 15/64	9.5 3/8	44.4 1 3/4	GC1100KRRB	C205	T-27031	1.152 2.54
RFC RFC RFC	1 1/8 1 3/16 1 1/4 S	85.72 3.375	104.8 4 1/8	127 5	22.6 57/64	3.6 9/64	11.9 15/32	40.9 1 39/64	30.6 1 13/64	10.3 13/32	10.7 27/64	30.2 1 3/16	9.5 3/8	52.4 2 1/16	GC1102KRRB GC1103KRRB GC1103KRRB3	C206	T-27021	1.742 3.84
RFC RFC RFC	1 1/4 1 3/8 1 7/16	92.08 3.625	111.1 4 3/8	133.4 5 1/4	25.4 1	3.2 1/8	11.9 15/32	44.4 1 3/4	34.1 1 11/32	10.3 13/32	11.9 15/32	32.5 1 9/32	12.7 1/2	59.5 2 11/32	GC1104KRRB GC1106KRRB GC1107KRRB	C207	T-26730	1.864 4.11
RFC	1 1/2	92.08 3.625	111.1 4 3/8	133.4 5 1/4	27.4 1 5/64	4.8 3/16	11.9 15/32	48.8 1 59/64	38.1 1 1/2	10.7 27/64	11.9 15/32	36.9 1 29/64	12.7 1/2	68.3 2 11/16	GC1108KRRB	C208	T-26587	2.141 4.72
RFC RFC	1 11/16 1 3/4	107.95 4.25	130.2 5 1/8	155.6 6 1/8	29.4 1 5/32	— —	13.5 17/32	46.8 1 27/32	34.1 1 11/32	12.7 1/2	11.9 15/32	34.9 1 3/8	11.5 29/64	73 2 7/8	GC1111KRRB GC1112KRRB	C209	T-27276	2.817 6.21
RFC	1 15/16	114.3 4.5	136.5 5 3/8	161.9 6 3/8	30.2 1 3/16	6.4 1/4	13.5 17/32	54.8 2 5/32	42.9 1 11/16	11.9 15/32	15.9 5/8	38.9 1 17/32	12.7 1/2	79.4 3 1/8	GC1115KRRB	C210	T-26743	3.211 7.08
RFC RFC	2 2 3/16	127 5	152.4 6	181 7 1/8	33.3 1 5/16	7.1 9/32	15.1 19/32	61.1 2 13/32	44.4 1 3/4	16.7 21/32	22.2 7/8	38.9 1 17/32	12.7 1/2	88.9 3 1/2	GC1200KRRB GC1203KRRB	C211	T-28287	4.082 9

Shaft diameter with an S = smaller housing.

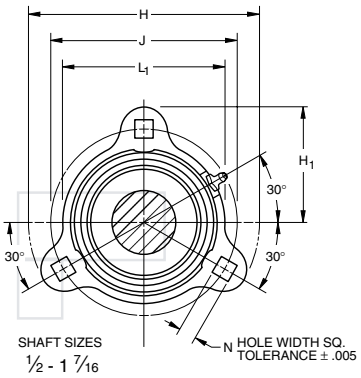
GVFD, GVFDR RELUBRICATABLE SERIES - VFD, VFDR NON-RELUBRICATABLE SERIES

- Malleable iron flange cartridges provide self-alignment and rigid support for medium-duty applications.
- Mounting bolt holes are interchangeable with pressed steel flangette units of corresponding size.

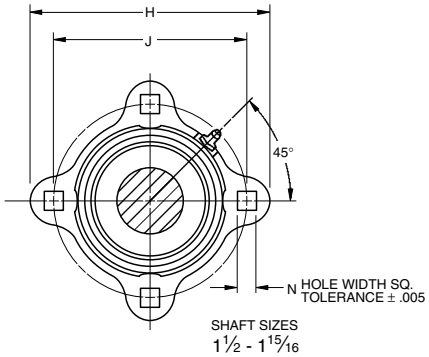
Suggested shaft tolerances: nominal to -.013 mm, -.0005".

BEARING DATA

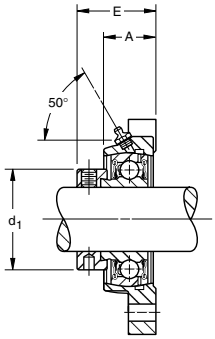
Unit	Bearing Number	Dimensions and Load Ratings
VFD, VFDR	RA...RRB	Page D56
GVFD, GVFDR	GRA...RRB	Page D57



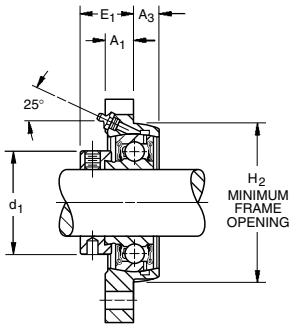
GVFD



GVFDR



GVFD



GVFDR

FOR NON-RELUBRICATABLE SERIES, OMIT G PREFIX ON UNIT AND BEARING NUMBER.

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: VFD 1 3/16" or VFDR 1 3/16" or GVFD 1 3/16" OR GVFDR 1 3/16".

Unit face mounted	Unit reverse mounted	Shaft Dia. mm	Shaft Dia. in.	H_1 mm / in.	L_1 mm / in.	H mm / in.	J mm / in.	N mm / in.	H_2 mm / in.	E mm / in.	A mm / in.	E_1 mm / in.	A_3 mm / in.	A_1 mm / in.	d_1 mm / in.	Bearing Number	Collar Number	Unit Wt. kg / lbs.
RELUBRICATABLE SERIES [1]																		
GVFD	GVFDR		1/2	40.5	53.2	81	63.5	7.1	47.6	31.8	17.5	22.2	7.9	9.5	28.6	GRA008RRB	S1008K	2.63
GVFD	GVFDR		5/8	1 19/32	2 3/32	3 3/16	2 1/2	9/32	1 7/8	1 1/4	11/16	7/8	5/16	3/8	1 1/8	GRA010RRB	S1010K	0.58
GVFD	GVFDR	17														GRAE17RRB	SE17K	
GVFD	GVFDR		3/4	45.2	60.3	90.5	71.4	8.7	54.8	34.1	19.8	23.4	9.1	10.7	33.3	GRA012RRB	S1012K	0.336
GVFD	GVFDR	20		1 25/32	2 3/8	3 9/16	2 13/16	11/32	2 5/32	1 11/32	25/32	59/64	23/64	27/64	1 5/16	GRAE20RRB	SE20K	0.74
GVFD	GVFDR		7/8													GRA014RRB	S1014K	
GVFD	GVFDR		15/16	47.6	66.7	95.2	76.2	8.7	60.3	34.1	19.8	23.4	9.1	10.7	38.1	GRA015RRB	S1015K	0.386
GVFD	GVFDR		1	1 7/8	2 5/8	3 3/4	3	11/32	2 3/8	1 11/32	25/32	59/64	23/64	27/64	1 1/2	GRA100RRB	S1100K	0.85
GVFD	GVFDR	25														GRAE25RRB	SE25K	
GVFD	GVFDR		1 1/8													GRA102RRB	S1102K	
GVFD	GVFDR		1 3/16	56.4	78.6	112.7	90.5	10.3	71.4	38.9	22.2	26.6	10.7	11.9	44.5	GRA103RRB	S1103K	0.608
GVFD	GVFDR		1 1/4 S	2 7/32	3 3/32	4 7/16	3 9/16	13/32	2 13/16	1 17/32	7/8	1 3/64	27/64	15/32	1 3/4	GRA103RRB2	S1103K3	1.34
GVFD	GVFDR	30														GRAE30RRB	SE30K	
GVFD	GVFDR		1 1/4													GRA104RRB	S1104K	0.821
GVFD	GVFDR		1 3/8	61.1	88.9	122.2	100	10.3	81.8	42.1	23.8	29.4	11.1	12.7	54	GRA106RRB	S1106K	1.81
GVFD	GVFDR		1 7/16	2 13/32	3 1/2	4 13/16	3 15/16	13/32	3 7/32	1 21/32	15/16	1 5/32	7/16	1/2	2 1/8	GRA107RRB	S1107	
GVFD	GVFDR	35														GRAE35RRB	SE35K	
GVFD	GVFDR		1 1/2	73.8	98.4	147.6	119.1	13.5	89.7	48.4	28.6	32.5	12.7	15.9	60.3	GRA108RRB	S1108KT	1.334
GVFD	GVFDR	40		2 29/32	3 7/8	5 13/16	4 11/16	17/32	3 17/32	1 29/32	1 1/8	1 9/32	1/2	5/8	2 3/8	GRAE40RRB	SE40K	2.94
GVFD	GVFDR		1 5/8													GRA110RRB	S1110K	
GVFD	GVFDR		1 11/16	74.6	107.2	149.2	120.6	13.5	96	48.4	28.6	32.5	12.7	15.9	63.5	GRA111RRB	S1111K	1.361
GVFD	GVFDR		1 3/4	2 15/16	4 7/32	5 7/8	4 3/4	17/32	3 25/32	1 29/32	1 1/8	1 9/32	1/2	5/8	2 1/2	GRA112RRB	S1112K	3
GVFD	GVFDR	45														GRAE45RRB	SE45K	
GVFD	GVFDR		1 7/8	77.8	113.5	155.6	127	13.5	100.8	48.4	28.6	32.5	12.7	15.9	69.8	GRA114RRB	S1114K	1.451
GVFD	GVFDR		1 15/16	3 1/16	4 15/32	6 1/8	5	17/32	3 31/32	1 29/32	1 1/8	1 9/32	1/2	5/8	2 3/4	GRA115RRB	S1115K	3.2
GVFD	GVFDR	50														GRAE50RRB	SE50K	

[1] All units have a 1/4-28 grease fitting, except as noted.
: 10-32 grease fitting.

Shaft diameter with an S = smaller housing.

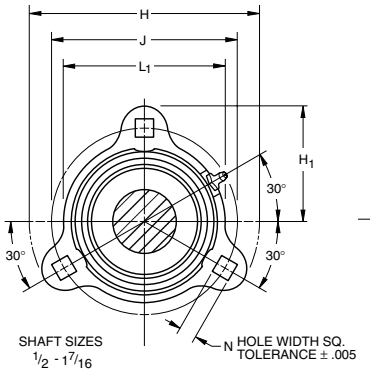
GRFD, GRFDR RELUBRICATABLE SERIES - RFD, RFDR NON-RELUBRICATABLE SERIES

- Malleable iron flange cartridges provide self-alignment and rigid support for medium-duty applications.

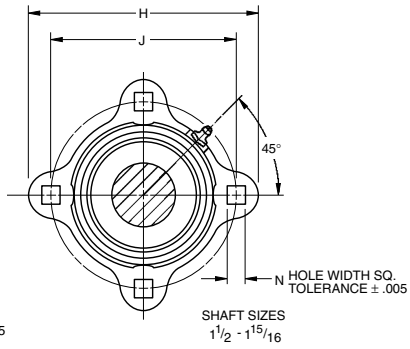
Suggested shaft tolerances: nominal to -.013 mm, -.0005".

BEARING DATA

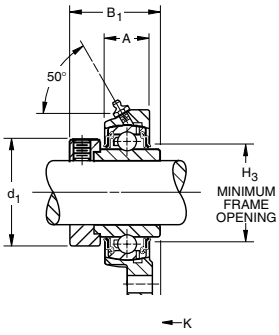
Unit	Bearing Number	Dimensions and Load Ratings
RFD, RFDR	...KRRB	Page D53
GRFD, GRFDR	G...KRRB	Page D54



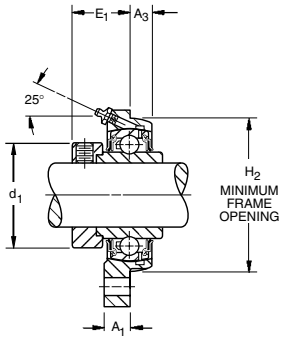
GRFD



GVFDR



GRFD



GRFDR

FOR NON-RELUBRICATABLE SERIES, OMIT G PREFIX ON UNIT AND BEARING NUMBER.

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: GRFD 1 3/16" or GRFDR 1 3/16" or RFD 1 3/16" OR RFDR 1 3/16".

Unit face mounted	Unit reverse mounted	Shaft Dia. mm	Shaft Dia. in.	H_1 mm / in.	L_1 mm / in.	H mm / in.	J mm / in.	N mm / in.	H_2 mm / in.	E mm / in.	A mm / in.	E_1 mm / in.	A_3 mm / in.	A_1 mm / in.	d_1 mm / in.	H_3 mm / in.	K mm / in.	Bearing Number	Collar Number	Unit Wt. kg / lbs.
RELUBRICATABLE SERIES (1)																				
GRFD	GRFDR		1/2															G1008KRRB	S1008K	
GRFD	GRFDR		5/8	40.5	53.2	81	63.5	7.1	47.6	37.3	17.5	23.4	7.9	9.5	28.6	29.4	4.4	G1010KRRB	S1010K	0.259
GRFD	GRFDR		11/16	1 19/32	2 3/32	3 3/16	2 1/2	9/32	1 7/8	1 15/32	11/16	59/64	5/16	3/8	1 1/8	1 5/32	11/64	G1011KRRB	S1011K	0.57
GRFD	GRFDR	17																GE17KRRB	SE17K	
GRFD	GRFDR		3/4	45.2	60.3	90.5	71.4	8.7	54.8	43.7	19.8	26.6	9.1	10.7	33.3	34.1	6.4	G1012KRRB	S1012K	0.395
GRFD	GRFDR	20		1 25/32	2 3/8	3 9/16	2 13/16	11/32	2 5/32	1 23/32	25/32	1 3/64	23/64	27/64	1 5/16	1 11/32	1/4	GE20KRRB	SE20K	0.87
GRFD	GRFDR		7/8															G1014KRRB	S1014K	
GRFD	GRFDR		15/16	47.6	66.7	95.2	76.2	8.7	60.3	44.4	19.8	27	9.1	10.7	38.1	38.9	6.7	G1015KRRB	S1015K	0.463
GRFD	GRFDR		1	1 7/8	2 5/8	3 3/4	3	11/32	2 3/8	1 3/4	25/32	1 1/16	23/64	27/64	1 1/2	1 17/32	17/64	G1100KRRB	S1100K	1.02
GRFD	GRFDR	25																GE25KRRB	SE25K	
GRFD	GRFDR		1 1/16															G1101KRRB	S1101K	
GRFD	GRFDR		1 1/8	56.4	78.6	112.7	90.5	10.3	71.4	48.4	22.2	30.2	10.7	11.9	44.5	46	6.4	G1102KRRB	S1102K	6.26
GRFD	GRFDR		1 3/16	2 7/32	3 3/32	4 7/16	3 9/16	13/32	2 13/16	1 29/32	7/8	1 3/16	27/64	15/32	1 3/4	1 13/16	1/4	G1103KRRB	S1103K	1.38
GRFD	GRFDR		1 1/4 S															G1103KRRB3	S1103K3	
GRFD	GRFDR	30																GE30KRRB	SE30K	
GRFD	GRFDR		1 1/4															G1104KRRB	S1104K	
GRFD	GRFDR		1 5/16	61.1	88.9	122.2	100	10.3	81.8	51.2	23.8	32.5	11.1	12.7	54	53.2	6.4	G1105KRRB	S1105K	0.857
GRFD	GRFDR		1 3/8	2 13/32	3 1/2	4 13/16	3 15/16	13/32	3 7/32	2 1/64	15/16	1 9/32	7/16	1/2	2 1/8	2 3/32	1/4	G1106KRRB	S1106K	1.89
GRFD	GRFDR		1 7/16															G1107KRRB	S1107K	
GRFD	GRFDR	35																GE35KRRB	SE35K	
GRFD	GRFDR		1 1/2	73.8	98.4	147.6	119.1	13.5	89.7	56.4	28.6	34.9	12.7	15.9	60.3	59.5	5.6	G1108KRRB	S1108KT	1.138
GRFD	GRFDR		1 9/16	2 29/32	3 7/8	5 13/16	4 11/16	17/32	3 17/32	2 7/32	1 1/8	1 3/8	1/2	5/8	2 3/8	2 11/32	7/32	G1109KRRB	S1109KT	2.50
GRFD	GRFDR	40																GE40KRRB	SE40K	
GRFD	GRFDR		1 5/8															G1110KRRB	S1110K	
GRFD	GRFDR		1 11/16	74.6	107.2	149.2	120.6	13.5	96	56.4	28.6	34.9	12.7	15.9	63.5	65.1	5.6	G1111KRRB	S1111K	1.488
GRFD	GRFDR		1 3/4	2 15/16	4 7/32	5 7/8	4 3/4	17/32	3 25/32	2 7/32	1 1/8	1 3/8	1/2	5/8	2 1/2	2 9/16	7/32	G1112KRRB	S1112K	3.28
GRFD	GRFDR	45																GE45KRRB	SE45K	
GRFD	GRFDR		1 7/8	77.8	113.5	155.6	127	13.5	100.8	62.7	28.6	38.1	12.7	15.9	69.8	69.8	8.7	G1114KRRB	S1114K	1.692
GRFD	GRFDR		1 15/16	3 1/16	4 15/32	6 1/8	5	17/32	3 31/32	2 15/32	1 1/8	1 1/2	1/2	5/8	2 3/4	2 3/4	11/32	G1115KRRB	S1115K	3.73
GRFD	GRFDR	50																GE50KRRB	SE50K	

(1) All units have a 1/4-28 grease fitting, except as noted.

: 10-32 grease fitting.

Shaft diameter with an S = smaller housing.

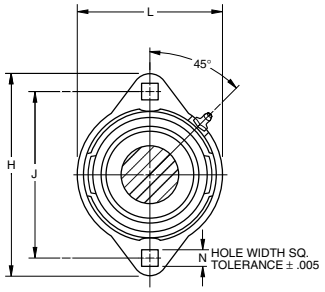
GVFTD, GVFTDR RELUBRICATABLE SERIES - VFTD, VFTDR NON-RELUBRICATABLE SERIES

- Malleable iron flange cartridges provide self-alignment and rigid support for medium-duty applications.

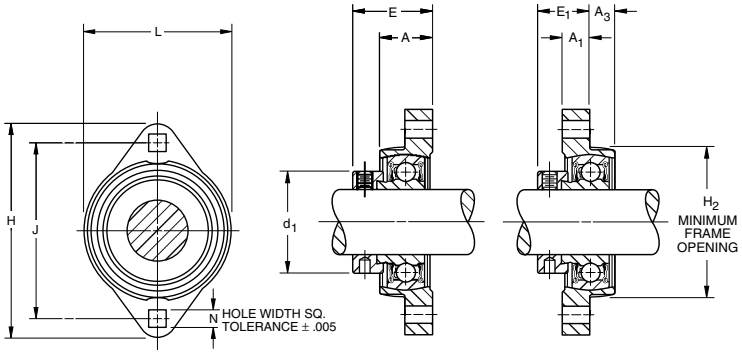
Suggested shaft tolerances: nominal to -.013 mm, -.0005".

BEARING DATA

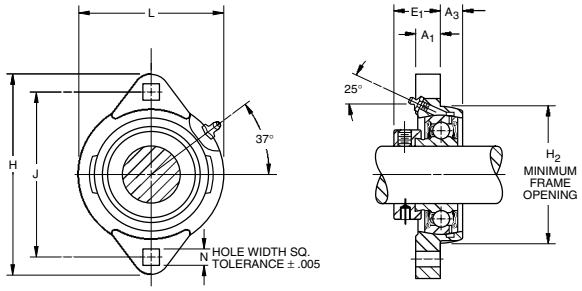
Unit	Bearing Number	Dimensions and Load Ratings
VFTD, VFTDR	RA...RRB	Page D56
GVFTD, GVFTDR	GRA...RRB	Page D57



GVFTD



VFTD VFTDR



GVFTDR

FOR NON-RELUBRICATABLE SERIES, OMIT G PREFIX ON UNIT AND BEARING NUMBER.

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: VFTD 1 3/16" or VFTDR 1 3/16" or GVFTD 1 3/16" OR GVFTDR 1 3/16".

Unit face mounted	Unit reverse mounted	Shaft Dia. mm	Shaft Dia. in.	H mm / in.	J mm / in.	L mm / in.	N mm / in.	H_2 mm / in.	E mm / in.	A mm / in.	E_1 mm / in.	A_3 mm / in.	A_1 mm / in.	d_1 mm / in.	Bearing Number	Collar Number	Unit Wt. kg / lbs.
RELUBRICATABLE SERIES (1)																	
GVFTD	GVFTDR		1/2	81	63.5	53.2	7.1	47.6	31.8	17.5	22.2	7.9	9.5	28.6	GRA008RRB	S1008K	0.245
GVFTD	GVFTDR		5/8	3 3/16	2 1/2	2 3/32	9/32	1 7/8	1 1/4	11/16	7/8	5/16	3/8	1 1/8	GRA010RRB	S1010K	0.54
GVFTD	GVFTDR	17													GRAE17RRB	SE17K	
GVFTD	GVFTDR		3/4	90.5	71.4	60.3	8.7	54.8	34.1	19.8	23.4	9.1	10.7	33.3	GRA012RRB	S1012K	0.331
GVFTD	GVFTDR	20		3 9/16	2 13/16	2 3/8	11/32	2 5/32	1 11/32	25/32	59/64	23/64	27/64	1 5/16	GRAE20RRB	SE20K	0.73
GVFTD	GVFTDR		7/8												GRA014RRB	S1014K	
GVFTD	GVFTDR		15/16	95.2	76.2	66.7	8.7	60.3	34.1	19.8	23.4	9.1	10.7	38.1	GRA015RRB	S1015K	0.363
GVFTD	GVFTDR		1	3 3/4	3	2 5/8	11/32	2 3/8	1 11/32	25/32	59/64	23/64	27/64	1 1/2	GRA100RRB	S1100K	0.8
GVFTD	GVFTDR	25													GRAE25RRB	SE25K	
GVFTD	GVFTDR		1 1/8												GRA102RRB	S1102K	
GVFTD	GVFTDR		1 3/16	112.7	90.5	78.6	10.3	71.4	38.9	22.2	26.6	10.7	11.9	44.5	GRA103RRB	S1103K	0.608
GVFTD	GVFTDR		1 1/4 S	4 7/16	3 9/16	3 3/32	13/32	2 13/16	1 17/32	7/8	1 3/64	27/64	15/32	1 3/4	GRA103RRB2	S1103K3	1.34
GVFTD	GVFTDR	30													GRAE30RRB	SE30K	
GVFTD	GVFTDR		1 1/4												GRA104RRB	S1104K	0.862
GVFTD	GVFTDR		1 3/8	122.2	100	88.9	10.3	81.8	42.1	23.8	29.4	11.1	12.7	54	GRA106RRB	S1106K	1.9
GVFTD	GVFTDR		1 7/16	4 13/16	3 15/16	3 1/2	13/32	3 7/32	1 21/32	15/16	1 5/32	7/16	1/2	2 1/8	GRA107RRB	S1107K	
GVFTD	GVFTDR	35													GRAE35RRB	SE35K	

(1) All units have a 1/4-28 grease fitting.
Shaft diameter with an S = smaller housing.

GRFTD, GRFTDR RELUBRICATABLE SERIES - RFTD, RFTDR NON-RELUBRICATABLE SERIES

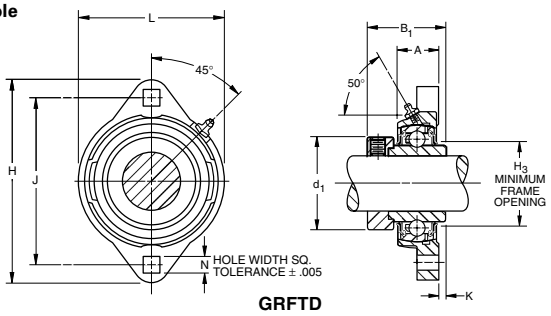
- Malleable iron flange cartridges provide self-alignment and rigid support for medium-duty applications.

Suggested shaft tolerances: nominal to -.013 mm, -.0005".

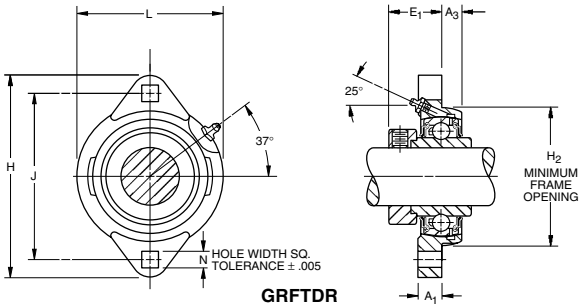
BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RFTD, RFTDR	...KRRB	Page D53
GRFTD, GRFTDR	G...KRRB	Page D54

Relubricatable Series

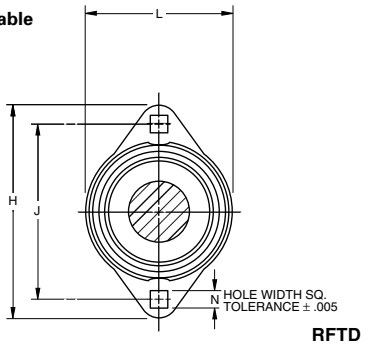


GRFTD

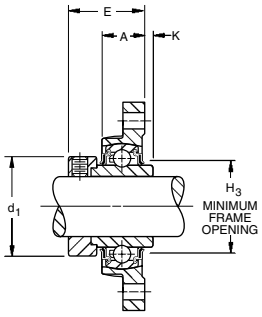


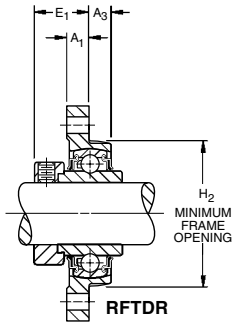
GRFTDR

Non-Relubricatable Series



RFTD





RFTDR

FOR NON-RELUBRICATABLE SERIES, OMIT G PREFIX ON UNIT AND BEARING NUMBER.

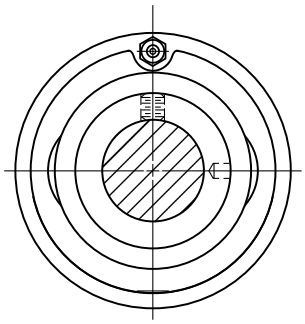
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RFTD 1 3/16" or RFTDR 1 3/16" or GRFTD 1 3/16" OR GRFTDR 1 3/16".

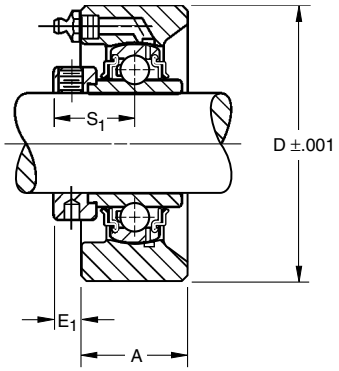
Unit face mounted	Unit reverse mounted	Shaft Dia. mm	Shaft Dia. in.	H mm / in.	J mm / in.	L mm / in.	N mm / in.	H_2 mm / in.	B_1 mm / in.	A mm / in.	E_1 mm / in.	A_3 mm / in.	A_1 mm / in.	d_1 mm / in.	H_3 mm / in.	K mm / in.	Bearing Number	Collar Number	Unit Wt. kg / lbs.
RELUBRICATABLE SERIES (1)																			
GRFTD	GRFTDR		1/2														G1008KRRB	S1008K	
GRFTD	GRFTDR		5/8	81	63.5	53.2	7.1	47.6	37.3	15.9	23.4	7.9	9.5	28.6	29.4	4.4	G1010KRRB	S1010K	0.254
GRFTD	GRFTDR		11/16	3 3/16	2 1/2	2 3/32	9/32	1 7/8	1 15/32	5/8	59/64	5/16	3/8	1 1/8	1 5/32	11/64	G1011KRRB	S1011K	0.56
GRFTD	GRFTDR	17															GE17KRRB	SE17K	
GRFTD	GRFTDR		3/4	90.5	71.4	60.3	8.7	54.8	43.7	19.8	26.6	9.1	10.7	33.3	34.1	6.4	G1012KRRB	S1012K	0.386
GRFTD	GRFTDR	20		3 9/16	2 13/16	2 3/8	11/32	2 5/32	1 23/32	25/32	1 3/64	23/64	27/64	1 5/16	1 11/32	1/4	GE20KRRB	SE20K	0.85
GRFTD	GRFTDR		7/8														G1014KRRB	S1014K	
GRFTD	GRFTDR		15/16	95.2	76.2	66.7	8.7	60.3	44.4	19.8	27	9.1	10.7	38.1	38.9	6.7	G1015KRRB	S1015K	0.386
GRFTD	GRFTDR		1	3 3/4	3	2 5/8	11/32	2 3/8	1 3/4	25/32	1 1/16	23/64	27/64	1 1/2	1 17/32	17/64	G1100KRRB	S1100K	0.85
GRFTD	GRFTDR	25															GE25KRRB	SE25K	
GRFTD	GRFTDR		1 1/16														G1101KRRB	S1101K	
GRFTD	GRFTDR		1 1/8	112.7	90.5	78.6	10.3	71.4	48.4	22.2	30.2	10.7	11.9	44.5	46	6.4	G1102KRRB	S1102K	0.712
GRFTD	GRFTDR		1 3/16	4 7/16	3 9/16	3 3/32	13/32	2 13/16	1 29/32	7/8	1 3/16	27/64	15/32	1 3/4	1 13/16	1/4	G1103KRRB	S1103K	1.57
GRFTD	GRFTDR		1 1/4 S														G1103KRRB3	S1103K3	
GRFTD	GRFTDR	30															GE30KRRB	SE30K	
GRFTD	GRFTDR		1 1/4														G1104KRRB	S1104K	
GRFTD	GRFTDR		1 5/16	122.2	100	88.9	10.3	81.8	51.2	23.8	32.5	11.1	12.7	54	53.2	6.4	G1105KRRB	S1105K	0.962
GRFTD	GRFTDR		1 3/8	4 13/16	3 15/16	3 1/2	13/32	3 7/32	2 1/64	15/16	1 9/32	7/16	1/2	2 1/8	2 3/32	1/4	G1106KRRB	S1106K	2.12
GRFTD	GRFTDR		1 7/16														G1107KRRB	S1107K	
GRFTD	GRFTDR	35															GE35KRRB	SE35K	

(1) All units have a 1/4-28 grease fitting.
Shaft diameter with an S = smaller housing.

RC SERIES

- Convenient for mounting in straight-bore housings.
- Bearing features a self-locking collar and spherical outside diameter fitted to a corresponding spherical seat in the cartridge that provides self-alignment.
- Equipped with a G-KRRB (R-Seal) bearing.





Suggested housing bore:
Shaft Rotating: nominal +.025 mm to +.076 mm, +.001" to +.003".
Shaft Stationary: nominal +.00 mm to -.050 mm, +.000" to -.002".
Avoid excessive tightening of anchor bolts.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2"- 3 15/16", nominal to -.025 mm, -.0010".

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RC	G...KRRB	Page D54

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RC 1 3/16". POPULAR SIZES ARE IN BOLD.

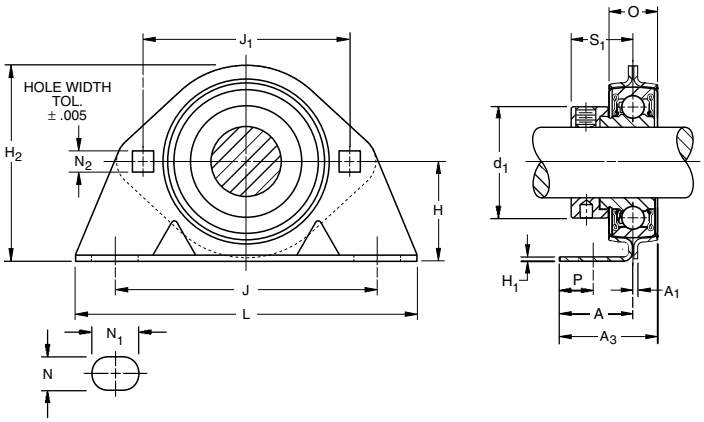
Unit	Shaft Dia.	D	A	E_1	S_1	Bearing Number	Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.				kg lbs.
RC	1/2					G1008KRRB	S1008K		
RC	5/8	68.27	30.2	8.3	23.4	G1010KRRB	S1010K	T-16793	0.549
RC	11/16	2 11/16	1 3/16	21/64	59/64	G1011KRRB	S1011K		1.21
RC	17					GE17KRRB	SE17K		
RC	**3/4**	74.61	36.5	8.3	26.6	G1012KRRB	S1012K	T-16795	0.804
RC	20	2 15/16	1 7/16	21/64	1 3/64	GE20KRRB	SE20K		1.77
RC	7/8					G1014KRRB	S1014K		
RC	15/16	79.38	38.1	7.9	27	G1015KRRB	S1015K	T-16797	0.876
RC	**1**	3 1/8	1 1/2	5/16	1 1/16	G1100KRRB	S1100K		1.93
RC	25					GE25KRRB	SE25K		
RC	1 1/16					G1101KRRB	S1101K		
RC	1 1/8	88.9	38.1	11.1	30.2	G1102KRRB	S1102K	T-16798	1.171
RC	1 3/16	3 1/2	1 1/2	7/16	1 3/16	G1103KRRB	S1103K		2.58
RC	30					GE30KRRB	SE30K		
RC	1 1/4					G1104KRRB	S1104K		
RC	1 5/16	98.43	39.7	12.7	32.5	G1105KRRB	S1105K	T-16686	1.448
RC	1 3/8	3 7/8	1 9/16	1/2	1 9/32	G1106KRRB	S1106K		3.19
RC	**1 7/16**					G1107KRRB	S1107K		
RC	35					GE35KRRB	SE35K		
RC	**1 1/2**	106.36	44.4	12.7	34.9	G1108KRRB	S1108KT	T-16800	1.87
RC	1 9/16	4 3/16	1 3/4	1/2	1 3/8	G1109KRRB	S1109KT		4.12
RC	40					GE40KRRB	SE40K		
RC	1 5/8					G1110KRRB	S1110K		
RC	**1 11/16**	111.13	44.4	12.7	34.9	G1111KRRB	S1111K	T-16687	1.97
RC	1 3/4	4 3/8	1 3/4	1/2	1 3/8	G1112KRRB	S1112K		4.34
RC	45					GE45KRRB	SE45K		
RC	1 7/8	115.89	52.4	11.9	38.1	G1114KRRB	S1114K	T-16802	2.452
RC	**1 15/16**	4 9/16	2 1/16	15/32	1 1/2	G1115KRRB	S1115K		5.4
RC	50					GE50KRRB	SE50K		
RC	2					G1200KRRB	S1200K		
RC	2 1/8	125.41	58.7	14.3	43.7	G1202KRRB	S1202K	T-16804	3.164
RC	**2 3/16**	4 15/16	2 5/16	9/16	1 23/32	G1203KRRB	S1203K		6.97
RC	55					GE55KRRB	SE55K		
RC	2 7/16	149.23	65.1	14.3	46.8	G1207KRRB	S1207K	T-17927	5.13
RC	60	5 7/8	2 9/16	9/16	1 27/32	GE60KRRB	SE60K		11.30

All units have 1/4"-28 grease fittings.

PBS SERIES

- Economical transmission unit for light-duty, moderate-speed requirements.
- Housing includes two heavy-gage, zinc-plated steel stampings. One is a standard stamping used in the MST two-bolt flangette unit.
- RA-RRB (extended inner-ring) bearings are regularly furnished with this bearing. RR wide inner rings also can be used.
- Timken self-locking collar completes the assembly.
- Made with precision bearing seat and dimensions held to close tolerances. This provides accurate bearing-to-housing fit and assures proper alignment of parts.
- RA-RRB bearing used in the PBS pillow block has positive contact land-riding seals. It includes a shroud cap design and is permanently prelubricated.
- Base-to-center height and bolt spacing are interchangeable with many other pillow blocks on the market.

Suggested shaft tolerances: **nominal to -.013 mm, -.0005".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
PBS	RA...RRB	Page D56

D

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: PBS 1 7/16"

Unit	Shaft Dia.	H	J	N_1	L	H_2	J_1	d_1	S_1	O	A	H_1	A_1	A_3	N_2	P	N	Bearing Number	Flangette Number	Stamping Radial Load Rating[1]	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			N lbs.	kg lbs.
PBS	1/2	30.2	92.1	15.9	123.8	59.5	63.5	28.6	22.2	14.3	25.4	2.64	1.9	32.5	7.1	10.3	10.3	RA008RRB	40	2650	0.34
PBS	5/8	1 3/16	3 5/8	5/8	4 7/8	2 11/32	2 1/2	1 1/8	7/8	9/16	1	0.104	0.075	1 9/32	9/32	13/32	13/32	RA010RRB	MST-(ZP)	600	0.75
PBS	17																	RAE17RRB			
PBS	3/4	33.3	96.8	15.9	127	68.3	71.4	33.3	23.4	15.9	25.4	3.02	2.11	33.3	8.7	10.3	10.3	RA012RRB	47	3100	0.44
PBS	20	1 5/16	3 13/16	5/8	5	2 11/16	2 13/16	1 5/16	59/64	5/8	1	0.119	0.083	1 5/16	11/32	13/32	13/32	RAE20RRB	MST-(ZP)	700	0.97
PBS	7/8																	RA014RRB			
PBS	15/16	36.5	95.2	20.6	133.4	72.2	76.2	38.1	23.4	17.5	25.4	3.4	2.11	34.1	8.7	11.1	11.1	RA015RRB	52	3550	0.544
PBS	1	1 7/16	3 3/4	13/16	5 1/4	2 27/32	3	1 1/2	59/64	11/16	1	0.134	0.083	1 11/32	11/32	7/16	7/16	RA100RRB	MST-(ZP)	800	1.2
PBS	25																	RAE25RRB			
PBS	1 1/8																	RA102RRB			
PBS	1 3/16	42.9	119.1	22.2	158.8	84.9	90.5	44.4	26.6	17.5	30.2	3.4	2.64	37.3	10.3	14.3	14.3	RA103RRB	62	3550	0.744
PBS	**1 1/4 S**	1 11/16	4 11/16	7/8	6 1/4	3 11/32	3 9/16	1 3/4	1 3/64	11/16	1 3/16	0.134	0.104	1 15/32	13/32	9/16	9/16	RA103RRB2	MST-(ZP)	800	1.64
PBS	30																	RAE30RRB			
PBS	1 1/4	47.6	127	22.2	165.1	94.5	100	54	29.4	22.2	34.9	3.78	2.64	46	10.3	14.3	14.3	RA104RRB	72	4000	1.089
PBS	1 3/8	1 7/8	5	7/8	6 1/2	3 23/32	3 15/16	2 1/8	1 5/32	7/8	1 3/8	0.149	0.104	1 13/16	13/32	9/16	9/16	RA106RRB	MST-(ZP)	900	2.4
PBS	1 7/16																	RA107RRB			
PBS	35																	RAE35RRB			

[1] Stamping thrust rating is 1/5 of stamping radial load rating.
Shaft diameter with an S = smaller housing.

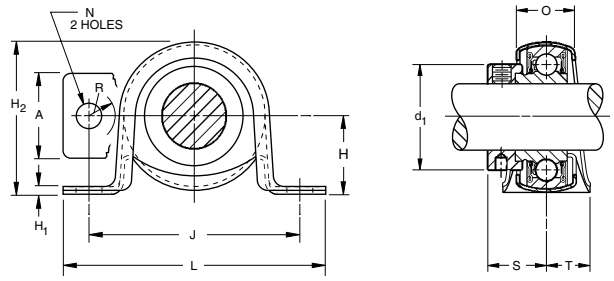
PB SERIES - RPB SERIES

- PB Series provides the advantages of ball bearings at an economical price.
- Used for light-duty applications.
- Consists of a two-piece separable zinc-plated steel housing with spherical bearing seat. This allows the spherically ground bearing to have initial self-alignment in all directions.
- The ball bearing is a RA-RRB extended inner ring type with positive contact land-riding seals and a self-locking collar.
- Incorporates improved shroud cap design and comes permanently prelubricated.
- RPB has same construction as PB-Type, but with a thick, electrically-conductive rubber interliner.
- Bearings in the RPB unit are designated as RA-RRB F-450 and have a special ball and race finish for quiet operation.
- RABR unit consists of the bearing with the rubber interliner.

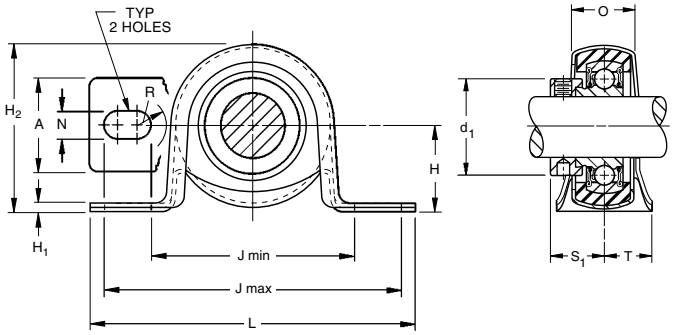
Suggested shaft tolerances: **nominal to -.013 mm, -.0005".**

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
PB	**RA...RRB**	**Page D56**
RPB	**RA...RRB**	**Page D56**



PB Series



RPB Series

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: PB 1 3/16". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia. mm	Shaft Dia. in.	H mm / in.	H_2 mm / in.	J max. mm / in.	J min. mm / in.	L mm / in.	A mm / in.	H_1 mm / in.	N mm / in.	R mm / in.	d_1 mm / in.	O mm / in.	S_1 mm / in.	T mm / in.	Bearing Number	Collar Number	Stamping Radial Load Rating[2] N / lbs.	Unit Wt. kg / lbs.
PB		**1/2**	22.2	44.4	81	55.6	92.1	25.4	2.54	8.7	8.7	28.6	18.24	22.07	12.7	RA008RRB	S1008K	1340	0.2
PB		5/8	7/8	1 3/4	3 3/16	2 3/16	3 5/8	1	0.1	11/32	11/32	1 1/8	0.718	0.869	1/2	RA010RRB	S1010K	300	0.44
PB	17															RAE17RRB	SE17K		
PB		**3/4**	25.4	52.4	88.9	63.5	104.8	25.4	2.54	10.3	10.3	33.3	21.82	23.44	15.9	RA012RRB	S1012K	1560	0.259
PB	20		1	2 1/16	3 1/2	2 1/2	4 1/8	1	0.1	13/32	13/32	1 5/16	0.859	0.923	5/8	RAE20RRB	SE20K	350	0.57
PB		7/8														RA014RRB	S1014K		
PB		15/16	28.6	56.4	100	71.4	114	28.6	5.28	10.3	10.3	38.1	25.4	23.44	14.3	RA015RRB	S1015K	1760	0.295
PB		**1**	1 1/8	2 7/32	3 15/16	2 13/16	4 1/2	1 1/8	0.208	13/32	13/32	1 1/2	1	0.923	9/16	RA100RRB	S1100K	400	0.65
PB	25															RAE25RRB	SE25K		
PB		1 1/8														RA102RRB	S1102K		
PB		1 3/16	33.3	66.7	104.8	76.2	123.8	31.8	3.68	10.3	10.3	44.5	25.4	26.72	19	RA103RRB	S1103K	2650	0.476
PB		1 1/4 S	1 5/16	2 5/8	4 1/8	3	4 7/8	1 1/4	0.145	13/32	13/32	1 3/4	1	1.052	3/4	RA103RRB2	S1103K3	600	1.05
PB	30															RAE30RRB	SE30K		

(1) Housing thrust rating is 1/3 of housing radial load rating.

Load ratings are upright mounted capacities with load direction toward base. These units should not be mounted vertically or upside down.

Shaft diameter with an S = smaller housing.

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RPB 1 3/16". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia. mm	Shaft Dia. in.	H mm / in.	H_2 mm / in.	J max. mm / in.	J min. mm / in.	L mm / in.	A mm / in.	H_1 mm / in.	N (width) mm / in.	R mm / in.	d_1 mm / in.	O mm / in.	S_1 mm / in.	T mm / in.	Bearing Number[1]	Collar Number	Stamping Radial Load Rating[2] N / lbs.	Unit Wt. kg / lbs.
RPB		**1/2**	25.4	52.4	88.9	63.5	104.8	25.4	2.54	10.3	10.3	28.6	21.59	22.07	15.9	RA008RRB	S1008K	880	0.2
RPB		5/8	1	2 1/16	3 1/2	2 1/2	4 1/8	1	0.1	13/32	13/32	1 1/8	0.85	0.869	5/8	RA010RRB	S1010K	200	0.44
RPB	17															RAE17RRB	SE17K		
RPB		**3/4**	28.58	56.4	100	71.4	114	28.6	5.28	10.3	10.3	33.3	25.4	23.44	14.3	RA012RRB	S1012K	1120	0.259
RPB	20		1 1/8	2 7/32	3 5/16	2 13/16	4 1/2	1 1/8	0.208	13/32	13/32	1 5/16	1	0.923	9/16	RAE20RRB	SE20K	250	0.57
RPB		7/8														RA014RRB	S1014K		
RPB		15/16	33.34	66.7	104.8	76.2	123.8	31.8	3.68	10.3	10.3	38.1	25.4	23.44	19	RA015RRB	S1015K	1340	0.295
RPB		**1**	1 5/16	2 5/8	4 1/8	3	4 7/8	1 1/4	0.145	13/32	13/32	1 1/2	1	0.923	3/4	RA100RRB	S1100K	300	0.65
RPB	25															RAE25RRB	SE25K		
LRPB		**1 3/16**	33.34	66.7	104.8	76.2	123.8	31.8	3.68	10.3	10.3	44.4	25.4	28.3	19	RAL103NPPB	LS103K	1340	0.476
			1 5/16	2 5/8	4 1/8	3	4 7/8	1 1/4	0.145	13/32	13/32	1 3/4	1	1.114	3/4			300	1.05

(1) Bearing suffix number FS450.

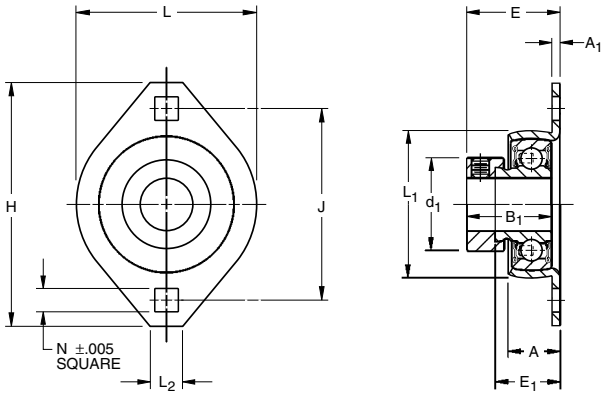
(2) Housing thrust rating is 1/3 of housing radial load rating. Maximum suggested speed is 2400 RPM.

VFMST SERIES

- Zinc-plated, pressed-metal flange unit is assembled with an RA-RR prelubricated extended inner ring type bearing.
- Ideal for light-duty applications.
- Features flush-mounting.
- Additional contamination protection.
- Self-aligning.

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
VFMST	**RA...RRB**	**Page D56**



POPULAR SIZES ARE IN BOLD.

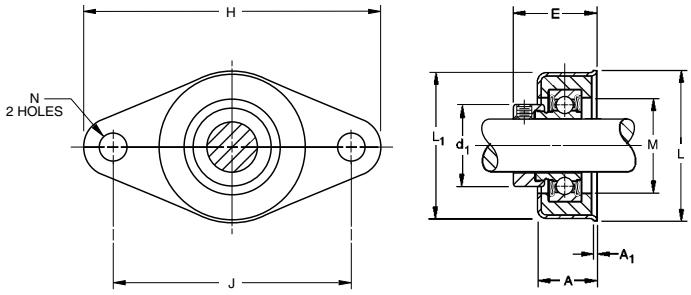
Unit	Shaft Dia.	H	J	L	E	A	N	L_1	E_1	L_2	B_1	d_1	A_1	Bearing Number	Collar Number	Stamping Size	Radial Load Rating(1)
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.				N lbs.
VFMST	**3/4**	90.5	71.4	66.7	33.3	16.7	8.7	50.8	23	12.7	31	33.3	2.64	RA012RRB	S1012K	47FMST	2240
VFMST	20	3 9/16	2 13/16	2 5/8	1 5/16	21/32	11/32	2	29/32	1/2	1 7/32	1 5/16	0.104	RAE20RRB	SE20K		500
VFMST	7/8													RA014RRB	S1014K		
VFMST	15/16	95.2	76.2	71	33.3	18.3	8.7	55.6	23.8	12.7	31	38.1	2.64	RA015RRB	S1015K	52FMST	2650
VFMST	**1**	3 3/4	3	2 51/64	1 5/16	23/32	11/32	2 3/16	15/16	1/2	1 7/32	1 1/2	0.104	RA100RRB	S1100K		600
VFMST	25													RAE25RRB	SE25K		
VFMST	**1 1/8**													RA102RRB	S1102K		
VFMST	1 3/16	112.7	90.5	84.1	38.9	23	10.3	66.7	27.8	15.9	35.7	44.4	3.4	RA103RRB	S1103K	62FMST	3550
VFMST	1 1/4 S	4 7/16	3 9/16	3 5/16	1 17/32	29/32	13/32	2 5/8	1 3/32	5/8	1 13/32	1 3/4	0.134	RA103RRB2	S1103K3		800
VFMST	30													RAE30RRB	SE30K		

Shaft diameter with an S = smaller housing. (1) Housing thrust rating is 1/3 of housing radial load rating.

LFST SERIES

- Zinc-plated, pressed-steel and flush-mounted.
- Simplifies bearing flange unit installations.
- Conductive rubber interliner reduces noise and vibration. Allows for alignment while pressed-steel flange assures rigid bearing support.
- Bolt hole spacing permits interchangeability with competitive mountings.
- Offers compact, economical, corrosion-resistant housing and balanced design.
- Features Timken RAL light series ball bearings. The RAL provides precision in an extended inner ring bearing with superior shroud seal protection and self-locking collar.
- Bearings are prelubricated.

Suggested shaft tolerances: nominal to -.013 mm, -.0005".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
LFST	**RAL...NPP**	**Page D60**

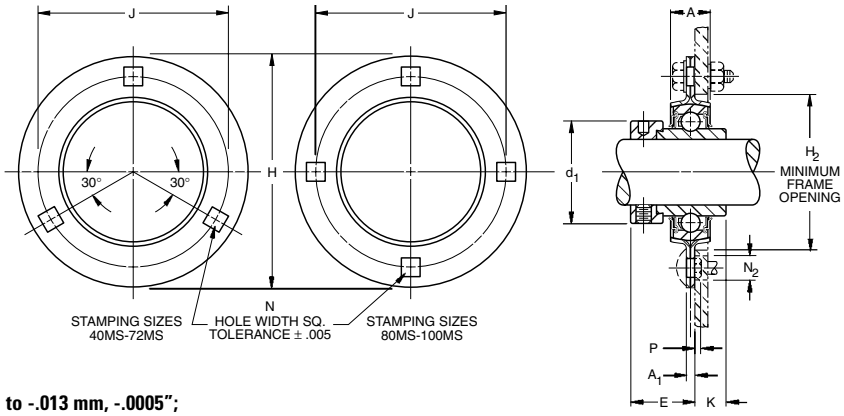
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: LFST 1". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia.	H	J	L	L_1	E	N	A	A_1	d_1	M	Bearing Number	Collar Number	Housing Radial Load Rating(1)
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.			N lbs.
LFST	1/2	114.3	92.1	57.2	55.6	31	9.5	23	1.52	25.4	29.4	RAL008NPP	LS008K	880
LFST	**5/8**	4 1/2	3 5/8	2 1/4	2 3/16	1 7/32	3/8	29/32	0.06	1	1 5/32	RAL010NPP	LS010K	200
LFST	**3/4**	114.3	92.1	57.2	55.6	31	9.5	23	1.52	29.8	34.9	RAL012NPP	LS012K	1120
		4 1/2	3 5/8	2 1/4	2 3/16	1 7/32	3/8	29/32	0.06	1 11/64	1 3/8			250
LFST	15/16	114.3	92.1	57.2	55.6	31	9.5	23	1.52	36.1	39.7	RAL015NPP	LS015K	1340
LFST	**1**	4 1/2	3 5/8	2 1/4	2 3/16	1 7/32	3/8	29/32	0.06	1 27/64	1 9/16	RAL100NPP	LS100K	300

(1) Housing thrust rating is 1/3 of housing radial load rating. Maximum suggested speed is 2400 RPM.

RR FLANGETTE UNIT

- Consists of two interchangeable, pressed-steel, zinc-plated flanges housing a standard bearing with self-locking collar.
- Spherical inside surfaces of each pair of flanges mate with the spherical outside surface of the bearing's outer ring. This provides initial self-alignment.
- Flangette is equipped with the KRRB (R-Seal) wide inner ring ball bearing.
- All units are non-relubricatable.



Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 3/16", nominal to -.025 mm, -.0010".

BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RR	KRRB	Page D53

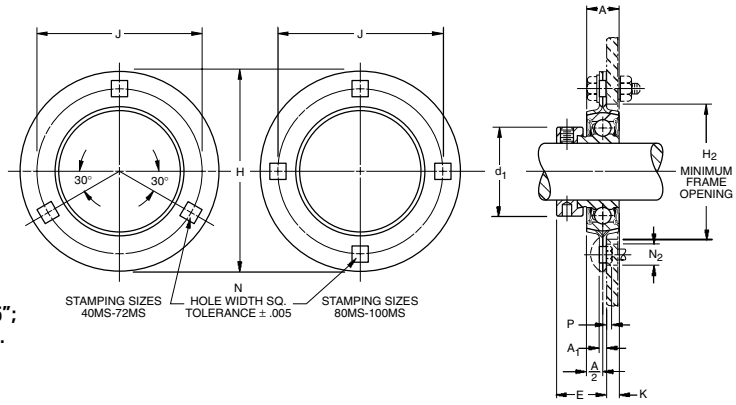
Unit	Shaft Dia.	H	A	J	N Hole Width	H_2	A_1	E	K	d_1	Bolt Size	P		N_2 Flange Hole Diam to Clear Sq. Shank	Bearing Number	Collar Number	Stamping[2] Size	Radial Load Rating[1]	Unit Wt.
												Short Shank	Long Shank						
	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.				N / lbs.	kg / lbs.
RR	1/2	81	14.2	63.5	7.1	49.2	3.8	25.4	11.9	28.6	6.4	0.15	2.54	10.3	1008KRRB	S1008K	40MS	2650	0.295
RR	5/8	3 3/16	9/16	2 1/2	9/32	1 15/16	0.15	1	15/32	1 1/8	1/4	0.006	0.1	13/32	1010KRRB	S1010K		600	0.65
RR	17														E17KRRB	SE17K			
RR	3/4	90.5	15.8	71.4	8.7	55.6	4.22	28.6	15.1	33.3	7.9	0.53	2.92	12.7	1012KRRB	S1012K	47MS	3100	0.404
RR	20	3 9/16	5/8	2 13/16	11/32	2 3/16	0.166	1 1/8	19/32	1 5/16	5/16	0.021	0.115	1/2	E20KRRB	SE20K		700	0.89
RR	7/8														1014KRRB	S1014K			
RR	15/16	95.2	17.4	76.2	8.7	60.3	4.22	28.6	15.1	38.1	7.9	0.53	2.92	12.7	1015KRRB	S1015K	52MS	3550	0.49
RR	1	3 3/4	11/16	3	11/32	2 3/8	0.166	1 1/8	19/32	1 1/2	5/16	0.021	0.115	1/2	1100KRRB	S1100K		800	1.08
RR	25														E25KRRB	SE25K			
RR	1 1/8														1102KRRB	S1102K			
RR	1 3/16	112.7	17.4	90.5	10.3	71.4	5.28	32.5	15.9	44.5	9.5	0.28	2.64	15.1	1103KRRB	S1103K	62MS	4900	0.753
RR	1 1/4 S	4 7/16	11/16	3 9/16	13/32	2 13/16	0.208	1 9/32	5/8	1 3/4	3/8	0.011	0.104	19/32	1103KRRB3	S1103K3		1100	1.66
RR	30														E30KRRB	SE30K			
RR	1 1/4														1104KRRB	S1104K			
RR	1 5/16	122.2	19	100	10.3	81	5.28	34.9	15.9	54	9.5	0.28	2.64	15.1	1105KRRB	S1105K	72MS	6220	0.962
RR	1 3/8	4 13/16	3/4	3 15/16	13/32	3 3/16	0.208	1 3/8	5/8	2 1/8	3/8	0.011	0.104	19/32	1106KRRB	S1106K		1400	2.12
RR	1 7/16														1107KRRB	S1107K			
RR	35														E35KRRB	SE35K			
RR	1 1/2	147.6	20.6	119.1	13.5	90.5	6.8	38.1	18.3	60.3	12.7	0.33	2.72	19.4	1108KRRB	S1108KT	80MS	7500	1.143
RR	1 9/16	5 13/16	13/16	4 11/16	17/32	3 9/16	0.268	1 1/2	23/32	2 3/8	1/2	0.013	0.107	49/64	1109KRRB	S1109KT		1700	2.52
RR	40														E40KRRB	SE40K			
RR	1 5/8	149.2	22.2	120.6	13.5	96.8	6.8	38.1	18.3	63.5	12.7	0.33	2.72	19.4	1110KRRB	S1110K	85MS	7500	1.651
RR	1 11/16	5 7/8	7/8	4 3/4	17/32	3 13/16	0.268	1 1/2	23/32	2 1/2	1/2	0.013	0.107	49/64	1111KRRB	S1111K		1700	3.64
RR	45														E45KRRB	SE45K			
RR	1 7/8	155.6	22.2	127	13.5	101.6	7.56	42.1	20.6	69.8	12.7	0	1.96	19.4	1114KRRB	S1114K	90MS	8500	1.878
RR	1 15/16	6 1/8	7/8	5	17/32	4	0.298	1 21/32	13/16	2 3/4	1/2	0	0.077	49/64	1115KRRB	S1115K		1900	4.14
RR	50														E50KRRB	SE50K			
RR	2														1200KRRB	S1200K			
RR	2 1/8	166.7	23.8	138.1	13.5	112.7	7.56	47.6	23.8	76.2	12.7	0	1.96	19.4	1202KRRB	S1202K	100MS	10200	2.268
RR	2 3/16	6 9/16	15/16	5 7/16	17/32	4 7/16	0.298	1 7/8	15/16	3	1/2	0	0.077	49/64	1203KRRB	S1203K		2300	5
RR	55														E55KRRB	SE55K			

(1) Thrust ratings for stamping are 50% of radial ratings.
(2) Stampings must be ordered in pairs to assemble bearing.
Shaft diameter with an S = smaller housing.

RA FLANGETTE UNIT

- Similar to Timken RR flangette unit.
- Consists of two interchangeable, pressed-steel, zinc-plated flanges that house a standard ball bearing.
- Incorporates an extended inner ring bearing with a self-locking collar and spherical seat in the cartridge, providing initial self-alignment.
- Equipped with a RA-RRB extended inner ring ball bearing.
- Units are non-relubricatable.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 3/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RA	RA...RRB	Page D56

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RA 1 " Flangette.

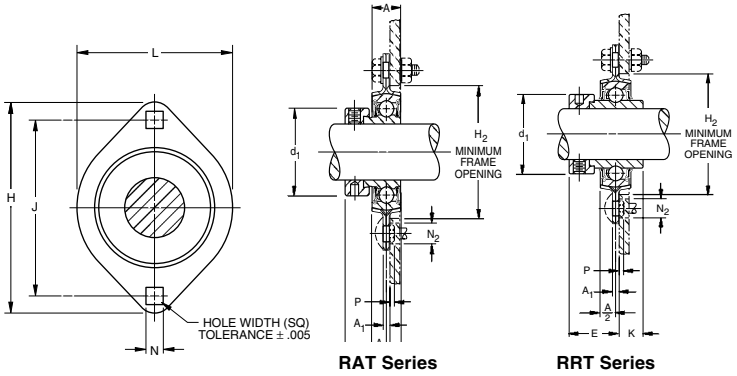
Unit	Shaft Dia. mm	Shaft Dia. in.	H mm / in.	A mm / in.	J mm / in.	N Hole Width mm / in.	H_2 mm / in.	A_1 mm / in.	E mm / in.	K mm / in.	d_1 mm / in.	Bolt Size mm / in.	P Short Shank mm / in.	P Long Shank mm / in.	N_2 Flange Hole Diam to Clear Sq. Shank mm / in.	Bearing Number	Collar Number	Stamping[2] Size	Radial Load Rating[1] N / lbs.	Unit Wt. kg / lbs.
RA		1/2														RA008RRB	S1008K			
RA		9/16	81	14.2	63.5	7.1	49.2	3.81	23.8	5.6	28.6	6.4	0.15	2.54	10.3	RA009RRB	S1009K	40MS	2650	0.277
		5/8	3 3/16	9/16	2 1/2	9/32	1 15/16	0.150	15/16	7/32	1 1/8	1/4	0.006	0.1	13/32	RA010RRB	S1010K		600	0.61
RA	17															RAE17RRB	SE17K			
RA		3/4	90.5	15.8	71.4	8.7	55.6	4.22	25	6.4	33.3	7.9	0.53	2.92	12.7	RA012RRB	S1012K	47MS	3100	0.363
RA	20		3 9/16	5/8	2 13/16	11/32	2 3/16	0.166	63/64	1/4	1 5/16	5/16	0.021	0.115	1/2	RAE20RRB	SE20K		700	0.8
		13/16														RA013RRB	S1013K			
RA		7/8	95.2	17.4	76.2	8.7	60.3	4.22	25	7.1	38.1	7.9	0.53	2.92	12.7	RA014RRB	S1014K	52MS	3550	0.408
RA		15/16	3 3/4	11/16	3	11/32	2 3/8	0.166	63/64	9/32	1 1/2	5/16	0.021	0.115	1/2	RA015RRB	S1015K		800	0.9
RA		1														RA100RRB	S1100K			
RA	25															RAE25RRB	SE25K			
		1 1/16														RA101RRB	S11013K			
RA		1 1/8	112.7	17.4	90.5	10.3	71.4	5.28	29.0	6.7	44.5	9.5	0.28	2.64	15.1	RA102RRB	S1102K	62MS	4900	0.667
RA		1 3/16	4 7/16	11/16	3 9/16	13/32	2 13/16	0.208	1 9/64	17/64	1 3/4	3/8	0.011	0.104	19/32	RA103RRB	S1103K		1100	1.47
RA		1 1/4 S														RA103RRB3	S1103K3			
RA	30															RAE30RRB	SE30K			
RA		1 1/4														RA104RRB	S1104K			
RA		1 5/16	122.2	19	100	10.3	81	5.28	31.8	7.5	54	9.5	0.28	2.64	15.1	RA105RRB	S1105K	72MS	6220	0.889
RA		1 3/8	4 13/16	3/4	3 15/16	13/32	3 3/16	0.208	1 1/4	19/64	2 1/8	3/8	0.011	0.104	19/32	RA106RRB	S1106K		1400	1.96
RA		1 7/16														RA107RRB	S1107K			
RA	35															RAE35RRB	SE35K			
RA		1 1/2	147.6	20.6	119.1	13.5	90.5	6.8	36.1	7.5	60.3	12.7	0.33	2.72	19.4	RA108RRB	S1108KT	80MS	7500	1.447
RA		1 9/16	5 13/16	13/16	4 11/16	17/32	3 9/16	0.268	1 27/64	19/64	2 3/8	1/2	0.013	0.107	49/64	RA109RRB	S1109KT		1700	3.19
RA	40															RAE40RRB	SE40K			
RA		1 5/8														RA110RRB	S1110K			
RA		1 11/16	149.2	22.2	120.6	13.5	96.8	6.8	36.1	7.5	63.5	12.7	0.33	2.72	19.4	RA111RRB	S1111K	85MS	7500	1.479
		1 3/4	5 7/8	7/8	4 3/4	17/32	3 13/16	0.268	1 27/64	19/64	2 1/2	1/2	0.013	0.107	49/64	RA112RRB	S1112K		1700	3.26
RA	45															RAE45RRB	SE45K			
		1 13/16														RA113RRB	S1113K			
RA		1 7/8	155.6	22.2	127	13.5	101.6	7.56	36.5	7.1	69.8	12.7	0	1.96	19.4	RA114RRB	S1114K	90MS	8500	1.669
RA		1 15/16	6 1/8	7/8	5	17/32	4	0.300	1 7/16	9/32	2 3/4	1/2	0	0.077	49/64	RA115RRB	S1115K		1900	3.68
RA	50															RAE50RRB	SE50K			
RA		2														RA200RRB	S1200K			
		2 1/16	166.7	23.8	138.1	13.5	112.7	7.56	40.5	8.3	76.2	12.7	0	1.96	19.4	RA201RRB	S1201K	100MS	10200	2
RA		2 1/8	6 9/16	15/16	5 7/16	17/32	4 7/16	0.300	1 19/32	29/64	3	1/2	0	0.077	49/64	RA202RRB	S1202K		2300	4.41
RA		2 3/16														RA203RRB	S1203K			
RA	55															RAE55RRB	SE55K			

(1) Thrust ratings for stamping are 50% of radial ratings.
(2) Stampings must be ordered in pairs to assemble bearing.
Shaft diameter with an S = smaller housing.

RAT, RRT TWO-BOLT FLANGETTE UNITS

- Designed for installations where the standard three-bolt flangettes cannot be used due to space limitations.
- Like standard three-bolt flangettes, they are available with RA-RRB extended inner ring ball bearings and the KRRB wide inner ring ball bearings (RRT) with self-locking collars.
- All units are non-relubricatable.

Suggested shaft tolerances: **½" 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 3/16", nominal to -.25 mm, -.0010".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RAT	RA...RRB	Page D56
RRT	...KRRB	Page D53

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RAT 1" Flangette or RRT 1" Flangette.

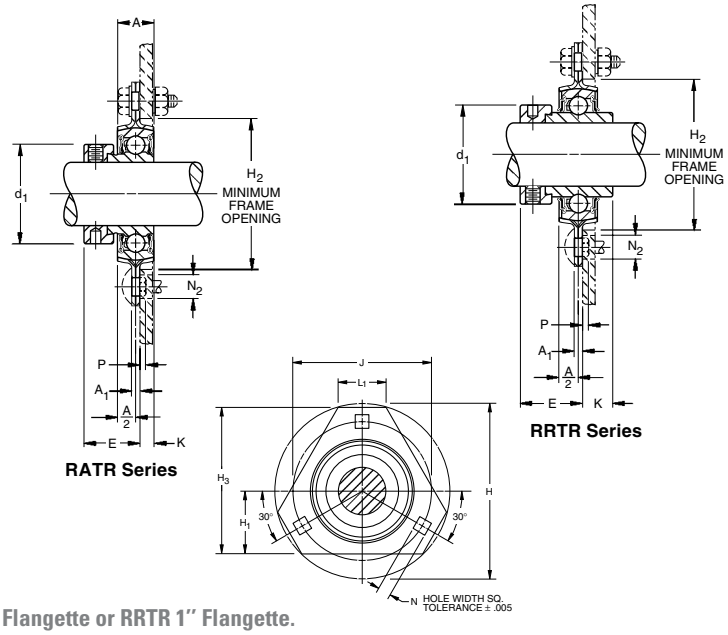
Unit	Shaft Dia.	L	H	A	J	N Hole Width	H_2	A_1	E	K	d_1	Bolt Size	P Short Shank	P Long Shank	N_2 Flange Hole Diam to Clear Sq. Shank	Bearing Number	Collar Number	Stamping[2] Size	Radial Load Rating[1]	Unit Wt.
	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.				N / lbs.	kg / lbs.
RAT																				
RAT	1/2	58.7	81	14.2	63.5	7.1	49.2	3.81	23.8	5.6	28.6	6.4	0.15	2.54	10.3	RA008RRB	S1008K	40MST	2650	0.213
RAT	5/8	2 5/16	3 3/16	9/16	2 1/2	9/32	1 15/16	0.150	15/16	7/32	1 1/8	1/4	0.006	0.1	13/32	RA010RRB	S1010K		600	0.47
RAT	17															RAE17RRB	SE17K			
RAT	3/4	66.7	90.5	15.8	71.4	8.7	55.6	4.22	25	6.4	33.3	7.9	0.53	2.92	12.7	RA012RRB	S1012K	47MST	3100	0.299
RAT	20	2 5/8	3 9/16	5/8	2 13/16	11/32	2 3/16	0.166	63/64	1/4	1 5/16	5/16	0.021	0.115	1/2	RAE20RRB	SE20K		700	0.66
RAT	7/8															RA014RRB	S1014K			
RAT	15/16	71	95.2	17.4	76.2	8.7	60.3	4.22	25	7.1	38.1	7.9	0.53	2.92	12.7	RA015RRB	S1015K	52MST	3550	0.331
RAT	1	2 51/64	3 3/4	11/16	3	11/32	2 3/8	0.166	63/64	9/32	1 1/2	5/16	0.021	0.115	1/2	RA100RRB	S1100K		800	0.73
RAT	25															RAE25RRB	SE25K			
RAT	1 1/16															RA101RRB	S1103K			
RAT	1 1/8	84.1	112.7	17.4	90.5	10.3	71.4	5.28	29	6.7	44.5	9.5	0.28	2.64	15.1	RA102RRB	S1102K	62MST	4900	0.531
RAT	1 3/16	3 5/16	4 7/16	11/16	3 9/16	13/32	2 13/16	0.208	1 9/64	17/64	1 3/4	3/8	0.011	0.104	19/32	RA103RRB	S1103K		1100	1.17
RAT	1 1/4 S															RA103RRB2	S1103K3			
RAT	30															RAE30RRB	SE30K			
RAT	1 1/4															RA104RRB	S1104K			
RAT	1 5/16	93.7	125.4	22.2	100	10.3	81	5.28	32.1	6.7	54	9.5	0.28	2.64	15.1	RA105RRB	S1105K	72MST	6220	0.476
RAT	1 3/8	3 11/16	4 15/16	7/8	3 15/16	13/32	3 3/16	0.208	1 17/64	17/64	2 1/8	3/8	0.011	0.104	19/32	RA106RRB	S1106K		1400	1.05
RAT	1 7/16															RA107RRB	S1107K			
RAT	35															RAE35RRB	SE35K			
RRT																				
RRT	1/2	58.7	81	14.2	63.5	7.1	49.2	3.81	23.8	5.6	28.6	6.4	0.15	2.54	10.3	1008KRBB	S1008K	40MST	2650	0.213
RRT	5/8	2 5/16	3 3/16	9/16	2 1/2	9/32	1 15/16	0.150	15/16	7/32	1 1/8	1/4	0.006	0.1	13/32	1010KRRB	S1010K		600	0.47
RRT	17															E17KRRB	SE17K			
RRT	3/4	66.7	90.5	15.8	71.4	8.7	55.6	4.22	25	6.4	33.3	7.9	0.53	2.92	12.7	1012KRRB	S1012K	47MST	3100	0.299
RRT	20	2 5/8	3 9/16	5/8	2 13/16	11/32	2 3/16	0.166	63/64	1/4	1 5/16	5/16	0.021	0.115	1/2	E20KRRB	SE20K		700	0.66
RRT	7/8															1014KRRB	S1014K			
RRT	15/16	71	95.2	17.4	76.2	8.7	60.3	4.22	25	7.1	38.1	7.9	0.53	2.92	12.7	1015KRRB	S1015K	52MST	3550	0.331
RRT	1	2 51/64	3 3/4	11/16	3	11/32	2 3/8	0.166	63/64	9/32	1 1/2	5/16	0.021	0.115	1/2	1100KRRB	S1100K		800	0.73
RRT	25															E25KRRB	SE25K			
RRT	1 1/16															1101KRRB	S1103K			
RRT	1 1/8	84.1	112.7	17.4	90.5	10.3	71.4	5.28	29	6.7	44.5	9.5	0.28	2.64	15.1	1102KRRB	S1102K	62MST	4900	0.531
RRT	1 3/16	3 5/16	4 7/16	11/16	3 9/16	13/32	2 13/16	0.208	1 9/64	17/64	1 3/4	3/8	0.011	0.104	19/32	1103KRRB	S1103K		1100	1.17
RRT	1 1/4 S															1103KRRB3	S1103K3			
RRT	30															E30KRRB	SE30K			
RRT	1 1/4															1104KRRB	S1104K			
RRT	1 5/16	93.7	125.4	22.2	100	10.3	81	5.28	32.1	6.7	54	9.5	0.28	2.64	15.1	1105KRRB	S1105K	72MST	6220	0.476
RRT	1 3/8	3 11/16	4 15/16	7/8	3 15/16	13/32	3 3/16	0.208	1 17/64	17/64	2 1/8	3/8	0.011	0.104	19/32	1106KRRB	S1106K		1400	1.05
RRT	1 7/16															1107KRRB	S1107K			
RRT	35															E35KRRB	SE35K			

(1) Thrust ratings for stamping are 50% of radial ratings.
(2) Stampings must be ordered in pairs to assemble bearing.
Shaft diameter with an S = smaller housing.

RATR, RRTR TRIANGLE FLANGETTE UNITS

- Similar to standard 47MS, 52MS, 62MS and 72MS, except the stamping is triangular instead of round.
- Used where space is a factor or where it is necessary to cut off one or more sides of the standard flangette stamping.
- RA-RRB and KRRB may be used with this stamping, as with other types of flangettes.
- All units are non-relubricatable.

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.013 mm, -.0005";**
2" - 2 3/16", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RATR	RA...RRB	Page D56
RRTR	...KRRB	Page D53

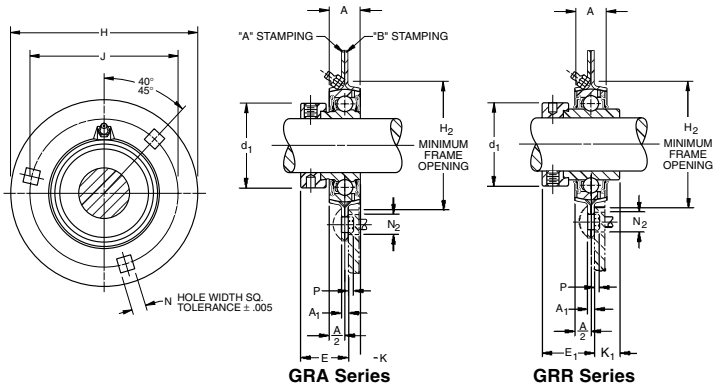
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RATR 1" Flangette or RRTR 1" Flangette.

Unit	Shaft Dia.		H_3	H	A	J	N Hole Width	H_2	A_1	E	K	d_1	H_1	L_1	Bolt Size	P		N_2 Flange Hole Diam to Clear Sq. Shank	Bearing Number	Collar Number	Stamping[2] Size	Radial Load Rating[1]	Unit Wt.
																Short Shank	Long Shank						
	mm	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.				N lbs.	kg lbs.
RATR																							
RATR		3/4	76.2	90.5	15.8	71.4	8.7	55.6	4.22	25	6.4	33.3	33.3	27	7.9	0.15	2.54	12.7	RA012RRB	S1012K	47MSTR	3100	0.313
RATR	20		3	3 9/16	5/8	2 13/16	11/32	2 3/16	0.166	63/64	1/4	1 5/16	1 5/16	1 1/16	5/16	0.006	0.1	1/2	RAE20RRB	SE20K		700	0.69
RATR		7/8																	RA014RRB	S1014K			
RATR		15/16	79.4	95.2	17.4	76.2	8.7	60.3	4.22	25	7.1	38.1	34.9	27.8	7.9	0.53	2.92	12.7	RA015RRB	S1015K	52MSTR	3550	0.354
RATR		1	3 1/8	3 3/4	11/16	3	11/32	2 3/8	0.166	63/64	9/32	1 1/2	1 3/8	1 3/32	5/16	0.021	0.115	1/2	RA100RRB	S1100K		800	0.78
RATR	25																		RAE25RRB	SE25K			
RATR		1 1/16																	RA101RRB	S1103K			
RATR		1 1/8	93.7	112.7	17.4	90.5	10.3	71.4	5.28	29	6.7	44.5	38.1	25.4	9.5	0.28	2.64	15.1	RA102RRB	S1102K	62MSTR	4900	0.526
RATR		1 3/16	3 11/16	4 7/16	11/16	3 9/16	13/32	2 13/16	0.208	1 9/64	17/64	1 3/4	1 1/2	1	3/8	0.011	0.104	19/32	RA103RRB	S1103K		1100	1.16
RATR		1 1/4 S																	RA103RRB2	S1103K3			
RATR	30																		RAE30RRB	SE30K			
RATR		1 1/4																	RA104RRB	S1104K			
RATR		1 5/16	105.6	127	19	100	10.3	81	5.28	32.1	6.7	54	44.4	32.1	9.5	.028	2.64	15.1	RA105RRB	S1105K	72MSTR	6300	0.703
RATR		1 3/8	4 5/32	5	3/4	3 15/16	13/32	3 3/16	0.208	1 17/64	17/64	2 1/8	1 3/4	1 17/64	3/8	0.011	0.104	19/32	RA106RRB	S1106K		1400	1.55
RATR		1 7/16																	RA107RRB	S1107K			
RATR	35																		RAE35RRB	SE35K			
RRTR																							
RRTR		3/4	76.2	90.5	15.8	71.4	8.7	55.6	4.22	28.6	15.1	33.3	33.3	27	7.9	0.15	2.54	12.7	1012KRRB	S1012K	47MSTR	3100	0.313
RRTR	20		3	3 9/16	5/8	2 13/16	11/32	2 3/16	0.166	1 1/8	19/32	1 5/16	1 5/16	1 1/16	5/16	0.006	0.1	1/2	E20KRRB	SE20K		700	0.69
RRTR		7/8																	1014KRRB	S1014K			
RRTR		15/16	79.4	95.2	17.4	76.2	8.7	60.3	4.22	28.6	15.1	38.1	34.9	27.8	7.9	0.53	2.92	12.7	1015KRRB	S1015K	52MSTR	3550	0.354
RRTR		1	3 1/8	3 3/4	11/16	3	11/32	2 3/8	0.166	1 1/8	19/32	1 1/2	1 3/8	1 3/32	5/16	0.021	0.115	1/2	1100KRRB	S1100K		800	0.78
RRTR	25																		E25KRRB	SE25K			
RRTR		1 1/16																	1101KRRB	S1103K			
RRTR		1 1/8	93.7	112.7	17.4	90.5	10.3	71.4	5.28	32.5	15.9	44.5	38.1	25.4	9.5	0.28	2.64	15.1	1102KRRB	S1102K	62MSTR	4900	0.526
RRTR		1 3/16	3 11/16	4 7/16	11/16	3 9/16	13/32	2 13/16	0.208	1 9/32	5/8	1 3/4	1 1/2	1	3/8	0.011	0.104	19/32	1103KRRB	S1103K		1100	1.16
RRTR		1 1/4 S																	1103KRRB3	S1103K3			
RRTR	30																		E30KRRB	SE30K			
RRTR		1 1/4																	1104KRRB	S1104K			
RRTR		1 5/16	105.6	127	19	100	10.3	81	5.28	34.9	16.3	54	44.4	32.1	9.5	.028	2.64	15.1	1105KRRB	S1105K	72MSTR	6300	0.703
RRTR		1 3/8	4 5/32	5	3/4	3 15/16	13/32	3 3/16	0.208	1 3/8	41/64	2 1/8	1 3/4	1 17/64	3/8	0.011	0.104	19/32	1106KRRB	S1106K		1400	1.55
RRTR		1 7/16																	1107KRRB	S1107K			
RRTR	35																		E35KRRB	SE35K			

(1) Thrust ratings for stamping are 50% of radial ratings.
(2) Stampings must be ordered in pairs to assemble bearing.
Shaft diameter with an S = smaller housing.

GRA AND GRR RELUBRICATABLE FLANGETTE UNITS

- Supplement to the standard non-relubricatable type.
- Zinc-plated and designed for relubrication in applications where excessive moisture and severe contamination are present.
- Relubricatable flangettes are dimensionally interchangeable with the non-relubricated types. Load ratings are also the same.
- Relubricatable units incorporate G-KRRB bearings and GRA-RRB inner ring bearings with positive contact land-riding seals and self-locking collars.
- Two stampings are needed to make a complete relubricatable flangette. Stamping A contains the boss for the grease fitting and a grease groove to allow grease to enter holes in the outer ring of the bearing. Stamping B contains a similar groove for the same purpose. With the grease groove in both stampings, the bearing can be reversed in the housing and still be relubricated.



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
GRA	GRA...RRB	Page D57
GRR	G...KRRB	Page D54

Suggested shaft tolerances: **½" - 1 15/16", nominal to -.10 mm, -.0005";**
2" - 2 3/16", nominal to -.0255 mm, -.0010".

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: GRA 1" Flangette.

Unit	Shaft Dia.	H	A	J	N Hole Width	H_2	A_1	E	E_1	K	K_1	d_1	P		N_2	Bearing Number		Collar	Stamping Radial Load Rating[1]
													Short Shank	Long Shank	Flange Hole Diam. to Clear Sq. Shank				
mm	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	(GRA)	(GRR)		N lbs.
G52MSA & G52MSB	13/16 7/8 15/16 1	95.2 3 3/4	17.4 11/16	76.2 3	8.7 11/32	60.3 2 3/8	4.22 0.166	25.4 1	29 1 9/64	6.7 17/64	13.5 17/32	38.1 1 1/2	0.53 0.021	2.92 0.115	12.7 1/2	GRA013RRB GRA014RRB GRA015RRB GRA100RRB GRAE25RRB	G1013KRRB G1014KRRB G1015KRRB G1100KRRB GE25KRRB	S1013K S1014K S1015K S1100K SE25K	3550 800
G62MSA & G62MSB	25 1 1/16 1 1/8 1 3/16 1 1/4 S 30	112.7 4 7/16	19.05 3/4	90.5 3 9/16	10.3 13/32	71.4 2 13/16	5.28 0.208	29.4 1 5/32	32.9 1 19/64	6.7 17/64	15.5 39/64	44.1 1 47/64	0.28 0.011	2.64 0.104	15.1 19/32	GRA101RRB GRA102RRB GRA103RRB GRA103RRB2 GRAE30RRB	G1101KRRB G1102KRRB G1103KRRB G1103KRRB3 GE30KRRB	S1103K S1102K S1103K S1103K3 SE30K	4900 1100
G72MSA & G72MSB	1 1/4 1 5/16 1 3/8 1 7/16 35	122.2 4 13/16	22.2 7/8	100 3 15/16	10.3 13/32	81 3 3/16	6.8 0.268	32.9 1 19/64	35.7 1 13/32	7.9 5/16	15.5 39/64	54 2 1/8	0.28 0.011	2.64 0.104	15.1 19/32	GRA104RRB GRA105RRB GRA106RRB GRA107RRB GRAE35RRB	G1104KRRB G1105KRRB G1106KRRB G1107KRRB GE35KRRB	S1104K S1105K S1106K S1107K SE35K	6220 1400
G80MSA[2] & G80MSB[2]	1 1/2 1 9/16 40	147.6 5 13/16	31.8 1 1/4	119.1 4 11/16	13.5 17/32	90.4 3 9/16	7.56 0.298	36.5 1 7/16	38.9 1 17/32	12.3 31/64	17.9 45/64	60.3 2 3/8	0.33 0.013	2.72 0.107	19.4 49/64	GRA108RRB GRA109RRB GRAE40RRB	G1108KRRB G1109KRRB GE40KRRB	S1108KT S1109KT SE40K	7500 1700
G85MSA[2] & G85MSB[2]	1 5/8 1 11/16 1 3/4 45	149.2 5 7/8	31.8 1 1/4	120.6 4 3/4	13.5 17/32	96.8 3 13/16	7.56 0.298	36.5 1 7/16	38.9 1 17/32	11.9 15/32	17.9 45/64	63.5 2 1/2	0.33 0.013	2.72 0.107	19.4 49/64	GRA110RRB GRA111RRB GRA112RRB GRAE45RRB	G1110KRRB G1111KRRB G1112KRRB GE45KRRB	S1110K S1111K S1112K SE45K	7500 1700
G90MSA[2] & G90MSB[2]	1 13/16 1 7/8 1 15/16 50	155.6 6 1/8	25.4 1	127 5	13.5 17/32	101.6 4	8.34 0.328	36.9 1 29/64	42.5 1 43/64	8.3 21/64	20.6 13/16	69.8 2 3/4	- -	1.96 0.077	19.4 49/64	GRA113RRB GRA114RRB GRA115RRB GRAE50RRB	G1113KRRB G1114KRRB G1115KRRB GE50KRRB	S1113K S1114K S1115K SE50K	8500 1900
G100MSA & G100MSB	2 2 1/16 2 1/8 2 3/16 55	166.7 6 9/16	31.8 1 1/4	138.1 5 7/16	13.5 17/32	112.7 4 7/16	8.34 0.328	40.5 1 19/32	47.6 1 7/8	11.9 15/32	23.8 15/16	76.2 3	- -	1.96 0.077	19.4 49/64	GRA200RRB GRA201RRB GRA202RRB GRA203RRB GRAE55RRB	G1200KRRB G1201KRRB G1202KRRB G1203KRRB GE55KRRB	S1200K S1201K S1202K S1203K SE55K	10200 2300

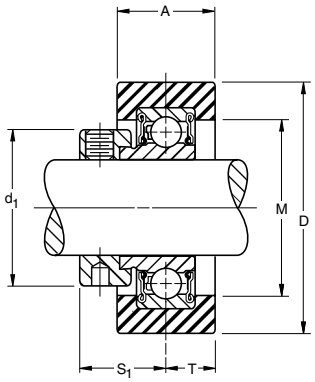
[1] Thrust ratings for stampings are 50% of radial ratings.
[2] Four bolt holes.
Shaft diameter with an S = smaller housing.

RCSM, RCR, CR SERIES

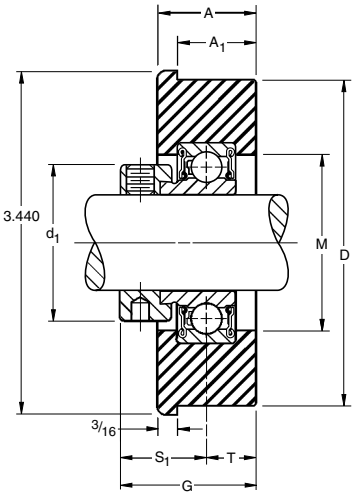
- RCSM and RCR are quiet, synthetic, conductive rubber cylindrical cartridges designed for domestic heating, air-conditioning, ventilating equipment and other applications that require noise-free operation.
- All units are available with the RA-RRB extended inner ring bearings with positive contact land-riding seals and self-locking collar.
- Initial supply of grease is provided in the one-piece, non-relubricatable cartridges.
- Timken patented CR unit was designed to accommodate the wide tolerances of hot or cold rolled #10 gage (.134 in.), 3 1/2 in. O.D., electric resistance welded mechanical tubing similar to what is found in post office conveyor systems.

BEARING DATA

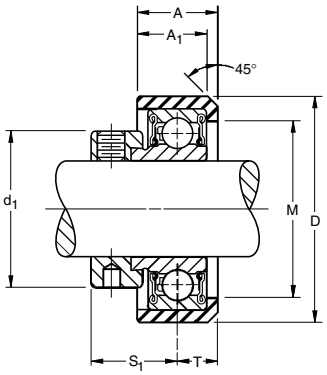
Unit	Bearing Number	Dimensions and Load Ratings
RCSM, RCR, CR	RA...RR	Page D56



RCSM



CR



RCR

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RCSM 3/4" or RCR 3/4" or CR 3/4". POPULAR SIZES ARE IN BOLD.

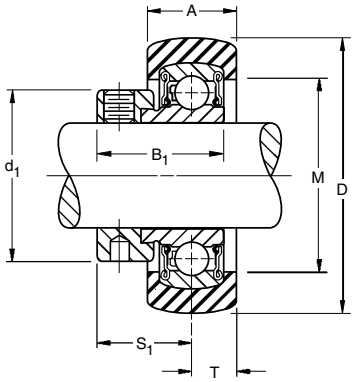
Unit	Shaft Dia. mm / in.	D mm / in.	A mm / in.	A_1 mm / in.	G mm / in.	M mm / in.	d_1 mm / in.	S_1 mm / in.	T mm / in.	Bearing Number[2]	Collar Number	Housing Radial Load Rating[1] N / lbs.	Unit Wt. kg / lbs.
RCSM SERIES										Suggested Housing Diameter = Nominal D ± .013 mm ± .005"			
RCSM	**1/2**	64.3	25.4	-	-	34.9	28.6	22.2	12.7	RA008RR	S1008K	880	0.395
RCSM	**5/8**	2 17/32	1	-	-	1 3/8	1 1/8	7/8	1/2	RA010RR	S1010K	200	0.87
RCSM	17									RAE17RR	SE17K		
RCSM	**3/4**	64.3	25.4	-	-	39.7	33.3	23.4	12.7	RA012RR	S1012K	1120	0.472
RCSM	20	2 17/32	1	-	-	1 9/16	1 5/16	59/64	1/2	RAE20RR	SE20K	250	1.04
RCSM	15/16	64.3	25.4	-	-	45.2	38.1	23.4	12.7	RA015RR	S1015K	1340	0.527
RCSM	**1**	2 17/32	1	-	-	1 25/32	1 1/2	59/64	1/2	RA100RR	S1100K	300	1.16
RCSM	25									RAE25RR	SE25K		
LRCSM	**1 3/16**	64.3	25.4	-	-	47.6	42.1	19.8	12.7	RAL103NPP	LS103K	1340	0.627
		2 17/32	1	-	-	1 7/8	1 21/32	25/32	1/2			300	1.38
RCSM SERIES										Suggested Housing Diameter = Nominal D -0.13 mm to -.038 mm, -.005" to -.0015"			
LRCR	**3/4**	46	18.3	15.9	-	34.9	30.2	18.7	9.9	RAL012NPP	LS012K	880	0.272
		1 13/16	23/32	5/8	-	1 3/8	1 3/16	47/64	25/64			200	0.6
RCR	**1**	57.2	19.8	17.5	-	44.4	38.1	23.4	9.9	RA100RR	S1100K	1340	0.409
RCR	25	2 1/4	25/32	11/16	-	1 3/4	1 1/2	59/64	25/64	RAE25RR	SE25K	300	0.9
RCSM SERIES										Suggested Housing Diameter 82.73 mm to 81.76 mm, 3.257" to 3.219"			
CR	**3/4**	83.57	25.4	22.2	36.1	39.7	33.3	23.4	12.7	RA012RR	S1012K	670	0.318
CR	20	3.29	1	7/8	1 27/64	1 9/16	1 5/16	59/64	1/2	RAE20RR	SE20K	150	0.7
CR	**1**	83.57	25.4	22.2	36.1	45.2	38.1	23.4	12.7	RA100RR	S1100K	880	0.34
CR	25	3.29	1	7/8	1 27/64	1 25/32	1 1/2	59/64	1/2	RAE25RR	SE25K	200	0.75
LCR	**1**	83.57	25.4	20.6	33.3	39.7	36.1	19.8	14.3	RAL100NPP	S1100K	880	0.309
LCR	25	3.29	1	13/16	1 5/16	1 9/16	1 27/64	25/32	9/16	RALE25NPP	SE25K	200	0.68

[1] Steady loads only. Thrust load is 1/3 radial load rating. Maximum suggested speed – 2400 RPM.
[2] Suffix for RA bearing is FS450 (RCSM and RCR Series).

RABR HVAC SPECIAL SERIES

- Features a conductive rubber interliner to dissipate static charges.
- Quiet RA-RRB extended inner ring bearings are prelubricated and have positive-contact, land-riding seals with self-locking collars.
- RABR units can be mounted in tri-arm brackets or pressed-steel stampings.
- Maximum suggested speed: 2400 RPM.

Suggested housing diameter = Nominal (A) -.130 mm -.380 mm, -.005", -.015".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RABR	RA..RRB	Page D56

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RABR 1". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia.	D	B_1	A	M	d_1	S_1	T	Bearing Number[1]	Collar Number	Housing Radial Load Rating[2]
	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.			N / lbs.
RABR	**1/2**	47.37	28.6	17.5	34.9	28.6	22.2	8.7	RA008RRB	S1008K	880
RABR	**5/8**	1.865	1 1/8	11/16	1 3/8	1 1/8	7/8	11/32	RA010RRB	S1010K	200
RABR	17								RAE17RRB	SE17K	
RABR	**3/4**	53.37	31	17.5	41.3	33.3	23.4	8.7	RA012RRB	S1012K	1120
RABR	20	2.062	1 7/32	11/16	1 5/8	1 5/16	59/64	11/32	RAE20RRB	SE20K	250
RABR	15/16	62.38	31	20.6	46.8	38.1	23.4	10.3	RA015RRB	S1015K	1340
RABR	**1**	2.456	1 7/32	13/16	1 27/32	1 1/2	59/64	13/32	RA100RRB	S1100K	300
RABR	25								RAE25RRB	SE25K	
RABR	1 3/16	62.38	35.7	20.6	46.8	44.4	28.6	10.3	RAL103PP	LS103K	1340
RABR	30	2.456	1 13/32	13/16	1 27/32	1 3/4	1 1/8	13/32	RAE30PP3	SE30K	300

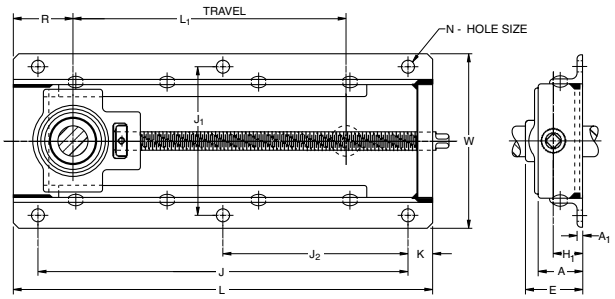
[1] For replacement of bearings, specify suffix FS-450.
[2] Thrust load is 1/3 radial load rating.

Maximum suggested speed is 2400 RPM.

NLTU SERIES

SIDE-MOUNTED, PRESSED-STEEL NLTU SERIES

- Take-up frame incorporates RTU take-up units as shown on the following pages.
- The frame is designed for side mounting and made of welded steel.



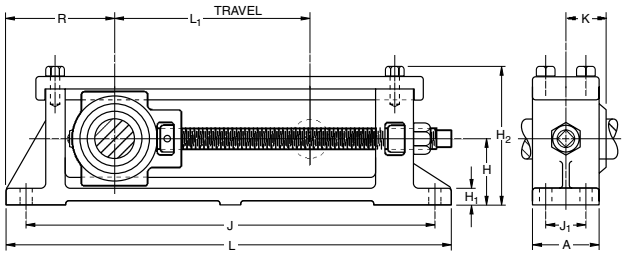
TO ORDER, COMPLETE ASSEMBLY, SPECIFY NLTU FRAME AND RTU TAKE-UP UNIT REQUIRED.
Example: NLTU5 frame and RTU 1 11/16". If frame only is required, order by frame number. Example: NLTU3.

NLTU Frame No.	Shaft Dia.	L_1	R	J	L	A_1	H_1	E	J_1	W	A	J_2	K	N	Bolts 6 req'd.	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	in.	kg lbs.
1	5/16, 3/4, 13/16, 7/8, 15/16, 1	231.8 9 1/8	62.7 2 15/32	327 12 7/8	377.8 14 7/8	4.8 3/16	27 1 1/16	54 2 1/8	141.3 5 9/16	166.7 6 9/16	44.4 1 3/4	163.5 6 7/16	25.4 1	12.7 1/2	7/16	3.691 8.13
3	1 1/16, 1 1/8, 1 3/16, 1 1/4, 1 5/16, 1 3/8, 1 7/16	290.5 11 7/16 290.5 11 7/16	64.23 2 17/32 61.9 2 7/16	392.1 15 7/16 392.1 15 7/16	432.2 17 7/16 432.2 17 7/16	4.8 3/16 4.8 3/16	31.8 1 1/4 31.8 1 1/4	61.9 2 7/16 64.3 2 17/32	154 6 1/16 154 6 1/16	179.4 7 1/16 179.4 7 1/16	50.8 2 50.8 2	196.1 7 23/32 196.1 7 23/32	25.4 1 25.4 1	12.7 1/2 12.7 1/2	7/16 7/16	5.003 11.02
5	1 1/2, 1 9/16, 1 5/8, 1 11/16, 1 3/4, 1 13/16, 1 7/8, 1 15/16	298.4 11 3/4	92.9 3 21/32	444.5 17 1/2	501.6 19 3/4	4.8 3/16	36.5 1 7/16	71.4 2 13/16	185.7 7 5/16	223.8 8 13/16	57.2 2 1/4	222.5 8 3/4	28.6 1 1/8	14.3 9/16	1/2	8.217 18.1
7	2, 2 1/16, 2 1/8, 2 3/16, 2 1/4, 2 5/16, 2 3/8, 2 7/16	362 14 1/4 362 14 1/4	92.9 3 21/32 92.9 3 21/32	546.1 21 1/2 546.1 21 1/2	603.2 23 3/4 603.2 23 3/4	4.8 3/16 4.8 3/16	38.1 1 1/2 38.1 1 1/2	81.8 3 7/32 84.9 3 11/32	219.1 8 5/8 219.1 8 5/8	265.1 10 7/16 265.1 10 7/16	63.5 2 1/2 63.5 2 1/2	273 10 3/4 273 10 3/4	28.6 1 1/8 28.6 1 1/8	15.9 5/8 15.9 5/8	9/16 9/16	12.312 27.12

TU SERIES

TOP-MOUNTED CAST IRON TU SERIES

- Take-up frame incorporates RTU take-up units as shown on the following pages.
- The frame is designed for top mounting and is made of cast iron.



TO ORDER, COMPLETE ASSEMBLY, SPECIFY TU FRAME AND RTU OR TU TAKE-UP UNIT REQUIRED. Example: TU5 frame and RTU 1 11/16".

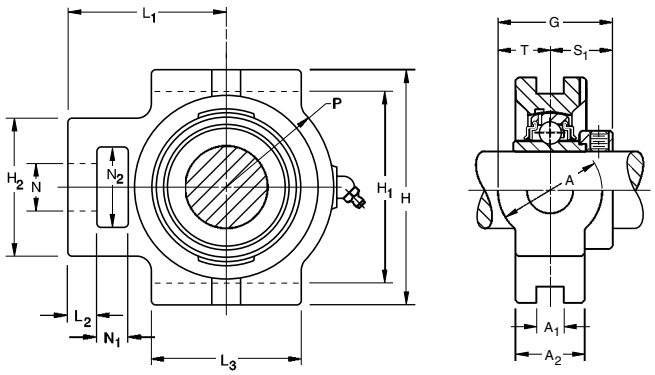
TU Frame No.	Shaft Dia.	L_1	R	J	L	H_1	H	H_2	J_1	A	K	Bolts 4 req'd.	Unit Wt.
	in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	in.	kg lbs.
1	3/4, 13/16, 7/8, 15/16, 1	203.2 8	114.3 4 1/2	419.2 16 1/2	469.9 18 1/2	14.3 9/16	63.5 2 1/2	131 5 5/32	34.9 1 3/8	54 2 1/8	– –	3/8	7.491 16.5
3	1 1/16, 1 1/8, 1 3/16, 1 1/4, 1 5/16, 1 3/8, 1 7/16	254 10	127 5	492.1 19 3/8	542.9 21 3/8	15.9 5/8	71.4 2 13/16	149.2 5 7/8	38.1 1 1/2	65.1 2 9/16	– –	7/16	11.464 25.25
5	1 1/2, 1 9/16, 1 5/8, 1 11/16, 1 3/4, 1 13/16, 1 7/8, 1 15/16	254 10	139.7 5 1/2	530.2 20 7/8	581 22 7/8	19 3/4	82.6 3 1/4	171.4 6 3/4	50.8 2	88.9 3 1/2	– –	1/2	20.203 44.5
7	2, 2 1/16, 2 1/8, 2 3/16, 2 1/4, 2 5/16, 2 3/8, 2 7/16	304.8 12	168.3 6 5/8	644.5 25 3/8	708 27 7/8	22.2 7/8	101.6 4	211.9 8 11/32	63.5 2 1/2	101.6 4	– –	5/8	36.320 80
9	2 11/16, 2 15/16 [1]	304.8 12	193.7 7 5/8	695.3 27 3/8	771.5 30 3/8	25.4 1	117.5 4 5/8	243.7 9 19/32	82.6 3 1/4	120.6 4 3/4	65.1 2 9/16	5/8	52.778 116.25

[1] Dimension K is 69.1 mm (2 23/32") for 2 15/16" shaft diameters.

RTU INDUSTRIAL SERIES

- Ball bearing take-up units are used where shaft adjustment and belt-tightening devices are required, such as in conveyor applications.
- Both types of take-up units incorporate self-aligning B-Type wide inner ring ball bearings with self-locking collars
- Use a G-KRRB, R-Seal Type wide inner ring bearing.
- Provides compact, efficient supports for adjustable shafts and conveyer take-up pulleys.
- Units are factory prelubricated. A grease fitting is provided for relubrication if required.
- See preceding page for take-up frames to fit these units.
- **Contact your Timken representative to discuss highly corrosive applications (e.g., food processing, chemical exposure) where Timken thin dense chrome coated bearings can be utilized.**

Suggested shaft tolerances: **¾" - 1 15/16", nominal to -.013 mm, -.0005"; 2" - 2 15/16", nominal to -.025 mm, -.0010".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
RTU	G-KRRB	Page D54

D

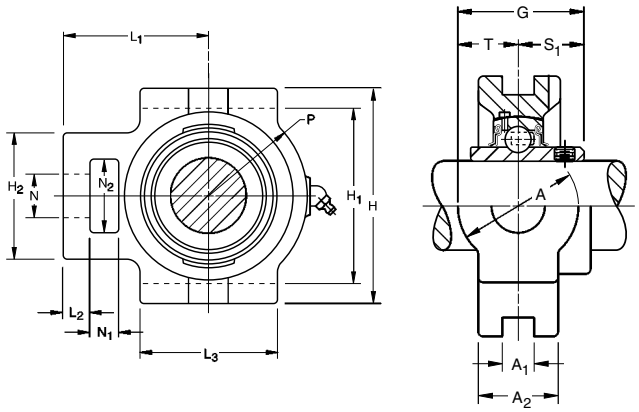
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: RTU 3/4" or RTU 2 11/16". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia.	G	T	S_1	A_2	A_1	A	L_1	H_2	N	N_2	L_2	N_1	P	L_3	H_1	H	Bearing Number	Collar Number	Housing Number	Unit Wt.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.				kg lbs.
RTU	**3/4**	47.6	20.6	27	34.1	13.5	41.3	67.5	57.2	19	31.8	12.7	15.9	49.2	57.2	76.2	92.1	G1012KRRB	S1012K	T-18832	1.444
RTU	20	1 7/8	13/16	1 1/16	1 11/32	17/32	1 5/8	2 21/32	2 1/4	3/4	1 1/4	1/2	5/8	1 15/16	2 1/4	3	3 5/8	GE20KRRB	SE20K		3.18
RTU	7/8																	G1014KRRB	S1014K		
RTU	15/16	42.9	22.2	27	37.3	13.5	44.4	67.5	57.2	19	31.8	12.7	15.9	34.9	57.2	76.2	92.1	G1015KRRB	S1015K	T-18696	1.498
RTU	**1**	1 15/16	7/8	1 1/16	1 15/32	17/32	1 3/4	2 21/32	2 1/4	3/4	1 1/4	1/2	5/8	1 3/8	2 1/4	3	3 5/8	G1100KRRB	S1100K		3.3
RTU	25																	GE25KRRB	SE25K		
RTU	1 1/16																	G1101KRRB	S1101K		
RTU	1 1/8	55.6	25.4	30.2	38.1	13.5	50.8	72.2	61.9	22.2	36.5	12.7	15.9	41.3	63.5	88.9	104.8	G1102KRRB	S1102K	T-18694	1.92
RTU	**1 3/16**	2 3/16	1	1 3/16	1 1/2	17/32	2	2 27/32	2 7/16	7/8	1 7/16	1/2	5/8	1 5/8	2 1/2	3 1/2	4 1/8	G1103KRRB	S1103K		4.23
RTU	30																	GE30KRRB	SE30K		
RTU	1 1/4																	G1104KRRB	S1104K		
RTU	1 5/16	54.8	22.2	32.5	36.5	13.5	44.5	74.6	63.5	22.2	36.5	12.7	15.9	49.2	69.8	88.9	104.8	G1105KRRB	S1105K	T-18692	2.025
RTU	1 3/8	2 5/32	7/8	1 9/32	1 7/16	17/32	1 3/4	2 15/16	2 1/2	7/8	1 7/16	1/2	5/8	1 15/16	2 3/4	3 1/2	4 1/8	G1106KRRB	S1106K		4.46
RTU	**1 7/16**																	G1107KRRB	S1107K		
RTU	35																	GE35KRRB	SE35K		
RTU	**1 1/2**	67.5	32.5	34.9	44.4	17.5	65.1	88.1	82.6	28.6	49.2	15.9	19	53.3	82.6	100.8	120.6	G1108KRRB	S1108KT	T-18834	3.314
RTU	1 9/16	2 21/32	1 9/32	1 3/8	1 3/4	11/16	2 9/16	3 15/32	3 1/4	1 1/8	1 15/16	5/8	3/4	2 3/32	3 1/4	3 31/32	4 3/4	G1109KRRB	S1109K		7.3
RTU	40																	GE40KRRB	SE40K		
RTU	1 5/8																	G1110KRRB	S1110K		
RTU	**1 11/16**	67.5	32.5	34.9	44.4	17.5	65.1	88.1	82.6	28.6	49.2	15.9	19	53.3	82.6	100.8	120.6	G1111KRRB	S1111K	T-18762	3.164
RTU	1 3/4	2 21/32	1 9/32	1 3/8	1 3/4	11/16	2 9/16	3 15/32	3 1/4	1 1/8	1 15/16	5/8	3/4	2 3/32	3 1/4	3 31/32	4 3/4	G1112KRRB	S1112K		6.97
RTU	45																	GE45KRRB	SE45K		
RTU	1 7/8	70.6	32.5	38.1	49.2	17.5	65.1	91.3	82.6	28.6	49.2	15.9	19	59.5	85.7	100.8	120.6	G1114KRRB	S1114K	T-18690	3.587
RTU	**1 15/16**	2 25/32	1 9/32	1 1/2	1 15/16	11/16	2 9/16	3 19/32	3 1/4	1 1/8	1 15/16	5/8	3/4	2 11/32	3 3/8	3 31/32	4 3/4	G1115KRRB	S1115K		7.9
RTU	50																	GE50KRRB	SE50K		
RTU	2																	G1200KRRB	S1201K	T-18828	6.333
RTU	2 1/8	77	34.9	43.7	55.6	27	69.8	119.9	101.6	34.9	63.5	19	31.8	69.1	101.6	129.4	149.2	G1202KRRB	S1202K		13.95
RTU	**2 3/16**	3 1/32	1 3/8	1 23/32	2 3/16	1 1/16	2 3/4	4 23/32	4	1 3/8	2 1/2	3/4	1 1/4	2 23/32	4	5 3/32	5 7/8	G1203KRRB	S1203K		
RTU	55																	GE55KRRB	SE55K		
RTU	2 1/4	81.8	34.9	46.8	52.4	27	69.8	119.9	101.6	34.9	63.5	19	31.8	69.1	101.6	129.4	149.2	G1204KRRB	S1204K	T-18830	5.993
RTU	2 3/8	3 7/32	1 3/8	1 27/32	2 1/16	1 1/16	2 3/4	4 23/32	4	1 3/8	2 1/2	3/4	1 1/4	2 23/32	4	5 3/32	5 7/8	G1206KRRB	S1206K		13.2
RTU	**2 7/16**																	G1207KRRB	S1207K		
RTU	60																	GE60KRRB	SE60K		

YTU INDUSTRIAL SERIES

- Used where shaft adjustment and belt-tightening devices are required, such as conveyer applications.
- Incorporates self-aligning B-Type extra wide inner ring ball bearings with setscrew lock.
- Provides compact, efficient supports for adjustable shafts and conveyor take-up pulleys.
- Factory prelubricated. A grease fitting is provided for relubrication if required.
- See preceding pages for take-up frames to fit these units.
- Safety end caps are available for selected sizes.
- **Contact your Timken representative to discuss highly corrosive applications (e.g., food processing, chemical exposure) where Timken thin dense chrome coated bearings can be utilized.**

Suggested shaft tolerances: **½"- 1 15/16", nominal to -.013 mm, -.0005"; 2"- 2 15/16", nominal to -.025 mm, -.0010".**



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
YTU	GY...KRRB	Page D67

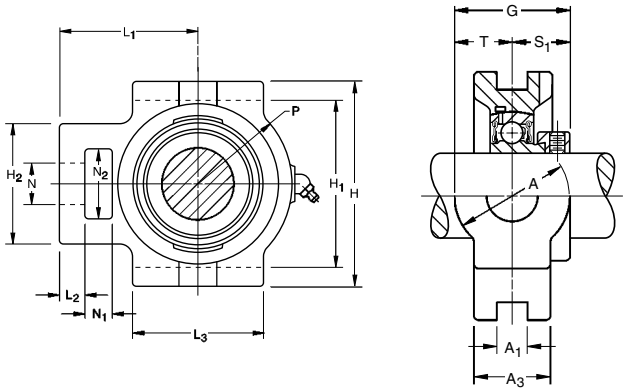
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: YTU 3/4". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia. mm	Shaft Dia. in.	G mm / in.	T mm / in.	S1 mm / in.	A2 mm / in.	A1 mm / in.	A mm / in.	L1 mm / in.	H2 mm / in.	N mm / in.	N2 mm / in.	L2 mm / in.	N1 mm / in.	P mm / in.	L3 mm / in.	H1 mm / in.	H mm / in.	Bearing Number	Housing Number
YTU		**3/4**	38.9 / 1 17/32	20.6 / 13/16	18.3 / 0.719	34.1 / 1 11/32	13.5 / 17/32	41.3 / 1 5/8	67.5 / 2 21/32	57.2 / 2 1/4	19 / 3/4	31.8 / 1 1/4	12.7 / 1/2	15.9 / 5/8	33.3 / 1 5/16	57.2 / 2 1/4	76.2 / 3	92.1 / 3 5/8	GY1012KRRB GYE20KRRB	T-18832
YTU	20																			
YTU		7/8																	GY1014KRRB	T-18696
YTU		15/16	42.1 / 1 21/32	22.2 / 7/8	19.8 / 0.781	37.3 / 1 15/32	13.5 / 17/32	44.4 / 1 3/4	67.5 / 2 21/32	57.2 / 2 1/4	19 / 3/4	31.8 / 1 1/4	12.7 / 1/2	15.9 / 5/8	34.9 / 1 3/8	57.2 / 2 1/4	76.2 / 3	92.1 / 3 5/8	GY1015KRRB GY1100KRRB GYE25KRRB	
YTU		**1**																		
YTU	25																			
YTU		1 1/8	47.6 / 1 7/8	25.4 / 1	22.2 / 0.875	38.1 / 1 1/2	13.5 / 17/32	50.8 / 2	72.2 / 2 27/32	61.9 / 2 7/16	22.2 / 7/8	36.5 / 1 7/16	12.7 / 1/2	15.9 / 5/8	41.3 / 1 5/8	63.5 / 2 1/2	88.9 / 3 1/2	104.8 / 4 1/8	GY1102KRRB GY1103KRRB GYE30KRRB	T-18694
YTU		**1 3/16**																		
YTU	30																			
YTU		1 1/4	47.6 / 1 7/8	22.2 / 7/8	25.4 / 1	36.5 / 1 7/16	13.5 / 17/32	44.5 / 1 3/4	74.6 / 2 15/16	63.5 / 2 1/2	22.2 / 7/8	36.5 / 1 7/16	12.7 / 1/2	15.9 / 5/8	49.2 / 1 15/16	69.8 / 2 3/4	88.9 / 3 1/2	104.8 / 4 1/8	GY1104KRRB GY1106KRRB GY1107KRRB3 GYE35KRRB	T-18692
YTU		1 3/8																		
YTU		1 7/16																		
YTU	35																			
YTU		1 1/2	62.7 / 2 15/32	32.5 / 1 9/32	30.2 / 1.188	44.4 / 1 3/4	17.5 / 11/16	65.1 / 2 9/16	88.1 / 3 15/32	82.6 / 3 1/4	28.6 / 1 1/8	49.2 / 1 15/16	15.9 / 5/8	19 / 3/4	53.3 / 2 3/32	82.6 / 3 1/4	100.8 / 3 31/32	120.6 / 4 3/4	GY1108KRRB GYE40KRRB	T-18834
YTU	40																			
YTU		1 5/8	62.7 / 2 15/16	32.5 / 1 9/32	30.2 / 1.188	44.4 / 1 3/4	17.5 / 11/16	65.1 / 2 9/16	88.1 / 3 15/32	82.6 / 3 1/4	28.6 / 1 1/8	49.2 / 1 15/16	15.9 / 5/8	19 / 3/4	53.3 / 2 3/32	82.6 / 3 1/4	100.8 / 3 31/32	120.6 / 4 3/4	GY1110KRRB GY1111KRRB GY1112KRRB GYE45KRRB	T-18762
YTU		1 11/16																		
YTU		1 3/4																		
YTU	45																			
YTU		1 15/16	65 / 2 9/16	32.5 / 1 9/32	32.5 / 1.281	49.2 / 1 15/16	17.5 / 11/16	65.1 / 2 9/16	91.3 / 3 19/32	82.6 / 3 1/4	28.6 / 1 1/8	49.2 / 1 15/16	15.9 / 5/8	19 / 3/4	59.5 / 2 11/32	85.7 / 3 3/8	100.8 / 3 31/32	120.6 / 4 3/4	GY1115KRRB GYE50KRRB	T-18690
YTU	50	1																		
YTU		**2 3/16**	68.3 / 2 11/16	34.9 / 1 3/8	33.3 / 1.312	55.6 / 2 3/16	27 / 1 1/16	69.8 / 2 3/4	119.9 / 4 23/32	101.6 / 4	34.9 / 1 3/8	63.5 / 2 1/2	19 / 3/4	31.8 / 1 1/4	69.1 / 2 23/32	101.6 / 4	129.4 / 5 3/32	149.2 / 5 7/8	GY1203KRRB GYE55KRRB	T-18828
YTU	55																			
YTU		2 1/4	74.6 / 2 15/16	34.9 / 1 3/8	39.7 / 1.562	52.4 / 2 1/16	27 / 1 1/16	69.8 / 2 3/4	119.9 / 4 23/32	101.6 / 4	34.9 / 1 3/8	63.5 / 2 1/2	19 / 3/4	31.8 / 1 1/4	69.1 / 2 23/32	101.6 / 4	129.4 / 5 3/32	149.2 / 5 7/8	GY1204KRRB GY1207KRRB	T-18830
YTU		2 7/16																		

VTU STANDARD SERIES

- Used where shaft adjustment and belt-tightening devices are required (e.g., conveyor belt applications).
- Provides shaft-aligning B-Type wide inner ring ball bearings with self-locking collars.
- Provides compact, efficient supports for adjustable shafts and conveyor take-up pulleys.
- Units are factory prelubricated. A grease fitting is provided for relubrication if required.
- See preceding pages for take-up frames to fit these units.

Suggested shaft tolerances: **$^{3}/_{4}$"- 1 $^{15}/_{16}$", nominal to -.013 mm, -.0005".**
2"- 2 $^{15}/_{16}$", nominal to -.025 mm, -.0010".



BEARING DATA

Unit	Bearing Number	Dimensions and Load Ratings
VTU	GRA...RRB	Page D57

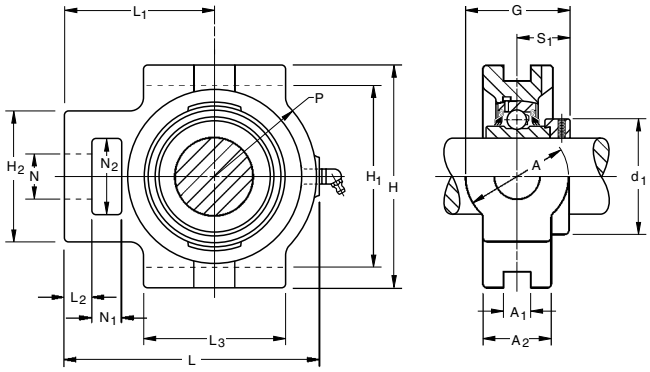
TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: VTU $^{3}/_{4}$" or VTU 2 $^{11}/_{16}$". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia.	G	T	S_1	A_2	A_1	A	L_1	H_2	N	N_2	L_2	N_1	P	L_3	H_1	H	Bearing Number	Collar Number	Housing Number	Unit Wt.
	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.				kg / lbs.
VTU	$^{3}/_{4}$	44.1	20.6	23.4	34.1	13.5	41.3	67.5	57.2	19	31.8	12.7	15.9	33.3	57.2	76.2	92.1	GRA012RRB	S1012K	T-18832	1.372
VTU	20	1 $^{47}/_{64}$	$^{13}/_{16}$	$^{59}/_{64}$	1 $^{11}/_{32}$	$^{17}/_{32}$	1 $^{5}/_{8}$	2 $^{21}/_{32}$	2 $^{1}/_{4}$	$^{3}/_{4}$	1 $^{1}/_{4}$	$^{1}/_{2}$	$^{5}/_{8}$	1 $^{5}/_{16}$	2 $^{1}/_{4}$	3	3 $^{5}/_{8}$	GRAE20RRB	SE20K		3.02
VTU	$^{7}/_{8}$																	GRA014RRB			
VTU	$^{15}/_{16}$	45.2	22.2	23.0	37.3	13.5	44.4	67.5	57.2	19	31.8	12.7	15.9	34.9	57.2	76.2	92.1	GRA015RRB	S1015K	T-18696	1.458
VTU	**1**	1 $^{25}/_{32}$	$^{7}/_{8}$	$^{29}/_{32}$	1 $^{15}/_{32}$	$^{17}/_{32}$	1 $^{3}/_{4}$	2 $^{21}/_{32}$	2 $^{1}/_{4}$	$^{3}/_{4}$	1 $^{1}/_{4}$	$^{1}/_{2}$	$^{5}/_{8}$	1 $^{3}/_{8}$	2 $^{1}/_{4}$	3	3 $^{5}/_{8}$	GRA100RRB	S1100K		3.21
VTU	25																	GRAE25RRB	SE25K		
VTU	1 $^{1}/_{8}$	52	25.4	27	38.1	13.5	50.8	72.2	61.9	22.2	36.5	12.7	15.9	41.3	63.5	88.9	104.8	GRA102RRB	S1102K	T-18694	1.862
VTU	**1 $^{3}/_{16}$**	2 $^{1}/_{16}$	1	1 $^{1}/_{16}$	1 $^{1}/_{2}$	$^{17}/_{32}$	2	2 $^{27}/_{32}$	2 $^{7}/_{16}$	$^{7}/_{8}$	1 $^{7}/_{16}$	$^{1}/_{2}$	$^{5}/_{8}$	1 $^{5}/_{8}$	2 $^{1}/_{2}$	3 $^{1}/_{2}$	4 $^{1}/_{8}$	GRA103RRB	S1103K3		4.10
VTU	30																	GRAE30RRB	SE30K		
VTU	1 $^{1}/_{4}$																	GRA104RRB	S1104K		
VTU	1 $^{3}/_{8}$	51.6	22.2	29.4	36.5	13.5	44.5	74.6	63.5	22.2	36.5	12.7	15.9	49.2	69.8	88.9	104.8	GRA106RRB	S1106K	T-18692	1.953
VTU	**1 $^{7}/_{16}$**	2 $^{1}/_{32}$	$^{7}/_{8}$	1 $^{5}/_{32}$	1 $^{7}/_{16}$	$^{17}/_{32}$	1 $^{3}/_{4}$	2 $^{15}/_{16}$	2 $^{1}/_{2}$	$^{7}/_{8}$	1 $^{7}/_{16}$	$^{1}/_{2}$	$^{5}/_{8}$	1 $^{15}/_{16}$	2 $^{3}/_{4}$	3 $^{1}/_{2}$	4 $^{1}/_{8}$	GRA107RRB	S1107K		4.30
VTU	35																	GRAE35RRB	SE35K		
VTU	1 $^{1}/_{2}$	65	32.5	32.5	44.4	17.5	65.1	88.1	82.6	28.6	49.2	15.9	19	53.3	82.6	100.8	120.6	GRA108RRB	S1108KT	T-18834	3.192
VTU	40	2 $^{9}/_{16}$	1 $^{9}/_{32}$	1 $^{9}/_{32}$	1 $^{3}/_{4}$	$^{11}/_{16}$	2 $^{9}/_{16}$	3 $^{15}/_{32}$	3 $^{1}/_{4}$	1 $^{1}/_{8}$	1 $^{15}/_{16}$	$^{5}/_{8}$	$^{3}/_{4}$	2 $^{3}/_{32}$	3 $^{1}/_{4}$	3 $^{31}/_{32}$	4 $^{3}/_{4}$	GRAE40RRB	SE40K		7.03
VTU	1 $^{5}/_{8}$																	GRA110RRB	S1110K		
VTU	1 $^{11}/_{16}$	65	32.5	32.5	44.4	17.5	65.1	88.1	82.6	28.6	49.2	15.9	19	53.3	82.6	100.8	120.6	GRA111RRB	S1111K	T-18762	3.009
VTU	1 $^{3}/_{4}$	2 $^{9}/_{16}$	1 $^{9}/_{32}$	1 $^{9}/_{32}$	1 $^{3}/_{4}$	$^{11}/_{16}$	2 $^{9}/_{16}$	3 $^{15}/_{32}$	3 $^{1}/_{4}$	1 $^{1}/_{8}$	1 $^{15}/_{16}$	$^{5}/_{8}$	$^{3}/_{4}$	2 $^{3}/_{32}$	3 $^{1}/_{4}$	3 $^{31}/_{32}$	4 $^{3}/_{4}$	GRA112RRB	S1112K		6.63
VTU	45																	GRAE45RRB	SE45K		
VTU	1 $^{7}/_{8}$	65	32.5	32.5	49.2	17.5	65.1	91.3	82.6	28.6	49.2	15.9	19	59.5	85.7	100.8	120.6	GRA114RRB	S1114K	T-18690	3.342
VTU	**1 $^{15}/_{16}$**	2 $^{9}/_{16}$	1 $^{9}/_{32}$	1 $^{9}/_{32}$	1 $^{15}/_{16}$	$^{11}/_{16}$	2 $^{9}/_{16}$	3 $^{19}/_{32}$	3 $^{1}/_{4}$	1 $^{1}/_{8}$	1 $^{15}/_{16}$	$^{5}/_{8}$	$^{3}/_{4}$	2 $^{11}/_{32}$	3 $^{3}/_{8}$	3 $^{31}/_{32}$	4 $^{3}/_{4}$	GRA115RRB	S1115K		7.36
VTU	50																	GRAE50RRB	SE50K		
VTU	2	71.4	34.9	36.5	55.6	27	69.8	119.9	101.6	34.9	63.5	19	31.8	69.1	101.6	129.4	149.2	GRA200RRB	S1200K	T-18828	5.784
VTU	2 $^{3}/_{16}$	2 $^{13}/_{16}$	1 $^{3}/_{8}$	1 $^{7}/_{16}$	2 $^{3}/_{16}$	1 $^{1}/_{16}$	2 $^{3}/_{4}$	4 $^{23}/_{32}$	4	1 $^{3}/_{8}$	2 $^{1}/_{2}$	$^{3}/_{4}$	1 $^{1}/_{4}$	2 $^{23}/_{32}$	4	5 $^{3}/_{32}$	5 $^{7}/_{8}$	GRA203RRB	S1203K		12.73
VTU	55																	GRAE55RRB	SE55K		

TTU INDUSTRIAL SERIES

- Used where shaft adjustment and belt-tightening devices are required (e.g., in conveyor belt applications).
- Incorporates self-aligning, B-Type, extra wide inner ring ball bearings with self-locking collars.
- Uses a G-KPPB4 (Tri-Ply) type wide inner ring bearing.
- Provides compact, efficient supports for adjustable shafts and conveyor take-up pulleys.
- Units are factory prelubricated. A grease fitting is provided for relubrication if required.
- **Contact your Timken representative to discuss highly corrosive applications (e.g., food processing, chemical exposure) where Timken thin dense chrome coated bearings can be utilized.**

Suggested shaft tolerances: **2" - 2 3/16", nominal to -.025 mm, -.0010".**



BEARING DATA

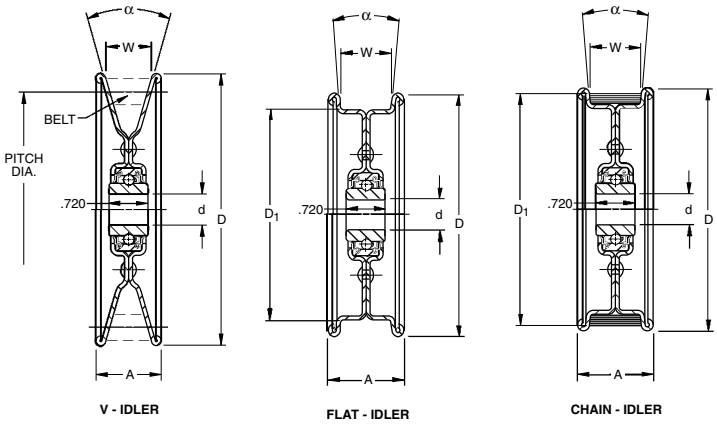
Unit	Bearing Number	Dimensions and Load Ratings
TTU	G-KPPB4	Page D65

TO ORDER, SPECIFY UNIT AND SHAFT DIAMETER. Example: TTU 3/4". POPULAR SIZES ARE IN BOLD.

Unit	Shaft Dia.	G (max.)	L	S_1	d_1 ±.005"	A_2 ±.010"	A_1	A	L_1 ref.	H_2	N min.	N_2 ref.	L_2	N_1	P ref.	L_3	H_1 ref.	H	Bearing Number	Housing Number
	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.	mm / in.		
TTU	2																		G1200KPPB4	
TTU	2 1/16	79	190.5	43.6	75.7	55.6	27	69.8	119.9	101.6	63.5	34.7	19	31.8	69.1	101.6	129.4	149.2	G1201KPPB4	T-18830
TTU	2 1/8	3.109	7 1/2	1.716	2.980	2 3/16	1 1/16	2 3/4	4 23/32	4	2 1/2	1.365	3/4	1 1/4	2 23/32	4	5 3/32	5 7/8	G1202KPPB4	
TTU	**2 3/16**																		G1203KPPB4	
TTU	55																		GE55KPPB4	

IDLER PULLEY UNITS

- A pressed-steel pulley and a Timken precision ball bearing with rubber seals are combined to make a self-contained unit.
- Two pulley designs are available. One for V-belts and another for the backs of V-belts. Both are made for A, B, C and D section belts.
- A chain idler is available that is identical in construction to the flat idler, with the addition of an assembled rubber "tire" (part number A-10927). The rubber "tire" cushions the chain, preventing undue wear on the pulley surface or chain.
- Idler pulley units feature a Timken single-row radial ball bearing with an inner ring extended on both sides. This provides clearance for abutting parts and greater support on the shaft.
- Contact-type rubber seals assure positive retention for lubricant and full protection against dirt, dust and foreign matter.



V - IDLER FLAT - IDLER CHAIN - IDLER

- All units are non-relubricatable. Special features include smoothly rolled-over edges, eliminating belt chafing and scuffing. The "weep holes" on the rivet circle allow water drainage when the pulley is mounted in a horizontal position.

TO ORDER, SPECIFY PULLEY NUMBER. Example: 008-10853 Idler Pulley.

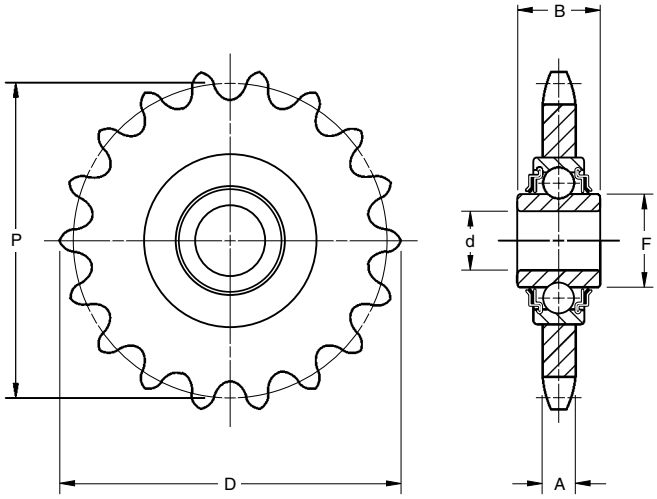
Pulley Number	α Included Angle Degrees	Bearing Number	Bore d	D	A	D_1	W	A Section	Belt Pitch Dia. B Section	C Section	Wt.
			mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.
V IDLERS											
006-11520A[1]	32	WS3NPP3	10.01 / 9.78	76.2	19		12.45	63.5			0.145
			0.394 / 0.385	3	3/4		.049	2 1/2			0.32
10874[2]	34	203NPP	17.000 / 16.993	101.6	22.2		12.7	92.1			0.417
			0.6693 / 0.6690	4	7/8		0.5	3 5/8			0.92
010-10874	34	203KRR2	16.13 / 16.26	101.6	22.2		12.7	92.1			0.435
			0.635 / 0.640	4	7.8		0.5	3 5/8			0.96
008-10482	32	203KRR5	13.08 / 12.95	128.6	31.8		22.15		95.2	114.3	0.572
			0.515 / 0.510	5 1/16	1 1/4		0.872		3 3/4	4 1/2	1.26
010-10482	32	203KRR2	16.13 / 16.26	128.6	31.8		22.15		95.2	114.3	0.558
			0.635 / 0.640	5 1/16	1 1/4		0.872		3 3/4	4 1/2	1.23
008-10853	32	203KRR5	13.08 / 12.95	185.7	31.8		22.15		152.4	171.4	1.134
			0.515 / 0.510	7 5/16	1 1/4		0.872		6	6 3/4	2.5
010-10853	32	203KRR2	16.13 / 16.26	185.7	31.8		22.15		152.4	171.4	1.12
			0.635 / 0.640	7 5/16	1 1/4		0.872		6	6 3/4	2.47
FLAT IDLERS											
006-11581A[1]	10	WS3NPP3	10.01 / 9.78	92.1	30.6	76.2	22.2				0.259
			0.394 / 0.385	3 5/8	1 7/32	3	7/8				0.57
008-10601	10	203KRR5	13.08 / 12.95	117.5	36.5	101.6	25.4				0.503
			0.515 / 0.510	4 5/8	1 7/16	4	1				1.11
010-10601	10	203KRR2	16.13 / 16.26	117.5	36.5	101.6	25.4				0.49
			0.635 / 0.640	4 5/8	1 7/16	4	1				1.08
008-10483	10	203KRR5	13.08 / 12.95	158.8	36.5	139.7	25.4				0.803
			0.515 / 0.510	6 1/4	1 7/16	5 1/2	1				1.77
010-10483	10	203KRR2	16.13 / 16.26	158.8	36.5	139.7	25.4				0.789
			0.635 / 0.640	6 1/4	1 7/16	5 1/2	1				1.74
008-10650	50	203KRR5	13.08 / 12.95	158.8	36.5	139.7	25.4				0.785
			0.515 / 0.510	6 1/4	1 7/16	5 1/2	1				1.73
010-10650	50	203KRR2	16.13 / 16.26	158.8	41.3	139.7	25.4				0.771
			0.635 / 0.640	6 1/4	1 7/16	5 1/2	1				1.7
008-11515	10	203KRR5	13.08 / 12.95	222.2	35.7	203.2	25.4				1.238
			0.515 / 0.510	8 3/4	1 13/32	8	1				2.73
010-11515	10	203KRR2	16.13 / 16.26	222.2	35.7	203.2	25.4				1.225
			0.635 / 0.640	8 3/4	1 13/32	8	1				2.7
008-10731	10	203KRR5	13.08 / 12.95	222.2	48.4	203.2	38.1				1.488
			0.515 / 0.510	8 3/4	1 29/32	8	1 1/2				3.38
010-10731	10	203KRR2	16.13 / 16.26	222.2	48.4	203.2	38.1				1.474
			0.635 / 0.640	8 3/4	1 29/32	8	1 1/2				3.25
CHAIN IDLERS											
008-10927	10	203KRR5	13.08 / 12.95	117.5	36.5	111.1	25.4				0.576
			0.515 / 0.510	4 5/8	1 7/16	4 3/8	1				1.27
010-10927	10	203KRR2	16.13 / 16.26	117.5	36.5	111.1	25.4				0.562
			0.635 / 0.640	4 5/8	1 7/16	4 3/8	1				1.24

[1] Inner ring width 13.891 mm - 13.764 mm; .5469" - .5419"

[2] 12 mm Inner ring width .4724" - .4674"

ROLLER CHAIN IDLER SPROCKETS

- Sintered steel sprockets are hardened and provide an economical means of suitability.
- Replaces the hardened plate steel sprockets on most applications.
- All units are non-relubricatable.



TO ORDER, SPECIFY SPROCKET NUMBER. Example: 010-5017S Idler Sprocket.

Sprocket Number	Bearing Number	Bore d	A.S.A. Chain No.	No. of Teeth	Pitch	P	D	A	F	B	Bearing Radial Load Rating @ 500 RPM	Wt.
		mm in.			mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	N lbs.	kg lbs.
008-4018-S	203KRR5 E8728	13.08 / 12.95 0.515 / 0.500	40	18	12.7 1/2	73.13 2.879	79.88 3.145	7.21 0.284	24.43 0.962	18.29 0.72	3550 800	0.2 0.44
008-5017-S	203KRR5 E8728	13.08 / 12.95 0.515 / 0.500	50	17	15.9 5/8	86.36 3.4	94.72 3.729	8.71 0.343	24.43 0.962	18.29 0.72	3550 800	0.299 0.66
008-6015-S	203KRR5 E8728	13.08 / 12.95 0.515 / 0.500	60	15	19 3/4	91.62 3.607	101.32 3.989	11.66 0.459	24.43 0.962	18.29 0.72	3550 800	0.417 0.92
010-4018-S	203KRR2 E8728	16.26 / 16.13 0.640 / 0.635	40	18	12.7 1/2	73.13 2.879	79.88 3.145	7.21 0.284	24.43 0.962	18.29 0.72	3550 800	0.2 0.44
010-5017-S	203KRR2 E8728	16.26 / 16.13 0.640 / 0.635	50	17	15.9 5/8	86.36 3.4	94.72 3.729	8.71 0.343	24.43 0.962	18.29 0.72	3550 800	0.299 0.66
010-6015-S	203KRR2 E8728	16.26 / 16.13 0.640 / 0.635	60	15	19 3/4	91.62 3.607	101.32 3.989	11.66 0.459	24.43 0.962	18.29 0.72	3550 800	0.417 0.92
011H-5017-S	204KRR2 E8728	17.65 / 17.52 HEX 0.695 / 0.690	50	17	15.9 5/8	86.36 3.4	94.72 3.729	8.71 0.343	28.73 1.131	18.29 0.72	3550 800	0.299 0.66
011H-6015-S	204RR2 E8728	17.65 / 17.52 HEX 0.695 / 0.690	60	15	19 3/4	91.62 3.607	101.32 3.989	11.66 0.459	24.43 0.962	18.29 0.72	3550 800	0.417 0.92
012-8012-S	204RR6 E8728	19.18 / 19.05 0.7500 / 0.7505	80	12	25.4 1	98.15 3.864	110.41 4.347	14.6 0.575	26.62 1.048	15.49 0.61	4800 1080	0.676 1.49

HOUSED UNITS REPLACEMENT CHART

Housed Units	Replacement Bearing Assembly	Features	Part Number
C	MUB replaced by 1000KRB & Col.	Standard Series (SM) wide inner ring (B-Type), collar, caps, and wire	Example: 2 11/16 inch (uses MUB 2 11/16 inch)
DRNR	1000KR & Col. (Two)	Single R-Seal (A-Type), complete bearing number marked on seal	Example: DRNR 1 3/16 inch (uses two 1103KR & Col.)
FLCT	RA000RRB & Col.	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
GRFD, GRFDR, GRFTD, GRFTDR	G1000KRRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: GRFD 1 3/16 inch (uses G1103KRRB & col.)
GRKD, GRSD	G1000KRRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: GRKD 1 3/16 inch (uses G1103KRRB & Col.)
GVFD, GVFDR, GVFTD, GVFTDR	GRA000RRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
GVKD, GVSD	GRA000RRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
LAK, LAS	G1000KLLB & Col.	G-Relubricatable; B-Spherical outer ring; LL-Double Mechani-Seal	Complete bearing number marked on seal. Example: LAK 1 3/16 inch (uses G1103KLLB & Col.)
LAKHL	1000KLS & Col.	L-Single Mechani-Seal; S-External self-aligning	Complete bearing number marked on seal. Example: LAKHL 1 3/16 inch (uses 1103KLS & Col.)
LAO, LSAO	GN000KLLB & Col.	G-Relubricatable; B-Spherical outer ring; LL-Double Mechani-Seal	Complete bearing number marked on seal. Example: LAO 1 3/16 inch (uses GN103KLLB & Col.)
LCJ, LCJT	G1000KLLB & Col.	G-Relubricatable; B-Spherical outer ring; LL-Double Mechani-Seal	Complete bearing number marked on seal. Example: LCJ 1 3/16 inch (uses G1103KLLB & Col.)
LCJO	GN000KLLB	G-Relubricatable; N-Heavy Series; B-Spherical outer ring; LL-Double Mechani-Seal	Complete bearing number marked on seal. Example: LCJO 1 3/16 inch (uses GN103KLLB & Col.)
PB, PBS, VKD, VSD	RA000RRB & Col.	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
RA Flangette, RAT Flangette	RA000RRB & Col.	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
RA Relubricatable Flangette	GRA000RRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	To order, specify bearings & markings, Example: 1-GRA103RRB & Col., 1-G62MSA marking, 1-G62MSB marking
RAK, RAS, RAKH, RSA	G1000KRRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RAK 1 3/16 inch (uses G1103KRRB & Col.)
RAKHL	1000KRS & Col	R-Single R-Seal; S-External self-aligning	Complete bearing number marked on seal. Example: RAKHL 1 3/16 inch (uses 1103KRS & Col.)
RAKN, RASN	1000KRRB & Col.	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RAKN 1 3/16 inch (uses 1103KRRB & Col.)
RAO, RSAO	GN000KRRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RSAO 3 3/16 inch (uses GN303KRRB & Col.)
RASC	GC1000KRRB & Col.	G-Relubricatable;C-Concentric collar; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RASC 1 3/16 inch (uses GC1103KRRB & Col.)
RCJ, RCJT, RC	G1000KRRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RCJ 1 3/16 inch (uses G1103KRRB & Col.)
RCJN, RR Flangette, RRT Flangette	1000KRRB & Col.	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RCJN 1 3/16 inch (uses 1103KRRB & Col.)
RFC, RCJC, RCJTC	GC1000KRRB & Col.	G-Relubricatable; C-Concentric collar; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: 1 3/16 inch (uses GC1103KRRB & Col.)
RFD, RFDR, RFTD, RFTDR	1000KRRB & Col.	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RFD: 1 3/16 inch (uses 1103KRRB & Col.)

Housed Units	Replacement Bearing Assembly	Features	Part Number
RKD, RSD	1000KRRB & Col.	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RKD 1 3/16 inch (uses 1103KRRB & Col.)
RPB	RABR (Shaft Size)	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	RA000RRB FS-450 Bearing & Col. mounted in rubber interliner. Example: RPB 1 3/16 (uses an RABR 1 3/16 inch)
RR Relubricatable Flangette	G1000KRRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	To order, specify bearing & markings, Example: 1-G1100KRRB & Col., 1-G52MSA marking, 1-G52MSB marking
SA	MUB replaced by 1000KRB & Col.	Standard Series (SM) wide inner ring bearing (B-Type), collar, caps and wire	Example: SA 1 3/16 inch (uses MUB 1 3/16 inch)
SAD	MUBD replaced by 1000KRB & Col.	Standard Series (SM) wide inner ring bearing (B-Type), dust seal, collar, caps and wire	Example: SA 1 3/16 inch (uses MUB 1 3/16 inch)
SADD	MUBD replaced by N000KRB & Col.	Rear dust seal, otherwise same as SAD	
SAL	SM1000KS & Col.	S-External self-aligning ring	Example: SAL 1 3/16 inch (uses SM1103KS & Col.)
SAO	MUOB replaced by 100KRB & Col.	Heavy Series (SMN) wide inner ring bearing (B-Type), collar, caps and wire	Example: SAO 1 3/16 inch (uses MUOB 1 3/16 inch)
SAOD	MUOBD (Shaft Size}	Heavy Series (SMN) wide inner ring bearing (B-Type), dust seal, collar, caps and wire	Example: SAOD 1 3/16 inch (uses MUOBD 1 3/16 inch)
SAODD	MUOBD (Shaft Size}	Rear dust seal, otherwise same as SAOD	
SAOL	SMN000KS & Col.	S-External self-aligning ring Heavy Series	Example: SAOL 1 3/16 inch (uses SMN103KS & Col.)
SAS, SAK	GYA000RRB	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
SCJ, SCJT	GYA00RRB	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
TAK, TAS	G1000KPPB & Col.	G-Relubricatable; B-Spherical outer ring; PP-Double Tri-Ply-Seal	Complete bearing number marked on seal. Example: TAK 1 3/16 inch (uses G1103KPPB3 & Col.)
TCJ, TCJT	G1000KPPB & Col.	G-Relubricatable; B-Spherical outer ring; PP-Double Tri-Ply Seal	Complete bearing number marked on seal. Example: TCJ 1 3/16 inch (uses G1103KPPB3 & Col.)
VAK, VAS	GRA000RRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
VCJ, VCJT	GRA000RRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
VFD, VFDR, VFTD, VFTDR	RA000RRB & Col.	Non-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Bearing identification marked on seal.
YAS, YAK, YASM YCJ, YCJT, YTU	GY-KRRB	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal Y-Series wide inner ring	Bearing identification marked on seal.

OTHER TYPES

LTU Take-Up	G1000KLLB & Col.	G-Relubricatable; B-Spherical outer ring; LL-Double Mechani-Seal	Complete bearing number marked on seal. Example: LTU 1 3/16 inch (uses G1103KLLB & Col.)
RHC, RHCM Hanger	GC1000KRRB & Col.	G-Relubricatable; C-Concentric collar; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RCH 1 1/2 inch (uses GC1108KRRB & Col.)
RTU Take-Up	G1000KRRB & Col.	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: RTU 1 3/16 inch (uses G1103KRRB & Col.)
STU Take-Up	GYA-RRB	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal	Complete bearing number marked on seal. Example: STU 1 3/16 inch (uses GYA103RRB)
TU Take-Up	MUB replaced by 1000KRB & Col.	Standard Series (SM) wide inner ring bearing (B-Type), collar, caps and wire	Example: TU 2 11/16 inch (uses MUB 2 11/16 & Col.)
YTU Take-Up	GY-KRRB	G-Relubricatable; B-Spherical outer ring; RR-Double R-Seal; Y-Series wide inner ring with setscrew lock	Complete bearing number marked on seal. Example: YTU 1 3/16 inch (uses GY1103KRRB)

MACHINE UNITS

A complete machine unit consists of either a standard (SM) or heavy (SMN) Series wide inner ring bearing, an inner and outer sealing cap, a retaining wire and self-locking collar – or an integrally sealed bearing and collar. These units are available as bearing replacements for Timken power transmission units such as the SA, SAO, DSA and DSAO pillow blocks, C and Co cylindrical cartridges or special housings.

The "caps" are two steel members which comprise a non-integral frictionless labyrinth seal. The inner member is pressed on the inner ring and rotates with it. The outer member is pressed in the housing against the face of the outer ring and is held in place by the round retaining wire.

The A-Type unit is designated MUA (standard series) or MUOA (heavy series); the B-Type MUB (standard series) or MUOB (heavy series). The B-Type bearing is mounted in the spherical housing seat by means of two slots milled diametrically opposite each other in the housing. The bearing can be inserted at right angles and swiveled into position.

A-TYPE

Figure 1 shows a machine unit with an A-Type bearing carrying the designation MUA (standard series) and MUOA (heavy series). It consists of a wide inner ring, open type or one-piece R-seal bearing, collar, caps and wire. The "caps" are two steel members which comprise a non-integral frictionless labyrinth seal. The inner member is pressed on the inner ring and rotates with it. The outer member is pressed in the housing against the face of the outer ring and is held in place by the round retaining wire.

A-Type units are being converted to a KR-Type bearing with collar, B-Type cap and wire.

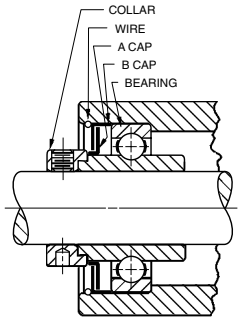
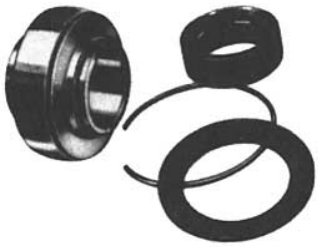


Figure 1 – MUA, MUOA

B-TYPE

Figure 2 is the same as Figure 1, except that the bearing is B-Type and seal on collar side is either a labyrinth seal (as shown) or a one-piece R-Seal. In the latter case no wire is supplied. The designation of the machine unit is MUB (standard series) or MUOB (heavy series). The B-Type bearing is mounted in the spherical housing seat by means of two slots milled diametrically opposite each other in the housing. The bearing can be inserted at right angles and swiveled into position. No additional shoulders or snap rings are required to locate this type.

B-Type units are being converted to a KRB-Type bearing and collar.



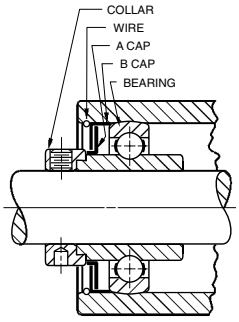


Figure 2 – MUB, MUOB

TIMKEN® SAFETY END CAPS MAKE WORKPLACE PROTECTION A SNAP

Easy-to-install Timken Safety End Caps protect exposed rotating shafts, reducing hazards around many types of equipment. The patent-pending design meets all applicable OSHA requirements.

The Timken safety product line consists of a mounting ring and snap-on cover, both molded in durable, bright yellow polymer. The end cap snaps into the adhesive-backed ring that adheres to the outboard face of most flanged bearing housings. The secure 360 degree fit makes for a rugged unit that also provides basic protection and washdown.

Factory retrofits are a snap with everything provided in a handy kit. The cost-effective end covers are simple to install on Timken and most other flanged units. Current sizes range from $\frac{3}{4}$ in. to 1 $\frac{15}{16}$ in. (20 mm to 50 mm) shaft sizes for two or four-bolt flanged cast iron, malleable iron, and other selected housing styles and sizes.

Safety end caps protect against rotating stub shafts.

KIT CONTENTS

Timken safety end caps come in a convenient kit that contains everything required for a safe and durable mounting:

- Polymer end cap
- Adhesive-backed polymer mounting ring
- Scuffing pad
- Cleaning cloth

INSTALLATION

Steps in the simple mounting procedure include:

1. Use the scuffing pad on housing's mating surface where the mounting ring will be placed.
2. Clean off mounting area.
3. Attach adhesive-backed mounting ring.
4. Hold mounting ring in place with pressure for 60 seconds.
5. Allow adhesive to set for minimum of one hour.
6. Snap end cap into place.

ORDERING INFORMATION

Kit *	Shaft Sizes
204 ECY Kit	$\frac{3}{4}$, 20 mm
205 ECY KIT	$\frac{7}{8}$, $\frac{15}{16}$, 1, 25 mm
206 ECY KIT	1 $\frac{1}{16}$, 1 $\frac{1}{8}$,1 $\frac{3}{16}$, 1 $\frac{1}{4}$ S, 30 mm
207 ECY KIT	1 $\frac{1}{4}$, 1 $\frac{5}{16}$, 1 $\frac{3}{8}$, 1 $\frac{7}{16}$, 35 mm
208 ECY KIT	1 $\frac{1}{2}$, 40 mm
209 ECY KIT	1 $\frac{5}{8}$, 1 $\frac{11}{16}$, 1 $\frac{3}{4}$, 45 mm
210 ECY KIT	1 $\frac{15}{16}$, 2 S, 50 mm

* Kits are designed to fit the following housed units -
4-Bolt: YCJ, RCJ, RCJC, TCJ, LCJ, SCJ, VCJ
2-Bolt: YCJT, RCJT, RCJTC, TCJT, LCJT, SCJT, VCJT

D

TIMKEN BALL BEARING PILLOW BLOCK GREASE

Timken Ball Bearing Pillow Block grease is a NLGI No. 2 polyurea-thickened grease. It provides outstanding long-life, moderately high-temperature lubrication to ball bearings. This grease maintains its mechanical shear stability and provides corrosion resistance, even in the presence of salt water. Timken Ball Bearing Pillow Grease features low-noise characteristics and excellent pumpability. This grease does not contain extreme-pressure additives but is inhibited against rust and oxidation. Operating temperatures range from -40° F to 400° F (-40° C to 163° C). This grease is typically used in lightly loaded ball bearings in pillow blocks and conveyors that operate in high-temperature environments, including kiln and glasswork applications, electric motors, chemical manufacturing and noise-sensitive environments.

SINGLE-POINT AND CENTRALIZED MULTI-POINT LUBRICATORS

Proper lubrication is critical to bearing and machine performance. To help prevent damage, Timken G-Power and M-Power single-point lubricators deliver periodic grease to bearings, chains, guideways and other industrial equipment components. You can choose from gas-powered or electromechanical varieties to meet your operating specifications. C-Power multi-point lubricators are a centralized lubrication system capable of delivering grease to up to six lubrication points. Oil is not an option for this unit.

G-Power and M-Power and C-Power canisters can be filled with Timken-formulated lubricants or many other types of commercial lubricants. A full line of accessories – including brackets, clamps, brushes, fittings and hose extensions – ease installation and offer a host of mounting options for hard-to-reach locations.

LUBRICATION

The Timken Company understands the importance of friction management. Our line of application- and environment-specific lubricants have been developed by leveraging our knowledge of tribology and anti-friction bearings and how these two elements affect overall system performance.

Timken lubricants help bearings and related components operate effectively in demanding industrial operations. High temperature, anti-wear and water-resistant additives offer superior protection in challenging environments.

Similar to our bearings, all Timken lubricants are backed by highly trained customer service and technical support. Industrial customers turn to Timken for comprehensive friction management solutions, and we help customers analyze performance and suggest options that make sense for their unique operating conditions and maintenance intervals.

SUPER PRECISION MACHINE TOOL BEARINGS

Overview: Timken is a premier manufacturer of Fafnir® super precision machine tool ball bearings. From standard catalog ABMA/ISO designs to custom sizes and features, Timken has the super precision ball bearing to meet your needs.

- **Sizes:** 10 mm - 300 mm (.3937 in. - 11.8110 in.) bore.
  26 mm - 400 mm (1.0236 in. - 15.7480 in.) O.D.
- **Markets:** High speed machine tool spindles, high stiffness ball screw support systems, low noise "quiet" bearings, aircraft generator, defense.
- **Features:** ABMA ABEC 7/9 (ISO P4/P2) precision level angular contact 15˚, 25˚, 60˚; single and double-row ball screw; high speed seals' ceramic balls; advanced materials.
- **Benefits:** Very high speed; high accuracy; high stiffness; low operating temperature; low noise; low vibration.

Super Precision Ball Bearings
Angular Contact

Contact Angle:
2 = 15°
3 = 25°

Construction:
K Conrad
WI angular contact; low shoulder on outer ring
WO angular contact; low shoulder on inner ring
WN angular contact; low shoulder on both rings
HX angular contact; low shoulder on both rings

Precision Class:
MM/MMV super high precision between ABEC 7 (ISO P4) and ABEC 9 (ISO P2)
MMX ultra precision • ABEC 9 (ISO P2)

Retainer: No retainer callout implies Timken® Fafnir® PRC
PRB molded nylon cage
PRC molded reinforced nylon cage
CR phenolic (composition) – Timken Fafnir standard
MBR machined bronze

VV high speed seals

2	MM	C	91	04	WI	CR	DUL	A3188

Hybrid Ceramic

Series:
9300 ultra-light
9100 extra-light
99100 extra-light
200 light
300 medium

Bore Size:
(04 and up, multiply these last two numbers by 5 to get bore in millimeters:)
00 10 mm
01 12 mm
02 15 mm
03 17 mm
04 20 mm

Preload: Universal Flush Ground :
***SUX** single bearing, extra-light
***SUL** single bearing, light
***SUM** single bearing, medium
***SUH** single bearing, heavy
DUX duplex pairs of bearings, extra-light
DUL duplex pairs of bearings, light
DUM duplex pairs of bearings, medium
DUH duplex pairs of bearings, heavy
TUX triplex set of bearings, extra-light
TUL triplex set of bearings, light
TUM triplex set of bearings, medium
TUH triplex set of bearings, heavy
QUX quadruplex set of bearings, extra-light
QUL quadruplex set of bearings, light
QUM quadruplex set of bearings, medium
QUH quadruplex set of bearings, heavy

An example of a specification number for other than standard

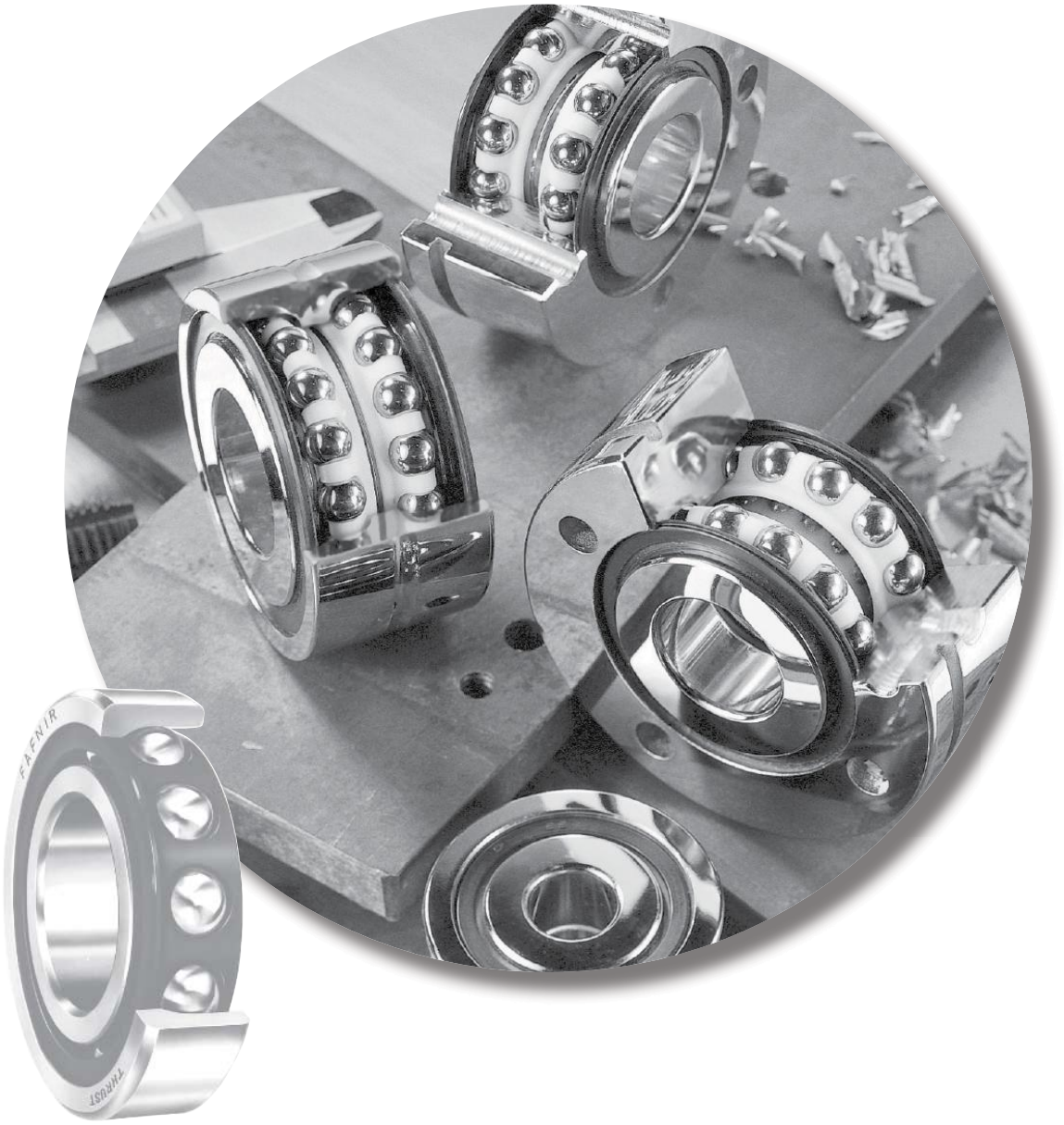
Super Precision Ball Bearings
Ballscrew Support Bearings

METRIC **MM** **25** **BS** **62** **DU** **H**

- **MM** — **ABEC 7 (ISO P4)** with tighter lateral eccentricity
- **25** — **Bore Size:** mm
- **BS** — **Ballscrew Support Series Designation for Metric Number**
- **62** — **O.D. Size:** mm
- **DU** — **Number of bearings in set:** **DU** duplex (2), **TU** triplex (3), **QU** quadruplex (4)
- **H** — **Preload Level:** **L** light, **M** medium, ***H** heavy. ***Standard**

INCH **MM** **93** **10 WI** **2** **H** **DU** **H**

- **MM** — **ABEC 7 (ISO P4)** with tighter lateral eccentricity
- **93** — **Ballscrew Support Series Designation for inch Number**
- **10 WI** — **Relative Size of Bore:** larger number larger bore
- **2** — **Design** Specific Timken® Fafnir®
- **H** — **Series** High capacity
- **DU** — **Number of bearings in set:** **DU** duplex (2), **TU** triplex (3), **QU** quadruplex (4)
- **H** — **Preload Level:** **L** light, **M** medium, ***H** heavy. ***Standard**


FAFNIR
THRUST

Super Precision Ball Bearings

INTRODUCTION

MEANINGS OF PREFIXES AND SUFFIXES

In the Timken® Fafnir® numbering system the basic number which denotes the size and series is always is always retained. When special variations are made, as in the case of precision bearings, prefixes and suffixes are added which have definite meanings as follows:

PREFIXES

MM • Super Precision • ABEC 7/ABEC 9 (ISO P4/P2)

2MM/2MMV • Super Precision between ABEC 7 and ABEC 9 (ISO P4/P2) • low contact angle - 15˚

3MM/3MMV • Super Precision between ABEC 7 and ABEC 9 (ISO P4/P2) • high contact angle - 25˚

MMX • Ultra Precision • ABEC 9 • (ISO P2)

SUFFIXES

K • Deep groove radial

WI • Angular contact-low shoulder on outer

WO • Angular contact-low shoulder on inner

WN • Angular contact-low shoulder on both inner and outer

HX • Angular contact-low shoulder on both inner and outer

CR • Composition cage (non-metallic)

MBR • Machined bronze cage

SR • Machined steel cage

PRB • Molded nylon cage

PRC • Molded nylon cage (reinforced)

PRF, PRG • Special high performance material

SUL • Flush-ground single bearing • Light preload

SUM • Flush-ground single bearing • Medium preload

SUH • Flush-ground single bearing • Heavy preload

DUL • Flush-ground duplex bearings • Light preload

DUM • Flush-ground duplex bearings • Medium preload

DUH • Flush-ground duplex bearings • Heavy preload

TUL • Flush-ground triplex bearings • Light preload

TUM • Flush-ground triplex bearings • Medium preload

TUH • Flush-ground triplex bearings • Heavy preload

QUL • Flush-ground quadruplex bearings • Light preload

QUM • Flush-ground quadruplex bearings • Medium preload

QUH • Flush-ground quadruplex bearings • Heavy preload

PERFORMANCE

The performance of a super precision bearing is not completely defined by the ABEC/ISO classes. The latitude of these classes allows for a significant range of variability in product performance among bearing manufacturers. Characteristics such as raceway curvature and uniformity; the balls' conformance to sphericity; race and ball surface finish; waviness of contact areas; preload offset tolerance; cleanliness; calibration of envelope dimensions; matching of bearings within a set; cage design and material; lubricant; radial play; contact angle and precision of ball complement are not defined by ABEC/ISO. All have a direct impact on the service life and performance of a bearing. The lack of a comprehensive standard allows inferior bearings to be marketed as ABEC 7 or 9 (ISO P4 or P2) without the ability to produce superior performance. All Timken MM, MMV, and MMX precision grade comply with strict controls over these non-specified parameters, to provide premium performance.

OPTIMIZED GRADES OF PRECISION

MM, MMV – SUPER PRECISION, SUPER HIGH PRECISION (ABEC 7/9, ISO P4/P2)

Super precision bearings manufactured to the MM(V) tolerance class operate with running accuracy and performance levels meeting ABEC 9 (ISO P2) yet maintain non-critical features at ABEC 7 (ISO P4) level for cost-effectiveness. Bore and O.D. surfaces are coded in micron units for the convenience of the discriminating machine tool builder striving for optimum fitting of crucial spindle components.

MMX – ULTRAPRECISION (ABEC 9, ISO P2)

Super precision bearings with closer tolerances and running accuracies than ABEC 7 (ISO P4) bearings are made to ABEC 9 (ISO P2) tolerances. Bearings produced to these tolerances are generally used on ultra-high-speed grinding spindles designed for tight dimensional tolerances and super-fine surface finishes. Contact your Timken representative for availability of product range.

BEARING TYPES

ANGULAR-CONTACT BEARINGS

2MM-WI types with 15 degree initial contact angle are designed to meet the needs of machine builders for precision bearings which will operate at as low a temperature as possible for a wide range of speeds and operating loads. In order for machines to produce more accurate work at a higher production rate, the bearings must provide a high degree of rigidity in both axial and radial directions while operating at minimum temperatures. For example, precision machining or cutting tools impose heavier loads on bearings than those encountered in precision grinding. In the former, speeds are slower and loads heavier than the latter, where speeds are high and loads light. The 2MM-WI Type gives the machine builder the flexibility required to meet such variations in applications.

3MM-WI manufactured with 25 degree contact angle, are for use on applications where the loading on the bearings is predominately thrust – and a high degree of axial rigidity is a definite requirement. Typical applications for these are large vertical rotary surface grinders, horizontal and vertical disc grinders, and thrust bearing applications for heavy-duty lathes where the bearings must directly carry extremely high tail stock or chucking pressure.

2MM-WO with 15 degree initial contact angle are designed for extremely high-speed applications where centrifugal force of the balls is the principal load on the bearing. Unlike the MM-WI Type, which has a low shoulder outer ring, the 2MM-WO Type has full shoulders on both sides of the outer race and a low shoulder on one side of the inner ring. This design permits assembly with a maximum complement of balls and a one-piece cage which pilots against the precision-ground lands of the outer ring. Generally this bearing series is supplied with a separable inner ring and ball retaining cage along with special race geometry for extremely high-speed operation.

2MMV and 3MMV-HX are dimensionally interchangeable with equivalent 9100, 99100, 9300 and ISO Series-10 and 19 bearings. These designs enable spindle heads to remove more material in less time while maintaining superior machining tolerances. This is achieved through a proven combination of unique ball complements with precision engineering raceway geometries.

2MMV and 3MMV-HX VV possess all of the high-speed advantages of the HX but with true high speed seals. These bearing seals protect lubricant from outside contaminants while ensuring internal lubricant retention, extending service life significantly.

2MMV and 3MMV 99100WN are available with 15 degree or 25 degree contact angle variations and have been developed to operate under the demanding requirements of high-speed machine tools. They incorporate design features which permit operation at higher speeds than standard angular contact ball bearings. The bore, outside diameter and width are the same as the MM9100 Series.

BALL SCREW SUPPORT BEARINGS

To meet the demands of the servo-controlled machinery field, the Timken® Fafnir ® ball screw support bearings are specially designed with steep contact angles and offer high levels of stiffness for ball screw application requirements. Timken's most recent product offering in this area is a series of double-row, sealed, flanged (or cartridge) units that use an integral double-row outer ring to help simplify installation procedures. Timken offers the following ball screw support bearing products:

- Inch Series bearings (MM9300)
- Metric Series bearings (MMBS)
- Flanged Cylindrical Cartridge housings (BSBU)
- Pillow Block housings (BSPB)
- Integral Double-Row units (MMN, MMF)

2MM-WI &
3MM-WI Types

HXVV Types

2MMV99100 Types

MM9300WI DUH (Inch)
MM…BS…DUH (Metric)

INTRODUCTION

Workhead and tool spindles are the most important components of machine tools. Consequently, to reach the requirements for spindle speed, work accuracy and finish, selection of the proper size and type of ball bearings to support these spindles is a critical design problem.

Of all the anti-friction bearing types, super precision ball bearings have proved to be the best value for the wide variety of bearing applications covering broad ranges of operating loads, speeds and lubrication conditions. Duplexed, preloaded, angular contact bearings with one-piece composition retainers, have excellent capacity and provide maximum spindle rigidity. These bearings are widely used in achieving faster speeds, greater accuracy, smoother finishes and higher production rates.

Many considerations are involved in the choice of bearings for precision applications. Among those which influence the performance of machine tool spindles are the internal fit-up and geometry of the bearings, the mounting arrangement, the shaft and housing mounting fits, the balance and alignment of the rotating parts, and last, but equally important, the lubrication. While many of these factors are significant in slow-speed applications, all of them must be considered for high-speed spindles.

To minimize deflection under load, shafts for machine tool spindles are designed to have a minimum unsupported length and maximum cross-section. For the same reason, spindle housings are designed heavy enough to carry the work load. Their cross-sections are made as uniform as possible to reduce stress concentration during uneven deflection of the frame due to thermal changes. In addition, heavy, well-proportioned housings can function as sinks to conduct heat away from ball bearings.

SELECTIVE ASSEMBLY

Under certain conditions it may be desirable to control fits more accurately without the added expense of using closer tolerance bearings and assembly parts. This can be accomplished by selective assembly of the bearings, shafts, and housings, after they have been sized and sorted according to bores and outside diameters. Timken provides bore and O.D. micron coding as standard practice for super precision angular contact radial ball bearings. This improved fit-up at assembly provides a higher degree of precision from the spindle.

SUCCESSFUL APPLICATIONS

Detailed assembly drawings on the following pages are representative of successful applications of Timken® Fafnir® super precision bearings on such equipment; high-cycle wheel heads; high-speed internal grinding spindles; super precision work heads; and high-speed router spindles. It is hoped that these arrangements will stimulate questions regarding your particular application problems which will promptly be addressed by your Timken representative.

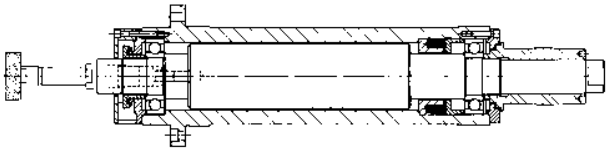
SPECIAL REQUIREMENTS

High-speed grease-lubricated spindles and heavy precision workheads requiring unusual rigidity and running accuracy are a few of the many special problems involving super precision bearings. These and many other applications generally require design features that can be reviewed by your Timken representative.

APPLICATIONS

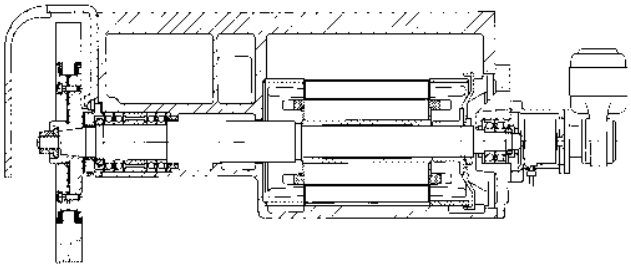
HIGH-SPEED INTERNAL GRINDING SPINDLE

Designed for internal precision grinding, this spindle incorporates 2MM9106WO-CR super precision bearings, preloaded by a nest of coiled helical springs mounted in a cartridge. Thrust load exerted by the springs assures intimate contact of the balls with the bearing raceways under all operating conditions. The sealed construction provides highly effective protection against intrusion of coolant and foreign matter. Grease, packed in each bearing prior to assembly, is sealed-in for life. Operating speed of this spindle is 25000 RPM.



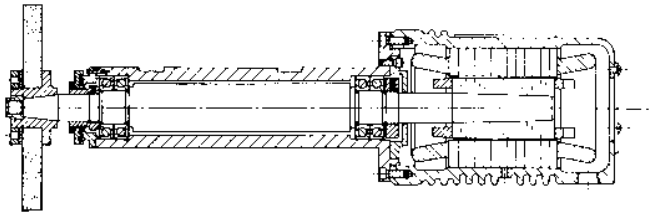
ULTRA PRECISION SURFACE GRINDING SPINDLE

2MMX9122WI-DUM super precision bearings, produced to ABEC9 tolerances, are employed in this horizontal surface grinding spindle for maximum rigidity and accuracy. A back-to-back pair of 2MM312WI-CR-DUL super precision bearings is used at the floating location. This spindle grinds surfaces that are accurate within .000025 inch, flat and parallel, are square within .000010 inch, and to a surface finish of 5 rms, or better. The spindle, driven by a 30 hp motor, operates at 900 RPM. Bearings are packed with grease prior to assembly.



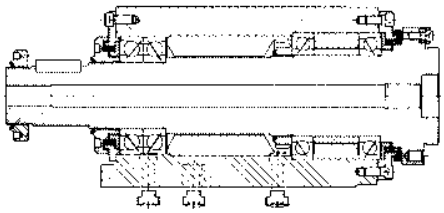
PRECISION SURFACE GRINDING SPINDLE

This motorized surface grinding spindle, operating at 3600 RPM, uses 2MM9107WI-DUM duplex super precision preloaded bearings at both locations, mounted back-to-back, with one pair floating. Labyrinth slinger-type sealing prevents entry of contaminants and seals in the lubrication. Bearings are grease lubricated for life.



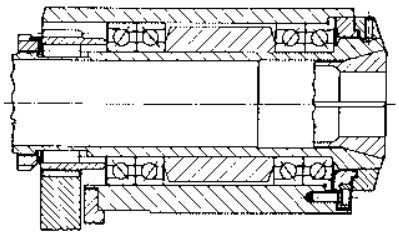
HEAVY-DUTY PRECISION BORING SPINDLE

Super precision, duplexed, preloaded bearings mounted back-to-back are used at each location in this boring spindle to assure smooth performance and a high degree of radial and axial rigidity. Operating speeds vary between 200 and 3000 RPM. Equal-length spacers between the bearings at the work end increase spindle rigidity. When the bearings are properly positioned on the shaft and the respective rings securely clamped, the preload is reproduced and no subsequent adjustment is required. Just prior to assembly, each bearing is packed with grease for life.



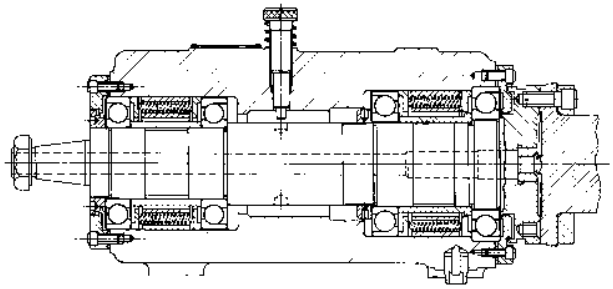
SIX-SPINDLE AUTOMATIC SCREW MACHINE

This bearing arrangement meets the demand for a high-speed, heavy-duty, multiple-spindle screw machine to operate with constant accuracy at maximum production. Because of the hollow shaft construction and the short distance between bearings, extra-light series duplex pairs are used at each location. This affords a high degree of radial rigidity and adds stiffness to the shaft. By mounting a duplex pair of flanged (3MMF) bearings with a 2MM super precision bearing, back-to-back, under a predetermined preload at the front end, accuracy and rigidity of the spindle are assured and permit a straight housing bore. The rear pair of back-to-back bearings is allowed to float in the housing, making an outer-ring spacer unnecessary. Lubrication is by pressure-feed oil circulation.



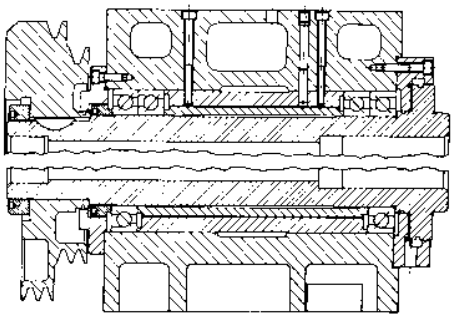
HIGH-SPEED PRECISION BORING HEAD

This high-speed boring head operates at 2500 to 3000 RPM, employing angular-contact, super precision bearings. The front bearings are of different sizes. The outer ring of the larger bearing abuts and is clamped against the housing shoulder. The inboard bearing is permitted to move axially in its housing under spring load. At the rear location two bearings, of the same size and spring loaded, are allowed to float in the housing as temperature differentials occur in the operation spindle. With this head, interference shafts may be permitted without affecting bearing preload. Excessive heat generation is prevented, resulting in low operating temperatures. Bearings are grease lubricated.



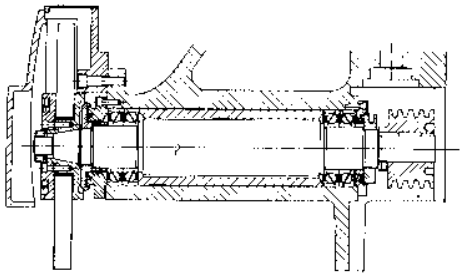
ULTRA PRECISION GRINDING WORKHEAD

This workhead must maintain straightness and roundness accuracy within ten millionths (.000010) of an inch. To meet such rigid requirements for extremely close dimensional control, ultra precision ball bearings and a shaft of extra stiffness are used. The bearings for such applications are manufactured to tolerances closer than those for ABEC 9 (ISO P2) specifications. Equally important is the high degree of workmanship and accuracy with which the shaft, housing and component parts of the workhead must be made. Upper section shows a four-bearing arrangement for heavy work. Lower half shows a two-bearing mounting for lighter work. In either case, the bearings are packed with grease, prior to mounting.



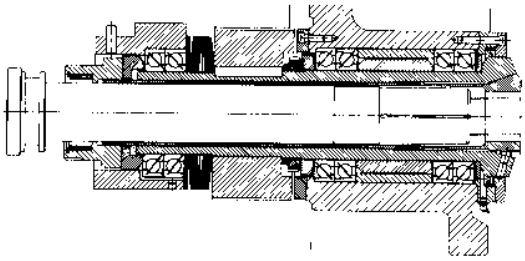
PRECISION TOOLROOM SURFACE GRINDER SPINDLE

Timken® Fafnir® duplexed, super precision, preloaded bearings used in this spindle provide the high degree of rigidity in both directions necessary to meet requirements for modern surface grinding and to assure efficient performance at a low operating temperature. The housing is bored straight-through to assure true alignment – the housing shoulders are eliminated. The precision ground outer sleeve is doweled to the housing to provide the means for stabilizing the spindle axially at the work end bearing location. The rear pair of bearings floats to compensate for thermal changes. Bearings are grease lubricated for life just prior to assembly.



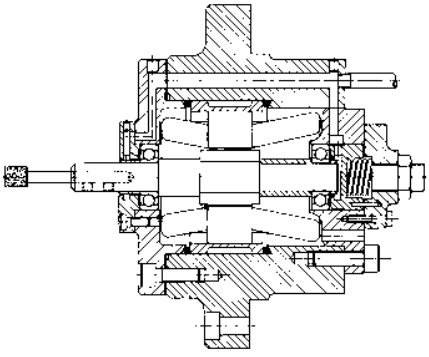
SINGLE BAR MACHINE

This spindle is supported by two pairs of 2MM9124WI-DUM super precison bearings, mounted back-to-back in tandem pairs. Operating speeds vary from 78 to 1500 RPM. A pair of 2MM9122WI-DUM bearings mounted in tandem carries a 25000 pound thrust load during the unchucking operation. The bearings are grease packed for life prior to assembly.



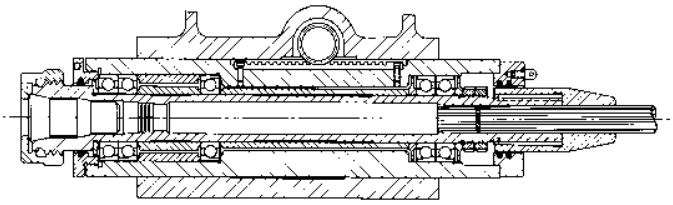
100,000 RPM HIGH-CYCLE WHEELHEAD

Super precision 2MMX9101WO-CR bearings produced to ABEC 9 (ISO P2) RPM tolerances are spring-loaded in this wheelhead which operates at 100,000 RPM. Oil mist lubrication is employed and the motor is water cooled.



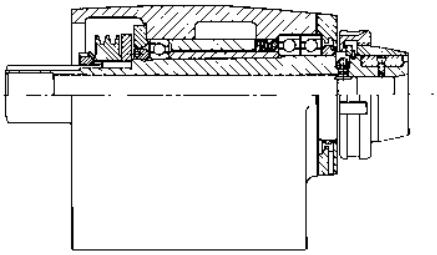
PRECISION JIG-BORING SPINDLE

This jig-boring spindle delivers extreme accuracy over a wide range of speeds. Excellently designed, it is supported with 2MM210WI-DUM grease-lubricated super precision bearings. With this spindle, holes located to an accuracy of one ten-thousandth (.0001) of an inch are bore ground straight and to size limits of better than two ten-thousandths (.0002) of an inch.



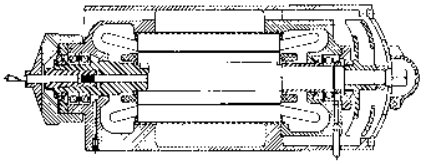
SUPER PRECISION LATHE HEADSTOCK

This lathe spindle produces work held to a roundness of 35 millionths (.000035) of an inch. Maximum operating speed is 4800 RPM. Tandem pair of 3MM9114WI-DUL bearings is opposed by a spring-loaded 3MM9113WI bearing, resulting in excellent spindle rigidity. Bearings are prelubricated with grease.



HIGH-SPEED MOTORIZED ROUTER

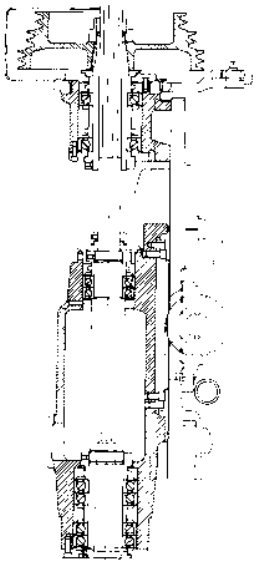
A specially matched duplex pair of Timken® Fafnir® 2MM210WI-DU-FS223 super precision ball bearings, mounted back-to-back at the work end, affords the necessary bearing rigidity to permit routing through aluminum plate one inch thick with a single pass. The upper bearing is spring-loaded and permitted to float. Router is driven by a 30 hp motor at speeds up to 15000 RPM, and uses oil mist lubrication.



PRECISION VERTICAL MILLING SPINDLE

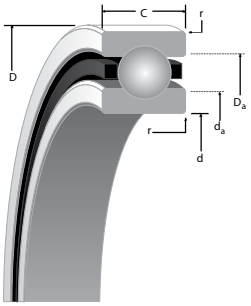
This spindle operates at 12 different speeds ranging from 260 to 6200 rpm under a wide variety of conditions. At the work end, two duplex pairs of Timken Fafnir 2MM212WI-DUL preloaded bearings are mounted in tandem in a back-to-back arrangement, separated by spacers of equal length. This affords extremely high radial and axial rigidity. At the center, a pair of Timken Fafnir 2MM210WI-DUL bearings mounted back-to-back permits axial float of the spindle to compensate for thermal changes.

The driving pulley shaft is rigidly supported by a widely spaced duplex pair of Timken Fafnir 2MM212WI-DUL preloaded bearings. All bearings are grease packed for life.



ULTRA-LIGHT 2(3)MM9300WI (ISO 19) SERIES

DIMENSIONAL SERIES METRIC



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WI CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

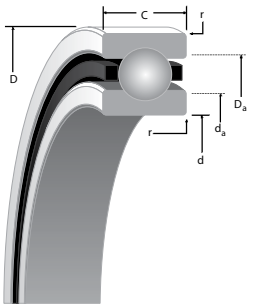
Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	C_o (stat)	C_e (dyn)	Limiting Speed(Ng)	C_o (stat)	C_e (dyn)	Limiting Speed(Ng)
	in/tol: +0; -.000(µm)			mm	kg	N		RPM	N		RPM
9300WI	10 (4)	22 (5)	6 (40)	12 x 3.2	0.01	1640 1460	3510 3510	77500 93000	1580 1410	3380 3380	69800 83760
9301WI	12 (4)	24 (5)	6 (80)	13 x 3.2	0.01	1840 1640	3690 3690	67200 80640	1770 1580	3550 3550	66500 79800
9302WI	15 (4)	28 (5)	7 (80)	13 x 3.6	0.02	2370 2110	4560 4560	55600 66720	2280 2030	4360 4360	50000 60000
9303WI	17 (4)	30 (5)	7 (80)	14 x 3.6	0.02	2800 2500	4970 4970	50100 60120	2680 2380	4740 4740	45100 5120
9304WI	20 (5)	37 (6)	9 (120)	14 x 4.8	0.04	4560 4050	8080 8080	42100 50520	4360 3880	7700 7700	41600 49920
9305WI	25 (5)	42 (6)	9 (120)	17 x 4.8	0.04	5750 5120	9040 9040	34800 41760	5470 4860	8590 8590	31300 37500
9306WI	30 (5)	47 (6)	9 (120)	19 x 4.8	0.05	6610 5890	9540 9540	29700 35640	6270 5580	9040 9040	26700 32000
9307WI	35 (6)	55 (7)	10 (120)	19 x 5.6	0.08	9020 8020	12600 12600	25400 30480	8530 7590	11600 11600	22900 27500
9308WI	40 (6)	62 (7)	12 (120)	19 x 6.4	0.11	11700 10400	16000 16000	22400 26880	11100 9890	15100 15100	20200 2250
9309WI	45 (6)	68 (7)	12 (120)	21 x 6.4	0.13	13200 11700	16800 16800	20000 24000	12500 11100	15900 15900	18000 21600
9310WI	50 (6)	72 (7)	12 (120)	23 x 6.4	0.14	14600 13000	17600 17600	18300 21960	13800 12300	16600 16600	16500 14800
9311WI	55 (7)	80 (7)	13 (150)	23 x 7.1	0.19	18500 16400	21800 21800	16600 19920	17400 15500	20600 20600	14900 17900
9312WI	60 (7)	85 (8)	13 (150)	25 x 7.1	0.20	20200 18000	22700 22700	15300 18360	19000 16900	21400 21400	13800 16500
9313WI	65 (7)	90 (8)	13 (150)	27 x 7.1	0.22	21900 19500	23600 23600	14200 17040	20400 18100	22200 22200	12800 15300
9314WI	70 (7)	100 (8)	16 (150)	24 x 8.7	0.34	29000 25800	32000 32000	13100 15720	27300 24300	30200 30200	11800 14100
9315WI	75 (7)	105 (8)	16 (150)	25 x 8.7	0.36	30300 26900	32500 32500	12300 14760	28400 25200	30600 30600	11100 13300
9316WI	80 (7)	110 (8)	16 (150)	27 x 8.7	0.39	32700 29100	33800 33800	11600 13920	30500 27100	31900 31900	10400 12500
9317WI	85 (8)	120 (8)	18 (200)	26 x 9.5	0.56	37500 33400	38700 38700	10800 12960	35000 31200	36500 36500	9700 11600
9318WI	90 (8)	125 (9)	18 (200)	26 x 10.3	0.57	44000 39200	45000 45000	10300 12360	41200 36700	42400 42400	9300 11100
9319WI	95 (8)	130 (9)	18 (200)	28 x 10.3	0.60	47400 42200	46800 46800	9800 11760	44200 39300	44100 44100	8800 10500
9320WI	100 (8)	140 (9)	20 (200)	29 x 10.3	0.85	48800 43400	47200 47200	9100 10920	45500 40500	44400 44400	8200 9800
9322WI	110 (8)	150 (9)	20 (200)	31 x 10.3	0.92	51700 46000	48400 48400	8400 10080	48200 42900	45600 45600	7600 9100
9324WI	120 (8)	165 (10)	22 (200)	30 x 11.9	1.24	66900 59500	62000 62000	7700 9240	62300 55,500	58300 58300	6900 8300
9326WI	130 (10)	180 (10)	24 (250)	30 x 13.5	1.65	86400 76900	78500 78500	7100 8520	80500 71700	73900 73900	6400 7700
9328WI	140 (10)	190 (10)	24 (250)	32 x 13.5	1.75	91600 81500	80700 80700	6600 7920	85400 76000	76000 76000	5900 7000
9330WI	150 (10)	210 (10)	28 (250)	27 x 17.5	2.61	130800 116400	119200 119200	6200 7440	122700 109200	112400 112400	5600 6700
9332WI	160 (10)	220 (10)	28 (250)	27 x 18.3	2.75	143100 127300	128900 128900	5800 6960	134100 119300	121600 121600	5800 6690
9334WI	170 (10)	230 (11)	28 (250)	29 x 18.3	2.88	153600 13670	133700 133700	5500 6600	143200 127500	126000 126000	5000 6000
9340WI	200 (12)	280 (13)	38 (300)	27 x 23.8	6.29	243300 216300	209400 209400	4600 5520	228800 203600	19700 197700	4100 4900

(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
0.3	13.2	13	19.6	19.3	9.995	10.000	0.005	0.004	22	22.005	0.000	0.010	22.010	22.005	0.015	0.005	9300WI
0.3	15.2	14.9	21.6	21.3	11.995	12.000	0.005	0.004	24	24.005	0.000	0.010	24.010	24.005	0.015	0.005	9301WI
0.3	18.3	18.1	25.5	25.2	14.995	15.000	0.005	0.004	28	28.005	0.000	0.010	28.010	28.005	0.015	0.005	9302WI
0.3	20.3	20	27.5	27.2	16.995	17.000	0.005	0.004	30	30.005	0.000	0.010	30.010	30.005	0.015	0.005	9303WI
0.3	24.1	23.9	33.7	33.4	19.995	20.000	0.005	0.005	37	37.006	0.000	0.012	37.010	37.005	0.016	0.005	9304WI
0.3	29.1	28.9	38.7	38.4	24.995	25.000	0.005	0.005	42	42.006	0.000	0.012	42.010	42.005	0.016	0.005	9305WI
0.3	34.1	33.9	43.7	43.4	29.995	30.000	0.005	0.005	47	47.006	0.000	0.012	47.012	47.007	0.018	0.007	9306WI
0.6	40	39.5	51.1	50.6	34.995	35.000	0.005	0.006	55	55.008	0.000	0.015	55.012	55.007	0.019	0.007	9307WI
0.6	45.1	44.6	57.9	57.4	39.995	40.000	0.005	0.006	62	62.008	0.000	0.015	62.012	62.007	0.019	0.007	9308WI
0.6	50.7	50.1	63.4	62.9	44.995	45.000	0.005	0.006	68	68.008	0.000	0.015	68.012	68.007	0.019	0.007	9309WI
0.6	55.1	54.6	67.9	67.4	49.995	50.000	0.005	0.006	72	72.008	0.000	0.015	72.011	72.007	0.019	0.007	9310WI
1	60.9	60.4	75.2	74.7	54.995	55.000	0.005	0.007	80	80.008	0.000	0.015	80.012	80.008	0.020	0.008	9311WI
1	65.8	65.3	80.2	79.7	59.995	60.000	0.005	0.007	85	85.008	0.000	0.016	85.016	85.009	0.024	0.009	9312WI
1	70.8	70.3	85.2	84.7	64.995	65.000	0.005	0.007	90	90.008	0.000	0.016	90.015	90.007	0.023	0.007	9313WI
1	76.8	76.3	94.3	93.8	69.995	70.000	0.005	0.007	100	100.008	0.000	0.016	100.018	100.010	0.025	0.010	9314WI
1	81.9	81.1	99.4	98.6	74.995	75.005	0.005	0.012	105	105.008	0.000	0.016	105.019	105.011	0.026	0.011	9315WI
1	86.9	86.1	104.4	103.6	79.995	80.005	0.005	0.012	110	110.008	0.000	0.016	110.018	110.010	0.025	0.010	9316WI
1	93.6	92.8	112.7	111.9	84.995	85.005	0.005	0.012	120	120.008	0.000	0.016	120.018	120.010	0.025	0.010	9317WI
1	97.8	97	118.5	117.7	89.995	90.005	0.005	0.013	125	125.008	0.000	0.017	125.021	125.011	0.030	0.011	9318WI
1	102.8	102	123.5	122.7	94.995	95.005	0.005	0.013	130	130.009	0.000	0.018	130.020	130.010	0.029	0.010	9319WI
1	110.3	109.5	131	130.2	99.995	100.005	0.005	0.013	140	140.009	0.000	0.018	140.020	140.010	0.029	0.010	9320WI
1	120.3	119.5	141	140.2	109.995	110.005	0.005	0.013	150	150.009	0.000	0.018	150.023	150.012	0.032	0.012	9322WI
1	131.2	130.4	155	154.3	119.995	120.005	0.005	0.013	165	165.01	0.000	0.020	165.022	165.012	0.032	0.012	9324WI
1.5	142.1	141.4	169.2	168.4	129.995	130.005	0.005	0.015	180	180.01	0.000	0.020	180.022	180.012	0.032	0.012	9326WI
1.5	152.1	151.4	179.2	178.4	139.995	140.005	0.005	0.015	190	190.01	0.000	0.021	190.022	190.012	0.033	0.012	9328WI
2	163.1	162.4	198.2	197.4	149.995	150.005	0.005	0.015	210	210.011	0.000	0.022	210.025	210.015	0.036	0.015	9330WI
2	173.2	172.4	208.2	207.4	159.995	160.005	0.005	0.015	220	220.011	0.000	0.022	220.025	220.015	0.036	0.015	9332WI
2	185.4	184.7	216.1	215.4	169.995	170.005	0.005	0.015	230	230.011	0.000	0.022	230.025	230.015	0.036	0.015	9334WI
2.1	216.8	216	264.5	263.7	199.993	200.008	0.007	0.019	280	280.013	0.000	0.026	280.031	280.018	0.044	0.018	9340WI

ULTRA-LIGHT 2(3)MM9300WI (ISO 19) SERIES

DIMENSIONAL SERIES INCHES



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WI CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	C_o (stat)	C_e (dyn)	Limiting Speed(Ng)	C_o (stat)	C_e (dyn)	Limiting Speed(Ng)
	in./tol: +0; -.000(µm)			in.	lbs.	lbs.		RPM	lbs.		RPM
9300WI	0.3937 (1.5)	0.8661 (2)	0.2362 (16)	12 x 1/8	0.02	370 330	790 790	77500 93000	360 320	760 760	69800 83760
9301WI	0.4724 (1.5)	0.9449 (2)	0.2362 (31)	13 x 1/8	0.03	410 370	830 830	67200 80640	400 350	800 800	60500 79800
9302WI	0.5906 (1.5)	1.1024 (2)	0.2756 (31)	13 x 9/64	0.04	530 470	1030 1030	55600 66720	510 460	980 980	50000 60000
9303WI	0.6693 (1.5)	1.1811 (2)	0.2756 (31)	14 x 9/64	0.04	630 560	1120 1120	50100 60120	600 540	1070 1070	45100 54120
9304WI	0.7874 (2)	1.4567 (2.5)	0.3543 (47)	14 x 3/16	0.08	1020 910	1820 1820	42100 50520	920 870	1730 1730	37900 49920
9305WI	0.9843 (2)	1.6535 (2.5)	0.3543 (47)	17 x 3/16	0.1	1290 1150	2030 2030	34800 41760	1230 1090	1930 1930	31300 37560
9306WI	1.1811 (2)	1.8504 (2.5)	0.3543 (47)	19 x 3/16	0.11	1490 1320	2150 2150	29700 35640	1410 1260	2030 2030	26700 32040
9307WI	1.378 (2.5)	2.1654 (3)	0.3937 (47)	19 x 7/32	0.17	2030 1800	2830 2830	25400 30480	1920 1710	2680 2680	22900 27480
9308WI	1.5748 (2.5)	2.4409 (3)	0.4724 (47)	19 x 1/4	0.25	2640 2350	3600 3600	22400 26880	2500 2220	3400 3400	20200 24240
9309WI	1.7717 (2.5)	2.6772 (3)	0.4724 (47)	21 x 1/4	0.29	2960 2640	3785 3785	20000 24000	2810 2500	3560 3560	18000 21600
9310WI	1.9685 (2.5)	2.8346 (3)	0.4724 (47)	23 x 1/4	0.3	3290 2930	3950 3950	18300 21960	3100 2760	3730 3730	16500 19800
9311WI	2.1654 (3)	3.1496 (3)	0.5118 (59)	23 x 9/32	0.41	4150 3700	4900 4900	16600 19920	3920 3490	4620 4620	14900 17880
9312WI	2.3622 (3)	3.3465 (3)	0.5118 (59)	25 x 9/32	0.44	4540 4040	5100 5100	15300 18360	4270 3800	4820 4820	13800 16560
9313WI	2.5591 (3)	3.5433 (3)	0.5118 (59)	27 x 9/32	0.47	4910 4370	5290 5290	14200 17040	4580 4080	4990 4990	12800 15360
9314WI	2.7559 (3)	3.937 (3)	0.6299 (59)	24 x 11/32	0.76	6510 5800	7200 7200	13100 15720	6130 5450	6790 6790	11800 14160
9315WI	2.9528 (3)	4.1339 (3)	0.6299 (59)	25 x 11/32	0.80	6810 6060	7310 7310	12300 14760	6380 5670	6890 6890	11100 13320
9316WI	3.1496 (3)	4.3307 (3)	0.6299 (59)	27 x 11/32	0.85	7350 6540	7600 7600	11600 13920	6860 6100	7170 7170	10400 12480
9317WI	3.3465 (3)	4.7244 (3)	0.7087 (79)	26 x 3/8	1.23	8440 7510	8700 8700	10800 12960	7880 7010	8200 8200	9700 11640
9318WI	3.5433 (3)	4.9213 (3.5)	0.7087 (79)	26 x 13/32	1.26	9900 8810	10100 10100	10300 12360	9270 8250	9540 9540	9300 11160
9319WI	3.7402 (3)	5.1181 (3.5)	0.7087 (79)	28 x 13/32	1.33	10700 9480	10500 10500	9800 11760	9930 8840	9910 9910	8800 10560
9320WI	3.937 (3)	5.5118 (3.5)	0.7874 (79)	29 x 13/32	1.87	11000 9760	10600 10600	9100 10920	10200 9100	9900 9900	8200 9840
9322WI	4.3307 (3)	5.9055 (3.5)	0.7874 (79)	31 x 13/32	2.02	11600 10300	10900 10900	8400 10080	10800 9650	10200 10200	7600 9120
9324WI	4.7244 (3)	6.4961 (4)	0.8661 (79)	30 x 15/32	2.74	15000 13400	13900 13900	7700 9240	14000 12500	13100 13100	6900 8280
9326WI	5.1181 (4)	7.0866 (4)	0.9449 (98)	30 x 17/32	3.63	19400 17300	17600 17600	7100 8520	18100 16100	16600 16600	6400 7680
9328WI	5.5118 (4)	7.4803 (4.5)	0.9449 (98)	32 x 17/32	3.85	20600 18300	18200 18200	6600 7920	19200 17100	17100 17100	5900 7080
9330WI	5.9055 (4)	8.2677 (4.5)	1.1024 (98)	27 x 11/16	5.75	20400 26200	26805 26805	6200 7440	21600 24500	25300 25300	5600 6720
9332WI	6.2992 (4)	8.6614 (4.5)	1.1024 (98)	27 x 23/32	6.06	32200 28600	29000 29000	5800 6960	30100 26800	27300 27300	5800 6960
9334WI	6.6929 (4)	9.0551 (4.5)	1.1024 (98)	29 x 23/32	6.34	34500 30700	30100 30100	5500 6600	32200 28700	28300 28300	5000 6000
9340WI	7.874 (4.5)	11.0236 (5)	1.4961 (118)	27 x 15/16	13.87	54600 48600	47100 47100	4600 5520	51400 45800	44400 44400	4100 4920

(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r Rad. [2]	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.012	0.52	0.51	0.77	0.76	0.3935	0.3937	0.0002	0.00015	0.8661	0.8663	0.0000	0.0004	0.86650	0.86630	0.00060	0.00020	9300WI
0.012	0.60	0.59	0.85	0.84	0.4722	0.4724	0.0002	0.00015	0.9449	0.9451	0.0000	0.0004	0.94530	0.94510	0.00060	0.00020	9301WI
0.012	0.72	0.71	1.00	0.99	0.5904	0.5906	0.0002	0.00015	1.0236	1.0238	0.0000	0.0004	1.02400	1.02380	0.00060	0.00020	9302WI
0.012	0.80	0.79	1.08	1.07	0.6691	0.6693	0.0002	0.00015	1.1811	1.1813	0.0000	0.0004	1.18150	1.18130	0.00060	0.00020	9303WI
0.012	0.95	0.94	1.33	1.32	0.7872	0.7874	0.0002	0.0002	1.4567	1.4570	0.0000	0.0005	1.45710	1.45690	0.00070	0.00020	9304WI
0.012	1.15	1.14	1.52	1.51	0.9841	0.9843	0.0002	0.0002	1.6535	1.6538	0.0000	0.0005	1.65390	1.65370	0.00070	0.00020	9305WI
0.012	1.34	1.33	1.72	1.71	1.1809	1.1811	0.0002	0.0002	1.8504	1.8507	0.0000	0.0005	1.85090	1.85070	0.00080	0.00030	9306WI
0.024	1.57	1.55	2.01	1.99	1.3778	1.3780	0.0002	0.00025	2.1654	2.1657	0.0000	0.0006	2.16590	2.16570	0.00080	0.00030	9307WI
0.024	1.78	1.76	2.28	2.26	1.5746	1.5748	0.0002	0.00025	2.4409	2.4412	0.0000	0.0006	2.44140	2.44120	0.00080	0.00030	9308WI
0.024	1.99	1.97	2.50	2.48	1.7715	1.7717	0.0002	0.00025	2.6772	2.6775	0.0000	0.0006	2.67770	2.67750	0.00080	0.00030	9309WI
0.024	2.17	2.15	2.67	2.65	1.9683	1.9685	0.0002	0.00025	2.8346	2.8349	0.0000	0.0006	2.83510	2.83490	0.00080	0.00030	9310WI
0.039	2.40	2.38	2.96	2.94	2.1652	2.1654	0.0002	0.0003	3.1496	3.1499	0.0000	0.0006	3.15010	3.14990	0.00080	0.00030	9311WI
0.039	2.59	2.57	3.16	3.14	2.3620	2.3622	0.0002	0.0003	3.3465	3.3468	0.0000	0.0006	3.34710	3.34680	0.00090	0.00030	9312WI
0.039	2.79	2.77	3.35	3.33	2.5589	2.5591	0.0002	0.0003	3.5433	3.5436	0.0000	0.0006	3.54390	3.54360	0.00090	0.00030	9313WI
0.039	3.02	3.00	3.71	3.69	2.7557	2.7559	0.0002	0.0003	3.9370	3.9373	0.0000	0.0006	3.93770	3.93740	0.00100	0.00040	9314WI
0.039	3.22	3.19	3.91	3.88	2.9526	2.9530	0.0002	0.0005	4.1339	4.1342	0.0000	0.0006	4.13460	4.13430	0.00100	0.00040	9315WI
0.039	3.42	3.39	4.11	4.08	3.1494	3.1498	0.0002	0.0005	4.3307	4.3310	0.0000	0.0006	4.33140	4.33110	0.00100	0.00040	9316WI
0.039	3.69	3.66	4.44	4.41	3.3463	3.3467	0.0002	0.0005	4.7244	4.7247	0.0000	0.0006	4.72510	4.72480	0.00100	0.00040	9317WI
0.039	3.85	3.82	4.66	4.63	3.5431	3.5435	0.0002	0.0005	4.9213	4.9216	0.0000	0.0007	4.92210	4.92170	0.00120	0.00040	9318WI
0.039	4.05	4.02	4.86	4.83	3.7400	3.7404	0.0002	0.0005	5.1181	5.1185	0.0000	0.0007	5.11890	5.11850	0.00110	0.00040	9319WI
0.039	4.34	4.31	5.16	5.13	3.9368	3.9372	0.0002	0.0005	5.5118	5.5122	0.0000	0.0007	5.51260	5.51220	0.00110	0.00040	9320WI
0.039	4.74	4.71	5.55	5.52	4.3305	4.3309	0.0002	0.0005	5.9055	5.9059	0.0000	0.0007	5.90640	5.90600	0.00120	0.00050	9322WI
0.039	5.16	5.13	6.10	6.07	4.7242	4.7246	0.0002	0.0005	6.4961	6.4965	0.0000	0.0008	6.49700	6.49660	0.00130	0.00050	9324WI
0.059	5.60	5.57	6.66	6.63	5.1179	5.1183	0.0002	0.0006	7.0866	7.0870	0.0000	0.0008	7.08750	7.08710	0.00130	0.00050	9326WI
0.059	5.99	5.96	7.05	7.02	5.5116	5.5120	0.0002	0.0006	7.4803	7.4807	0.0000	0.0008	7.48120	7.48080	0.00140	0.00050	9328WI
0.079	6.42	6.39	7.80	7.77	5.9053	5.9057	0.0002	0.0006	8.2677	8.2682	0.0000	0.0009	8.26870	8.26830	0.00150	0.00060	9330WI
0.079	6.82	6.79	8.20	8.17	6.2990	6.2994	0.0002	0.0006	8.6614	8.6619	0.0000	0.0009	8.6624	8.6620	0.00150	0.00060	9332WI
0.079	7.30	7.27	8.51	8.48	6.6927	6.6931	0.0002	0.0006	9.0551	9.0556	0.0000	0.0009	9.05610	9.05570	0.00150	0.00060	9334WI
0.083	8.54	8.51	10.41	10.38	7.8737	7.8743	0.0003	0.0008	11.0236	11.0241	0.0000	0.0010	11.02490	11.02440	0.00180	0.00080	9340WI

ULTRA-LIGHT 2MM9300WI (ISO 19) SERIES

DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB

Tandem
DT

Special Applications
DF

Bearing Number	PRELOAD				AXIAL STIFFNESS[1]				RADIAL STIFFNESS[1]			SPACER OFFSETS[1]		
	DUX	DUL	DUM	DUH	X-light	Light	Medium	Heavy	Light	Medium	Heavy	X-Light to Light	Light to Medium	Medium to Heavy
	N				N/µm				N/µm			µm		
METRIC DUPLEX PERFORMANCE DATA 2MM9300WI SERIES														
2MM9300WI	—	15	25	55	14.17	16.44	21.69	29.21	73.11	92.17	115.43	1.3	2.8	4.1
2MM9301WI	—	15	25	55	14.87	17.32	22.74	30.61	76.96	97.42	121.91	1.0	2.5	4.1
2MM9302WI	—	20	45	90	16.44	20.11	26.76	36.55	98.12	123.30	153.91	2.0	3.8	5.6
2MM9303WI	—	20	65	130	17.84	21.86	34.63	47.75	107.91	154.96	192.74	1.8	6.4	6.4
2MM9304WI	—	45	90	160	18.19	26.41	35.68	46.17	148.32	186.09	222.47	4.8	5.8	6.6
2MM9305WI	—	45	110	180	20.64	29.56	43.90	54.57	168.78	228.24	265.15	4.3	7.4	5.3
2MM9306WI	—	45	110	180	22.04	31.48	46.52	57.89	181.55	246.08	286.14	4.1	6.9	5.1
2MM9307WI	—	45	110	240	25.36	33.06	48.27	68.74	189.42	258.68	333.53	3.0	6.6	9.1
2MM9308WI	30	65	160	310	27.28	39.00	55.44	76.08	229.12	304.68	380.76	4.8	7.6	9.4
2MM9309WI	30	90	180	360	30.78	46.35	62.26	85.35	270.22	340.18	425.53	5.8	6.6	9.7
2MM9310WI	40	90	200	400	34.28	48.97	68.91	94.80	286.84	376.21	469.96	5.1	7.6	9.7
2MM9311WI	40	110	240	490	38.83	55.27	76.96	105.46	320.24	416.96	521.03	5.6	8.1	10.7
2MM9312WI	40	110	240	510	43.73	58.24	80.63	112.64	338.08	441.10	559.51	4.6	7.6	10.9
2MM9313WI	70	130	270	530	50.02	65.59	87.62	119.63	378.83	478.00	597.63	4.6	6.9	10.4
2MM9314WI	70	180	360	710	49.67	69.44	93.05	127.50	416.61	525.40	656.75	6.9	8.6	13.0
2MM9315WI	90	180	380	760	53.17	71.18	97.77	134.15	427.81	550.94	688.58	6.1	9.4	13.0
2MM9316WI	90	200	400	800	57.89	78.18	104.59	143.59	468.73	591.16	738.95	6.4	8.6	13.0
2MM9317WI	110	270	530	1070	61.39	85.88	115.78	160.03	521.20	655.00	817.48	8.1	10.7	15.5
2MM9318WI	110	270	530	1070	65.06	90.25	120.51	164.93	528.37	666.72	833.75	7.9	10.2	15.0
2MM9319WI	130	290	580	1160	70.13	97.42	130.13	178.05	570.17	719.36	899.51	7.9	10.2	15.0
2MM9320WI	130	360	710	1470	75.38	108.26	145.52	203.23	626.49	788.27	993.43	9.1	11.2	17.3
2MM9322WI	180	400	800	1600	88.15	125.75	169.48	234.19	681.41	856.84	1068.81	9.1	11.4	17.0
2MM9324WI	200	490	980	1960	97.77	144.47	192.74	265.50	752.94	947.08	1181.97	10.7	13.2	19.3
2MM9326WI	220	620	1220	2450	106.69	150.06	201.48	280.36	846.52	1058.84	1322.07	13.0	14.2	21.3
2MM9328WI	270	620	1250	2560	105.11	159.68	214.43	297.33	883.59	1112.54	1401.30	11.2	14.2	21.8
2MM9330WI	290	850	1690	3450	119.98	181.72	243.99	332.14	954.95	1203.31	1512.71	16.8	18.0	27.4
2MM9332WI	489	980	1980	3960	131.9	173.6	234.1	322.1	1013.5	1281.0	1600.0	12.70	19.80	28.45
2MM9334WI	360	1020	2050	4000	163.36	215.13	288.76	397.02	1085.95	1367.72	1696.36	17.5	19.3	27.2
2MM9340WI	778	1560	3110	6230	164.93	217.05	291.03	399.82	1296.71	1634.27	2042.83	16.3	24.4	36.1
	lbs.				10^6lbs./in.				10^6lbs./in.			in.		
INCH DUPLEX PERFORMANCE DATA 2MM9300WI SERIES														
2MM9300WI	—	3	6	12	0.081	0.094	0.124	0.167	0.418	0.527	0.66	0.00005	0.00011	0.00016
2MM9301WI	—	3	6	12	0.085	0.099	0.13	0.175	0.44	0.557	0.697	0.00004	0.0001	0.00016
2MM9302WI	—	5	10	20	0.094	0.115	0.153	0.209	0.561	0.705	0.88	0.00008	0.00015	0.00022
2MM9303WI	—	5	15	30	0.102	0.125	0.198	0.273	0.617	0.886	1.102	0.00007	0.00025	0.00025
2MM9304WI	—	10	20	35	0.104	0.151	0.204	0.264	0.848	1.064	1.272	0.00019	0.00023	0.00026
2MM9305WI	—	10	25	40	0.118	0.169	0.251	0.312	0.965	1.305	1.516	0.00017	0.00029	0.00021
2MM9306WI	—	10	25	40	0.126	0.18	0.266	0.331	1.038	1.407	1.636	0.00016	0.00027	0.00020
2MM9307WI	—	10	25	55	0.145	0.189	0.276	0.393	1.083	1.479	1.907	0.00012	0.00026	0.00036
2MM9308WI	5	15	35	70	0.156	0.223	0.317	0.435	1.31	1.742	2.177	0.00019	0.00030	0.00037
2MM9309WI	10	20	40	80	0.176	0.265	0.356	0.488	1.545	1.945	2.433	0.00023	0.00026	0.00038
2MM9310WI	10	20	45	90	0.196	0.28	0.394	0.542	1.64	2.151	2.687	0.00020	0.0003	0.00038
2MM9311WI	10	25	55	110	0.222	0.316	0.44	0.603	1.831	2.384	2.979	0.00022	0.00032	0.00042
2MM9312WI	10	25	55	115	0.25	0.333	0.461	0.644	1.933	2.522	3.199	0.00018	0.0003	0.00043
2MM9313WI	15	30	60	120	0.286	0.375	0.501	0.684	2.166	2.733	3.417	0.00018	0.00027	0.00041
2MM9314WI	15	40	80	160	0.284	0.397	0.532	0.729	2.382	3.004	3.755	0.00027	0.00034	0.00051
2MM9315WI	20	40	85	170	0.304	0.407	0.559	0.767	2.446	3.15	3.937	0.00024	0.00037	0.00051
2MM9316WI	20	45	90	180	0.331	0.447	0.598	0.821	2.68	3.38	4.225	0.00025	0.00034	0.00051
2MM9317WI	25	60	120	240	0.351	0.491	0.662	0.915	2.98	3.745	4.674	0.00032	0.00042	0.00061
2MM9318WI	25	60	120	240	0.372	0.516	0.689	0.943	3.021	3.812	4.767	0.00031	0.00040	0.00059
2MM9319WI	30	65	130	260	0.401	0.557	0.744	1.018	3.26	4.113	5.143	0.00031	0.00040	0.00059
2MM9320WI	30	80	160	330	0.431	0.619	0.832	1.162	3.582	4.507	5.68	0.00036	0.00044	0.00068
2MM9322WI	40	90	180	360	0.504	0.719	0.969	1.339	3.896	4.899	6.111	0.00036	0.00045	0.00067
2MM9324WI	45	110	220	440	0.559	0.826	1.102	1.518	4.305	5.415	6.758	0.00042	0.00052	0.00076
2MM9326WI	50	140	275	550	0.61	0.858	1.152	1.603	4.84	6.054	7.559	0.00051	0.00056	0.00084
2MM9328WI	60	140	280	575	0.601	0.913	1.226	1.7	5.052	6.361	8.012	0.00044	0.00056	0.00086
2MM9330WI	65	190	380	775	0.686	1.039	1.395	1.899	5.46	6.88	8.649	0.00066	0.00071	0.00108
2MM9332WI	110	220	445	890	0.753	0.991	1.337	1.839	5.787	7.315	9.135	0.00050	0.00078	0.00112
2MM9334WI	80	230	460	900	0.934	1.23	1.651	2.27	6.209	7.82	9.699	0.00069	0.00076	0.00107
2MM9340WI	175	350	700	1400	0.943	1.241	1.664	2.286	7.414	9.344	11.68	0.00064	0.00096	0.00142

Notes: [1] For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

ULTRA-LIGHT 3MM9300WI (ISO 19) SERIES

DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB

Tandem
DT

Special Applications
DF

Bearing Number	PRELOAD				AXIAL STIFFNESS(1)			RADIAL STIFFNESS(1)			SPACER OFFSETS(1)	
	DUX	DUL	DUM	DUH	Light	Medium	Heavy	Light	Medium	Heavy	Light to Medium	Medium to Heavy
	N				N/µm			N/µm			µm	
METRIC DUPLEX PERFORMANCE DATA 3MM9300WI SERIES												
3MM9300WI	—	20	45	90	32.7	42.3	55.3	70.5	88.7	110.9	2.54	3.81
3MM9301WI	—	20	45	90	34.5	44.5	58.14	74.4	93.7	117.3	2.03	3.81
3MM9302WI	—	45	90	160	46.4	60.2	75.2	96.9	121.6	145.2	3.30	4.06
3MM9303WI	—	45	130	240	50.7	77.0	98.6	106.5	152.5	184.5	5.59	5.08
3MM9304WI	—	45	155	265	51.8	82.7	102.4	112.4	170.6	202.6	6.60	5.08
3MM9305WI	—	65	180	310	67.9	97.9	122.4	146.7	202.9	242.8	5.33	4.83
3MM9306WI	—	70	180	310	72.9	105.3	130.7	157.8	218.8	262.0	5.08	4.57
3MM9307WI	45	90	240	420	84.6	123.3	152.5	182.8	255.7	304.9	5.84	5.08
3MM9308WI	65	130	310	560	101.8	139.4	174.9	218.8	289.8	349.3	5.84	6.10
3MM9309WI	90	160	360	670	114.7	156.2	199.7	246.3	323.9	396.3	5.84	6.86
3MM9310WI	90	160	400	670	121.5	174.6	210.9	261.5	357.8	419.6	6.60	5.59
3MM9311WI	90	200	490	850	138.7	193.8	239.8	294.5	396.3	472.6	6.86	6.60
3MM9312WI	90	200	510	890	146.7	207.6	257.5	311.1	425.4	508.4	6.86	6.60
3MM9313WI	110	220	530	1070	159.7	221.2	290.0	339.3	454.4	599.2	6.60	8.38
3MM9314WI	130	290	710	1290	171.6	239.4	301.7	366.4	494.8	599.2	8.13	8.64
3MM9315WI	155	310	760	1330	180.8	251.3	313.4	385.7	518.8	622.8	8.13	8.13
3MM9316WI	180	330	800	1380	194.8	269.3	332.7	415.7	556.7	663.4	7.87	7.62
3MM9317WI	220	440	1070	1870	214.9	298.2	371.8	462.1	617.0	738.3	9.65	9.65
3MM9318WI	220	400	930	1670	212.7	290.5	363.1	455.3	605.2	730.2	8.38	8.89
3MM9319WI	220	470	1160	2000	235.8	329.9	408.0	504.1	682.1	814.2	9.65	9.14
3MM9320WI	310	600	1470	2560	264.3	369.2	459.8	562.0	754.7	901.4	10.92	10.41
3MM9322WI	330	670	1600	2780	286.5	397.9	494.8	608.7	812.1	968.6	10.92	10.41
3MM9324WI	400	800	1960	3450	311.7	421.3	543.9	663.7	891.8	1,069.2	12.19	12.19
3MM9326WI	510	1020	2450	4340	352.6	488.3	611.5	751.2	1002.2	1198.9	13.46	13.72
3MM9328WI	530	1070	2560	4450	373.1	516.8	642.1	795.4	1062.2	1268.5	13.21	13.21
3MM9330WI	710	1450	3450	6000	401.1	551.1	688.2	854.6	1144.0	1363.0	16.76	16.26
3MM9332WI	800	1580	3950	6940	418.2	588.9	734.1	876.5	1215.9	1455.7	18.80	17.78
3MM9334WI	800	1600	4000	6940	440.0	618.2	760.4	944.3	1280.7	1519.0	18.29	16.26
3MM9340WI	1250	3110	6230	12460	580.1	751.0	985.0	1222.0	1537.0	1920.4	18.80	28.70
	lbs.				10^6lbs./in.			10^6lbs./in.			in.	
INCH DUPLEX PERFORMANCE DATA 3MM9300WI SERIES												
3MM9300WI	—	5	10	20	0.187	0.242	0.316	0.403	0.507	0.634	0.00010	0.00015
3MM9301WI	—	5	10	20	0.197	0.254	0.332	0.425	0.535	0.670	0.00008	0.00015
3MM9302WI	—	10	20	35	0.265	0.344	0.430	0.554	0.695	0.830	0.00013	0.00016
3MM9303WI	—	10	30	55	0.290	0.440	0.564	0.609	0.872	1.055	0.00022	0.00020
3MM9304WI	—	10	35	60	0.296	0.472	0.585	0.642	0.974	1.157	0.00026	0.00020
3MM9305WI	—	15	40	70	0.388	0.560	0.700	0.839	1.160	1.388	0.00021	0.00019
3MM9306WI	—	15	40	70	0.417	0.602	0.747	0.902	1.251	1.498	0.00020	0.00018
3MM9307WI	10	20	55	95	0.484	0.705	0.872	1.045	1.462	1.743	0.00023	0.00020
3MM9308WI	15	30	70	125	0.582	0.797	1.000	1.251	1.657	1.997	0.00023	0.00024
3MM9309WI	20	35	80	150	0.656	0.893	1.142	1.408	1.852	2.266	0.00023	0.00027
3MM9310WI	20	35	90	150	0.695	0.998	1.206	1.495	2.046	2.399	0.00026	0.00022
3MM9311WI	20	45	110	190	0.793	1.108	1.371	1.684	2.266	2.702	0.00027	0.00026
3MM9312WI	20	45	115	200	0.839	1.187	1.472	1.779	2.432	2.907	0.00027	0.00026
3MM9313WI	25	50	120	240	0.913	1.265	1.658	1.940	2.598	3.426	0.00026	0.00033
3MM9314WI	30	65	160	290	0.981	1.369	1.725	2.095	2.829	3.426	0.00032	0.00034
3MM9315WI	35	70	170	300	1.034	1.437	1.792	2.205	2.966	3.561	0.00032	0.00032
3MM9316WI	40	75	180	310	1.114	1.540	1.902	2.377	3.183	3.793	0.00031	0.00030
3MM9317WI	50	100	240	420	1.229	1.705	2.126	2.642	3.528	4.221	0.00038	0.00038
3MM9318WI	50	90	210	375	1.216	1.661	2.076	2.603	3.460	4.175	0.00033	0.00035
3MM9319WI	50	105	260	450	1.348	1.886	2.333	2.882	3.900	4.655	0.00038	0.00036
3MM9320WI	70	135	330	575	1.511	2.111	2.629	3.213	4.315	5.154	0.00043	0.00041
3MM9322WI	75	150	360	625	1.638	2.275	2.829	3.480	4.643	5.538	0.00043	0.00041
3MM9324WI	90	180	440	775	1.782	2.409	3.110	3.795	5.099	6.113	0.00048	0.00048
3MM9326WI	115	230	550	975	2.016	2.792	3.496	4.295	5.730	6.855	0.00053	0.00054
3MM9328WI	120	240	575	1000	2.130	2.950	3.660	4.548	6.073	7.253	0.00052	0.00052
3MM9330WI	160	325	775	1350	2.296	3.172	3.939	4.886	6.519	7.793	0.00066	0.00064
3MM9332WI	180	355	890	1560	2.388	3.363	4.192	5.119	6.943	8.312	0.00074	0.00070
3MM9334WI	180	360	900	1560	2.512	3.530	4.342	5.392	7.313	8.674	0.00072	0.00064
3MM9340WI	280	700	1400	2800	3.317	4.294	5.632	6.987	8.788	10.980	0.00074	0.00113

Notes: (1) For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

ULTRA-LIGHT 2MM9300WI (ISO 19) SERIES

SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15		Kluber Isoflex NBU15		Operating Speeds[2] (DB Mounting) [1]					
	25%	40%	15%	20%	DUL	Grease DUM	DUH	DUL	Oil DUM	DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
2MM9300WI	0.09	0.15	0.06	0.08	62000	46500	31000	105400	79100	52700
2MM9301WI	0.11	0.17	0.07	0.10	53800	40300	26900	91500	68500	45700
2MM9302WI	0.17	0.28	0.12	0.15	44500	33400	22200	75700	56800	37700
2MM9303WI	0.19	0.30	0.12	0.16	40100	30100	20000	68200	51200	34000
2MM9304WI	0.40	0.60	0.25	0.34	33700	25300	16800	57300	43000	28600
2MM9305WI	0.40	0.70	0.29	0.39	27800	20900	13900	47300	35500	23600
2MM9306WI	0.50	0.80	0.34	0.45	23800	17800	11900	40500	30300	20200
2MM9307WI	0.80	1.20	0.51	0.68	20300	15200	10200	34500	25800	17300
2MM9308WI	1.20	1.90	0.80	1.07	17900	13400	9000	30400	22800	15300
2MM9309WI	1.30	2.10	0.88	1.18	16000	12000	8000	27200	20400	13600
2MM9310WI	1.40	2.30	0.95	1.27	14600	11000	7300	24800	18700	12400
2MM9311WI	1.90	3.00	1.30	1.70	13300	10000	6600	22600	17000	11200
2MM9312WI	2.00	3.20	1.40	1.80	12200	9200	6100	20700	15600	10400
2MM9313WI	2.10	3.40	1.40	1.90	11400	8500	5700	19400	14500	9700
2MM9314WI	3.60	5.70	2.40	3.20	10500	7900	5200	17900	13400	8800
2MM9315WI	3.80	6.10	2.50	3.40	9800	7400	4900	16700	12600	8300
2MM9316WI	4.00	6.40	2.70	3.50	9300	7000	4600	15800	11900	7800
2MM9317WI	5.30	8.60	3.60	4.80	8600	6500	4300	14600	11100	7300
2MM9318WI	5.90	9.40	3.90	5.20	8200	6200	4100	13900	10500	7000
2MM9319WI	6.10	9.70	4.10	5.40	7800	5900	3900	13300	10000	6600
2MM9320WI	7.50	12.00	5.00	6.70	7300	5500	3600	12400	9400	6100
2MM9322WI	8.10	13.00	5.40	7.30	6700	5000	3400	11400	8500	5800
2MM9324WI	11.10	17.80	7.40	9.90	6200	4600	3100	10500	7800	5300
2MM9326WI	14.60	23.30	9.70	13.00	5700	4300	2800	9700	7300	4800
2MM9328WI	15.50	24.80	10.40	13.80	5300	4000	2600	9000	6800	4400
2MM9330WI	24.80	39.70	16.60	22.10	5000	3700	2500	8500	6300	4300
2MM9332WI	26.20	41.90	17.50	23.30	4600	3500	2300	7900	5900	3900
2MM9334WI	28.20	45.20	18.90	25.10	4400	3300	2200	7500	5600	3700
2MM9340WI	56.80	90.90	37.90	50.60	3700	2800	1800	6300	4700	3100

[1] For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
[2] For ceramic ball complements use 120% of speeds shown.

ULTRA-LIGHT 3MM9300WI (ISO 19) SERIES

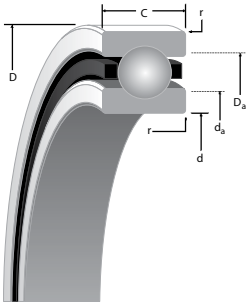
SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15		Kluber Isoflex NBU15		Operating Speeds[2] (DB Mounting) [1]					
	25%	40%	15%	20%	DUL	Grease DUM	DUH	DUL	Oil DUM	DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
3MM9300WI	0.09	0.15	0.06	0.08	55800	41850	27900	94860	71190	47430
3MM9301WI	0.11	0.17	0.07	0.10	48420	36270	24210	82350	61650	41130
3MM9302WI	0.17	0.28	0.12	0.15	40050	30060	19980	68130	51120	33930
3MM9303WI	0.19	0.30	0.12	0.16	36090	27090	18000	61380	46080	30600
3MM9304WI	0.40	0.60	0.25	0.34	30330	22770	15120	51570	38700	25740
3MM9305WI	0.40	0.70	0.29	0.39	25020	18810	12510	42570	31950	21240
3MM9306WI	0.50	0.80	0.34	0.45	21420	16020	10710	36450	27270	18180
3MM9307WI	0.80	1.20	0.51	0.68	18270	13680	9180	31050	23220	15570
3MM9308WI	1.20	1.90	0.80	1.07	16110	12060	8100	27360	20520	3770
3MM9309WI	1.30	2.10	0.88	1.18	14400	10800	7200	24480	18360	12240
3MM9310WI	1.40	2.30	0.95	1.27	13140	9900	6570	22320	16830	11160
3MM9311WI	1.90	3.00	1.30	1.70	11970	9000	5940	20340	15300	10080
3MM9312WI	2.00	3.20	1.40	1.80	10980	8280	5490	18630	14040	9360
3MM9313WI	2.10	3.40	1.40	1.90	10260	7650	5130	17460	13050	8730
3MM9314WI	3.60	5.70	2.40	3.20	9450	7110	4680	16110	12060	7920
3MM9315WI	3.80	6.10	2.50	3.40	8820	6660	4410	15030	11340	7470
3MM9316WI	4.00	6.40	2.70	3.50	8370	6300	4140	14220	10710	7020
3MM9317WI	5.30	8.60	3.60	4.80	7740	5850	3870	13140	9990	6570
3MM9318WI	5.90	9.40	3.90	5.20	7380	5580	3690	12510	9450	6300
3MM9319WI	6.10	9.70	4.10	5.40	7020	5310	3510	11970	9000	5940
3MM9320WI	7.50	12.00	5.00	6.70	6570	4950	3240	11160	8460	5490
3MM9322WI	8.10	13.00	5.40	7.30	6030	4500	3060	10260	7650	5220
3MM9324WI	11.10	17.80	7.40	9.90	5580	4140	2790	9450	7020	4770
3MM9326WI	14.60	23.30	9.70	13.00	5130	3870	2520	8730	6570	4320
3MM9328WI	15.50	24.80	10.40	13.80	4770	3600	2340	8100	6120	3960
3MM9330WI	24.80	39.70	16.60	22.10	4500	3330	2250	7650	5670	3870
3MM9332WI	26.20	41.90	17.50	23.30	4140	3150	2070	7110	5310	3510
3MM9334WI	28.20	45.20	18.90	25.10	3960	2970	1980	6750	5040	3330
3MM9340WI	56.80	90.90	37.90	50.60	3330	2520	1620	5670	4230	2790

[1] For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
[2] For ceramic ball complements use 120% of speeds shown.

ULTRA-LIGHT 2(3)MMV9300HX (ISO 19) SERIES

DIMENSIONAL SERIES METRIC



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WI CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

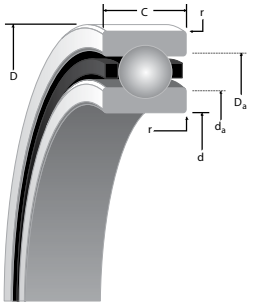
Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width[1]	Ball Qty. x Dia.	Wt.	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]
	mm/tol: +0; -(µm)			mm	kg	N		RPM	N		RPM
9300HX	10 (4)	22 (5)	6 (40)	12 x 3.2	0.01	534 489	1468 1468	91700 110040	534 489	1379 1379	82500 99000
9301HX	12 (4)	24 (5)	6 (80)	14 x 3.2	0.01	610 540	1500 1500	80000 96000	580 520	1420 1420	72000 86400
9302HX	15 (4)	28 (5)	7 (80)	13 x 3.6	0.02	979 890	2091 2091	66800 80160	890 801	2046 2046	60100 72120
9303HX	17 (4)	30 (5)	7 (80)	14 x 3.6	0.02	1023 934	2224 2224	60400 72480	979 890	2091 2091	54400 65280
9304HX	20 (5)	37 (6)	9 (120)	14 x 4.8	0.04	1690 1512	3514 3514	50200 60240	1601 1423	3336 3336	45200 54240
9305HX	25 (5)	42 (6)	9 (120)	17 x 4.8	0.04	2046 1824	3781 3781	41800 50160	1913 1735	3603 3603	37600 45120
9306HX	30 (5)	47 (6)	9 (120)	19 x 4.8	0.05	2402 2135	4048 4048	35900 43080	2224 1957	3825 3825	32300 38760
9307HX	35 (6)	55 (7)	10 (120)	19 x 5.6	0.08	3158 2847	5115 5115	30500 36600	2980 2624	4804 4804	27500 33000
9308HX	40 (6)	62 (7)	12 (120)	19 x 6.4	0.11	6005 5338	10675 10675	28000 33600	5693 5071	10097 10097	25200 30240
9309HX	45 (6)	68 (7)	12 (120)	21 x 6.4	0.13	6716 6005	11164 11164	25000 30000	6405 5693	10586 10586	22500 27000
9310HX	50 (6)	72 (7)	12 (120)	23 x 6.4	0.14	7473 6672	11698 11698	22900 27480	7072 6405	11031 11031	20600 24720
9311HX	55 (7)	80 (7)	13 (150)	23 x 7.1	0.19	9430 8407	14500 14500	20700 24840	8896 7917	13700 13700	18600 22320
9312HX	60 (7)	85 (8)	13 (150)	25 x 7.1	0.2	10319 9207	15123 15123	19200 23040	9697 8629	14278 14278	17300 20760
9313HX	65 (7)	90 (8)	13 (150)	27 x 7.1	0.22	11164 9919	15701 15701	17800 21360	10400 9250	14800 14800	16000 19200
9314HX	70 (7)	100 (8)	16 (150)	24 x 8.7	0.34	14767 13166	21306 21306	16400 19680	13922 12365	20105 20105	14800 17760
9315HX	75 (7)	105 (8)	16 (150)	25 x 8.7	0.36	15435 13744	21617 21617	15400 18480	14500 12899	20416 20416	13900 16680
9316HX	80 (7)	110 (8)	16 (150)	27 x 8.7	0.39	16680 14856	22507 22507	14500 17400	15568 13833	21217 21217	13100 15720
9317HX	85 (8)	120 (8)	18 (200)	26 x 9.5	0.56	19171 17036	25754 25754	13500 16200	17836 15879	24242 24242	12200 14640
9318HX	90 (8)	125 (9)	18 (200)	26 x 10.3	0.57	22462 19972	29935 29935	12900 15480	20995 18682	28200 28200	11600 13920
9319HX	95 (8)	130 (9)	18 (200)	28 x 10.3	0.6	24197 21528	31136 31136	12300 14760	22507 20060	29312 29312	10300 12360
9320HX	100 (8)	140 (9)	20 (200)	29 x 10.3	0.85	24864 22151	31403 31403	11400 13680	23174 20639	29535 29535	9900 11800
9322HX	110 (8)	150 (9)	20 (200)	31 x 10.3	0.92	26377 23485	32204 32204	10500 12600	24597 21884	30291 30291	9500 11400
9324HX	120 (8)	165 (10)	22 (200)	30 x 11.9	1.24	34,161 30424	41277 41277	9600 11520	31803 28334	38831 38831	8600 10320
9326HX	130 (10)	180 (10)	24 (250)	30 x 13.5	1.65	44035 39187	52042 52042	8900 10680	41055 36518	48928 48928	8000 9600
9328HX	140 (10)	190 (10)	24 (250)	32 x 13.5	1.75	46704 41544	53821 53821	8300 9960	43501 38742	50707 50707	7500 9000
9330HX	150 (10)	210 (10)	28 (250)	27 x 17.5	2.61	66720 59603	79174 79174	7700 9240	62717 55600	74726 74726	6900 8280

[Ng] For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
[1] Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
[2] ABMA STD 20 (r_{as} max).

r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
0.3	13.2	13	19.6	19.3	9.995	10.000	0.005	0.004	22.000	22.005	0.0000	0.010	22.010	22.005	0.015	0.005	9300HX
0.3	15.2	14.9	21.6	21.3	11.995	12.000	0.005	0.004	24.000	24.005	0.000	0.010	24.010	24.005	0.015	0.005	9301HX
0.3	18.3	18.1	25.5	25.2	14.995	15.000	0.005	0.004	28.000	28.005	0.000	0.010	28.010	28.005	0.015	0.005	9302HX
0.3	20.3	20	27.5	27.2	16.995	17.000	0.005	0.004	30.000	30.005	0.000	0.010	30.010	30.005	0.015	0.005	9303HX
0.3	24.1	23.9	33.7	33.4	19.995	20.000	0.005	0.005	37.000	37.006	0.000	0.012	37.010	37.005	0.016	0.005	9304HX
0.3	29.1	28.9	38.7	38.4	24.995	25.000	0.005	0.005	42.000	42.006	0.000	0.012	42.010	42.005	0.016	0.005	9305HX
0.3	34.1	33.9	43.7	43.4	29.995	30.000	0.005	0.005	47.000	47.006	0.000	0.012	47.012	47.007	0.018	0.007	9306HX
0.6	40	39.5	51.1	50.6	34.995	35.000	0.005	0.006	55.000	55.008	0.000	0.015	55.012	55.007	0.019	0.007	9307HX
0.6	45.1	44.6	57.9	57.4	39.995	40.000	0.005	0.006	62.000	62.008	0.000	0.015	62.012	62.007	0.019	0.007	9308HX
0.6	50.7	50.1	63.4	62.9	44.995	45.000	0.005	0.006	68.000	68.008	0.000	0.015	68.012	68.007	0.019	0.007	9309HX
0.6	55.1	54.6	67.9	67.4	49.995	50.000	0.005	0.006	72.000	72.008	0.000	0.015	72.011	72.007	0.019	0.007	9310HX
1.0	60.9	60.4	75.2	74.7	54.995	55.000	0.005	0.007	80.000	80.008	0.000	0.015	80.012	80.008	0.020	0.008	9311HX
1.0	65.8	65.3	80.2	79.7	59.995	60.000	0.005	0.007	85.000	85.008	0.000	0.016	85.016	85.009	0.024	0.009	9312HX
1.0	70.8	70.3	85.2	84.7	64.995	65.000	0.005	0.007	90.000	90.008	0.0000	0.016	90.015	90.007	0.023	0.007	9313HX
1.0	76.8	76.3	94.3	93.8	69.995	70.000	0.005	0.007	100.000	100.008	0.0000	0.016	100.018	100.010	0.025	0.010	9314HX
1.0	81.9	81.1	99.4	98.6	74.995	75.005	0.005	0.012	105.000	105.008	0.0000	0.016	105.019	105.011	0.026	0.011	9315HX
1.0	86.9	86.1	104.4	103.6	79.995	80.005	0.005	0.012	110.000	110.008	0.0000	0.016	110.018	110.010	0.025	0.010	9316HX
1.0	93.6	92.8	112.7	111.9	84.995	85.005	0.005	0.012	120.000	120.008	0.0000	0.016	120.018	120.010	0.025	0.010	9317HX
1.0	97.8	97.0	118.5	117.7	89.995	90.005	0.005	0.013	125.000	125.008	0.0000	0.017	125.021	125.011	0.030	0.011	9318HX
1.0	102.8	102.0	123.5	122.7	94.995	95.005	0.005	0.013	130.000	130.009	0.0000	0.018	130.020	130.010	0.029	0.010	9319HX
1.0	110.3	109.5	131	130.2	99.995	100.005	0.005	0.013	140.000	140.009	0.0000	0.018	140.020	140.010	0.029	0.010	9320HX
1.0	120.3	119.5	141	140.2	109.995	110.005	0.005	0.013	150.000	150.009	0.0000	0.018	150.023	150.012	0.032	0.012	9322HX
1.0	131.2	130.4	155	154.3	119.995	120.005	0.005	0.013	165.000	165.010	0.0000	0.020	165.022	165.012	0.032	0.012	9324HX
1.5	142.1	141.4	169.2	168.4	129.995	130.005	0.005	0.015	180.000	180.010	0.0000	0.020	180.022	180.012	0.032	0.012	9326HX
1.5	152.1	151.4	179.2	178.4	139.995	140.005	0.005	0.0150	190.000	190.010	0.0000	0.021	190.022	190.012	0.033	0.012	9328HX
2.0	163.1	162.4	198.2	197.4	149.995	150.005	0.005	0.015	210.000	210.011	0.0000	0.022	210.025	210.015	0.036	0.015	9330HX

ULTRA-LIGHT 2(3)MMV9300HX (ISO 19) SERIES

DIMENSIONAL SERIES INCHES



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WI CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

Bearing Number 2MM or 3MM	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	(2MM) LOAD RATINGS (steel ball & ceramic ball) C_o (stat)	C_e (dyn)	Limiting Speed(Ng)	(3MM) LOAD RATINGS (steel ball & ceramic ball) C_o (stat)	C_e(dyn)	Limiting Speed(Ng)
	in./tol: +0; -.000(X)			in.	lbs.	lbs.		RPM	lbs.		RPM
9300HX	0.3937 (1.5)	0.8661 (2)	0.2362 (16)	13 x 3/32	0.02	120 110	330 330	91700 110040	120 110	310 310	82500 99000
9301HX	0.4724 (1.5)	0.9449 (2)	0.2362 (31)	14 x 3/32	0.03	140 120	340 340	80000 96000	130 120	320 320	72000 86400
9302HX	0.5906 (1.5)	1.1024 (2)	0.2756 (31)	16 x 7/64	0.04	220 200	470 470	66800 80160	200 180	460 460	60100 72120
9303HX	0.6693 (1.5)	1.1811 (2)	0.2756 (31)	17 x 7/64	0.04	230 210	500 500	60400 72480	220 200	470 470	54400 65280
9304HX	0.7874 (2)	1.4567 (2.5)	0.3543 (47)	17 x 9/64	0.08	380 340	790 790	50200 60240	360 320	750 750	45200 54240
9305HX	0.9843 (2)	1.6535 (2.5)	0.3543 (47)	20 x 9/64	0.1	460 410	850 850	41800 50160	430 390	810 810	37600 45120
9306HX	1.1811 (2)	1.8504 (2.5)	0.3543 (47)	23 x 9/64	0.11	540 480	910 910	35900 43080	500 440	860 860	32300 38760
9307HX	1.378 (2.5)	2.1654 (3)	0.3937 (47)	25 x 5/32	0.18	710 640	1150 1150	30500 36600	670 590	1080 1080	27500 33000
9308HX	1.5748 (2.5)	2.4409 (3)	0.4724 (47)	19 x 1/4	0.25	1350 1200	2400 2400	28000 33600	1280 1140	2270 2270	25200 30240
9309HX	1.7717 (2.5)	2.6772 (3)	0.4724 (47)	21 x 1/4	0.29	1510 1350	2510 2510	25000 30000	1440 1280	2380 2380	22500 27000
9310HX	1.9685 (2.5)	2.8346 (3)	0.4724 (47)	23 x 1/4	0.3	1680 1500	2630 2630	22900 27480	1590 1440	2480 2480	20600 24720
9311HX	2.1654 (3)	3.1496 (3)	0.5118 (59)	23 x 9/32	0.39	2120 1890	3260 3260	20700 24840	2000 1780	3080 3080	18600 22320
9312HX	2.3622 (3)	3.3465 (3)	0.5118 (59)	25 x 9/32	0.43	2320 2070	3400 3400	19200 23040	2180 1940	3210 3210	17300 20760
9313HX	2.5591 (3)	3.5433 (3)	0.5118 (59)	27 x 9/32	0.45	2510 2230	3530 3530	17800 21360	2340 2080	3320 3320	16000 19200
9314HX	2.7559 (3)	3.937 (3)	0.6299 (59)	24 x 11/32	0.75	3320 2960	4790 4790	16400 19680	3130 2780	4520 4520	14800 17760
9315HX	2.9528 (3)	4.1339 (3)	0.6299 (59)	25 x 11/32	0.8	3470 3090	4860 4860	15400 18480	3260 2900	4590 4590	13900 16680
9316HX	3.1496 (3)	4.3307 (3)	0.6299 (59)	27 x 11/32	0.8	3750 3340	5060 5060	14500 17400	3500 3110	4770 4770	13100 15720
9317HX	3.3465 (3)	4.7244 (3)	0.7087 (79)	26 x 3/8	1.16	4310 3830	5790 5790	13500 16200	4010 3570	5450 5450	12200 14640
9318HX	3.5433 (3)	4.9213 (3.5)	0.7087 (79)	26 x 13/32	1.2	5050 4490	6730 6730	12900 15480	4720 4200	6340 6340	11600 13920
9319HX	3.7402 (3)	5.1181 (3.5)	0.7087 (79)	28 x 13/32	1.26	5440 4840	7000 7000	12300 14760	5060 4510	6590 6590	10300 12360
9320HX	3.937 (3)	5.5118 (3.5)	0.7874 (79)	29 x 13/32	1.8	5590 4980	7060 7060	11400 13680	5210 4640	6640 6640	10000 12000
9322HX	4.3307 (3)	5.9055 (3.5)	0.7874 (79)	31 x 13/32	1.92	5930 5280	7240 7240	10500 12600	5530 4920	6810 6810	9500 11400
9324HX	4.7244 (3)	6.4961 (4)	0.8661 (79)	30 x 15/32	2.6	7680 6840	9280 9280	9600 11520	7150 6370	8730 8730	8600 10320
9326HX	5.1181 (4)	7.0866 (4)	0.9449 (98)	30 x 17/32	3.63	9900 8810	11700 11700	8900 10680	9230 8210	11000 11000	8000 9600
9328HX	5.5118 (4)	7.4803 (4.5)	0.9449 (98)	32 x 17/32	3.85	10500 9340	12100 12100	8300 9960	9780 8710	11400 11400	7500 9000
9330HX	5.9055 (4)	8.2677 (4.5)	1.1024 (98)	27 x 11/16	5.75	15000 13400	17800 17800	7700 9240	14100 12500	16800 16800	6900 8200

(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.012	0.52	0.51	0.77	0.76	0.3935	0.3937	0.0002	0.00015	0.8661	0.8663	0.0000	0.0004	0.8665	0.8663	0.0006	0.0002	9300HX
0.012	0.6	0.59	0.85	0.84	0.4722	0.4724	0.0002	0.00015	0.9449	0.9451	0.0000	0.0004	0.9453	0.9451	0.0006	0.0002	9301HX
0.012	0.72	0.71	1	0.99	0.5904	0.5906	0.0002	0.00015	1.0236	1.0238	0.0000	0.0004	1.0240	1.0238	0.0006	0.0002	9302HX
0.012	0.8	0.79	1.08	1.07	0.6691	0.6693	0.0002	0.00015	1.1811	1.1813	0.0000	0.0004	1.1815	1.1813	0.0006	0.0002	9303HX
0.012	0.95	0.94	1.33	1.32	0.7872	0.7874	0.0002	0.0002	1.4567	1.4570	0.0000	0.0005	1.4571	1.4569	0.0007	0.0002	9304HX
0.012	1.15	1.14	1.52	1.51	0.9841	0.9843	0.0002	0.0002	1.6535	1.6538	0.0000	0.0005	1.6539	1.6537	0.0007	0.0002	9305HX
0.012	1.34	1.33	1.72	1.71	1.1809	1.1811	0.0002	0.0002	1.8504	1.8507	0.0000	0.0005	1.8509	1.8507	0.0008	0.0003	9306HX
0.024	1.57	1.55	2.01	1.99	1.3778	1.3780	0.0002	0.00025	2.1654	2.1657	0.0000	0.0006	2.1659	2.1657	0.0008	0.0003	9307HX
0.024	1.78	1.76	2.28	2.26	1.5746	1.5748	0.0002	0.00025	2.4409	2.4412	0.0000	0.0006	2.4414	2.4412	0.0008	0.0003	9308HX
0.024	1.99	1.97	2.5	2.48	1.7715	1.7717	0.0002	0.00025	2.6772	2.6775	0.0000	0.0006	2.6777	2.6775	0.0008	0.0003	9309HX
0.024	2.17	2.15	2.67	2.65	1.9683	1.9685	0.0002	0.00025	2.8346	2.8349	0.0000	0.0006	2.8351	2.8349	0.0008	0.0003	9310HX
0.039	2.4	2.38	2.96	2.94	2.1652	2.1654	0.0002	0.0003	3.1496	3.1499	0.0000	0.0006	3.1501	3.1499	0.0008	0.0003	9311HX
0.039	2.59	2.57	3.16	3.14	2.3620	2.3622	0.0002	0.0003	3.3465	3.3468	0.0000	0.0006	3.3471	3.3468	0.0009	0.0003	9312HX
0.039	2.79	2.77	3.35	3.33	2.5589	2.5591	0.0002	0.0003	3.5433	3.5436	0.0000	0.0006	3.5439	3.5436	0.0009	0.0003	9313HX
0.039	3.02	3	3.71	3.69	2.7557	2.7559	0.0002	0.0003	3.9370	3.9373	0.0000	0.0006	3.9377	3.9374	0.0010	0.0004	9314HX
0.039	3.22	3.19	3.91	3.88	2.9526	2.9530	0.0002	0.0005	4.1339	4.1342	0.0000	0.0006	4.1346	4.1343	0.0010	0.0004	9315HX
0.039	3.42	3.39	4.11	4.08	3.1494	3.1498	0.0002	0.0005	4.3307	4.3310	0.0000	0.0006	4.3314	4.3311	0.0010	0.0004	9316HX
0.039	3.69	3.66	4.44	4.41	3.3463	3.3467	0.0002	0.0005	4.7244	4.7247	0.0000	0.0006	4.7251	4.7248	0.0010	0.0004	9317HX
0.039	3.85	3.82	4.66	4.63	3.5431	3.5435	0.0002	0.0005	4.9213	4.9216	0.0000	0.0007	4.9221	4.9217	0.0012	0.0004	9318HX
0.039	4.05	4.02	4.86	4.83	3.7400	3.7404	0.0002	0.0005	5.1181	5.1185	0.0000	0.0007	5.1189	5.1185	0.0011	0.0004	9319HX
0.039	4.34	4.31	5.16	5.13	3.9368	3.9372	0.0002	0.0005	5.5118	5.5122	0.0000	0.0007	5.5126	5.5122	0.0011	0.0004	9320HX
0.039	4.74	4.71	5.55	5.52	4.3305	4.3309	0.0002	0.0005	5.9055	5.9059	0.0000	0.0007	5.9064	5.9060	0.0012	0.0005	9322HX
0.039	5.16	5.13	6.1	6.07	4.7242	4.7246	0.0002	0.0005	6.4961	6.4965	0.0000	0.0008	6.4970	6.4966	0.0013	0.0005	9324HX
0.059	5.6	5.57	6.66	6.63	5.1179	5.1183	0.0002	0.0006	7.0866	7.0870	0.0000	0.0008	7.0875	7.0871	0.0013	0.0005	9326HX
0.059	5.99	5.96	7.05	7.02	5.5116	5.5120	0.0002	0.0006	7.4803	7.4807	0.0000	0.0008	7.4812	7.4808	0.0014	0.0005	9328HX
0.079	6.42	6.39	7.8	7.77	5.9053	5.9057	0.0002	0.0006	8.2677	8.2682	0.0000	0.0009	8.2687	8.2683	0.0015	0.0006	9330HX

ULTRA-LIGHT 2MMV9300HX (ISO 19) SERIES

DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB

Tandem
DT

Special Applications
DF

Bearing Number	PRELOAD Light	Medium	Heavy	AXIAL STIFFNESS(1) Light	Medium	Heavy	RADIAL STIFFNESS(1) Light	Medium	Heavy	SPACER OFFSETS(1) Light to Medium	Medium to Heavy
	N			N/µm			N/µm			µm	
METRIC DUPLEX PERFORMANCE DATA 2MMV9300HX SERIES											
2MMV9300HX	9	25	55	10.2	15.6	21.0	61.0	88.5	110.8	5.6	5.6
2MMV9301HX	9	25	55	10.7	16.7	22.8	61.3	88.2	110.2	5.1	5.6
2MMV9302HX	20	45	85	17.0	22.7	31.0	96.4	120.9	150.9	4.6	6.6
2MMV9303HX	20	45	85	16.9	22.3	30.0	100.9	127.1	159.1	4.6	6.6
2MMV9304HX	20	65	135	18.2	28.5	38.7	109.6	157.9	197.3	7.6	8.1
2MMV9305HX	20	65	135	20.2	31.3	42.3	122.0	176.3	220.5	7.1	7.1
2MMV9306HX	20	65	135	22.0	33.9	45.7	133.7	193.6	242.6	6.1	6.6
2MMV9307HX	45	110	225	30.8	44.6	60.5	185.7	251.7	314.6	7.1	8.6
2MMV9308HX	45	135	265	29.5	45.1	60.1	177.9	259.6	325.7	9.7	10.2
2MMV9309HX	45	155	310	31.5	50.9	68.0	189.4	292.1	366.4	10.7	10.7
2MMV9310HX	65	175	355	38.7	56.7	75.9	232.6	324.6	407.0	9.1	10.7
2MMV9311HX	65	200	400	39.5	60.3	80.5	241.2	352.2	442.0	10.7	11.2
2MMV9312HX	65	225	445	41.7	66.2	88.3	254.1	385.7	483.9	11.7	11.7
2MMV9313HX	65	225	445	43.7	69.3	92.3	266.7	406.1	509.8	11.2	11.2
2MMV9314HX	110	335	665	51.0	78.1	104.5	316.6	461.2	578.4	13.7	14.7
2MMV9315HX	110	335	665	52.3	80.0	107.0	325.0	474.0	594.7	13.2	14.2
2MMV9316HX	110	335	665	54.9	83.8	111.8	341.2	499.0	626.5	12.7	13.7
2MMV9317HX	135	400	800	58.4	89.3	119.3	365.2	533.1	669.2	14.2	15.2
2MMV9318HX	135	400	800	59.4	90.4	120.2	373.1	548.1	688.9	14.2	15.2
2MMV9319HX	135	400	800	62.2	94.5	125.5	390.6	575.9	724.3	13.7	14.7
2MMV9320HX	155	490	975	67.4	104.6	139.5	423.4	630.5	791.8	15.2	15.7
2MMV9322HX	175	535	1065	73.8	112.7	150.4	464.0	678.6	851.9	15.2	16.3
2MMV9324HX	225	665	1335	80.9	123.4	164.7	513.7	752.1	944.3	17.3	18.3
2MMV9326HX	245	735	1465	87.9	133.4	177.0	545.9	805.2	1012.7	17.8	18.8
2MMV9328HX	265	800	1600	94.6	143.6	190.6	587.5	865.4	1088.2	17.8	19.3
2MMV9330HX	355	1065	2135	99.6	151.1	200.6	630.0	930.8	1170.8	22.4	24.4
	lbs.			10^6lbs./in.			10^6lbs./in.			in.	
INCH DUPLEX PERFORMANCE DATA 2MMV9300HX SERIES											
2MMV9300HX	2	6	12	0.0581	0.0894	0.1202	0.3489	0.5059	0.6337	0.00022	0.00022
2MMV9301HX	2	6	12	0.0614	0.0957	0.1301	0.3506	0.5044	0.6300	0.00020	0.00022
2MMV9302HX	5	10	20	0.0972	0.1297	0.1770	0.5509	0.6912	0.8627	0.00018	0.00026
2MMV9303HX	5	10	20	0.0966	0.1275	0.1718	0.5769	0.7266	0.9097	0.00018	0.00026
2MMV9304HX	5	15	30	0.1043	0.1627	0.2213	0.6269	0.9029	1.1280	0.00030	0.00032
2MMV9305HX	5	15	30	0.1154	0.1787	0.2417	0.6977	1.0080	1.2610	0.00028	0.00028
2MMV9306HX	5	15	30	0.1258	0.1940	0.2611	0.7644	1.1070	1.3870	0.00024	0.00026
2MMV9307HX	10	25	50	0.1759	0.2550	0.3460	1.0620	1.4390	1.7990	0.00028	0.00034
2MMV9308HX	10	30	60	0.1688	0.2576	0.3437	1.0170	1.4840	1.8620	0.00038	0.00040
2MMV9309HX	10	35	70	0.1799	0.2910	0.3889	1.0830	1.6700	2.0950	0.00042	0.00042
2MMV9310HX	15	40	80	0.2214	0.3243	0.4340	1.3300	1.8560	2.3270	0.00036	0.00042
2MMV9311HX	15	45	90	0.2260	0.3449	0.4603	1.3790	2.0140	2.5270	0.00042	0.00044
2MMV9312HX	15	50	100	0.2382	0.3783	0.5051	1.4530	2.2050	2.7670	0.00046	0.00046
2MMV9313HX	15	50	100	0.2501	0.3962	0.5278	1.5250	2.3220	2.9150	0.00044	0.00044
2MMV9314HX	25	75	150	0.2915	0.4465	0.5977	1.8100	2.6370	3.3070	0.00054	0.00058
2MMV9315HX	25	75	150	0.2991	0.4575	0.6117	1.8580	2.7100	3.4000	0.00052	0.00056
2MMV9316HX	25	75	150	0.3140	0.4790	0.6390	1.9510	2.8530	3.5820	0.00050	0.00054
2MMV9317HX	30	90	180	0.3339	0.5104	0.6820	2.0880	3.0480	3.8260	0.00056	0.00060
2MMV9318HX	30	90	180	0.3396	0.5167	0.6874	2.1330	3.1340	3.9390	0.00056	0.00060
2MMV9319HX	30	90	180	0.3559	0.5403	0.7174	2.2330	3.2930	4.1410	0.00054	0.00058
2MMV9320HX	35	110	220	0.3852	0.5978	0.7975	2.4210	3.6050	4.5270	0.00060	0.00062
2MMV9322HX	40	120	240	0.4221	0.6444	0.8601	2.6530	3.8800	4.8710	0.00060	0.00064
2MMV9324HX	50	150	300	0.4624	0.7057	0.9418	2.9370	4.3000	5.3990	0.00068	0.00072
2MMV9326HX	55	165	330	0.5028	0.7627	1.0120	3.1210	4.6040	5.7900	0.00070	0.00074
2MMV9328HX	60	180	360	0.5408	0.8209	1.0900	3.3590	4.9480	6.2220	0.00070	0.00076
2MMV9330HX	80	240	480	0.5694	0.8640	1.1470	3.6020	5.3220	6.6940	0.00088	0.00096

Notes: (1) For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

ULTRA-LIGHT 3MMV9300HX (ISO 19) SERIES

DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB

Tandem
DT

Special Applications
DF

Bearing Number	PRELOAD			AXIAL STIFFNESS(1)			RADIAL STIFFNESS(1)			SPACER OFFSETS(1)	
	Light	Medium	Heavy	Light	Medium	Heavy	Light	Medium	Heavy	Light to Medium	Medium to Heavy
	N			N/µm			N/µm			µm	
METRIC DUPLEX PERFORMANCE DATA 3MMV9300HX SERIES											
3MMV9300HX	22	45	90	28.53	36.82	48.06	60.22	75.61	94.48	2.79	4.06
3MMV9301HX	22	45	90	29.93	38.58	50.28	63.30	79.51	99.41	2.54	4.06
3MMV9302HX	22	65	135	34.07	50.72	66.06	72.78	104.78	131.04	4.06	4.57
3MMV9303HX	22	65	135	35.45	52.71	68.60	75.75	109.14	136.54	4.06	4.32
3MMV9304HX	45	110	225	48.76	67.98	88.46	103.86	140.69	175.95	4.57	5.59
3MMV9305HX	45	110	225	54.17	75.33	97.75	115.68	156.99	196.59	4.06	5.08
3MMV9306HX	45	110	225	59.33	82.33	106.58	126.87	172.47	216.18	3.56	4.57
3MMV9307HX	65	175	355	74.51	106.06	137.72	159.18	220.72	276.34	5.08	5.59
3MMV9308HX	65	225	445	70.62	108.04	139.41	154.45	233.67	293.31	7.11	7.11
3MMV9309HX	90	245	490	83.32	119.21	153.84	182.60	257.80	323.74	6.10	7.11
3MMV9310HX	90	265	535	88.43	130.41	168.25	193.61	282.11	354.17	6.60	7.11
3MMV9311HX	110	335	665	99.24	146.29	188.72	216.70	315.69	396.50	7.11	8.13
3MMV9312HX	110	335	665	104.80	154.33	198.86	228.59	333.88	419.41	6.60	7.62
3MMV9313HX	110	335	665	110.22	162.15	208.66	239.96	351.37	441.80	6.60	7.11
3MMV9314HX	155	490	980	122.31	183.12	235.94	265.50	394.05	495.14	8.64	9.14
3MMV9315HX	155	490	980	125.63	187.84	242.06	272.49	404.89	508.96	8.64	9.14
3MMV9316HX	155	490	980	132.14	197.46	254.13	285.96	426.23	536.07	8.13	8.64
3MMV9317HX	200	625	1245	144.52	215.48	277.74	313.42	463.66	582.59	9.14	10.16
3MMV9318HX	200	625	1245	148.32	220.72	283.69	319.72	475.73	598.51	9.14	9.65
3MMV9319HX	200	625	1245	155.70	231.57	297.33	334.58	499.86	629.12	8.64	9.14
3MMV9320HX	245	735	1465	170.75	251.16	323.04	369.04	540.62	679.84	9.14	10.16
3MMV9322HX	265	800	1600	183.82	270.40	348.05	397.55	581.89	731.61	9.14	10.16
3MMV9324HX	310	935	1870	198.51	291.73	374.99	427.46	628.07	790.37	10.16	11.18
3MMV9326HX	355	1065	2135	216.35	317.27	407.34	462.79	684.21	861.73	10.67	11.68
3MMV9328HX	400	1200	2400	235.07	344.90	443.02	504.06	743.15	935.54	10.67	12.19
3MMV9330HX	535	1600	3200	249.06	365.54	469.26	540.62	799.12	1006.55	13.72	15.24
	lbs.			10^6lbs./in.			10^6lbs./in.			in.	
INCH DUPLEX PERFORMANCE DATA 3MMV9300HX SERIES											
3MMV9300HX	5	10	20	0.163	0.211	0.275	0.344	0.432	0.540	.00011	.00016
3MMV9301HX	5	10	20	0.171	0.221	0.288	0.362	0.455	0.568	.00010	.00016
3MMV9302HX	5	15	30	0.195	0.290	0.378	0.416	0.599	0.749	.00016	.00018
3MMV9303HX	5	15	30	0.203	0.301	0.392	0.433	0.624	0.781	.00016	.00017
3MMV9304HX	10	25	50	0.279	0.389	0.506	0.594	0.804	1.006	.00018	.00022
3MMV9305HX	10	25	50	0.310	0.431	0.559	0.661	0.898	1.124	.00016	.00020
3MMV9306HX	10	25	50	0.339	0.471	0.609	0.725	0.986	1.236	.00014	.00018
3MMV9307HX	15	40	80	0.426	0.606	0.787	0.910	1.262	1.580	.00020	.00022
3MMV9308HX	15	50	100	0.404	0.618	0.797	0.883	1.336	1.677	.00028	.00028
3MMV9309HX	20	55	110	0.476	0.682	0.880	1.044	1.474	1.851	.00024	.00028
3MMV9310HX	20	60	120	0.506	0.746	0.962	1.107	1.613	2.025	.00026	.00028
3MMV9311HX	25	75	150	0.567	0.836	1.079	1.239	1.805	2.267	.00028	.00032
3MMV9312HX	25	75	150	0.599	0.882	1.137	1.307	1.909	2.398	.00026	.00030
3MMV9313HX	25	75	150	0.630	0.927	1.193	1.372	2.009	2.526	.00026	.00028
3MMV9314HX	35	110	220	0.699	1.047	1.349	1.518	2.253	2.831	.00034	.00036
3MMV9315HX	35	110	220	0.718	1.074	1.384	1.558	2.315	2.910	.00034	.00036
3MMV9316HX	35	110	220	0.756	1.129	1.453	1.635	2.437	3.065	.00032	.00034
3MMV9317HX	45	140	280	0.826	1.232	1.588	1.792	2.651	3.331	.00036	.00040
3MMV9318HX	45	140	280	0.848	1.262	1.622	1.828	2.720	3.422	.00036	.00038
3MMV9319HX	45	140	280	0.890	1.324	1.700	1.913	2.858	3.597	.00034	.00036
3MMV9320HX	55	165	330	0.976	1.436	1.847	2.110	3.091	3.887	.00036	.00040
3MMV9322HX	60	180	360	1.051	1.546	1.990	2.273	3.327	4.183	.00036	.00040
3MMV9324HX	70	210	420	1.135	1.668	2.144	2.444	3.591	4.519	.00040	.00044
3MMV9326HX	80	240	480	1.237	1.814	2.329	2.646	3.912	4.927	.00042	.00046
3MMV9328HX	90	270	540	1.344	1.972	2.533	2.882	4.249	5.349	.00042	.00048
3MMV9330HX	120	360	720	1.424	2.090	2.683	3.091	4.569	5.755	.00054	.00060

Notes: (1) For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

ULTRA-LIGHT 2MMV9300HX (ISO 19) SERIES

SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15		Kluber Isoflex NBU15		Operating Speeds[2] (DB Mounting) [1]					
	25%	40%	15%	20%	DUL	Grease DUM	DUH	DUL	Oil DUM	DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
2MMV9300HX	0.11	0.18	0.06	0.09	73360	55020	36680	123795	93534	62310
2MMV9301HX	0.13	0.20	0.07	0.11	64000	48000	32000	108000	81600	54360
2MMV9302HX	0.20	0.33	0.12	0.17	53440	40080	26720	90180	68136	45391
2MMV9303HX	0.23	0.36	0.12	0.18	48320	36240	24160	81540	61608	41042
2MMV9304HX	0.48	0.71	0.25	0.39	40160	30120	20080	67770	51204	34111
2MMV9305HX	0.48	0.83	0.29	0.44	33440	25080	16720	56430	42636	28403
2MMV9306HX	0.60	0.95	0.34	0.51	28720	21540	14360	48465	36618	24394
2MMV9307HX	0.95	1.43	0.51	0.77	24400	18300	12200	41175	31110	20725
2MMV9308HX	1.43	2.26	0.8	1.22	22400	16800	11200	37800	28560	19026
2MMV9309HX	1.55	2.50	0.88	1.34	20000	15000	10000	33750	25500	16988
2MMV9310HX	1.67	2.74	0.95	1.44	18320	13740	9160	30915	23358	15561
2MMV9311HX	2.26	3.57	1.3	1.93	16560	12420	8280	27945	21114	14066
2MMV9312HX	2.38	3.81	1.4	2.05	15360	11520	7680	25920	19584	13046
2MMV9313HX	2.50	4.05	1.4	2.16	14240	10680	7120	24030	18156	12095
2MMV9314HX	4.29	6.79	2.4	3.64	13120	9840	6560	22140	16728	11144
2MMV9315HX	4.52	7.26	2.5	3.86	12320	9240	6160	20790	15708	10464
2MMV9316HX	4.76	7.62	2.7	3.98	11600	8700	5800	19575	14790	9853
2MMV9317HX	6.31	10.24	3.6	5.45	10800	8100	5400	18225	13770	9173
2MMV9318HX	7.02	11.19	3.9	5.91	10320	7740	5160	17415	13158	8766
2MMV9319HX	7.26	11.55	4.1	6.14	9840	7380	4920	16605	12546	8358
2MMV9320HX	8.93	14.29	5	7.61	9120	6840	4560	15390	11628	7746
2MMV9322HX	9.64	15.48	5.4	8.30	8,400	6300	4200	14175	10710	7135
2MMV9324HX	13.21	21.19	7.4	11.25	7680	5760	3840	12960	9792	6523
2MMV9326HX	17.38	27.74	9.7	14.77	7088	5316	3540	11960	9037	6020
2MMV9328HX	18.45	29.52	10.4	15.68	6616	4962	3300	11165	8435	5619
2MMV9330HX	29.52	47.26	16.6	25.11	6168	4626	3080	10410	7864	5239

[1] For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
[2] For ceramic ball complements use 120% of speeds shown.

ULTRA-LIGHT 3MMV9300HX (ISO 19) SERIES

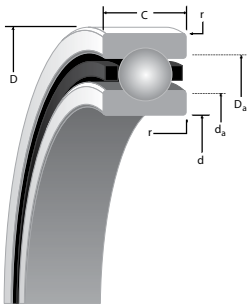
SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15		Kluber Isoflex NBU15		Operating Speeds[2] (DB Mounting)[1]					
	25%	40%	15%	20%	DUL	Grease DUM	DUH	DUL	Oil DUM	DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
3MMV9300HX	0.11	0.18	0.06	0.08	66080	49560	33040	111510	84250	56125
3MMV9301HX	0.13	0.20	0.07	0.10	57600	43200	28800	97200	73440	48900
3MMV9302HX	0.20	0.33	0.12	0.15	48080	36060	24040	81135	61300	40850
3MMV9303HX	0.23	0.36	0.12	0.16	43440	32580	21720	73305	55390	36900
3MMV9304HX	0.48	0.71	0.25	0.34	36160	27120	18080	61020	46100	30700
3MMV9305HX	0.48	0.83	0.29	0.39	30080	22560	15040	50760	38350	25550
3MMV9306HX	0.60	0.95	0.34	0.45	25840	19380	12920	43605	32950	21950
3MMV9307HX	0.95	1.43	0.51	0.69	22000	16500	11000	37125	28050	18690
3MMV9308HX	1.43	2.26	0.8	1.08	20160	15120	10080	34020	25700	17125
3MMV9309HX	1.55	2.50	0.88	1.19	18000	13500	9000	30375	22950	15290
3MMV9310HX	1.67	2.74	0.95	1.28	16480	12360	8240	27810	21000	14000
3MMV9311HX	2.26	3.57	1.3	1.72	14960	11220	7480	25245	19075	12700
3MMV9312HX	2.38	3.81	1.4	1.82	13760	10320	6880	23220	17500	11690
3MMV9313HX	2.50	4.05	1.4	1.92	12800	9600	6400	21600	16320	10875
3MMV9314HX	4.29	6.79	2.4	3.23	11840	8880	5920	19980	15100	10060
3MMV9315HX	4.52	7.26	2.5	3.43	11120	8340	5560	18765	14175	9450
3MMV9316HX	4.76	7.62	2.7	3.54	10480	7860	5240	17685	13360	8900
3MMV9317HX	6.31	10.24	3.6	4.85	9680	7260	4840	16335	12350	8225
3MMV9318HX	7.02	11.19	3.9	5.25	9280	6960	4640	15660	11825	7880
3MMV9319HX	7.26	11.55	4.1	5.45	8800	6600	4400	14850	11220	7475
3MMV9320HX	8.93	14.29	5	6.77	8240	6180	4120	13905	10500	7000
3MMV9322HX	9.64	15.48	5.4	7.37	7544	5658	3772	12731	9620	6400
3MMV9324HX	13.21	21.19	7.4	10.00	6912	5184	3456	11664	8810	5875
3MMV9326HX	17.38	27.74	9.7	13.13	6376	4782	3188	10760	8130	5415
3MMV9328HX	18.45	29.52	10.4	13.94	5960	4470	2980	10058	7600	5050
3MMV9330HX	29.52	47.26	16.6	22.32	5552	4164	2776	9369	7080	4710

[1] For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
[2] For ceramic ball complements use 120% of speeds shown.

EXTRA-LIGHT 2(3)MMV99100WN (ISO 10) SERIES

DIMENSIONAL SERIES METRIC



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WN CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer and inner rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

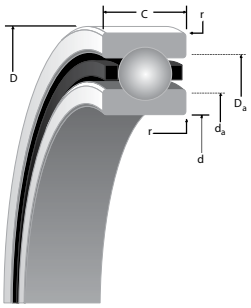
Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width[1]	Ball Qty. x Dia.	Wt.	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]
METRIC	mm/tol: +0; -(µm)			mm	kg.	N		RPM	N		RPM
99101WN	12 (4)	28 (5)	8 (80)	9 x 4.76	0.019	1740 1550	4540 4540	75800 90960	1670 1490	4360 4360	68200 81840
99102WN	15 (4)	32 (6)	9 (80)	11 x 4.76	0.028	2240 1990	5220 5220	64300 77160	2140 1900	5000 5000	57900 69480
99103WN	17 (4)	35 (6)	10 (80)	13 x 4.76	0.038	2510 2230	5530 5530	56900 68280	2400 2140	5280 5280	51200 61440
99104WN	20 (5)	42 (6)	12 (120)	11 x 6.35	0.064	4690 4180	9760 9760	43800 52200	4470 3980	9310 9310	39400 47280
99105WN	25 (5)	47 (6)	12 (120)	13 x 6.35	0.074	5800 5160	10900 10900	36500 43800	5510 4900	10300 10300	32900 39480
99106WN	30 (5)	55 (7)	13 (120)	16 x 6.35	0.116	7460 6640	12300 12300	29500 35400	7060 6280	11600 11600	26600 31920
99107WN	35 (6)	62 (7)	14 (120)	21 x 5.56	0.167	7840 6980	11100 11100	25300 30360	7440 6620	10500 10500	22800 27360
99108WN	40 (6)	68 (7)	15 (120)	24 x 5.56	0.207	9150 8140	11900 11900	22000 26400	8590 7650	11200 11200	19800 23760
99109WN	45 (6)	75 (7)	16 (120)	23 x 6.35	0.259	11400 10200	14800 14800	20200 24240	10700 9560	14000 14000	18200 21840
99110WN	50 (6)	80 (7)	16 (120)	25 x 6.35	0.281	12500 11100	15400 15400	18500 22200	11700 10400	14500 14500	16700 20040
99111WN	55 (7)	90 (8)	18 (150)	25 x 7.14	0.417	15800 14100	19100 19100	16600 19920	14800 13200	18000 18000	14900 17880
99112WN	60 (7)	95 (8)	18 (150)	26 x 7.14	0.445	16400 14600	19300 19300	15400 18480	15300 13600	18200 18200	13900 16680
99113WN	65 (7)	100 (8)	18 (150)	28 x 7.14	0.474	17600 15700	20000 20000	14400 17280	16400 14600	18800 18800	13000 15600
99114WN	70 (7)	110 (8)	20 (150)	28 x 7.94	0.665	21700 19300	24300 24300	13200 15840	20300 18000	22900 22900	11900 14280
99115WN	75 (7)	115 (8)	20 (150)	30 x 7.94	0.699	23100 20600	25000 25000	12300 14760	21600 19200	23500 23500	11100 13320
99116WN	80 (7)	125 (9)	22 (150)	29 x 8.73	0.944	27200 24200	29300 29300	11600 13920	25300 22500	27500 27500	10400 12480
99117WN	85 (8)	130 (9)	22 (200)	31 x 8.73	0.991	28900 25700	30200 30200	11000 13200	26900 23900	28400 28400	9900 11880
99118WN	90 (8)	140 (9)	24 (200)	28 x 10.32	1.266	36100 32700	39000 39000	10400 12480	34400 30600	36800 36800	9400 11280
99119WN	95 (8)	145 (9)	24 (200)	29 x 10.32	1.303	37900 33800	39600 39600	9900 11880	35400 31500	37300 37300	8900 10680
99120WN	100 (8)	150 (9)	24 (200)	31 x 10.32	1.374	40400 35900	40900 40900	9400 11280	37700 33600	38500 38500	8500 10200
99121WN	105 (8)	160 (10)	26 (200)	30 x 11.11	1.729	45400 40400	45900 45900	8900 10680	42400 37800	43400 43400	8000 9600
99122WN	110 (8)	170 (10)	28 (200)	30 x 11.91	2.188	52100 46400	52200 52200	8500 10200	48800 43400	49300 49300	7700 8880
99124WN	120 (8)	180 (10)	28 (200)	32 x 11.91	2.343	55200 49200	53500 53500	7900 9480	51700 46000	50600 50600	7100 8520
99126WN	130 (10)	200 (11)	33 (250)	32 x 13.49	3.563	71200 63400	67500 67500	7100 8520	66600 59200	63700 63700	6400 7680
99128WN	140 (10)	210 (11)	33 (250)	34 x 13.49	3.776	75200 67000	69300 69300	6600 7920	70300 62600	65300 65300	5900 7080
99130WN	150 (10)	225 (11)	35 (250)	34 x 15.08	4.509	91500 81400	83800 83800	6200 7440	85600 76200	79100 79100	5600 6720

[Ng] For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
[1] Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
[2] ABMA STD 20 (r_{as} max).

r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
0.3	15.64	15.44	24.56	24.36	11.995	12.000	0.005	0.004	28	28.005	0.0000	0.010	28.010	28.005	0.015	0.005	99101WN
0.3	19.14	18.94	28.06	27.86	14.995	15.000	0.005	0.004	32	32.005	0.0000	0.011	32.010	32.005	0.016	0.005	99102WN
0.3	21.64	21.44	30.56	30.36	16.995	17.000	0.005	0.004	35	35.006	0.0000	0.012	35.010	35.005	0.016	0.005	99103WN
0.6	25.05	24.85	37.15	36.95	19.995	20.000	0.005	0.005	42	42.006	0.0000	0.012	42.010	42.005	0.016	0.005	99104WN
0.6	30.05	29.85	42.15	41.95	24.995	25.000	0.005	0.005	47	47.006	0.0000	0.012	47.012	47.007	0.018	0.007	99105WN
1	36.55	36.35	48.65	48.45	29.995	30.000	0.005	0.005	55	55.008	0.0000	0.015	55.012	55.007	0.019	0.007	99106WN
1	43.34	43.14	53.86	53.66	34.995	35.000	0.005	0.006	62	62.008	0.0000	0.015	62.012	62.007	0.019	0.007	99107WN
1	48.84	48.64	59.36	59.16	39.995	40.000	0.005	0.006	68	68.008	0.0000	0.015	68.012	68.007	0.019	0.007	99108WN
1	54.05	53.85	66.15	65.95	44.995	45.000	0.005	0.006	75	75.008	0.0000	0.015	75.014	75.009	0.022	0.009	99109WN
1	59.05	58.85	71.15	70.95	49.995	50.000	0.005	0.006	80	80.008	0.0000	0.015	80.012	80.008	0.020	0.008	99110WN
1	65.76	65.56	79.44	79.24	54.995	55.000	0.005	0.007	90	90.008	0.0000	0.016	90.015	90.007	0.023	0.007	99111WN
1	70.76	70.56	84.44	84.24	59.995	60.000	0.005	0.007	95	95.008	0.0000	0.016	95.016	95.009	0.024	0.009	99112WN
1	75.76	75.56	89.44	89.24	64.995	65.000	0.005	0.007	100	100.008	0.0000	0.016	100.016	100.009	0.024	0.009	99113WN
1	82.46	82.26	97.74	97.54	69.995	70.000	0.005	0.007	110	110.008	0.0000	0.016	110.018	110.010	0.025	0.010	99114WN
1	87.46	87.26	102.74	102.54	74.995	75.005	0.005	0.012	115	115.008	0.0000	0.016	115.019	115.011	0.026	0.010	99115WN
1	94.17	93.97	111.03	110.83	79.995	80.005	0.005	0.012	125	125.008	0.0000	0.017	125.021	125.011	0.030	0.011	99116WN
1	99.17	98.97	116.03	115.83	84.995	85.005	0.005	0.012	130	130.009	0.0000	0.018	130.020	130.010	0.029	0.010	99117WN
1.5	105.08	104.88	125.12	124.92	89.995	90.005	0.005	0.013	140	140.009	0.0000	0.018	140.020	140.010	0.029	0.010	99118WN
1.5	110.08	109.88	130.12	129.92	94.995	95.005	0.005	0.013	145	145.009	0.0000	0.018	145.021	145.011	0.030	0.011	99119WN
1.5	115.08	114.88	135.12	134.92	99.995	100.005	0.005	0.013	150	150.009	0.0000	0.018	150.023	150.012	0.032	0.012	99120WN
2	121.79	121.59	143.41	143.21	104.995	105.005	0.005	0.013	160	160.009	0.0000	0.022	160.022	160.012	0.033	0.012	99121WN
2	128.49	128.29	151.71	151.51	109.995	110.005	0.005	0.013	170	170.010	0.0000	0.020	170.022	170.012	0.032	0.012	99122WN
2	138.49	138.29	161.71	161.51	119.995	120.005	0.005	0.013	180	180.010	0.0000	0.020	180.022	180.012	0.032	0.012	99124WN
2	151.91	151.71	178.29	178.09	129.995	130.005	0.005	0.015	200	200.011	0.0000	0.022	200.025	200.015	0.036	0.015	99126WN
2	161.91	161.71	188.29	188.09	139.995	140.005	0.005	0.015	210	210.011	0.0000	0.022	210.025	210.015	0.036	0.015	99128WN
2	172.82	172.62	202.38	202.18	149.995	150.005	0.005	0.015	225	225.011	0.0000	0.022	225.025	225.015	0.036	0.015	99130WN

EXTRA-LIGHT 2(3)MMV99100WN (ISO 10) SERIES

DIMENSIONAL SERIES INCHES



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WN CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer and inner rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width[1]	Ball Qty. x Dia.	Wt.	C_o (stat)	C_e(dyn)	Limiting Speed[Ng]	C_o (stat)	C_e(dyn)	Limiting Speed[Ng]
INCH	in/tol: +0; -.000(µm)			in.	lbs.	lbs.		RPM	lbs.		RPM
99101WN	0.4724 (1.5)	1.1024 (2)	0.315 (31)	9 x 3/16	0.04	390 360	1020 1020	75800 90960	380 340	980 980	68200 81840
99102WN	0.5906 (1.5)	1.2598 (2.5)	0.3543 (31)	11 x 3/16	0.06	500 450	1170 1170	64300 77160	480 430	1120 1120	57900 69480
99103WN	0.6693 (1.5)	1.378 (2.5)	0.3937 (31)	13 x 3/16	0.08	560 500	1240 1240	56900 68280	540 480	1190 1190	51200 61440
99104WN	0.7874 (2)	1.6535 (2.5)	0.4724 (47)	11 x 1/4	0.14	1050 940	2190 2190	43800 52560	1000 890	2090 2090	39400 47280
99105WN	0.9843 (2)	1.8504 (2.5)	0.4724 (47)	13 x 1/4	0.16	1300 1160	2450 2450	36500 43800	1240 1100	2330 2330	32900 39480
99106WN	1.1811 (2)	2.1654 (3)	0.5118 (47)	16 x 1/4	0.25	1680 1490	2770 2770	29500 35400	1590 1410	2620 2620	26600 31920
99107WN	1.378 (2.5)	2.4409 (3)	0.5512 (47)	21 x 7/32	0.37	1760 1570	2510 2510	25300 30360	1670 1490	2360 2360	22800 27360
99108WN	1.5748 (2.5)	2.6772 (3)	0.5906 (47)	24 x 7/32	0.46	2060 1830	2670 2670	22000 26400	1930 1720	2510 2510	19800 23760
99109WN	1.7717 (2.5)	2.9528 (3)	0.6299 (47)	23 x 1/4	0.57	2570 2280	3340 3340	20200 24240	2410 2150	3140 3140	18200 21840
99110WN	1.9685 (2.5)	3.1496 (3)	0.6299 (47)	25 x 1/4	0.62	2810 2500	3470 3470	18500 22200	2630 2340	3260 3260	16700 20040
99111WN	2.1654 (3)	3.5433 (3)	0.7087 (59)	25 x 9/32	0.92	3550 3160	4290 4290	16600 19920	3330 2960	4040 4040	14900 17880
99112WN	2.3622 (3)	3.7402 (3)	0.7087 (59)	26 x 9/32	0.98	3700 3290	4340 4340	15400 18480	3440 3060	4080 4080	13900 16680
99113WN	2.5591 (3)	3.937 (3)	0.7087 (59)	28 x 9/32	1.05	3960 3520	4500 4500	14400 17280	3680 3280	4230 4230	13000 15600
99114WN	2.7559 (3)	4.3307 (3)	0.7874 (59)	28 x 5/16	1.47	4890 4350	5450 5540	13200 15840	4569 4060	5140 5140	11900 14280
99115WN	2.9528 (3)	4.5276 (3)	0.7874 (59)	30 x 5/16	1.54	5200 4630	5620 5620	12300 14760	4850 4320	5290 5290	11100 13320
99116WN	3.1496 (3)	4.9213 (3.5)	0.8661 (59)	29 x 11/32	2.08	6110 5440	6580 6580	11600 13920	5690 5070	6190 6190	10400 12480
99117WN	3.3465 (3)	5.1181 (3.5)	0.8661 (79)	31 x 11/32	2.18	6490 5770	6780 6780	11000 13200	6040 5380	6380 6380	9900 11880
99118WN	3.5433 (3)	5.5118 (3.5)	0.9449 (79)	28 x 13/32	2.79	8270 7360	8780 8780	10400 13480	7720 6870	8280 8280	9400 11280
99119WN	3.7402 (3)	5.7087 (3.5)	0.9449 (79)	29 x 13/32	2.87	8530 7590	8890 8890	9900 11880	7970 7090	8390 8390	8900 10680
99120WN	3.937 (3)	5.9055 (3.5)	0.9449 (79)	31 x 13/32	3.03	9070 8080	9190 9190	9400 11280	8480 7540	8660 8660	8500 10200
99121WN	4.1339 (3)	6.2992 (4)	1.0236 (79)	30 x 7/16	3.81	10200 9080	10300 10300	8900 10680	9540 8490	9750 9750	8000 9600
99122WN	4.3307 (3)	6.6929 (4)	1.1024 (79)	30 x 15/32	4.82	11700 10400	11700 11700	8500 10200	11000 9760	11100 11100	7700 8880
99124WN	4.7244 (3)	7.0866 (4)	1.1024 (79)	32 x 15/32	5.17	12400 11100	12000 12000	7900 9480	11600 10300	11400 11400	7100 8520
99126WN	5.1181 (4)	7.874 (4.5)	1.2992 (98)	32 x 17/32	7.85	16000 14300	15200 15200	7100 8520	15000 13300	14300 14300	6400 7680
99128WN	5.5118 (4)	8.2677 (4.5)	1.2992 (98)	34 x 17/32	8.32	16900 15100	15600 15600	6600 7920	15800 14100	14700 14700	5900 7080
99130WN	5.9055 (4)	8.8583 (4.5)	1.378 (98)	34 x 19/32	9.94	20600 18300	18800 18800	6200 7440	19300 17100	17800 17800	5600 6720

[Ng] For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
[1] Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
[2] ABMA STD 20 (r_{as} max).

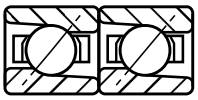
r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D (Housing) Max.	D (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.012	0.62	0.61	0.99	0.98	0.4722	0.4724	0.0002	0.00015	1.1024	1.1026	0.0000	0.0004	1.1028	1.1026	0.0006	0.0002	99101WN
0.012	0.76	0.75	1.13	1.12	0.5904	0.5906	0.0002	0.00015	1.2598	1.2600	0.0000	0.00045	1.2602	1.2600	0.0007	0.0002	99102WN
0.012	0.86	0.85	1.23	1.22	0.6691	0.6693	0.0002	0.00015	1.3780	1.3783	0.0000	0.0005	1.3784	1.3782	0.0007	0.0002	99103WN
0.024	0.99	0.98	1.49	1.48	0.7872	0.7874	0.0002	0.00020	1.6535	1.6538	0.0000	0.0005	1.6539	1.6537	0.0007	0.0002	99104WN
0.024	1.19	1.18	1.69	1.68	0.9841	0.9843	0.0002	0.00020	1.8504	1.8507	0.0000	0.0005	1.8509	1.8507	0.0008	0.0003	99105WN
0.039	1.44	1.43	1.94	1.93	1.1809	1.1811	0.0002	0.00020	2.1654	2.1657	0.0000	0.0006	2.1659	2.1657	0.0008	0.0003	99106WN
0.039	1.71	1.70	2.15	2.14	1.3778	1.378	0.0002	0.00025	2.4409	2.4412	0.0000	0.0006	2.4414	2.4412	0.0008	0.0003	99107WN
0.039	1.93	1.92	2.36	2.35	1.5746	1.5748	0.0002	0.00025	2.6772	2.6775	0.0000	0.0006	2.6777	2.6775	0.0008	0.0003	99108WN
0.039	2.13	2.12	2.63	2.62	1.7715	1.7717	0.0002	0.00025	2.9528	2.9531	0.0000	0.0006	2.9533	2.9531	0.0008	0.0003	99109WN
0.039	2.33	2.32	2.83	2.82	1.9683	1.9685	0.0002	0.00025	3.1496	3.1499	0.0000	0.0006	3.1501	3.1499	0.0008	0.0003	99110WN
0.039	2.59	2.58	3.16	3.15	2.1652	2.1654	0.0002	0.00030	3.5433	3.5436	0.0000	0.0006	3.5439	3.5436	0.0009	0.0003	99111WN
0.039	2.79	2.78	3.35	3.34	2.362	2.3622	0.0002	0.00030	3.7402	3.7405	0.0000	0.0006	3.7408	3.7405	0.0009	0.0003	99112WN
0.039	2.99	2.98	3.55	3.54	2.5589	2.5591	0.0002	0.00030	3.9370	3.9373	0.0000	0.0006	3.9377	3.9374	0.0010	0.0004	99113WN
0.039	3.25	3.24	3.88	3.87	2.7557	2.7559	0.0002	0.00030	4.3307	4.3310	0.0000	0.0006	4.3314	4.3311	0.0010	0.0004	99114WN
0.039	3.45	3.44	4.07	4.06	2.9526	2.9530	0.0002	0.00050	4.5276	4.5279	0.0000	0.0006	4.5283	4.5280	0.0010	0.0004	99115WN
0.039	3.71	3.70	4.40	4.39	3.1494	3.1498	0.0002	0.00050	4.9213	4.9216	0.0000	0.0007	4.9221	4.9217	0.0012	0.0004	99116WN
0.039	3.91	3.90	4.60	4.59	3.3463	3.3467	0.0002	0.00050	5.1181	5.1185	0.0000	0.0007	5.1189	5.1185	0.0011	0.0004	99117WN
0.059	4.14	4.13	4.95	4.94	3.5431	3.5435	0.0002	0.00050	5.5118	5.5122	0.0000	0.0007	5.5126	5.5122	0.0011	0.0004	99118WN
0.059	4.34	4.33	5.15	5.14	3.7400	3.7404	0.0002	0.00050	5.7087	5.7091	0.0000	0.0007	5.7095	5.7091	0.0011	0.0004	99119WN
0.059	4.54	4.53	5.35	5.34	3.9368	3.9372	0.0002	0.00050	5.9055	5.9059	0.0000	0.0007	5.9064	5.9060	0.0012	0.0005	99120WN
0.079	4.80	4.79	5.67	5.66	4.1337	4.1341	0.0002	0.00050	6.2992	6.2996	0.0000	0.0008	6.3001	6.2997	0.0013	0.0005	99121WN
0.079	5.06	5.05	6.00	5.99	4.3305	4.3309	0.0002	0.00050	6.6929	6.6933	0.0000	0.0008	6.6938	6.6934	0.0013	0.0005	99122WN
0.079	5.46	5.45	6.39	6.38	4.7242	4.7246	0.0002	0.00050	7.0866	7.0870	0.0000	0.0008	7.0875	7.0871	0.0013	0.0005	99124WN
0.079	5.98	5.97	7.05	7.04	5.1179	5.1183	0.0002	0.00060	7.8740	7.8745	0.0000	0.0009	7.8750	7.8746	0.0015	0.0006	99126WN
0.079	6.38	6.37	7.44	7.43	5.5116	5.512	0.0002	0.00060	8.2677	8.2682	0.0000	0.0009	8.2687	8.2683	0.0015	0.0006	99128WN
0.079	6.81	6.80	8.00	7.99	5.9053	5.9057	0.0002	0.00060	8.8583	8.8588	0.0000	0.0009	8.8593	8.8589	0.0015	0.0006	99130WN

EXTRA-LIGHT 2MMV99100WN (ISO 10) SERIES

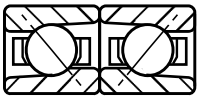
DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB



Tandem
DT



Special Applications
DF

Bearing Number	PRELOAD				AXIAL STIFFNESS(1)				RADIAL STIFFNESS(1)			SPACER OFFSETS(1)		
	DUX	DUL	DUM	DUH	X-light	Light	Medium	Heavy	Light	Medium	Heavy	X-Light to Light	Light to Medium	Medium to Heavy
	N (= lbs x 4.448)				N/µm (= 10^6 lbs/in x 175.12)				N/µm (= 10^6 lbs/in x 175.12)			µm		
METRIC DUPLEX PERFORMANCE DATA 2MMV99100WN SERIES														
2MMV99101WN	-	20	40	90	-	13.47	17.84	24.14	60.69	78.71	99.52	—	5.59	8.38
2MMV99102WN	-	20	40	90	-	15.22	20.11	27.11	89.72	113.86	139.92	—	5.08	7.62
2MMV99103WN	-	20	40	90	-	16.97	22.21	29.73	99.69	127.15	156.71	—	4.57	6.86
2MMV99104WN	20	40	90	180	17.14	22.39	29.91	40.75	125.75	155.84	195.54	4.57	6.86	10.16
2MMV99105WN	20	70	130	270	21.51	29.21	39.18	53.87	140.09	174.20	218.97	5.59	7.87	11.43
2MMV99106WN	20	70	130	270	24.49	33.06	44.07	60.17	173.50	220.20	276.52	4.83	6.86	10.16
2MMV99107WN	40	90	180	360	33.41	44.07	59.12	81.15	209.71	269.00	337.03	4.57	6.86	10.16
2MMV99108WN	70	110	220	440	39.00	52.12	70.13	96.72	247.13	312.37	391.25	5.08	7.37	10.67
2MMV99109WN	70	130	270	530	41.45	54.74	73.81	101.79	279.67	352.95	441.80	5.59	8.38	12.19
2MMV99110WN	70	130	270	530	43.55	57.54	77.31	106.34	295.41	373.24	467.51	5.33	7.87	11.68
2MMV99111WN	90	180	360	710	51.07	67.16	90.25	124.35	349.45	440.40	550.94	6.10	9.14	13.21
2MMV99112WN	90	180	360	710	52.30	68.74	92.35	126.80	358.55	452.29	565.80	5.84	8.89	12.95
2MMV99113WN	110	220	440	890	59.64	78.71	106.16	146.74	376.38	475.38	595.18	6.35	9.65	13.97
2MMV99114WN	110	220	440	890	62.26	81.68	109.14	149.36	426.58	538.17	626.14	6.10	9.40	13.72
2MMV99115WN	130	270	530	1070	69.61	91.65	122.95	168.95	446.34	563.70	705.90	6.60	9.91	14.73
2MMV99116WN	160	310	620	1250	0.17	95.67	128.55	177.00	489.55	617.57	772.53	7.37	11.18	11.18
2MMV99117WN	180	360	710	1420	79.58	105.11	141.67	195.36	511.41	645.73	808.56	7.62	11.43	16.76
2MMV99118WN	200	400	800	1600	80.63	106.16	142.54	196.06	537.12	678.61	850.01	8.64	12.95	18.80
2MMV99119WN	200	400	800	1600	82.38	108.44	145.34	199.74	549.54	694.70	870.65	8.38	12.70	12.70
2MMV99120WN	220	440	890	1780	89.37	117.71	158.11	217.58	605.50	764.49	957.05	8.64	12.95	19.05
2MMV99121WN	240	490	980	1960	94.10	123.83	165.81	229.99	631.91	797.72	823.60	8.89	13.46	20.57
2MMV99122WN	270	530	1070	2140	99.87	131.00	175.07	244.34	642.58	813.11	1019.49	9.14	13.97	22.10
2MMV99124WN	310	620	1250	2490	110.19	144.99	194.31	264.45	724.26	914.03	1144.20	9.65	14.73	20.83
2MMV99126WN	400	800	1600	3200	121.56	160.21	215.30	292.43	810.49	1023.51	1281.67	11.43	17.02	23.88
2MMV99128WN	420	850	1690	3380	128.73	169.65	228.07	311.85	889.19	1121.46	1395.00	11.18	17.02	24.38
2MMV99130WN	440	890	1780	3560	135.20	177.35	236.99	323.74	937.99	1184.25	1490.15	11.43	17.02	25.40
	lbs.				10^6lbs./in.				10^6lbs./in.			in.		
INCH DUPLEX PERFORMANCE DATA 2MMV9100WN SERIES														
2MMV99101WN	—	5	10	20	—	0.077	0.102	0.138	0.347	0.450	0.569	—	0.00022	0.00033
2MMV99102WN	—	5	10	20	—	0.087	0.115	0.155	0.513	0.651	0.800	—	0.00020	0.00030
2MMV99103WN	—	5	10	20	—	0.097	0.127	0.170	0.570	0.727	0.896	—	0.00018	0.00027
2MMV99104WN	5	10	20	40	0.098	0.128	0.171	0.233	0.719	0.891	1.118	0.00018	0.00027	0.00040
2MMV99105WN	5	15	30	60	0.123	0.167	0.224	0.308	0.801	0.996	1.252	0.00022	0.00031	0.00045
2MMV99106WN	5	15	30	60	0.140	0.189	0.252	0.344	0.992	1.259	1.581	0.00019	0.00027	0.00040
2MMV99107WN	10	20	40	80	0.191	0.252	0.338	0.464	1.199	1.538	1.927	0.00018	0.00027	0.00040
2MMV99108WN	15	25	50	100	0.223	0.298	0.401	0.553	1.413	1.786	2.237	0.00020	0.00029	0.00042
2MMV99109WN	15	30	60	120	0.237	0.313	0.422	0.582	1.599	2.018	2.526	0.00022	0.00033	0.00048
2MMV99110WN	15	30	60	120	0.249	0.329	0.442	0.608	1.689	2.134	2.673	0.00021	0.00031	0.00046
2MMV99111WN	20	40	80	160	0.292	0.384	0.516	0.711	1.998	2.518	3.150	0.00024	0.00036	0.00052
2MMV99112WN	20	40	80	160	0.299	0.393	0.528	0.725	2.050	2.586	3.235	0.00023	0.00035	0.00051
2MMV99113WN	25	50	100	200	0.341	0.450	0.607	0.839	2.152	2.718	3.403	0.00025	0.00038	0.00055
2MMV99114WN	25	50	100	200	0.356	0.467	0.624	0.854	2.439	3.077	3.580	0.00024	0.00037	0.00054
2MMV99115WN	30	60	120	240	0.398	0.524	0.703	0.966	2.552	3.223	4.036	0.00026	0.00039	0.00058
2MMV99116WN	35	70	140	280	0.001	0.547	0.735	1.012	2.799	3.531	4.417	0.00029	0.00044	0.00044
2MMV99117WN	40	80	160	320	0.455	0.601	0.810	1.117	2.924	3.692	4.623	0.00030	0.00045	0.00066
2MMV99118WN	45	90	180	360	0.461	0.607	0.815	1.121	3.071	3.880	4.860	0.00034	0.00051	0.00074
2MMV99119WN	45	90	180	360	0.471	0.620	0.831	1.142	3.142	3.972	4.978	0.00033	0.00050	0.00050
2MMV99120WN	50	100	200	400	0.511	0.673	0.904	1.244	3.462	4.371	5.472	0.00034	0.00051	0.00075
2MMV99121WN	55	110	220	440	0.538	0.708	0.948	1.315	3.613	4.561	4.709	0.00035	0.00053	0.00081
2MMV99122WN	60	120	240	480	0.571	0.749	1.001	1.397	3.674	4.649	5.829	0.00036	0.00055	0.00087
2MMV99124WN	70	140	280	560	0.630	0.829	1.111	1.512	4.141	5.226	6.542	0.00038	0.00058	0.00082
2MMV99126WN	90	180	360	720	0.695	0.916	1.231	1.672	4.634	5.852	7.328	0.00045	0.00067	0.00094
2MMV99128WN	95	190	380	760	0.736	0.970	1.304	1.783	5.084	6.412	7.976	0.00044	0.00067	0.00096
2MMV99130WN	100	200	400	800	0.773	1.014	1.355	1.851	5.363	6.771	8.520	0.00045	0.00067	0.00100

Notes: (1) For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

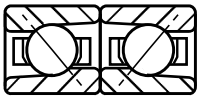
EXTRA-LIGHT 3MMV99100HX (ISO 10) SERIES

DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB

Tandem
DT



Special Applications
DF

Bearing Number	PRELOAD				AXIAL STIFFNESS[1]				RADIAL STIFFNESS[1]			SPACER OFFSETS[1]		
	DUX	DUL	DUM	DUH	X-light	Light	Medium	Heavy	Light	Medium	Heavy	X-Light to Light	Light to Medium	Medium to Heavy
	N				N/µm				N/µm			µm		
METRIC DUPLEX PERFORMANCE DATA 3MMV99100WN SERIES														
3MMV99101WN	—	40	90	180	—	35.85	46.00	59.99	58.77	75.03	92.52	—	4.32	6.60
3MMV99102WN	—	40	90	180	—	40.75	52.30	67.86	85.70	105.99	132.92	—	3.81	5.84
3MMV99103WN	—	40	90	180	—	45.30	58.07	75.21	95.50	118.41	148.84	—	3.30	5.33
3MMV99104WN	40	90	180	360	47.92	61.39	79.23	103.37	115.26	145.52	182.60	3.30	5.08	7.87
3MMV99105WN	70	130	270	530	61.74	79.05	102.49	134.32	128.55	162.83	204.46	3.81	5.84	8.89
3MMV99106WN	70	130	270	530	70.48	90.25	116.66	152.16	162.66	205.86	258.15	3.30	5.08	7.87
3MMV99107WN	90	180	360	710	90.07	115.61	149.89	196.76	200.79	253.26	317.09	3.56	5.33	8.13
3MMV99108WN	110	220	440	890	106.34	136.60	177.17	233.14	233.32	294.01	368.16	3.56	5.59	8.64
3MMV99109WN	130	270	530	1070	114.03	146.39	189.94	249.76	262.00	329.86	412.76	4.06	6.35	9.65
3MMV99110WN	130	270	530	1070	120.33	154.44	200.09	262.52	276.69	348.75	436.73	3.81	6.10	9.14
3MMV99111WN	180	360	710	1420	137.12	176.12	228.42	300.13	330.56	415.91	519.98	4.57	7.11	10.67
3MMV99112WN	180	360	710	1420	140.62	180.50	234.02	307.30	339.31	426.93	533.97	4.32	6.86	10.41
3MMV99113WN	220	440	890	1780	159.68	205.33	266.72	351.55	356.27	448.79	561.60	4.83	7.62	11.43
3MMV99114WN	220	440	890	1780	163.53	210.05	271.97	356.80	407.17	512.46	640.83	4.83	7.37	11.18
3MMV99115WN	270	530	1070	2220	182.42	234.54	304.33	406.99	426.23	536.77	671.62	5.08	7.87	12.95
3MMV99116WN	310	620	1250	2450	193.96	249.23	323.22	422.03	464.18	584.17	555.48	5.59	8.64	12.95
3MMV99117WN	360	710	1420	2670	212.33	273.02	354.52	454.91	485.00	610.93	764.31	5.84	9.14	12.19
3MMV99118WN	400	800	1600	3110	216.18	277.74	360.29	468.21	510.36	643.11	805.06	6.35	9.91	14.48
3MMV99119WN	400	800	1600	3110	221.25	284.04	368.16	478.00	522.43	658.50	824.48	6.35	9.91	14.22
3MMV99120WN	440	890	1780	3560	239.79	308.00	399.47	525.05	575.25	724.44	901.08	6.35	9.91	15.24
3MMV99121WN	490	980	2000	4000	246.61	316.74	414.34	544.99	603.75	760.12	955.48	6.86	11.18	16.51
3MMV99122WN	530	1070	2220	4450	259.55	333.18	438.47	576.30	617.75	779.00	980.49	7.11	11.94	17.53
3MMV99124WN	620	1250	2450	4890	285.79	367.29	473.28	622.47	695.40	875.20	1094.70	7.62	11.43	17.78
3MMV99126WN	800	1600	3110	6230	323.91	416.44	534.49	702.75	771.31	971.39	1211.71	8.64	12.70	20.07
3MMV99128WN	850	1690	3340	6670	343.33	441.27	569.82	749.27	845.82	1057.97	1323.29	8.64	12.95	20.07
3MMV99130WN	890	1780	3560	7120	352.25	451.94	585.39	767.81	900.39	1139.47	1425.44	8.89	13.72	21.08
	lbs.				10^6lbs./in.				10^6lbs./in.			in.		
INCH DUPLEX PERFORMANCE DATA 3MMV99100WN SERIES														
3MMV99101WN	—	10	20	40	—	0.205	0.263	0.343	0.336	0.429	0.529	—	0.00017	0.00026
3MMV99102WN	—	10	20	40	—	0.233	0.299	0.388	0.490	0.606	0.760	—	0.00015	0.00023
3MMV99103WN	—	10	20	40	—	0.259	0.332	0.430	0.546	0.677	0.851	—	0.00013	0.00021
3MMV99104WN	10	20	40	80	0.274	0.351	0.453	0.591	0.659	0.832	1.044	0.00013	0.0002	0.00031
3MMV99105WN	15	30	60	120	0.353	0.452	0.586	0.768	0.735	0.931	1.169	0.00015	0.00023	0.00035
3MMV99106WN	15	30	60	120	0.403	0.516	0.667	0.870	0.93	1.177	1.476	0.00013	0.0002	0.00031
3MMV99107WN	20	40	80	160	0.515	0.661	0.857	1.125	1.148	1.448	1.813	0.00014	0.00021	0.00032
3MMV99108WN	25	50	100	200	0.608	0.781	1.013	1.333	1.334	1.681	2.105	0.00014	0.00022	0.00034
3MMV99109WN	30	60	120	240	0.652	0.837	1.086	1.428	1.498	1.886	2.360	0.00016	0.00025	0.00038
3MMV99110WN	30	60	120	240	0.688	0.883	1.144	1.501	1.582	1.994	2.497	0.00015	0.00024	0.00036
3MMV99111WN	40	80	160	320	0.784	1.007	1.306	1.716	1.890	2.378	2.973	0.00018	0.00028	0.00042
3MMV99112WN	40	80	160	320	0.804	1.032	1.338	1.757	1.940	2.441	3.053	0.00017	0.00027	0.00041
3MMV99113WN	50	100	200	400	0.913	1.174	1.525	2.010	2.037	2.566	3.211	0.00019	0.0003	0.00045
3MMV99114WN	50	100	200	400	0.935	1.201	1.555	2.040	2.328	2.930	3.664	0.00019	0.00029	0.00044
3MMV99115WN	60	120	240	500	1.043	1.341	1.740	2.327	2.437	3.069	3.840	0.0002	0.00031	0.00051
3MMV99116WN	70	140	280	550	1.109	1.425	1.848	2.413	2.654	3.340	3.176	0.00022	0.00034	0.00051
3MMV99117WN	80	160	320	600	1.214	1.561	2.027	2.601	2.773	3.493	4.370	0.00023	0.00036	0.00048
3MMV99118WN	90	180	360	700	1.236	1.588	2.060	2.677	2.918	3.677	4.603	0.00025	0.00039	0.00057
3MMV99119WN	90	180	360	700	1.265	1.624	2.105	2.733	2.987	3.765	4.714	0.00025	0.00039	0.00056
3MMV99120WN	100	200	400	800	1.371	1.761	2.284	3.002	3.289	4.142	5.152	0.00025	0.00039	0.00060
3MMV99121WN	110	220	450	900	1.410	1.811	2.369	3.116	3.452	4.346	5.463	0.00027	0.00044	0.00065
3MMV99122WN	120	240	500	1000	1.484	1.905	2.507	3.295	3.532	4.454	5.606	0.00028	0.00047	0.00069
3MMV99124WN	140	280	550	1100	1.634	2.100	2.706	3.559	3.976	5.004	6.259	0.0003	0.00045	0.00070
3MMV99126WN	180	360	700	1400	1.852	2.381	3.056	4.018	4.410	5.554	6.928	0.00034	0.00050	0.00079
3MMV99128WN	190	380	750	1500	1.963	2.523	3.258	4.284	4.836	6.049	7.566	0.00034	0.00051	0.00079
3MMV99130WN	200	400	800	1600	2.014	2.584	3.347	4.390	5.148	6.515	8.150	0.00035	0.00054	0.00083

Notes: [1] For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

EXTRA-LIGHT 2MMV99100WN (ISO 10) SERIES

SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15		Kluber Isoflex NBU15		Operating Speeds[2] (DB Mounting)[1]					
	25%	40%	15%	20%	Grease DUL	Grease DUM	Grease DUH	Oil DUL	Oil DUM	Oil DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
2MMV99101WN	0.3	0.5	0.2	0.27	68200	60600	45500	116000	103000	77400
2MMV99102WN	0.4	0.6	0.24	0.32	57900	51400	38600	98400	98400	65600
2MMV99103WN	0.5	0.7	0.31	0.41	51200	45500	34100	87100	87100	58000
2MMV99104WN	0.9	1.4	0.58	0.77	39400	35000	26300	67000	67000	44700
2MMV99105WN	1	1.6	0.67	0.9	32900	29200	21900	55800	55800	37200
2MMV99106WN	1.3	2.1	0.87	1.17	26600	23600	17700	45100	45100	30100
2MMV99107WN	1.4	2.2	0.91	1.22	22800	20200	15200	38700	38700	25800
2MMV99108WN	1.7	2.7	1.14	1.52	19800	17600	13200	33700	33700	22400
2MMV99109WN	2.2	3.5	1.47	1.96	18200	16200	12100	30900	30900	20600
2MMV99110WN	2.4	3.8	1.58	2.11	16700	14800	11100	28300	28300	18900
2MMV99111WN	3.4	5.4	2.2	3	14900	13300	10000	25400	25400	17000
2MMV99112WN	3.6	5.8	2.4	3.2	13900	12300	9200	23600	23600	15600
2MMV99113WN	3.8	6.1	2.6	3.4	13000	11500	8600	22000	22000	14600
2MMV99114WN	5.1	8.2	3.4	4.6	11900	10600	7900	20200	20200	13400
2MMV99115WN	5.5	8.8	3.7	4.9	11100	9800	7400	18800	18800	12600
2MMV99116WN	7.1	11.3	4.7	6.3	10400	9300	7000	17700	17700	11900
2MMV99117WN	7.4	11.8	4.9	6.6	9900	8800	6600	16800	16800	11200
2MMV99118WN	9.7	15.6	6.5	8.7	9400	8300	6200	15900	15900	10500
2MMV99119WN	13.3	21.3	7.1	9.5	8900	7900	5900	15100	15100	10000
2MMV99120WN	10.6	17	7.4	9.9	8500	7500	5600	14400	14400	9500
2MMV99121WN	17.1	27.4	9.1	12.2	8000	7100	5300	13600	13600	9000
2MMV99122WN	16	25.6	10.7	14.2	7700	6800	5100	13000	13000	8700
2MMV99124WN	17.1	27.4	11.4	15.3	7100	6300	4700	12100	12100	8000
2MMV99126WN	25.8	41.3	17.2	23	6400	5700	4300	10900	10900	7300
2MMV99128WN	27.5	43.9	18.3	24.4	5900	5300	4000	10100	10100	6800
2MMV99130WN	43.9	70.3	29.3	39.1	5600	5000	3700	9500	9500	6300

[1] For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
[2] For ceramic ball complements use 120% of speeds shown.

EXTRA-LIGHT 3MMV99100WN (ISO 10) SERIES

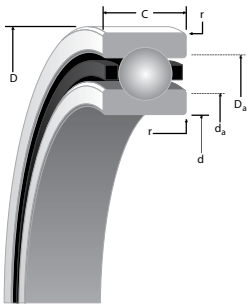
SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15		Kluber Isoflex NBU15		Operating Speeds[2] (DB Mounting) [1]					
	25%	40%	15%	20%	DUL	Grease DUM	DUH	DUL	Oil DUM	DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
3MMV99101WN	0.3	0.5	0.2	0.3	58000	47700	34100	86900	71600	51100
3MMV99102WN	0.4	0.6	0.2	0.3	49000	40500	28900	73800	60800	43400
3MMV99103WN	0.5	0.7	0.3	0.4	43500	35800	25600	65300	53800	38400
3MMV99104WN	0.9	1.4	0.6	0.8	33500	27600	19700	50200	41400	29500
3MMV99105WN	1.0	1.6	0.7	0.9	27900	23000	16400	41800	34400	24600
3MMV99106WN	1.3	2.1	0.9	1.2	22500	18500	13200	33800	27800	19900
3MMV99107WN	1.4	2.2	0.9	1.2	19300	15900	11300	28900	23800	17000
3MMV99108WN	1.7	2.7	1.1	1.5	16800	13900	9900	25200	20800	14800
3MMV99109WN	2.2	3.5	1.5	2.0	15500	12700	9100	23200	19100	13600
3MMV99110WN	2.4	3.8	1.6	2.1	14200	11700	8300	21300	17500	12500
3MMV99111WN	3.4	5.4	2.2	3.0	12700	10400	7400	19000	15600	11200
3MMV99112WN	3.6	5.8	2.4	3.2	11800	9700	6900	17700	14600	10400
3MMV99113WN	3.8	6.1	2.6	3.4	11000	9100	6500	16600	13600	9700
3MMV99114WN	5.1	8.2	3.4	4.6	10100	8300	5900	15200	12500	8900
3MMV99115WN	5.5	8.8	3.7	4.9	9400	7800	5500	14100	11700	8300
3MMV99116WN	7.1	11.3	4.7	6.3	8800	7300	5200	13300	10900	7800
3MMV99117WN	7.4	11.8	4.9	6.6	8400	6900	4900	12600	10400	7400
3MMV99118WN	9.7	15.6	6.5	8.7	7900	6500	4700	11900	9800	7000
3MMV99119WN	13.3	21.3	7.1	9.5	7600	6200	4500	11400	9400	6700
3MMV99120WN	10.6	17.0	7.4	9.9	7200	5900	4200	10800	8900	6300
3MMV99121WN	17.1	27.4	9.1	12.2	6800	5600	4000	10300	8500	6000
3MMV99122WN	16.0	25.6	10.7	14.2	6500	5300	3800	9700	8000	5700
3MMV99124WN	17.1	27.4	11.4	15.3	6000	4900	3500	9000	7400	5300
3MMV99126WN	25.8	41.3	17.2	23.0	5400	4500	3200	8100	6700	4800
3MMV99128WN	27.5	43.9	18.3	24.4	5100	4200	3000	7600	6300	4500
3MMV99130WN	43.9	70.3	29.3	39.1	4800	3900	2800	7200	5900	4200

[1] For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
[2] For ceramic ball complements use 120% of speeds shown.

ULTRA-LIGHT MM9100K (ISO 10) SERIES

DIMENSIONAL SIZES METRIC



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

CONRAD CONSTRUCTION:

- Maximum complement of balls separated by two-piece land piloted cage

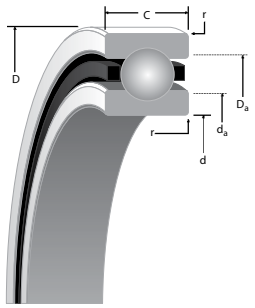
Bearing Number	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	LOAD RATINGS (steel ball & ceramic ball) C_o (stat)	C_e(dyn)	Limiting Speed (Ng)
METRIC	mm/tol: +0; (µm)			mm	kg	N		RPM
MM9101K	12 (4)	28 (5)	8 (80)	8 x 4.76	0.020	2400 2130	5670 5670	52800 63400
MM9103K	17 (4)	35 (6)	10 (80)	10 x 4.76	0.038	3300 2890	6660 6660	39600 47500
MM9104K	20 (5)	42 (6)	12 (120)	8 x 6.35	0.064	4400 3980	9620 9620	34000 40800
MM9105K	25 (5)	47 (6)	12 (120)	10 x 6.35	0.074	5900 5210	11200 11200	28300 34000
MM9106K	30 (5)	55 (7)	13 (120)	11 x 7.14	0.109	8300 7390	14700 14700	23300 28000
MM9107K	35 (6)	62 (7)	14 (120)	11 x 7.94	0.144	10300 9150	17700 17700	20700 24800
MM9108K	40 (6)	68 (7)	15 (120)	12 x 7.94	0.180	11600 10300	18600 18600	18200 21800
MM9109K	45 (6)	75 (7)	16 (120)	13 x 8.73	0.230	15100 13500	23300 23300	16300 19600
MM9110K	50 (6)	80 (7)	16 (120)	14 x 8.73	0.248	16700 14700	24200 24200	14900 17900
MM9111K	55 (7)	90 (8)	18 (150)	13 x 10.32	0.362	21400 18900	31400 31400	13500 16200
MM9112K	60 (7)	95 (8)	18 (150)	14 x 10.32	0.430	23200 20600	32600 32600	12500 15000
MM9113K	65 (7)	100 (8)	18 (150)	15 x 10.32	0.450	25200 22400	33900 33900	11600 13900
MM9114K	70 (7)	110 (8)	20 (150)	14 x 11.91	0.620	30900 27500	42200 42200	10700 12800
MM9115K	75 (7)	115 (8)	20 (150)	15 x 11.91	0.606	33400 29800	43800 43800	10100 12100
MM9116K	80 (7)	125 (9)	22 (150)	14 x 13.49	0.804	40000 35300	52800 52800	9420 11300
MM9117K	85 (8)	130 (9)	22 (200)	15 x 13.49	0.845	42900 38300	54900 54900	8900 10700
MM9118K	90 (9)	140 (9)	24 (200)	14 x 15.08	1.092	49800 44100	64500 64500	8390 10100
MM9120K	100 (8)	150 (9)	24 (200)	15 x 15.08	1.208	54300 48200	66700 66700	7630 9160
MM9122K	110 (8)	170 (10)	28 (200)	14 x 17.46	1.882	66700 59900	83400 83400	6840 8240
MM9124K	120 (8)	180 (10)	28 (200)	15 x 17.46	2.019	72500 65000	86300 86300	6320 7500
MM9126K	130 (10)	200 (11)	33 (250)	14 x 20.64	3.041	94300 83600	112600 112600	5810 6975

(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
0.3	16.1	15.9	25.5	25.3	11.995	12.000	0.005	0.004	28	28.005	0.000	0.010	28.010	28.005	0.015	0.005	MM9101K
0.3	21.7	21.5	31.1	30.9	16.995	17.000	0.005	0.004	35	35.006	0.000	0.012	35.010	35.005	0.016	0.005	MM9103K
0.6	25.0	24.8	37.7	37.5	19.995	20.000	0.005	0.005	42	42.006	0.000	0.012	42.010	42.005	0.016	0.005	MM9104K
0.6	30.1	29.9	42.6	42.3	24.995	25.000	0.005	0.005	47	47.006	0.000	0.012	47.012	47.007	0.018	0.007	MM9105K
1.0	36.2	35.9	50.7	50.4	29.995	30.000	0.005	0.005	55	55.008	0.000	0.015	55.012	55.007	0.019	0.007	MM9106K
1.0	41.2	40.6	56.6	56.1	34.995	35.000	0.005	0.006	62	62.008	0.000	0.015	62.012	62.007	0.019	0.007	MM9107K
1.0	46.2	45.7	62.2	61.7	39.995	40.000	0.005	0.006	68	68.008	0.000	0.015	68.012	68.007	0.019	0.007	MM9108K
1.0	51.8	51.3	69.3	68.8	44.995	45.000	0.005	0.006	75	75.008	0.000	0.015	75.014	75.009	0.022	0.009	MM9109K
1.0	56.6	56.1	74.2	73.7	49.995	50.000	0.005	0.006	80	80.008	0.000	0.015	80.012	80.008	0.020	0.008	MM9110K
1.0	62.7	62.2	83.3	82.8	54.995	55.000	0.005	0.007	90	90.008	0.000	0.016	90.015	90.007	0.023	0.007	MM9111K
1.0	67.8	67.3	88.1	87.6	59.995	60.000	0.005	0.007	95	95.008	0.000	0.016	95.016	95.009	0.024	0.009	MM9112K
1.0	72.6	72.1	93.2	92.7	64.995	65.000	0.005	0.007	100	100.008	0.000	0.016	100.018	100.010	0.025	0.010	MM9113K
1.0	78.2	77.7	102.4	101.9	69.995	70.000	0.005	0.007	110	110.008	0.000	0.016	110.018	110.010	0.025	0.010	MM9114K
1.0	83.4	82.7	107.3	106.6	74.995	75.005	0.005	0.012	115	115.008	0.000	0.016	115.019	115.011	0.026	0.010	MM9115K
1.0	89.3	88.5	116.5	115.7	79.995	80.005	0.005	0.012	125	125.008	0.000	0.017	125.021	125.011	0.030	0.011	MM9116K
1.0	94.9	94.1	122.1	121.3	84.995	85.005	0.005	0.012	130	130.009	0.000	0.018	130.020	130.010	0.029	0.010	MM9117K
1.5	100.5	99.7	130.9	130.2	89.995	90.005	0.005	0.013	140	140.009	0.000	0.018	140.020	140.010	0.029	0.010	MM9118K
1.5	110.6	109.9	140.8	140.1	99.995	100.005	0.005	0.013	150	150.009	0.000	0.018	150.023	150.012	0.032	0.012	MM9120K
2.0	123.1	122.3	158.4	157.6	109.995	110.005	0.005	0.013	170	170.010	0.000	0.020	170.022	170.012	0.032	0.012	MM9122K
2.0	133.2	132.5	168.3	167.5	119.995	120.005	0.005	0.013	180	180.010	0.000	0.020	180.022	180.012	0.032	0.012	MM9124K
2.0	144.9	144.2	186.6	185.8	129.995	130.005	0.005	0.015	200	200.011	0.000	0.022	200.025	200.015	0.036	0.015	MM9126K

EXTRA-LIGHT MM9100K (ISO 10) SERIES

DIMENSIONAL SIZES INCHES



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

CONRAD CONSTRUCTION:

- Maximum complement of balls separated by two-piece land piloted cage.

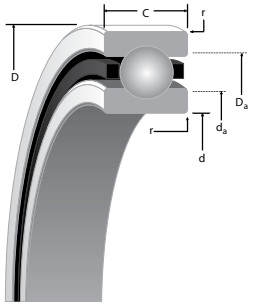
Bearing Number	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	LOAD RATINGS (steel ball & ceramic ball) C_o (stat)	C_e (dyn)	Limiting Speed
INCH	in./tol: +0; -.000(X)			in.	lbs.	lbs.		RPM
MM9101K	0.4724 (1.5)	1.1024 (2)	0.3150 (31)	8 x 3/16	0.04	540 480	1280 1280	52800 63400
MM9103K	0.6693 (1.5)	1.3780 (2.5)	0.3937 (31)	10 x 3/16	0.08	735 650	1500 1500	39600 47500
MM9104K	0.7874 (2)	1.6535 (2.5)	0.4724 (47)	8 x 1/4	0.14	1000 890	2160 2160	34000 40800
MM9105K	0.9843 (2)	1.8504 (2.5)	0.4724 (47)	10 x 1/4	0.16	1320 1170	2510 2510	28300 34000
MM9106K	1.1811 (2)	2.1654 (3)	0.5118 (47)	11 x 9/32	0.24	1860 1660	3300 3300	23300 28000
MM9107K	1.3780 (2.5)	2.4409 (3)	0.5512 (47)	11 x 5/16	0.32	2320 2060	3980 3980	20700 24800
MM9108K	1.5748 (2.5)	2.6772 (3)	0.5906 (47)	12 x 5/16	0.40	2600 2310	4180 4180	18300 21800
MM9109K	1.7717 (2.5)	2.9528 (3)	0.6299 (47)	13 x 11/32	0.51	3400 3030	5230 5230	16300 19600
MM9110K	1.9685 (2.5)	3.1496 (3)	0.6299 (47)	14 x 11/32	0.55	3750 3310	5440 5440	14900 17900
MM9111K	2.1654 (3)	3.5433 (3)	0.7087 (59)	13 x 13/32	0.80	4800 4250	7050 7050	13500 16200
MM9112K	2.3622 (3)	3.7402 (3)	0.7087 (59)	14 x 13/32	0.95	5210 4630	7340 7340	12500 15000
MM9113K	2.5591 (3)	3.9370 (3)	0.7087 (59)	15 x 13/32	0.99	5650 5030	7610 7610	11600 13900
MM9114K	2.7559 (3)	4.3307 (3)	0.7874 (59)	14 x 15/32	1.37	6940 6180	9490 9490	10700 12800
MM9115K	2.9528 (3)	4.5276 (3)	0.7874 (59)	15 x 15/32	1.34	7500 6700	9850 9850	10100 12100
MM9116K	3.1496 (3)	4.9213 (3.5)	0.8661 (59)	14 x 17/32	1.77	9000 7940	11900 11900	9420 11300
MM9117K	3.3465 (3)	5.1181 (3.5)	0.8661 (79)	15 x 17/32	1.86	9650 8600	12300 12300	8900 10700
MM9118K	3.5433 (3)	5.5118 (3.5)	0.9449 (79)	14 x 19/32	2.41	11200 9920	14500 14500	8390 10100
MM9120K	3.9370 (3)	5.9055 (3.5)	0.9449 (79)	15 x 19/32	2.66	12200 10800	15000 15000	7630 9160
MM9122K	4.3307 (3)	6.6929 (4)	1.1024 (79)	14 x 11/16	4.15	15000 13500	18700 18700	6840 8,210
MM9124K	4.7244 (3)	7.0866 (4)	1.1024 (79)	15 x 11/16	4.45	16300 14600	19400 19400	6320 7580
MM9126K	5.1181 (4)	7.8740 (4.5)	1.2992 (98)	14 x 13/16	6.70	21200 18800	25300 25300	5810 6975

(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r	Suggested Shoulder Diameters				Shaft Diameter		Mounting Fits		FIXED				FLOATING				
	d_a (Shaft)		D_a (Housing)						Housing Bore (Stationary)		Mounting Fits		Housing Bore (Stationary)		Housing Clearance		
Rad.(2)	Max.	Min.	Max.	Min.	Min.	Max.	Loose	Tight	Min.	Max.	Tight	Loose	Max.	Min.	Max.	Min.	
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.012	0.64	0.63	1.01	1.00	0.4722	0.4724	0.0002	0.00015	1.1024	1.1026	0.0000	0.0004	1.1028	1.1026	0.00060	0.00020	MM9101K
0.012	0.86	0.85	1.23	1.22	0.6691	0.6693	0.0002	0.00015	1.3780	1.3783	0.0000	0.0005	1.3784	1.3782	0.00070	0.00020	MM9103K
0.024	0.99	0.98	1.49	1.48	0.7872	0.7874	0.0002	0.0002	1.6535	1.6538	0.0000	0.0005	1.6539	1.6537	0.00070	0.00020	MM9104K
0.024	1.19	1.18	1.68	1.67	0.9841	0.9843	0.0002	0.0002	1.8504	1.8507	0.0000	0.0005	1.8509	1.8507	0.00080	0.00030	MM9105K
0.039	1.43	1.42	2.00	1.99	1.1809	1.1811	0.0002	0.0002	2.1654	2.1657	0.0000	0.0006	2.1659	2.1657	0.00080	0.00030	MM9106K
0.039	1.62	1.60	2.23	2.21	1.3778	1.3780	0.0002	0.00025	2.4409	2.4412	0.0000	0.0006	2.4414	2.4412	0.00080	0.00030	MM9107K
0.039	1.82	1.80	2.45	2.43	1.5746	1.5748	0.0002	0.00025	2.6772	2.6775	0.0000	0.0006	2.6777	2.6775	0.00080	0.00030	MM9108K
0.039	2.04	2.02	2.73	2.71	1.7715	1.7717	0.0002	0.00025	2.9528	2.9531	0.0000	0.0006	2.9533	2.9531	0.00080	0.00030	MM9109K
0.039	2.23	2.21	2.92	2.90	1.9683	1.9685	0.0002	0.00025	3.1496	3.1499	0.0000	0.0006	3.1501	3.1499	0.00080	0.00030	MM9110K
0.039	2.47	2.45	3.28	3.26	2.1652	2.1654	0.0002	0.0003	3.5433	3.5436	0.0000	0.0006	3.5439	3.5436	0.00090	0.00030	MM9111K
0.039	2.67	2.65	3.47	3.45	2.3620	2.3622	0.0002	0.0003	3.7402	3.7405	0.0000	0.0006	3.7408	3.7405	0.00090	0.00030	MM9112K
0.039	2.86	2.84	3.67	3.65	2.5589	2.5591	0.0002	0.0003	3.9370	3.9373	0.0000	0.0006	3.9377	3.9374	0.00100	0.00040	MM9113K
0.039	3.08	3.06	4.03	4.01	2.7557	2.7559	0.0002	0.0003	4.3307	4.3310	0.0000	0.0006	4.3314	4.3311	0.00100	0.00040	MM9114K
0.039	3.29	3.26	4.23	4.20	2.9526	2.9530	0.0002	0.0005	4.5276	4.5279	0.0000	0.0006	4.5283	4.5280	0.00100	0.00040	MM9115K
0.039	3.52	3.49	4.59	4.56	3.1494	3.1498	0.0002	0.0005	4.9213	4.9216	0.0000	0.0007	4.9221	4.9217	0.00120	0.00040	MM9116K
0.039	3.74	3.71	4.81	4.78	3.3463	3.3467	0.0002	0.0005	5.1181	5.1185	0.0000	0.0007	5.1189	5.1185	0.00110	0.00040	MM9117K
0.059	3.96	3.93	5.16	5.13	3.5431	3.5435	0.0002	0.0005	5.5118	5.5122	0.0000	0.0007	5.5126	5.5122	0.00110	0.00040	MM9118K
0.059	4.36	4.33	5.55	5.52	3.9368	3.9372	0.0002	0.0005	5.9055	5.9059	0.0000	0.0007	5.9064	5.9060	0.00120	0.00050	MM9120K
0.079	4.85	4.82	6.24	6.21	4.3305	4.3309	0.0002	0.0005	6.6929	6.6933	0.0000	0.0008	6.6938	6.6934	0.00130	0.00050	MM9122K
0.079	5.25	5.22	6.63	6.60	4.7242	4.7246	0.0002	0.0005	7.0866	7.0870	0.0000	0.0008	7.0875	7.0871	0.00130	0.00050	MM9124K
0.079	5.71	5.68	7.35	7.32	5.1179	5.1183	0.0002	0.0006	7.8740	7.8745	0.0000	0.0009	7.8750	7.8746	0.00150	0.00060	MM9126K

LIGHT
2(3)MM200WI
(ISO 02) SERIES

DIMENSIONAL SERIES
METRIC



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WI CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

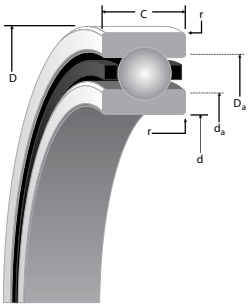
Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width[1]	Ball Qty . x Dia.	Wt.	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]
METRIC	mm/tol: +0; -(µm)			mm	kg	N		RPM	N		RPM
200WI	10 (3.8)	30 (5.1)	9 (40)	8 x 5.56	0.03	2900 2610	7100 7100	62800 75400	2800 2540	6900 6900	56500 67800
201WI	12 (3.8)	32 (6.4)	10 (80)	9 x 5.95	0.036	3800 3410	8760 8760	56700 68000	3700 3320	8500 8500	51000 61200
202WI	15 (3.8)	35 (6.4)	11 (80)	10 x 5.95	0.044	4500 4010	9580 9580	47800 57400	4400 3880	9250 9250	43000 51600
203WI	17 (3.8)	40 (6.4)	12 (80)	10 x 6.75	0.064	5900 5170	12000 12000	41900 50300	5600 5000	11600 11600	37700 45200
204WI	20 (5.1)	47 (6.4)	14 (130)	10 x 7.94	0.103	8100 7160	16100 16100	35700 42800	7700 6900	15500 15500	32100 38500
205WI	25 (5.1)	52 (7.7)	15 (130)	12 x 7.94	0.127	10200 9110	18400 18400	29800 35800	9800 8690	17600 17600	26800 32200
206WI	30 (5.1)	62 (7.7)	16 (130)	12 x 9.53	0.195	14700 13100	25500 25500	25100 30100	14000 12500	24400 24400	22600 27100
207WI	35 (6.4)	72 (7.7)	17 (130)	12 x 11.11	0.282	20000 17800	33700 33700	21600 25900	19100 17100	32200 32200	19400 23300
208WI	40 (6.4)	80 (7.7)	18 (130)	11 x 12.70	0.352	23800 21100	40,400 40400	19300 23100	22700 20200	38700 38700	17400 20900
209WI	45 (6.4)	85 (7.7)	19 (130)	13 x 12.70	0.408	28800 25600	45200 45200	17500 21000	27600 24500	43100 43100	15800 19000
210WI	50 (6.4)	90 (7.7)	20 (130)	14 x 12.70	0.457	31700 28200	47400 47400	16000 19200	30200 26900	45200 45200	14400 17300
211WI	55 (7.7)	100 (7.7)	21 (150)	14 x 14.29	0.608	40000 35500	58700 58700	14500 17400	38500 34000	55900 55900	13100 15700
212WI	60 (7.7)	110 (7.7)	22 (150)	14 x 15.88	0.787	48900 43600	71000 71000	13200 15800	47100 41800	67700 67700	11900 14300
213WI	65 (7.7)	120 (7.7)	23 (150)	14 x 16.67	0.998	54700 48700	77400 77400	12100 14300	52500 46500	73700 73700	10900 13100
214WI	70 (7.7)	125 (9)	24 (150)	14 x 17.46	1.074	60000 53600	84200 84200	11400 13700	57400 51100	80200 80200	10300 12400
215WI	75 (7.7)	130 (9)	25 (150)	15 x 17.46	1.174	64900 58200	87900 87900	10800 13000	62300 55600	83700 83700	9700 11600
216WI	80 (7.7)	140 (9)	26 (150)	15 x 19.05	1.448	77000 69000	102900 102900	10100 12100	73800 65800	98000 98000	9100 10900
217WI	85 (7.7)	150 (9)	28 (200)	15 x 20.64	1.817	90700 80,700	118900 118900	9400 11300	85800 76800	113300 113300	8500 10200
218WI	90 (7.7)	160 (10.3)	30 (200)	14 x 22.23	2.196	97900 87100	129900 129900	8900 10700	92500 82900	123700 123700	8000 9600
219WI	95 (7.7)	170 (10.3)	32 (200)	14 x 23.81	2.669	111200 9600	147100 147100	8400 10100	106800 94900	140100 140100	7600 9100
220WI	100 (7.7)	180 (10.3)	34 (200)	14 x 25.40	3.209	126800 112900	165200 165200	8000 9600	120100 107800	15500 157500	7200 8600
222WI	110 (7.7)	200 (11.5)	38 (200)	14 x 28.58	4.486	160100 142000	194900 194900	7200 8600	153500 135900	185800 185800	6500 7800
224WI	120 (7.7)	215 (11.5)	40 (200)	14 x 30.16	5.358	180100 159600	210100 210100	6700 8000	173500 152400	200500 200500	6000 7200
226WI	130 (10.3)	230 (11.5)	40 (250)	17 x 30.16	6.468	222400 197400	238200 238200	6100 7300	211300 188800	226800 226800	5500 6600
230WI	150 (10.3)	270 (12.8)	45 (250)	15 x 38.10	9.98	302500 272100	305200 305200	5300 6400	291300 259900	290900 290900	4800 5800

[Ng] For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
[1] Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
[2] ABMA STD 20 (r_{as} max).

r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
0.6	15.1	14.9	26	25.8	9.995	10.000	0.005	0.004	30	30.005	0.000	0.010	30.010	30.005	0.015	0.005	200WI
0.6	16.6	16.4	28.1	27.8	11.995	12.000	0.005	0.004	32	32.005	0.000	0.011	32.010	32.005	0.016	0.005	201WI
0.6	19.2	18.9	31.1	30.9	14.995	15.000	0.005	0.004	35	35.006	0.000	0.012	35.010	35.005	0.016	0.005	202WI
0.6	21.7	21.5	35.7	35.4	16.995	17.000	0.005	0.004	40	40.006	0.000	0.012	40.010	40.005	0.016	0.005	203WI
1	26	25.8	41.5	41.3	19.995	20.000	0.005	0.005	47	47.006	0.000	0.012	47.012	47.007	0.018	0.007	204WI
1	31.1	30.9	47.1	46.9	24.995	25.000	0.005	0.005	52	52.006	0.000	0.013	52.012	52.007	0.019	0.007	205WI
1	36.7	36.5	56	55.8	29.995	30..000	0.005	0.005	62	62.008	0.000	0.015	62.012	62.007	0.019	0.007	206WI
1	42.7	42.2	65.3	64.8	34.995	35.000	0.005	0.006	72	72.008	0.000	0.015	72.011	72.007	0.019	0.007	207WI
1	47.8	47.2	73.2	72.6	39.995	40.000	0.005	0.006	80	80.008	0.000	0.015	80.012	80.008	0.02	0.008	208WI
1	52.8	52.3	78.2	77.7	44.995	45.000	0.005	0.006	85	85.008	0.000	0.016	85.016	85.009	0.024	0.009	209WI
1	57.9	57.4	83.3	82.8	49.995	50.000	0.005	0.006	90	90.008	0.000	0.016	90.015	90.007	0.023	0.007	210WI
1.5	63.8	63.3	92.2	91.7	54.995	55.000	0.005	0.007	100	100.008	0.000	0.016	100.018	100.010	0.025	0.01	211WI
1.5	69.9	69.3	101.4	100.8	59.995	60.000	0.005	0.007	110	110.008	0.000	0.016	110.018	110.010	0.025	0.010	212WI
1.5	76.2	75.7	109.7	109.2	64.995	65.000	0.005	0.007	120	120.008	0.000	0.016	120.018	120.010	0.025	0.010	213WI
1.5	80.8	80.3	115.8	115.3	69.995	70.000	0.005	0.007	125	125.008	0.000	0.017	125.021	125.011	0.03	0.011	214WI
1.5	86	85.2	120.8	120	74.995	75.005	0.005	0.012	130	130.009	0.000	0.018	130.020	130.010	0.029	0.010	215WI
2	91.3	90.6	129.9	129.2	79.995	80.005	0.005	0.012	140	140.009	0.000	0.018	140.020	140.010	0.029	0.010	216WI
2	97.4	96.7	138.8	138.1	84.995	85.005	0.005	0.012	150	150.009	0.000	0.018	150.023	150.012	0.032	0.012	217WI
2	103.5	102.7	148	147.2	89.995	90.005	0.005	0.013	160	160.009	0.000	0.022	160.022	160.012	0.033	0.012	218WI
2.1	109.4	108.6	157.1	153.3	94.995	95.005	0.005	0.013	170	170.010	0.000	0.02	170.022	170.012	0.032	0.012	219WI
2.1	115.2	114.4	166	165.2	99.995	100.005	0.005	0.013	180	180.010	0.000	0.02	180.022	180.012	0.032	0.012	220WI
2.1	127.1	126.4	184.3	183.5	109.995	110.005	0.005	0.013	200	200.011	0.000	0.022	200.025	200.015	0.036	0.015	222WI
2.1	138.1	137.3	198.5	197.7	119.995	120.005	0.005	0.013	215	215.011	0.000	0.022	215.025	215.015	0.036	0.015	224WI
2.5	150.5	149.7	211	210.2	129.995	130.005	0.005	0.015	230	230.011	0.000	0.022	230.025	230.015	0.036	0.015	226WI
2.5	172.6	171.8	248.8	248	149.995	150.005	0.005	0.015	270	270.013	0.000	0.026	270.031	270.018	0.044	0.018	230WI

LIGHT
2(3)MM200WI
(ISO 02) SERIES

DIMENSIONAL SERIES INCHES



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WI CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	C_o (stat)	C_e (dyn)	Limiting Speed (Ng)	C_o (stat)	C_e (dyn)	Limiting Speed (Ng)
INCHES	in./tol: +0; -.000(X)			in.	lbs.	lbs.		RPM	lbs.		RPM
200WI	0.3937 (1.5)	1.1811 (2)	0.3543 (16)	8 x 7/32	0.07	660 590	1600 1600	62800 75400	640 570	1550 1550	56500 67800
201WI	0.4724 (1.5)	1.2598 (2.5)	0.3937 (31)	9 x 15/64	0.08	860 770	1970 1970	56700 68000	830 750	1910 1910	51000 61200
202WI	0.5906 (1.5)	1.378 (2.5)	0.4331 (31)	10 x 15/64	0.1	1010 900	2200 2200	47800 57400	980 870	2080 2080	43000 51600
203WI	0.6693 (1.5)	1.5748 (2.5)	0.4724 (31)	10 x 17/64	0.14	1320 1160	2750 2750	41900 50300	1270 1120	2600 2600	37700 45200
204WI	0.7874 (2)	1.8504 (2.5)	0.5512 (47)	10 x 5/16	0.23	1810 1610	3620 3620	35700 42800	1730 1550	3490 3490	32100 38500
205WI	0.9843 (2)	2.0472 (3)	0.5906 (47)	12 x 5/16	0.28	2320 2050	4130 4130	29800 35800	2200 1950	3950 3950	26800 32100
206WI	1.1811 (2)	2.4409 (3)	0.6299 (47)	12 x 3/8	0.43	3310 2940	5740 5740	25100 30100	3150 2810	5490 5490	22600 27100
207WI	1.378 (2.5)	2.8346 (3)	0.6693 (47)	12 x 7/16	0.62	4490 4000	7580 7580	21600 25900	4300 3820	7240 7240	19400 23300
208WI	1.5748 (2.5)	3.1496 (3)	0.7087 (47)	11 x 1/2	0.78	5340 4750	9070 9070	19300 23200	5100 4550	8690 8690	17400 20900
209WI	1.7717 (2.5)	3.3465 (3)	0.748 (47)	13 x 1/2	0.9	6470 5760	10200 10200	17500 21000	6200 5500	9700 9700	15800 19000
210WI	1.9685 (2.5)	3.5433 (3)	0.7874 (47)	14 x 1/2	1.01	7130 6340	10700 10700	16000 19200	6800 6050	10200 10200	14400 17300
211WI	2.1654 (3)	3.937 (3)	0.8268 (59)	14 x 9/16	1.34	9000 7980	13200 13200	14500 17400	8650 7640	12600 12600	13100 15700
212WI	2.3622 (3)	4.3307 (3)	0.8661 (59)	14 x 5/8	1.74	11000 9810	16000 16000	13200 15800	10600 9400	15200 15200	11900 14300
213WI	2.5591 (3)	4.7244 (3)	0.9055 (59)	14 x 21/32	2.2	12300 11000	17400 17400	12100 14500	11800 10400	16600 16600	10900 13100
214WI	2.7559 (3)	4.9213 (3.5)	0.9449 (59)	14 x 11/16	2.37	13400 12100	18900 18900	11400 13700	12900 11500	18000 18000	10300 12400
215WI	2.9528 (3)	5.1181 (3.5)	0.9843 (59)	15 x 11/16	2.59	14600 13100	19800 19800	10800 13000	14000 12500	18800 18800	9700 11600
216WI	3.1496 (3)	5.5118 (3.5)	1.0236 (59)	15 x 3/4	3.19	17300 15500	23100 23100	10100 12100	16600 14800	22000 22000	9100 10900
217WI	3.3465 (3)	5.9055 (3.5)	1.1024 (79)	15 x 13/16	4.01	20400 18200	26700 26700	9400 11300	19300 17300	25500 25500	8500 10200
218WI	3.5433 (3)	6.2992 (4)	1.1811 (79)	14 x 7/8	4.84	22000 19600	29200 29200	8900 10700	20800 18600	27800 27800	8000 9600
219WI	3.7402 (3)	6.6929 (4)	1.2598 (79)	14 x 15/16	5.88	25000 22400	33100 33100	8400 10100	24000 21300	31500 31500	7600 9100
220WI	3.937 (3)	7.0866 (4)	1.3386 (79)	14 x 1	7.07	28500 25400	37100 37100	8000 9600	27000 24200	35400 35400	7200 8600
222WI	4.3307 (3)	7.874 (4.5)	1.4961 (79)	14 x 1 1/8	9.89	36000 31900	43800 43800	7200 8600	34500 30600	41800 41800	6500 7800
224WI	4.7244 (3)	8.4646 (4.5)	1.5748 (79)	14 x 1 3/16	11.81	40500 35900	47200 47200	6700 8000	39000 34300	45100 45100	6000 7200
226WI	5.1181 (4)	9.0551 (4.5)	1.5748 (98)	17 x 1 3/16	14.26	50000 44400	53500 53500	6100 7300	47500 42500	51000 51000	5500 6600
230WI	5.9055 (4)	10.6299 (5)	1.7717 (98)	15 x 1 1/2	22	68000 61200	68600 68600	5300 6400	65500 58400	65400 65400	4800 5800

(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Tight	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.024	0.60	0.59	1.03	1.02	0.3935	0.3937	0.0002	0.00015	1.1811	1.1813	0.000	0.0004	1.18150	1.18130	0.00060	0.00020	200WI
0.024	0.66	0.65	1.11	1.10	0.4722	0.4724	0.0002	0.00015	1.2598	1.2600	0.000	0.00045	1.26020	1.26000	0.00070	0.00020	201WI
0.024	0.76	0.75	1.23	1.22	0.5904	0.5906	0.0002	0.00015	1.3780	1.3783	0.000	0.0005	1.37840	1.37820	0.00070	0.00020	202WI
0.024	0.86	0.85	1.41	1.40	0.6691	0.6693	0.0002	0.00015	1.5748	1.5751	0.000	0.0005	1.57520	1.57500	0.00070	0.00020	203WI
0.039	1.03	1.02	1.64	1.63	0.7872	0.7874	0.0002	0.0002	1.8504	1.8507	0.000	0.0005	1.85090	1.85070	0.00080	0.00030	204WI
0.039	1.23	1.22	1.86	1.85	0.9841	0.9843	0.0002	0.0002	2.0472	2.0475	0.000	0.00055	2.04770	2.04750	0.00080	0.00030	205WI
0.039	1.45	1.44	2.21	2.20	1.1809	1.1811	0.0002	0.0002	2.4409	2.4412	0.000	0.0006	2.44140	2.44120	0.00080	0.00030	206WI
0.039	1.68	1.66	2.57	2.55	1.3778	1.3780	0.0002	0.00025	2.8346	2.8349	0.000	0.0006	2.83510	2.83490	0.00080	0.00030	207WI
0.039	1.88	1.86	2.88	2.86	1.5746	1.5748	0.0002	0.00025	3.1496	3.1499	0.000	0.0006	3.15010	3.14990	0.00080	0.00030	208WI
0.039	2.08	2.06	3.08	3.06	1.7715	1.7717	0.0002	0.00025	3.3465	3.3468	0.000	0.0006	3.34710	3.34680	0.00090	0.00030	209WI
0.039	2.28	2.26	3.28	3.26	1.9683	1.9685	0.0002	0.00025	3.5433	3.5436	0.000	0.0006	3.54390	3.54360	0.00090	0.00030	210WI
0.059	2.51	2.49	3.63	3.61	2.1652	2.1654	0.0002	0.0003	3.9370	3.9373	0.000	0.0006	3.93770	3.93740	0.00100	0.00040	211WI
0.059	2.75	2.73	3.99	3.97	2.3620	2.3622	0.0002	0.0003	4.3307	4.3310	0.000	0.0006	4.33140	4.33110	0.00100	0.00040	212WI
0.059	3.00	2.98	4.32	4.30	2.5589	2.5591	0.0002	0.0003	4.7244	4.7247	0.000	0.0006	4.72510	4.72480	0.00100	0.00040	213WI
0.059	3.18	3.16	4.56	4.54	2.7557	2.7559	0.0002	0.0003	4.9213	4.9216	0.000	0.0007	4.92210	4.92170	0.00120	0.00040	214WI
0.059	3.39	3.36	4.76	4.73	2.9526	2.9530	0.0002	0.0005	5.1181	5.1185	0.000	0.0007	5.11890	5.11850	0.00110	0.00040	215WI
0.079	3.60	3.57	5.12	5.09	3.1494	3.1498	0.0002	0.0005	5.5118	5.5122	0.000	0.0007	5.51260	5.51220	0.00110	0.00040	216WI
0.079	3.84	3.81	5.47	5.44	3.3463	3.3467	0.0002	0.0005	5.9055	5.9059	0.000	0.0007	5.90640	5.9060	0.00120	0.00050	217WI
0.079	4.08	4.05	5.83	5.8	3.5431	3.5435	0.0002	0.0005	6.2992	6.2996	0.000	0.0008	6.30010	6.29970	0.00130	0.00050	218WI
0.079	4.31	4.28	6.19	6.16	3.7400	3.7404	0.0002	0.0005	6.6929	6.6933	0.000	0.0008	6.69380	6.69340	0.00130	0.00050	219WI
0.079	4.54	4.51	6.54	6.51	3.9368	3.9372	0.0002	0.0005	7.0866	7.0870	0.000	0.0008	7.08750	7.08710	0.00130	0.00050	220WI
0.079	5.01	4.98	7.26	7.23	4.3305	4.3309	0.0002	0.0005	7.8740	7.8745	0.000	0.0009	7.87500	7.87460	0.00150	0.00060	222WI
0.079	5.44	5.41	7.82	7.79	4.7242	4.7246	0.0002	0.0005	8.4646	8.4651	0.000	0.0009	8.46560	8.46520	0.00150	0.00060	224WI
0.098	5.93	5.9	8.31	8.28	5.1179	5.1183	0.0002	0.0006	9.0551	9.0556	0.000	0.0009	9.05610	9.05570	0.00150	0.00060	226WI
0.098	6.8	6.77	9.8	9.77	5.9053	5.9057	0.0002	0.0006	10.6299	10.6304	0.000	0.0010	10.63120	10.63070	0.00180	0.00080	230WI

LIGHT 2MM200WI (ISO 02) SERIES

DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB

Tandem
DT

Special Applications
DF

Bearing Number	PRELOAD				AXIAL STIFFNESS[1]				RADIAL STIFFNESS[1]			SPACER OFFSETS[1]		
	DUX	DUL	DUM	DUH	X-light	Light	Medium	Heavy	Light	Medium	Heavy	X-Light to Light	Light to Medium	Medium to Heavy
	N				N/µm				N/µm			µm		
METRIC DUPLEX PERFORMANCE DATA 2MM200WN SERIES														
2MM200WI	—	20	90	160	—	18.54	33.06	42.85	85.88	136.07	162.13	—	10.41	7.11
2MM201WI	—	20	90	160	—	19.24	34.11	44.07	96.02	153.56	183.30	—	9.91	6.86
2MM202WI	—	20	90	180	—	20.64	36.20	49.67	102.67	164.93	205.51	—	9.40	8.38
2MM203WI	—	40	130	330	—	25.54	41.10	63.84	137.12	197.46	263.05	—	10.67	15.24
2MM204WI	—	70	180	360	—	30.08	46.17	64.36	168.43	232.97	289.81	—	11.68	12.95
2MM205WI	—	90	220	400	—	37.60	56.49	74.86	209.53	283.16	340.88	—	11.43	10.92
2MM206WI	—	90	220	560	—	38.30	56.49	87.10	222.47	303.10	405.77	—	11.18	18.54
2MM207WI	—	130	400	780	—	47.22	75.91	104.42	269.35	388.10	478.70	—	17.27	16.76
2MM208WI	—	130	440	890	—	45.30	75.73	105.46	261.65	392.65	489.20	—	20.57	19.56
2MM209WI	110	180	560	1110	46.52	56.14	91.82	128.20	322.87	472.58	588.36	5.08	20.32	20.32
2MM210WI	130	220	560	1220	51.60	64.19	95.67	139.57	366.24	496.89	637.86	6.35	16.76	22.61
2MM211WI	160	220	780	1560	54.22	63.31	109.49	153.74	382.86	582.42	724.61	4.83	25.65	23.62
2MM212WI	180	330	890	1890	59.12	77.66	119.11	171.40	456.31	632.26	802.44	9.65	22.61	27.69
2MM213WI	200	440	1000	2110	62.61	88.32	126.28	181.20	511.76	668.64	846.52	13.46	20.83	28.96
2MM214WI	220	440	1110	2220	67.86	89.72	133.97	186.97	519.80	703.80	876.25	11.18	23.88	27.69
2MM215WI	240	560	1220	2450	72.93	102.49	145.34	203.06	586.96	760.64	946.38	14.48	21.59	28.19
2MM216WI	270	670	1450	2780	77.66	113.16	159.16	217.75	639.96	825.18	1014.59	17.02	22.86	28.45
2MM217WI	290	780	1670	3340	80.63	119.28	167.38	234.19	692.78	890.07	1108.17	19.05	24.89	33.27
2MM218WI	330	780	1780	3560	82.55	116.83	168.25	235.07	678.61	891.47	1109.92	18.03	27.94	35.31
2MM219WI	360	890	2000	4000	86.75	126.10	179.97	250.98	726.88	932.74	1183.02	20.07	28.96	37.08
2MM220WI	380	1110	2220	4450	88.85	137.65	187.14	261.30	795.8	1000.08	1245.99	25.91	27.43	39.62
2MM222WI	440	1330	2670	5340	98.64	153.91	208.48	289.81	881.32	1108.17	1381.36	28.19	29.46	42.93
2MM224WI	490	1470	2940	5870	102.84	158.81	215.65	300.13	926.97	1166.06	1453.59	29.46	31.24	45.47
2MM226WI	560	1650	3290	6580	121.21	186.44	252.38	350.32	1089.45	1372.44	1712.80	27.94	29.97	43.69
2MM230WI	690	1890	3780	7560	130.30	192.74	258.85	356.10	1136.85	1437.33	1797.97	29.46	33.53	49.28
	lbs.				10^6lbs./in.				10^6lbs./in.			in.		
INCH DUPLEX PERFORMANCE DATA 2MM200WI SERIES														
2MM200WI	—	5	20	35	—	0.106	0.189	0.245	0.491	0.778	0.927	—	0.00041	0.00028
2MM201WI	—	5	20	35	—	0.110	0.195	0.252	0.549	0.878	1.048	—	0.00039	0.00027
2MM202WI	—	5	20	40	—	0.118	0.207	0.284	0.587	0.943	1.175	—	0.00037	0.00033
2MM203WI	—	10	30	75	—	0.146	0.235	0.365	0.784	1.129	1.504	—	0.00042	0.0006
2MM204WI	—	15	40	80	—	0.172	0.264	0.368	0.963	1.332	1.657	—	0.00046	0.00051
2MM205WI	—	20	50	90	—	0.215	0.323	0.428	1.198	1.619	1.949	—	0.00045	0.00043
2MM206WI	—	20	50	125	—	0.219	0.323	0.498	1.272	1.733	2.320	—	0.00044	0.00073
2MM207WI	—	30	90	175	—	0.270	0.434	0.597	1.540	2.219	2.737	—	0.00068	0.00066
2MM208WI	—	30	100	200	—	0.259	0.433	0.603	1.496	2.245	2.797	—	0.00081	0.00077
2MM209WI	25	40	125	250	0.266	0.321	0.525	0.733	1.846	2.702	3.364	0.0002	0.0008	0.0008
2MM210WI	30	50	125	275	0.295	0.367	0.547	0.798	2.094	2.841	3.647	0.00025	0.00066	0.00089
2MM211WI	35	50	175	350	0.310	0.362	0.626	0.879	2.189	3.330	4.143	0.00019	0.00101	0.00093
2MM212WI	40	75	200	425	0.338	0.444	0.681	0.980	2.609	3.615	4.588	0.00038	0.00089	0.00109
2MM213WI	45	100	225	475	0.358	0.505	0.722	1.036	2.926	3.823	4.840	0.00053	0.00082	0.00114
2MM214WI	50	100	250	500	0.388	0.513	0.766	1.069	2.972	4.024	5.010	0.00044	0.00094	0.00109
2MM215WI	55	125	275	550	0.417	0.586	0.831	1.161	3.356	4.349	5.411	0.00057	0.00085	0.00111
2MM216WI	60	150	325	625	0.444	0.647	0.910	1.245	3.659	4.718	5.801	0.00067	0.0009	0.00112
2MM217WI	65	175	375	750	0.461	0.682	0.957	1.339	3.961	5.089	6.336	0.00075	0.00098	0.00131
2MM218WI	75	175	400	800	0.472	0.668	0.962	1.344	3.880	5.097	6.346	0.00071	0.0011	0.00139
2MM219WI	80	200	450	900	0.496	0.721	1.029	1.435	4.156	5.333	6.764	0.00079	0.00114	0.00146
2MM220WI	85	250	500	1000	0.508	0.787	1.070	1.494	4.550	5.718	7.124	0.00102	0.00108	0.00156
2MM222WI	100	300	600	1200	0.564	0.880	1.192	1.657	5.039	6.336	7.898	0.00111	0.00116	0.00169
2MM224WI	110	330	660	1320	0.588	0.908	1.233	1.716	5.300	6.667	8.311	0.00116	0.00123	0.00179
2MM226WI	125	370	740	1480	0.693	1.066	1.443	2.003	6.229	7.847	9.793	0.0011	0.00118	0.00172
2MM230WI	155	425	850	1700	0.745	1.102	1.480	2.036	6.500	8.218	10.280	0.00116	0.00132	0.00194

Notes: [1] For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

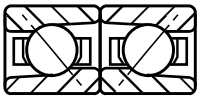
LIGHT 3MM200WI (ISO 02) SERIES

DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB

Tandem
DT



Special Applications
DF

Bearing Number	PRELOAD				AXIAL STIFFNESS[1]			RADIAL STIFFNESS[1]			SPACER OFFSETS[1]		
	DUX	DUL	DUM	DUH	Light	Medium	Heavy	Light	Medium	Heavy	X-Light to Light	Light to Medium	Medium to Heavy
	N				N/µm			N/µm			µm		
METRIC DUPLEX PERFORMANCE DATA 3MM200WI SERIES													
3MM200WI	—	40	130	270	39.35	59.99	79.75	84.65	121.38	150.94	—	7.11	7.62
3MM201WI	—	40	130	270	44.77	67.51	88.85	94.10	135.90	169.48	—	6.35	6.86
3MM202WI	—	70	180	360	55.44	80.45	106.51	115.96	160.21	199.39	—	6.60	6.60
3MM203WI	—	90	330	440	63.84	105.99	119.28	132.92	204.46	223.87	—	11.43	4.06
3MM204WI	—	130	360	560	75.21	109.66	131.35	159.51	220.02	253.26	—	9.65	6.60
3MM205WI	—	160	400	670	89.20	128.20	157.76	189.59	258.50	303.98	—	8.89	7.37
3MM206WI	—	220	560	890	106.16	150.76	182.42	227.02	306.77	356.10	—	10.41	7.87
3MM207WI	130	310	780	1330	126.45	179.62	223.52	267.42	360.99	428.33	6.86	12.19	12.19
3MM208WI	160	360	890	1330	132.57	187.84	220.90	275.64	372.71	423.96	7.11	13.21	8.64
3MM209WI	180	440	1110	1780	159.86	226.85	274.24	332.14	448.44	520.50	7.87	13.72	10.67
3MM210WI	200	490	1220	2000	173.68	246.43	300.65	360.12	486.22	568.25	7.62	13.97	11.43
3MM211WI	220	620	1560	2450	193.61	274.94	330.21	407.34	549.71	634.36	9.65	15.75	11.68
3MM212WI	240	760	1890	2890	213.73	303.63	360.47	450.02	607.43	695.05	11.18	17.53	11.94
3MM213WI	270	850	2110	3340	225.62	320.42	385.65	474.50	640.48	740.18	11.94	18.54	13.72
3MM214WI	290	890	2220	3560	231.39	328.46	397.37	492.87	665.67	772.53	12.19	19.05	14.73
3MM215WI	360	980	2450	3780	250.28	355.75	424.13	532.75	719.19	825.53	11.68	19.30	13.72
3MM216WI	400	1110	2780	4450	269.87	383.03	462.79	570.35	770.61	894.61	12.45	20.32	15.75
3MM217WI	440	1200	3000	4890	280.36	397.37	483.42	600.43	812.41	949.18	12.45	21.08	17.02
3MM218WI	490	1330	3110	5560	286.14	394.75	498.12	608.83	805.06	968.42	13.72	20.83	21.84
3MM219WI	560	1560	3110	6230	310.27	402.97	531.00	655.70	824.65	1029.29	15.24	17.27	26.67
3MM220WI	600	1730	3470	6940	328.29	426.41	561.60	694.18	873.45	1090.50	16.26	18.29	27.94
3MM222WI	690	2050	4082	8180	359.94	466.81	613.90	762.39	960.03	1199.46	17.78	19.81	30.23
3MM224WI	820	2250	4480	8980	377.78	490.07	643.98	805.76	1014.77	1267.85	17.53	20.57	31.50
3MM226WI	980	2560	5120	10230	448.09	580.49	761.86	954.08	1190.72	1503.97	16.51	19.81	30.48
3MM230WI	1290	3110	6230	12450	473.63	612.32	801.04	1009.87	1276.25	1598.24	17.53	22.86	35.05
	lbs.				10^6lbs./in.			10^6lbs./in.			in.		
INCH DUPLEX PERFORMANCE DATA 3MM200WI SERIES													
3MM200WI	—	10	30	60	0.225	0.343	0.456	0.484	0.694	0.863	—	0.00028	0.00030
3MM201WI	—	10	30	60	0.256	0.386	0.508	0.538	0.777	0.969	—	0.00025	0.00027
3MM202WI	—	15	40	80	0.317	0.460	0.609	0.663	0.916	1.140	—	0.00026	0.00026
3MM203WI	—	20	75	100	0.365	0.606	0.682	0.76	1.169	1.280	—	0.00045	0.00016
3MM204WI	—	30	80	125	0.430	0.627	0.751	0.912	1.258	1.448	—	0.00038	0.00026
3MM205WI	—	35	90	150	0.510	0.733	0.902	1.084	1.478	1.738	—	0.00035	0.00029
3MM206WI	—	50	125	200	0.607	0.862	1.043	1.298	1.754	2.036	—	0.00041	0.00031
3MM207WI	30	70	175	300	0.723	1.027	1.278	1.529	2.064	2.449	0.00027	0.00048	0.00048
3MM208WI	35	80	200	300	0.758	1.074	1.263	1.576	2.131	2.424	0.00028	0.00052	0.00034
3MM209WI	40	100	250	400	0.914	1.297	1.568	1.899	2.564	2.976	0.00031	0.00054	0.00042
3MM210WI	45	110	275	450	0.993	1.409	1.719	2.059	2.780	3.249	0.00030	0.00055	0.00045
3MM211WI	50	140	350	550	1.107	1.572	1.888	2.329	3.143	3.627	0.00038	0.00062	0.00046
3MM212WI	55	170	425	650	1.222	1.736	2.061	2.573	3.473	3.974	0.00044	0.00069	0.00047
3MM213WI	60	190	475	750	1.290	1.832	2.205	2.713	3.662	4.232	0.00047	0.00073	0.00054
3MM214WI	65	200	500	800	1.323	1.878	2.272	2.818	3.806	4.417	0.00048	0.00075	0.00058
3MM215WI	80	220	550	850	1.431	2.034	2.425	3.046	4.112	4.720	0.00046	0.00076	0.00054
3MM216WI	90	250	625	1000	1.543	2.190	2.646	3.261	4.406	5.115	0.00049	0.00080	0.00062
3MM217WI	100	270	675	1100	1.603	2.272	2.764	3.433	4.645	5.427	0.00049	0.00083	0.00067
3MM218WI	110	300	700	1250	1.636	2.257	2.848	3.481	4.603	5.537	0.00054	0.00082	0.00086
3MM219WI	125	350	700	1400	1.774	2.304	3.036	3.749	4.715	5.885	0.00060	0.00068	0.00105
3MM220WI	135	390	780	1560	1.877	2.438	3.211	3.969	4.994	6.235	0.00064	0.00072	0.00110
3MM222WI	155	460	920	1840	2.058	2.669	3.510	4.359	5.489	6.858	0.00070	0.00078	0.00119
3MM224WI	185	505	1010	2020	2.160	2.802	3.682	4.607	5.802	7.249	0.00069	0.00081	0.00124
3MM226WI	220	575	1150	2300	2.562	3.319	4.356	5.455	6.808	8.599	0.00065	0.00078	0.00120
3MM230WI	290	700	1400	2800	2.708	3.501	4.580	5.774	7.297	9.138	0.00069	0.00090	0.00138

Notes: [1] For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

LIGHT 2MM200WI (ISO 02) SERIES

SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15		Kluber Isoflex NBU15		Operating Speeds[2] (DB Mounting)[1]					
	25%	40%	15%	20%	Grease			Oil		
					DUL	DUM	DUH	DUL	DUM	DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
2MM200WI	0.30	0.50	0.20	0.27	50200	37700	25100	85300	64100	42700
2MM201WI	0.40	0.60	0.25	0.33	45400	34000	22200	79100	57800	39400
2MM202WI	0.50	0.80	0.32	0.43	38200	28700	19100	66300	48800	33200
2MM203WI	0.70	1.10	0.45	0.59	33500	25100	16500	58100	42700	29100
2MM204WI	1.10	1.70	0.72	0.96	28600	21400	14300	48600	36400	24300
2MM205WI	1.30	2.10	0.88	1.18	23800	17900	11900	40500	30400	20200
2MM206WI	2.00	3.10	1.31	1.74	20000	15100	10000	34200	25600	17000
2MM207WI	2.70	4.40	1.82	2.43	17300	13,000	8600	29400	22000	14600
2MM208WI	3.70	6.00	2.49	3.32	15400	11600	7700	26200	19700	13100
2MM209WI	4.20	6.60	2.77	3.70	14000	10500	7000	22800	17900	11900
2MM210WI	4.80	7.60	3.20	4.30	12500	9600	6400	21800	16300	10900
2MM211WI	6.10	9.70	4.10	5.40	11600	8700	5800	19700	14800	9900
2MM212WI	7.50	12.00	5.00	6.70	10600	7920	5300	18000	13500	9000
2MM213WI	9.20	14.60	6.10	8.10	9700	7260	4800	16500	12300	8200
2MM214WI	10.60	16.90	7.00	9.40	9100	6840	4600	15500	11600	7800
2MM215WI	11.60	18.60	7.80	10.30	8600	6480	4300	14600	11020	7300
2MM216WI	13.70	22.00	9.20	12.20	8100	6060	4000	13800	10300	6800
2MM217WI	16.90	27.10	11.30	15.10	7500	5640	3800	12800	9590	6500
2MM218WI	21.50	34.40	14.40	19.10	7100	5340	3600	12100	9080	6100
2MM219WI	25.80	41.40	17.30	23.00	6700	5040	3400	11400	8570	5800
2MM220WI	30.70	49.10	20.50	27.30	6400	4800	3200	10900	8160	5400
2MM222WI	42.30	67.60	28.20	37.60	5800	4320	2900	9900	7340	4900
2MM224WI	51.40	82.30	34.30	45.80	5400	4020	2700	9200	6830	4600
2MM226WI	50.80	81.30	33.90	45.20	4900	3660	2400	8300	6220	4100
2MM230WI	82.40	131.90	55.00	73.40	4200	3180	2160	7100	5410	3600

(1) For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
(2) For ceramic ball complements use 120% of speeds shown.

LIGHT 3MM200WI (ISO 02) SERIES

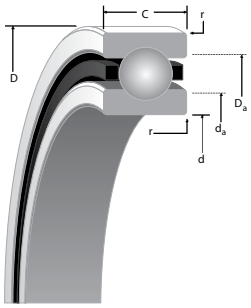
SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15		Kluber Isoflex NBU15		Operating Speeds[2] (DB Mounting)[1]					
	25%	40%	15%	20%	Grease			Oil		
					DUL	DUM	DUH	DUL	DUM	DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
3MM200WI	0.30	0.50	0.20	0.27	45180	33930	22590	76770	57690	38430
3MM201WI	0.40	0.60	0.25	0.33	40860	30600	19980	71190	52020	35460
3MM202WI	0.50	0.80	0.32	0.43	34380	25830	17190	59670	43920	29880
3MM203WI	0.70	1.10	0.45	0.59	30150	22590	14850	52290	38430	26190
3MM204WI	1.10	1.70	0.72	0.96	25740	19260	12870	43740	32760	21870
3MM205WI	1.30	2.10	0.88	1.18	21420	16110	10710	36450	27360	18180
3MM206WI	2.00	3.10	1.31	1.74	18000	13590	9000	30780	23040	15300
3MM207WI	2.70	4.40	1.82	2.43	15570	11700	7740	26460	19800	13140
3MM208WI	3.70	6.00	2.49	3.32	13860	10440	6930	23580	17730	11790
3MM209WI	4.20	6.60	2.77	3.70	12600	9450	6300	20520	16110	10710
3MM210WI	4.80	7.60	3.20	4.30	11250	8640	5760	19620	14670	9810
3MM211WI	6.10	9.70	4.10	5.40	10440	7830	5220	17730	13320	8910
3MM212WI	7.50	12.00	5.00	6.70	9540	7128	4770	16200	12150	8100
3MM213WI	9.20	14.60	6.10	8.10	8730	6534	4320	14850	11070	7380
3MM214WI	10.60	16.90	7.00	9.40	8190	6156	4140	13950	10440	7020
3MM215WI	11.60	18.60	7.80	10.30	7740	5832	3870	13140	9918	6570
3MM216WI	13.70	22.00	9.20	12.20	7290	5454	3600	12420	9270	6120
3MM217WI	16.90	27.10	11.30	15.10	6750	5076	3420	11520	8631	5850
3MM218WI	21.50	34.40	14.40	19.10	6390	4806	3240	10890	8172	5490
3MM219WI	25.80	41.40	17.30	23.00	6030	4536	3060	10260	7713	5220
3MM220WI	30.70	49.10	20.50	27.30	5760	4320	2880	9810	7344	4860
3MM222WI	42.30	67.60	28.20	37.60	5220	3888	2610	8910	6606	4410
3MM224WI	51.40	82.30	34.30	45.80	4860	3618	2430	8280	6147	4140
3MM226WI	50.80	81.30	33.90	45.20	4410	3294	2160	7470	5598	3690
3MM230WI	82.40	131.90	55.00	73.40	3780	2862	1944	6390	4869	3240

(1) For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
(2) For ceramic ball complements use 120% of speeds shown.

LIGHT
MM200K
(ISO 02) SERIES

DIMENSIONAL SIZES
METRIC



SUPER PRECISION MM:
Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

CONRAD CONSTRUCTION:
- Maximum complement of balls seperated by two-piece land piloted cage.

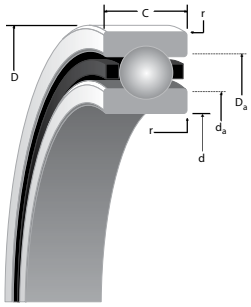
Bearing Number	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	LOAD RATINGS (steel ball & ceramic ball) C_o (stat)	C_e (dyn)	Limiting Speed(Ng)
METRIC	mm/tol: +0; -(µm)			mm	kg	N		RPM
MM201K	12 (4)	32 (6)	10 (80)	7 x 5.95	0.035	3000 2710	7550 7550	52200 62600
MM202K	15 (4)	35 (6)	11 (80)	8 x 5.95	0.043	3700 3290	8450 8450	44000 52800
MM203K	17 (4)	40 (6)	12 (80)	8 x 6.75	0.062	4700 4230	10600 10600	38500 46200
MM204K	20 (5)	47 (6)	14 (130)	8 x 7.94	0.1	6500 5860	14200 14200	32800 39400
MM205K	25 (5)	52 (7)	15 (130)	9 x 7.94	0.122	7800 6980	15500 15500	27400 32900
MM206K	30 (5)	62 (7)	16 (130)	9 x 9.53	0.185	11300 10000	21600 21600	23000 27600
MM207K	35 (6)	72 (7)	17 (130)	9 x 11.11	0.267	15300 13600	28500 28500	19800 23800
MM208K	40 (6)	80 (7)	18 (130)	9 x 12.70	0.337	20000 17700	36200 36200	17700 21200
MM209K	45 (6)	85 (8)	19 (130)	9 x 12.70	0.377	20200 18200	36300 36300	16000 19200
MM210K	50 (6)	90 (8)	20 (130)	10 x 12.70	0.425	23100 20600	38900 38900	14600 17500
MM211K	55 (7)	100 (8)	21 (150)	10 x 14.29	0.564	29100 26000	48100 48100	13300 16000
MM212K	60 (7)	110 (8)	22 (150)	10 x 15.88	0.727	36300 32000	58200 58200	12100 14500
MM213K	65 (7)	120 (8)	23 (150)	10 x 16.67	0.928	40000 35600	63400 63400	11100 13300
MM214K	70 (7)	125 (9)	24 (150)	10 x 17.46	0.994	43600 39200	69000 69000	10500 12600
MM215K	75 (7)	130 (9)	25 (150)	10 x 17.46	1.074	44500 39900	68900 68900	9900 11900
MM216K	80 (7)	140 (9)	26 (150)	10 x 19.05	1.317	53400 47200	80600 80600	9200 11000

(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r	Suggested Shoulder Diameters				Shaft Diameter		Mounting Fits		FIXED				FLOATING				
	d_a (Shaft)		D_a (Housing)						Housing Bore (Stationary)		Mounting Fits		Housing Bore (Stationary)		Housing Clearance		
Rad.(2)	Max.	Min.	Max.	Min.	Min.	Max.	Loose	Tight	Min.	Max.	Tight	Loose	Max.	Min.	Max.	Min.	
mm	mm	mm	mm	mm	mm	mm	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.6	16.6	16.4	28.1	27.8	11.9950	12.000	0.005	0.004	32	32.005	0.000	0.011	32.010	32.005	0.016	0.005	MM201K
0.6	19.2	18.9	31.1	30.9	14.9950	15.000	0.005	0.004	35	35.006	0.000	0.012	35.010	35.005	0.016	0.005	MM202K
0.6	21.7	21.5	35.7	35.4	16.9950	17.000	0.005	0.004	40	40.006	0.000	0.012	40.010	40.005	0.016	0.005	MM203K
1	26	25.8	41.5	41.3	19.9950	20.000	0.005	0.005	47	47.006	0.000	0.012	47.012	47.007	0.018	0.007	MM204K
1	31.1	30.9	47.1	46.9	24.9950	25.000	0.005	0.005	52	52.006	0.000	0.013	52.012	52.007	0.019	0.007	MM205K
1	36.7	36.5	56	55.8	29.9950	30.000	0.005	0.005	62	62.008	0.000	0.015	62.012	62.007	0.019	0.007	MM206K
1	42.7	42.2	65.3	64.8	34.9950	35.000	0.005	0.006	72	72.008	0.000	0.015	72.011	72.007	0.019	0.007	MM207K
1	47.8	47.2	73.2	72.6	39.9950	40.000	0.005	0.006	80	80.008	0.000	0.015	80.012	80.008	0.020	0.008	MM208K
1	52.8	52.3	78.2	77.7	44.9950	45.000	0.005	0.006	85	85.008	0.000	0.016	85.016	85.009	0.024	0.009	MM209K
1	57.9	57.4	83.3	82.8	49.9950	50.000	0.005	0.006	90	90.008	0.000	0.016	90.015	90.007	0.023	0.007	MM210K
1.5	63.8	63.3	92.2	91.7	54.9950	55.000	0.005	0.007	100	100.008	0.000	0.016	100.018	100.010	0.025	0.010	MM211K
1.5	69.9	69.3	101.4	100.8	59.9950	60.000	0.005	0.007	110	110.008	0.000	0.016	110.018	110.010	0.025	0.010	MM212K
1.5	76.2	75.7	109.7	109.2	64.9950	65.000	0.005	0.007	120	120.008	0.000	0.016	120.018	120.010	0.025	0.010	MM213K
1.5	80.8	80.3	115.8	115.3	69.9950	70.000	0.005	0.007	125	125.008	0.000	0.017	125.021	125.011	0.030	0.011	MM214K
1.5	86	85.2	120.8	120	74.9950	75.005	0.005	0.012	130	130.009	0.000	0.018	130.020	130.010	0.029	0.010	MM215K
2	91.3	90.6	129.9	129.2	79.9950	80.005	0.005	0.012	140	140.009	0.000	0.018	140.020	140.010	0.029	0.010	MM216K

LIGHT
MM200K
(ISO 02) SERIES

DIMENSIONAL SIZES
INCHES



SUPER PRECISION MM:
Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

CONRAD CONSTRUCTION:
- Maximum complement of balls seperated by two-piece land piloted cage.

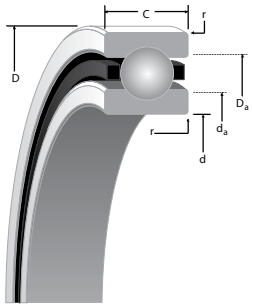
Bearing Number	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	LOAD RATINGS (steel ball & ceramic ball) C_o (stat)	C_e(dyn)	Limiting Speed(Ng)
INCH	in./tol: +0; -.000(µm)			in.	lbs.	lbs.		RPM
MM201K	0.4724 (1.5)	1.2598 (2.5)	0.394 (31)	7 x 15/64	0.08	680 610	1700 1700	52200 62600
MM202K	0.5906 (1.5)	1.378 (2.5)	0.4331 (31)	8 x 15/64	0.09	830 740	1900 1900	44000 52800
MM203K	0.6693 (1.5)	1.5748 (2.5)	0.4724 (31)	8 x 17/64	0.14	1060 950	2380 2380	38500 46200
MM204K	0.7874 (2)	1.8504 (2.5)	0.5512 (47)	8 x 5/16	0.22	1460 1320	3190 3190	32800 39400
MM205K	0.9843 (2)	2.0472 (3)	0.5906 (47)	9 x 5/16	0.27	1760 1570	3490 3490	27400 32900
MM206K	1.1811 (2)	2.4409 (3)	0.6299 (47)	9 x 3/8	0.41	2550 2.25	4850 4850	23000 27600
MM207K	1.378 (2.5)	2.8346 (3)	0.6693 (47)	9 x 7/16	0.59	3450 3060	6400 6400	19800 23800
MM208K	1.5748 (2.5)	3.1496 (3)	0.7087 (47)	9 x 1/2	0.74	4500 3970	8130 8130	17700 21200
MM209K	1.7717 (2.5)	3.3465 (3)	0.748 (47)	9 x 1/2	0.83	4550 4090	8160 8160	16000 19200
MM210K	1.9685 (2.5)	3.5433 (3)	0.7874 (47)	10 x 1/2	0.94	5200 4640	8740 8740	14600 17500
MM211K	2.1654 (3)	3.937 (3)	0.8268 (59)	10 x 9/16	1.24	6550 5850	10800 10800	13300 16000
MM212K	2.3622 (3)	4.3307 (3)	0.8661 (59)	10 x 5/8	1.60	8150 7190	13100 13100	12100 14500
MM213K	2.5591 (3)	4.7244 (3)	0.9055 (59)	10 x 21/32	2.05	9000 8000	14300 14300	11100 13300
MM214K	2.7559 (3)	4.9213 (3.5)	0.9449 (59)	10 x 11/16	2.19	9800 8800	15500 15500	10500 12600
MM215K	2.9528 (3)	5.1181 (3.5)	0.9843 (59)	10 x 11/16	2.37	10000 8960	15500 15500	9900 11900
MM216K	3.1496 (3)	5.5118 (3.5)	1.0236 (59)	10 x 3/4	2.9	12000 10600	18100 18100	9200 11000

(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r	Suggested Shoulder Diameters				Shaft Diameter		Mounting Fits		FIXED				FLOATING				
	d_a (Shaft)		D_a (Housing)						Housing Bore (Stationary)		Mounting Fits		Housing Bore (Stationary)		Housing Clearance		
Rad.[2]	Max.	Min.	Max.	Min.	Min.	Max.	Loose	Tight	Min.	Max.	Tight	Loose	Max.	Min.	Max.	Min.	
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.024	0.66	0.65	1.11	1.10	0.4722	0.4724	0.0002	0.00015	1.2598	1.2600	0.000	0.00045	1.26020	1.26000	0.00070	0.00020	MM201K
0.024	0.76	0.75	1.23	1.22	0.5904	0.5906	0.0002	0.00015	1.3780	1.3783	0.000	0.0005	1.37840	1.37820	0.00070	0.00020	MM202K
0.024	0.86	0.85	1.41	1.40	0.6691	0.6693	0.0002	0.00015	1.5748	1.5751	0.000	0.0005	1.57520	1.57500	0.00070	0.00020	MM203K
0.039	1.03	1.02	1.64	1.63	0.7872	0.7874	0.0002	0.0002	1.8504	1.8507	0.000	0.0005	1.85090	1.85070	0.00080	0.00030	MM204K
0.039	1.23	1.22	1.86	1.85	0.9841	0.9843	0.0002	0.0002	2.0472	2.0475	0.000	0.00055	2.04770	2.04750	0.00080	0.00030	MM205K
0.039	1.45	1.44	2.21	2.20	1.1809	1.1811	0.0002	0.0002	2.4409	2.4412	0.000	0.0006	2.44140	2.44120	0.00080	0.00030	MM206K
0.039	1.68	1.66	2.57	2.55	1.3778	1.3780	0.0002	0.00025	2.8346	2.8349	0.000	0.0006	2.83510	2.83490	0.00080	0.00030	MM207K
0.039	1.88	1.86	2.88	2.86	1.5746	1.5748	0.0002	0.00025	3.1496	3.1499	0.000	0.0006	3.15010	3.14990	0.00080	0.00030	MM208K
0.039	2.08	2.06	3.08	3.06	1.7715	1.7717	0.0002	0.00025	3.3465	3.3468	0.000	0.0006	3.34710	3.34680	0.00090	0.00030	MM209K
0.039	2.28	2.26	3.28	3.26	1.9683	1.9685	0.0002	0.00025	3.5433	3.5436	0.000	0.0006	3.54390	3.54360	0.00090	0.00030	MM210K
0.059	2.51	2.49	3.63	3.61	2.1652	2.1654	0.0002	0.0003	3.9370	3.9373	0.000	0.0006	3.93770	3.93740	0.00100	0.00040	MM211K
0.059	2.75	2.73	3.99	3.97	2.3620	2.3622	0.0002	0.0003	4.3307	4.3310	0.000	0.0006	4.33140	4.33110	0.00100	0.00040	MM212K
0.059	3.00	2.98	4.32	4.30	2.5589	2.5591	0.0002	0.0003	4.7244	4.7247	0.000	0.0006	4.72510	4.72480	0.00100	0.00040	MM213K
0.059	3.18	3.16	4.56	4.54	2.7557	2.7559	0.0002	0.0003	4.9213	4.9216	0.000	0.0007	4.92210	4.92170	0.00120	0.00040	MM214K
0.059	3.39	3.36	4.76	4.73	2.9526	2.9530	0.0002	0.0005	5.1181	5.1185	0.000	0.0007	5.11890	5.11850	0.00110	0.00040	MM215K
0.079	3.60	3.57	5.12	5.09	3.1494	3.1498	0.0002	0.0005	5.5118	5.5122	0.000	0.0007	5.51260	5.51220	0.00110	0.00040	MM216K

MEDIUM 2(3)MM300WI (ISO 03) SERIES

DIMENSIONAL SERIES METRIC



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WI CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

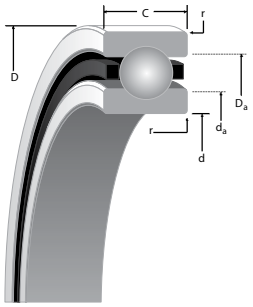
Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width[1]	Ball Qty. x Dia.	Wt.	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]
METRIC	mm/tol: +0; -(µm)			mm	kg	N		RPM	N		RPM
301WI	12 (4)	37 (6)	12 (80)	8 x 7.14	0.061	4700 4230	11000 11000	47600 57100	4600 4060	10900 10900	42800 51400
302WI	15 (4)	42 (6)	13 (80)	10 x 6.75	0.087	5810 5170	12900 12900	38100 45700	5600 5000	11600 11600	34300 41200
303WI	17 (4)	47 (6)	14 (80)	7 x 9.53	0.104	7280 6480	16900 16900	36800 44200	7100 6300	16400 16400	33100 39700
304WI	20 (5)	52 (7)	15 (120)	8 x 10.32	0.137	10000 8900	21500 21500	32200 38600	9650 8590	20900 20900	29000 34800
305WI	25 (5)	62 (7)	17 (120)	9 x 11.91	0.221	15300 13600	30500 30500	26200 31400	14800 13200	29500 29500	23600 28300
306WI	30 (5)	72 (7)	19 (120)	10 x 13.49	0.328	22200 19800	34120 34120	22100 26500	21500 19100	39900 39900	19900 23900
307WI	35 (6)	80 (7)	21 (120)	10 x 14.29	0.443	25600 22800	46200 46200	19200 23000	24700 22000	44500 44500	17300 20800
308WI	40 (6)	90 (8)	23 (120)	11 x 15.88	0.608	35000 31200	59700 59700	16900 20300	38900 30100	57500 57500	15200 18200
309WI	45 (6)	100 (8)	25 (120)	10 x 17.46	0.809	38700 34500	66500 66500	15100 18100	37400 33300	64100 64100	13600 16300
310WI	50 (6)	110 (8)	27 (120)	10 x 19.05	1.046	46200 41200	77900 77900	13600 16300	44700 39800	75100 75100	12200 14600
311WI	55 (7)	120 (8)	29 (150)	10 x 20.64	1.332	54600 48600	90200 90200	12400 14900	52600 46800	86700 86700	11200 13400
312WI	60 (7)	130 (9)	31 (150)	10 x 22.23	1.665	63500 56600	103100 103100	11400 13700	61100 54400	99100 99100	10300 12400
313WI	65 (7)	140 (9)	33 (150)	11 x 23.81	2.101	80500 71700	124400 124400	10500 12600	77400 68900	119700 119700	9500 11400
314WI	70 (7)	150 (9)	35 (150)	11 x 25.40	2.548	91900 81800	139900 139900	9800 11800	88300 78500	134500 134500	8800 10600
319WI	95 (7)	200 (10)	45 (200)	10 x 34.93	5.587	155900 138800	204400 204400	7400 8900	150400 133900	196800 196800	6700 8000

[Ng] For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
[1] Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
[2] ABMA STD 20 (r_{as} max).

r Rad.(2)	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits (Stationary) Tight	FIXED Mounting Fits (Stationary) Loose	FLOATING Housing Bore Max.	FLOATING Housing Bore Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
1	17.7	17.4	32.1	31.9	11.995	12.000	0.005	0.004	37.000	37.006	0.000	0.012	37.010	37.005	0.016	0.005	301WI
1	22.2	22.0	35.7	35.4	14.995	15.000	0.005	0.004	42.000	42.006	0.000	0.012	42.010	42.005	0.016	0.005	302WI
1	22.7	22.5	42.0	41.8	16.995	17.000	0.005	0.004	47.000	47.006	0.000	0.012	47.012	47.007	0.018	0.007	303WI
1	30.1	29.9	46.6	46.4	19.995	20.000	0.005	0.005	52.000	52.006	0.000	0.013	52.012	52.007	0.019	0.007	304WI
1	32.1	31.9	55.8	55.5	24.995	25.000	0.005	0.005	62.000	62.008	0.000	0.015	62.012	62.007	0.019	0.007	305WI
1	37.7	37.5	65.2	64.9	29.995	30.000	0.005	0.005	72.000	72.008	0.000	0.015	72.011	72.007	0.019	0.007	306WI
1.5	43.7	43.2	72.1	71.6	34.995	35.000	0.005	0.006	80.000	80.008	0.000	0.015	80.012	80.008	0.020	0.008	307WI
1.5	49.8	49.3	81.3	80.8	39.995	40.000	0.005	0.006	90.000	90.008	0.000	0.016	90.015	90.007	0.023	0.007	308WI
1.5	55.9	55.4	90.2	89.7	44.995	45.000	0.005	0.006	100.000	100.008	0.000	0.016	100.018	100.010	0.025	0.010	309WI
2	61.2	60.7	99.8	99.3	49.995	50.000	0.005	0.006	110.000	110.008	0.000	0.016	110.018	110.010	0.025	0.010	310WI
2	67.3	66.8	108.7	108.2	54.995	55.000	0.005	0.007	120.000	120.008	0.000	0.016	120.018	120.010	0.025	0.010	311WI
2	43.2	72.6	117.9	117.3	59.995	60.000	0.005	0.007	130.000	130.009	0.000	0.018	130.020	130.010	0.029	0.010	312WI
2	80.3	79.8	126.8	126.2	64.995	65.000	0.005	0.007	140.000	140.009	0.000	0.018	140.020	140.010	0.029	0.010	313WI
2	85.3	84.8	135.6	135.1	69.995	70.000	0.005	0.007	150.000	150.009	0.000	0.018	150.023	150.012	0.032	0.012	314WI
3	113.2	112.4	183.3	182.5	94.995	95.000	0.005	0.013	200.00	200.011	0.000	0.022	200.025	200.015	0.036	0.015	319WI

MEDIUM 2(3)MM300WI (ISO 03) SERIES

DIMENSIONAL SERIES INCHES



SUPER PRECISION MM:

Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

WI CONSTRUCTION:

- Incorporates low shoulder on non-thrust side of outer rings.
- Maximum complement of balls separated by one-piece cage piloted against a ground thrust shoulder land of the outer ring.

Bearing Number						(2MM) LOAD RATINGS (steel ball & ceramic ball)			(3MM) LOAD RATINGS (steel ball & ceramic ball)		
2MM or 3MM	d Bore	D O.D.	C Width[1]	Ball Qty. x Dia.	Wt.	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]	C_o (stat)	C_e (dyn)	Limiting Speed[Ng]
INCH	in/tol: +0; -.000(µm)			in.	lbs.	lbs.		RPM	lbs.		RPM
301WI	0.4724 (1.5)	1.4567 (2.5)	0.4724 (31)	8 x 9/32	0.13	1,060 950	2450 2450	47600 57100	1040 920	2450 2450	42800 51400
302WI	0.5906 (1.5)	1.6535 (2.5)	0.5118 (31)	10 x 17/64	0.19	1320 1160	2700 2700	38100 45700	1270 1120	2600 2600	34300 41200
303WI	0.6693 (1.5)	1.8504 (2.5)	0.5512 (31)	7 x 3/8	0.23	1630 1460	3900 3900	36800 44100	1600 1420	3690 3690	33100 39700
304WI	0.7874 (2)	2.0472 (3)	0.5906 (47)	8 x 13/32	0.30	2200 2000	4840 4840	32200 38600	2160 1930	4700 4700	29000 34800
305WI	0.9843 (2)	2.4409 (3)	0.6693 (47)	9 x 15/32	0.49	3450 3060	6850 6850	26200 31400	3350 2970	6630 6630	23600 28300
306WI	1.1811 (2)	2.8346 (3)	0.748 (47)	10 x 17/32	0.72	4990 4440	9270 9270	22100 26500	4820 4290	8960 8960	19900 23900
307WI	1.378 (2.5)	3.1496 (3)	0.8268 (47)	10 x 9/16	0.98	5700 5130	10400 10400	19200 23000	5600 4940	10000 10000	17300 20800
308WI	1.5748 (2.5)	3.5433 (3)	0.9055 (47)	11 x 5/8	1.34	7800 7010	13400 13400	16900 20300	7600 6770	12900 12900	15200 18200
309WI	1.7717 (2.5)	3.937 (3)	0.9843 (47)	10 x 11/16	1.78	8650 7750	15000 15000	15100 18100	8500 7480	14400 14400	13600 16300
310WI	1.9685 (2.5)	4.3307 (3)	1.063 (47)	10 x 3/4	2.31	10400 9250	17500 17500	13600 16300	10000 8940	16900 16900	12200 14600
311WI	2.1654 (3)	4.7244 (3)	1.1417 (59)	10 x 13/16	2.94	12200 10900	20300 20300	12400 14900	11800 10500	19500 19500	11200 13400
312WI	2.3622 (3)	5.1181 (3.5)	1.2205 (59)	10 x 7/8	3.67	14300 12700	23200 23200	11400 13700	13700 12200	22300 22300	10300 12400
313WI	2.5591 (3)	5.5118 (3.5)	1.2992 (59)	11 x 15/16	4.63	18000 16100	28000 28000	10500 12600	17300 15500	26900 26900	9500 11400
314WI	2.7559 (3)	5.9055 (3.5)	1.378 (59)	11 x 1	5.62	20800 18400	31500 31500	9800 11800	20000 17700	30200 30200	8800 10600
319WI	3.7402 (3)	7.8740 (4)	1.7717 (79)	10 x 1 3/8	12.32	35100 31200	46000 46000	7400 8900	33800 30100	44200 44200	6700 8000

[Ng] For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
[1] Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
[2] ABMA STD 20 (r_{as} max).

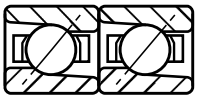
r Rad.[2]	Suggested Shoulder Diameters d_a (Shaft) Max.	d_a (Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Diameter Min.	Shaft Diameter Max.	Mounting Fits Loose	Mounting Fits Tight	FIXED Housing Bore (Stationary) Min.	FIXED Housing Bore (Stationary) Max.	FIXED Mounting Fits Might	FIXED Mounting Fits Loose	FLOATING Housing Bore (Stationary) Max.	FLOATING Housing Bore (Stationary) Min.	FLOATING Housing Clearance Max.	FLOATING Housing Clearance Min.	Bearing Number 2MM or 3MM
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.039	0.7	0.69	1.27	1.26	0.4722	0.4724	0.0002	0.00015	1.4567	1.4570	0.000	0.0005	1.45710	1.45690	0.00070	0.00020	301WI
0.039	0.88	0.87	1.41	1.4	0.5904	0.5906	0.0002	0.00015	1.6535	1.6538	0.000	0.0005	1.65390	1.65370	0.00070	0.00020	302WI
0.039	0.9	0.89	1.66	1.65	0.6691	0.6693	0.0002	0.00015	1.8504	1.8507	0.000	0.0005	1.85090	1.85070	0.00080	0.00030	303WI
0.039	1.19	1.18	1.84	1.83	0.7872	0.7874	0.0002	0.00020	2.0472	2.0475	0.000	0.00055	2.04770	2.04750	0.00080	0.00030	304WI
0.039	1.27	1.26	2.2	2.19	0.9841	0.9843	0.0002	0.00020	2.4409	2.4412	0.000	0.0006	2.44140	2.44120	0.00080	0.00030	305WI
0.039	1.49	1.48	2.57	2.56	1.1809	1.1811	0.0002	0.00020	2.8346	2.8349	0.000	0.0006	2.83510	2.83490	0.00080	0.00030	306WI
0.059	1.72	1.7	2.84	2.82	1.3778	1.3780	0.0002	0.00025	3.1496	3.1499	0.000	0.0006	3.15010	3.14990	0.00080	0.00030	307WI
0.059	1.96	1.94	3.2	3.18	1.5746	1.5748	0.0002	0.00025	3.5433	3.5436	0.000	0.0006	3.54390	3.54360	0.00090	0.00030	308WI
0.059	2.2	2.18	3.55	3.53	1.7715	1.7717	0.0002	0.00025	3.9370	3.9373	0.000	0.0006	3.93770	3.93740	0.00100	0.00040	309WI
0.079	2.41	2.39	3.93	3.91	1.9683	1.9685	0.0002	0.00025	4.3307	4.3310	0.000	0.0006	4.33140	4.33110	0.00100	0.00040	310WI
0.079	2.65	2.63	4.28	4.26	2.1652	2.1654	0.0002	0.00030	4.7244	4.7247	0.000	0.0006	4.72510	4.72480	0.00100	0.00040	311WI
0.079	2.88	2.86	4.64	4.62	2.3620	2.3622	0.0002	0.00030	5.1181	5.1185	0.000	0.0007	5.11890	5.11850	0.00110	0.00040	312WI
0.079	3.16	3.14	4.99	4.97	2.5589	2.5591	0.0002	0.00030	5.5118	5.5122	0.000	0.0007	5.51260	5.51220	0.00110	0.00040	313WI
0.079	3.36	3.34	5.34	5.32	2.7557	2.7559	0.0002	0.00030	5.9055	5.9059	0.000	0.0007	5.90640	5.90600	0.00120	0.00050	314WI

MEDIUM 2(3)MM300WI (ISO 03) SERIES

DUPLEX PERFORMANCE DATA

MOUNTING ARRANGEMENTS

Suggested
DB



Tandem
DT

Special Applications
DF

Bearing Number 2MM or 3MM	PRELOAD				AXIAL STIFFNESS(1)				RADIAL STIFFNESS(1)			SPACER OFFSETS(1)		
	DUX	DUL	DUM	DUH	X-light	Light	Medium	Heavy	Light	Medium	Heavy	X-Light to Light	Light to Medium	Medium to Heavy
	N				N/µm				N/µm			µm		
METRIC DUPLEX PERFORMANCE DATA 2MM300WI SERIES														
2MM301WI	—	20	70	180	—	17.49	27.81	44.25	98.82	153.56	183.30	—	7.87	12.45
2MM302WI	20	40	110	220	—	27.46	40.93	57.19	143.24	164.93	205.51	—	7.87	9.14
2MM303WI	40	70	160	310	—	26.58	38.83	54.57	147.44	197.46	263.05	—	10.92	13.46
2MM304WI	40	90	220	400	—	33.06	49.85	66.46	181.72	232.97	289.81	—	12.95	121.92
2MM305WI	90	160	330	620	—	46.17	65.24	88.50	247.83	283.16	340.88	—	12.7	14.99
2MM306WI	90	180	440	780	—	49.50	74.68	98.47	271.27	303.10	405.77	—	17.27	15.49
2MM307WI	110	220	560	1000	—	55.97	85.18	114.38	323.91	388.10	478.70	—	18.8	17.78
2MM308WI	130	290	670	1220	—	64.71	94.62	127.85	364.67	392.65	489.20	—	19.05	20.07
2MM309WI	180	330	780	1560	—	70.13	103.02	145.17	393.18	472.58	588.36	—	20.57	25.15
2MM310WI	220	440	1000	1780	—	81.15	117.36	156.01	366.24	496.89	637.86	—	22.35	22.86
2MM311WI	270	560	1110	2110	—	88.15	121.38	167.20	382.86	582.42	724.61	—	21.34	27.69
2MM312WI	270	560	1330	2450	—	89.72	133.80	180.85	456.31	632.26	802.44	—	27.94	28.19
2MM313WI	330	670	1670	3000	—	104.24	157.93	211.28	511.76	668.64	846.52	—	30.48	28.96
2MM314WI	400	780	1890	3450	—	110.89	166.33	224.22	519.80	703.80	876.25	—	32.26	32.00
2MM319WI	670	1330	3110	6230	—	140.44	206.03	290.33	726.88	932.74	1183.02	—	41.05	50.24

Bearing Number 2MM or 3MM	PRELOAD				AXIAL STIFFNESS(1)				RADIAL STIFFNESS(1)			SPACER OFFSETS(1)		
	DUX	DUL	DUM	DUH	X-light	Light	Medium	Heavy	Light	Medium	Heavy	X-Light to Light	Light to Medium	Medium to Heavy
	N				N/µm				N/µm			µm		
METRIC DUPLEX PERFORMANCE DATA 3MM300WI SERIES														
3MM301WI	40	90	180	310	—	58.59	76.61	96.37	94.10	135.90	169.48	—	5.33	6.10
3MM302WI	40	90	180	360	—	66.46	86.75	115.08	115.96	160.21	199.39	—	4.57	7.11
3MM303WI	40	110	270	440	—	63.66	89.02	109.49	132.92	204.46	223.87	—	8.13	7.11
3MM304WI	90	160	360	620	—	79.23	108.96	136.77	159.51	220.02	253.26	—	8.38	8.64
3MM305WI	110	220	530	890	—	101.62	142.19	174.90	189.59	258.50	303.98	—	10.16	8.89
3MM306WI	135	270	670	1110	—	112.29	159.33	196.06	227.02	306.77	356.10	—	11.68	9.91
3MM307WI	180	360	850	1560	—	134.85	187.84	241.01	267.42	360.99	428.33	—	12.19	13.21
3MM308WI	220	440	1110	1780	—	150.41	214.08	259.20	275.64	372.71	423.96	—	14.48	11.18
3MM309WI	270	530	1330	2220	—	165.98	235.94	290.51	332.14	448.44	520.50	—	15.75	13.46
3MM310WI	310	620	1560	2670	—	178.75	254.13	316.57	360.12	486.22	568.25	—	17.27	15.49
3MM311WI	400	780	1780	3110	—	198.16	272.32	342.10	407.34	549.71	634.36	—	17.02	17.27
3MM312WI	450	890	2000	3560	—	213.38	291.21	367.81	450.02	607.43	695.05	—	17.53	18.80
3MM313WI	560	1110	2670	4450	—	249.23	348.93	429.55	474.50	640.48	740.18	—	20.83	18.29
3MM314WI	620	1220	2890	5120	—	262.52	365.02	460.34	492.87	665.67	772.53	—	21.08	21.59
3MM319WI	1070	2110	4890	8900	—	328.81	453.52	578.22	655.70	824.65	1029.29	—	28.19	30.99

Notes: (1) For DB or DF arrangements only. For other mounting arrangements contact your Timken representative.

MEDIUM 2(3)MM300WI (ISO 03) SERIES

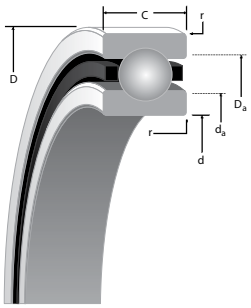
SPEED CAPABILITY DATA

Bearing Number	Grease Capacity NBU15 25%	Grease Capacity NBU15 40%	Kluber Isoflex NBU15 15%	Kluber Isoflex NBU15 20%	Operating Speeds[2] Grease DUL	Operating Speeds[2] Grease DUM	Operating Speeds[2] Grease DUH	(DB Mounting)[1] Oil DUL	(DB Mounting)[1] Oil DUM	(DB Mounting)[1] Oil DUH
	grams	grams	grams	grams	RPM	RPM	RPM	RPM	RPM	RPM
2MM300WI SERIES										
2MM301WI	0.6	1.0	0.40	0.53	35700	28600	19000	60700	48600	32400
2MM302WI	0.7	1.2	0.49	0.65	28600	22900	15200	48600	38900	25900
2MM303WI	1.2	2.0	0.83	1.10	27600	22100	14700	46900	37500	25000
2MM304WI	1.5	2.5	1.03	1.38	24200	19300	12900	41100	32800	21900
2MM305WI	2.3	3.8	1.57	2.09	19700	15700	10500	33400	26700	17800
2MM306WI	3.5	5.6	2.35	3.14	16600	13300	8800	28200	22500	15000
2MM307WI	4.6	7.4	3.07	4.10	14400	11500	7700	24500	19600	13100
2MM308WI	6.4	10.2	4.25	5.66	12700	10100	6800	21500	17200	11500
2MM309WI	8.5	13.6	5.68	7.58	11300	9100	6000	19300	15400	10300
2MM310WI	11.1	17.8	7.40	9.90	10200	8200	5400	17300	13900	9200
2MM311WI	14.2	22.7	9.50	12.60	9300	7400	5000	15800	12600	8400
2MM312WI	17.7	28.3	11.80	15.80	8600	6800	4600	14500	11600	7800
2MM313WI	20.7	33.2	13.80	18.50	7900	6300	4200	13400	10700	7100
2MM314WI	25.2	40.3	16.80	22.40	7400	5900	3900	12500	10000	6700
2MM319WI	60.9	97.4	40.60	54.10	5600	4400	3000	9400	7500	5000
3MM300WI SERIES										
3MM301WI	0.6	1.0	0.40	0.53	32130	25740	17100	54630	43740	29160
3MM302WI	0.7	1.2	0.49	0.65	25740	20610	13680	43740	35010	23310
3MM303WI	1.2	2.0	0.83	1.10	24840	19890	13230	42210	33750	22500
3MM304WI	1.5	2.5	1.03	1.38	21780	17370	11610	36990	29520	19710
3MM305WI	2.3	3.8	1.57	2.09	17730	14130	9450	30060	24030	16020
3MM306WI	3.5	5.6	2.35	3.14	14940	11970	7920	25380	20250	13500
3MM307WI	4.6	7.4	3.07	4.10	12960	10350	6930	22050	17640	11790
3MM308WI	6.4	10.2	4.25	5.66	11430	9090	6120	19350	15480	10350
3MM309WI	8.5	13.6	5.68	7.58	10170	8190	5400	17370	13860	9270
3MM310WI	11.1	17.8	7.40	9.90	9180	7380	4860	15570	12510	8280
3MM311WI	14.2	22.7	9.50	12.60	8370	6660	4500	14220	11340	7560
3MM312WI	17.7	28.3	11.80	15.80	7740	6120	4140	13050	10440	7020
3MM313WI	20.7	33.2	13.80	18.50	7110	5670	3780	12060	9630	6390
3MM314WI	25.2	40.3	16.80	22.40	6660	5310	3510	11250	9000	6030
3MM319WI	60.9	97.4	40.60	54.10	5040	3960	2700	8460	6750	4500

[1] For other mounting arrangement configurations refer to the engineering section on Permissible Speed calculation methods.
[2] For ceramic ball complements use 120% of speeds shown.

MEDIUM
MM300K
(ISO 03) SERIES

DIMENSIONAL SIZES
METRIC / INCH



SUPER PRECISION MM:
Running accuracy and performance meet ABEC 9 (ISO P2) levels. Non-critical features conform to ABEC 7 (ISO P4) requirements.

CONRAD CONSTRUCTION:
- Maximum complement of balls seperated by two-piece land piloted cage.

Bearing Number	d Bore	D O.D.	C Width(1)	Ball Qty. x Dia.	Wt.	LOAD RATINGS (steel ball & ceramic ball) C_o (stat)	C_e(dyn)	Limiting Speed (Ng)
METRIC	in./tol: +0; -(µm)			mm	kg	N		RPM
MM305K	25 (5)	62 (7)	17 (130)	7 x 11.9	0.222	12200	26700	26,500
MM306K	30 (5)	72 (7)	19 (130)	7 x 13.5	0.327	15800	34000	22,300
MM307K	35 (6)	80 (7)	21 (130)	7 x 14.3	0.431	18500	37800	19,400
MM308K	40 (6)	90 (8)	23 (130)	8 x 15.9	0.594	22700	46300	17,100
MM309K	45 (6)	100 (8)	25 (130)	8 x 17.5	0.807	31600	59600	15,200
MM310K	50 (6)	110 (8)	27 (130)	8 x 19.1	1.052	37800	69400	13,800
MM311K	55 (7)	120 (8)	29 (150)	8 x 20.6	1.329	44500	81400	12,500
MM312K	60 (7)	130 (9)	31 (150)	8 x 22.2	1.665	51600	92500	11,500
MM313K	65 (7)	140 (9)	33 (150)	8 x 23.8	2.046	59600	105000	10,700
MM314K	70 (7)	150 (9)	35 (150)	8 x 25.4	2.486	68100	115600	9,900
INCH	in./tol: +0; -.000(X)			in.	lbs.	lbs.		RPM
MM305K	0.9843 (2)	2.4409 (3)	0.6693 (47)	7 x 15/32	0.49	2750	6000	26,500
MM306K	1.1811 (2)	2.8346 (3)	0.748 (47)	7 x 17/32	0.72	3550	7650	22,300
MM307K	1.378 (2.5)	3.1496 (3)	0.8268 (47)	7 x 9/16	0.95	4150	8500	19,400
MM308K	1.5748 (2.5)	3.5433 (3)	0.9055 (47)	8 x 5/8	1.31	5100	10400	17,100
MM309K	1.7717 (2.5)	3.937 (3)	0.9843 (47)	8 x 11/16	1.78	7100	13400	15,200
MM310K	1.9685 (2.5)	4.3307 (3)	1.063 (47)	8 x 3/4	2.32	8500	15600	13,800
MM311K	2.1654 (3)	4.7244 (3)	1.1417 (59)	8 x 13/16	2.93	10000	18300	12,500
MM312K	2.3622 (3)	5.1181 (3.5)	1.2205 (59)	8 x 7/8	3.67	11600	20800	11,500
MM313K	2.5591 (3)	5.5118 (3.5)	1.2992 (59)	8 x 15/16	4.51	13400	23600	10,700
MM314K	2.7559 (3)	5.9055 (3.5)	1.378 (59)	8 x 1	5.48	15300	26000	9,900

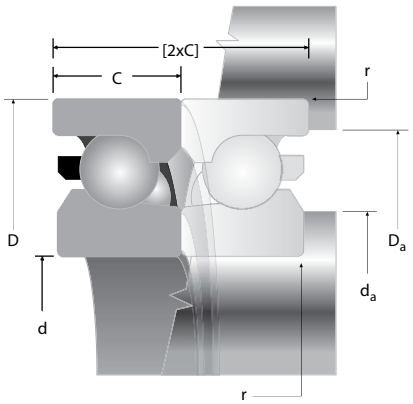
(Ng) For a single, grease lubricated, spring preloaded bearing. This value to be used in permissible Operating Speed (Sp) calculation.
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) ABMA STD 20 (r_{as} max).

r	Suggested Shoulder Diameters				Shaft Diameter		Mounting Fits		FIXED				FLOATING				
	d_a (Shaft)		D_a (Housing)						Housing Bore (Stationary)		Mounting Fits		Housing Bore (Stationary)		Housing Clearance		
Rad.(2)	Max.	Min.	Max.	Min.	Min.	Max.	Loose	Tight	Min.	Max.	Tight	Loose	Max.	Min.	Max.	Min.	
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm.	mm.	mm.	mm	
1	32.1	31.9	55.8	55.5	24.995	25.000	0.005	0.005	62	62.008	0.000	0.015	62.012	62.007	0.019	0.007	MM305K
1	37.7	37.5	65.2	64.9	29.995	30.000	0.005	0.005	72	72.008	0.000	0.015	72.011	72.007	0.019	0.007	MM306K
1.5	43.7	43.2	72.1	71.6	34.995	35.000	0.005	0.006	80	80.008	0.000	0.015	80.012	80.008	0.020	0.008	MM307K
1.5	49.8	49.3	81.3	80.8	39.995	40.000	0.005	0.006	90	90.008	0.000	0.016	90.015	90.007	0.023	0.007	MM308K
1.5	55.9	55.4	90.2	89.7	44.995	45.000	0.005	0.006	100	100.008	0.000	0.016	100.018	100.010	0.025	0.010	MM309K
1.5	61.2	60.7	99.8	99.3	49.995	50.000	0.005	0.006	110	110.008	0.000	0.016	110.018	110.010	0.025	0.010	MM310K
2	67.3	66.8	108.7	108.2	54.995	55.000	0.005	0.007	120	120.008	0.000	0.016	120.018	120.010	0.025	0.010	MM311K
2	43.2	72.6	117.9	117.3	59.995	60.000	0.005	0.007	130	130.009	0.000	0.018	130.020	130.010	0.029	0.010	MM312K
2	80.3	79.8	126.8	126.2	64.995	65.000	0.005	0.007	140	140.009	0.000	0.018	140.020	140.010	0.029	0.010	MM313K
2	85.3	84.8	135.6	135.1	69.995	70.000	0.005	0.007	150	150.009	0.000	0.018	150.023	150.012	0.032	0.012	MM314K
in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
0.039	1.27	1.26	2.2	2.19	0.9841	0.9843	0.0002	0.0002	2.4409	2.4412	0.0000	0.0006	2.44140	2.44120	0.00080	0.0003	MM305K
0.039	1.49	1.48	2.57	2.56	1.1809	1.1811	0.0002	0.0002	2.8346	2.8349	0.0000	0.0006	2.83510	2.83490	0.00080	0.0003	MM306K
0.059	1.72	1.7	2.84	2.82	1.3778	1.3780	0.0002	0.00025	3.1496	3.1499	0.0000	0.0006	3.15010	3.14990	0.00080	0.0003	MM308K
0.059	1.96	1.94	3.2	3.18	1.5746	1.5748	0.0002	0.00025	3.5433	3.5436	0.0000	0.0006	3.54390	3.54360	0.00090	0.0003	MM308K
0.059	2.2	2.18	3.55	3.53	1.7715	1.7717	0.0002	0.00025	3.9370	3.9373	0.0000	0.0006	3.93770	3.93740	0.00100	0.0004	MM309K
0.059	2.41	2.39	3.93	3.91	1.9683	1.9685	0.0002	0.00025	4.3307	4.3310	0.0000	0.0006	4.33140	4.33110	0.00100	0.0004	MM310K
0.079	2.65	2.63	4.28	4.26	2.1652	2.1654	0.0002	0.0003	4.7244	4.7247	0.0000	0.0006	4.72510	4.72480	0.00100	0.0004	MM311K
0.079	2.88	2.86	4.64	4.62	2.3620	2.3622	0.0002	0.0003	5.1181	5.1185	0.0000	0.0007	5.11890	5.11850	0.00110	0.0004	MM312K
0.079	3.16	3.14	4.99	4.97	2.5589	2.5591	0.0002	0.0003	5.5118	5.5122	0.0000	0.0007	5.51260	5.51220	0.00110	0.0004	MM313K
0.079	3.36	3.34	5.34	5.32	2.7557	2.7559	0.0002	0.0003	5.9055	5.9059	0.0000	0.0007	5.90640	5.90600	0.00120	0.00050	MM314K

BALL SCREW SUPPORT SERIES

DIMENSIONAL SIZES – METRIC SERIES (METRIC UNITS)

- Designed for maximum axial rigidty, low drag torque, and extreme control of lateral eccentricity.
- Manufactured to ABEC 9 axial tolerances.
- Nonseparable angular-contact type design (60˚ contact angle).
- Manufactured to ABEC 7 radial and envelope tolerances.
- Maximum complement of balls.
- Supplied prelubricated with heavy-duty grease NLGI #2.
- Packaged in DB arrangement [can be mounted in duplexed pairs and in multiplexed sets in either Back-to-Back (DB), Face-to-Face (DF) or Tandem (DT) arrangements].



Bearing Number	d Bore	D O.D.	C Width(1)	Wt.	Ball Qty. x Dia.	r Rad.(2)	d_a(Shaft) Max.	d_a(Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Dia. Max.	Shaft Dia. Min.	Housing Dia. Max.	Housing Dia. Min.
METRIC	mm/tol: +0; -(µm)			kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
MM12BS32	12 (4)	32 (6)	10 (80)	.04	11 x 4.8	0.8	17.63	17.37	26.63	26.37	11.996	11.992	32.006	32
MM15BS35	15 (4)	35 (6)	11 (80)	.05	13 x 4.8	0.8	20.63	20.37	29.63	29.37	14.996	14.992	35.006	35
MM17BS47	17 (4)	47 (6)	15 (80)	.13	12 x 7.9	0.8	23.13	22.87	41.63	41.37	16.996	16.992	47.006	47
MM20BS47	20 (5)	47 (6)	15 (120)	.12	12 x 7.9	0.8	26.13	25.87	41.63	41.37	19.995	19.99	47.006	47
MM25BS52	25 (5)	52 (7)	15 (120)	.14	13 x 7.9	0.8	31.63	31.37	43.63	43.37	24.995	24.99	52.007	52
MM25BS62	25 (5)	62 (7)	15 (120)	.23	17 x 7.9	0.8	35.13	34.87	56.13	55.87	24.995	24.99	62.007	62
MM30BS62	30 (5)	62 (7)	15 (120)	.21	17 x 7.9	0.8	40.13	39.87	56.13	55.87	29.995	29.99	62.007	62
MM30BS72	30 (5)	72 (7)	15 (120)	.32	18 x 8.7	0.8	40.13	39.87	56.13	55.87	29.995	29.99	72.007	72
MM35BS72	35 (6)	72 (7)	15 (120)	.29	18 x 8.7	0.8	42.13	41.87	64.13	63.87	34.994	34.988	72.007	72
MM35BS100	35 (6)	100 (8)	20 (120)	.86	18 x 12.7	0.8	42.13	41.87	90.13	89.87	39.994	39.988	72.007	72
MM40BS72	40 (6)	72 (7)	15 (120)	.25	18 x 8.7	0.8	47.13	46.87	64.13	63.87	44.994	44.988	75.007	75
MM40BS90	40 (6)	90 (8)	15 (120)	.49	24 x 8.7	0.8	47.13	46.87	82.13	81.87	39.994	39.988	90.008	90
MM40BS90-20	40 (6)	90 (8)	20 (120)	.66	24 x 8.7	0.8	47.13	46.87	82.13	81.87	39.994	39.998	90.008	90
MM40BS90-23	40 (6)	90 (8)	23 (120)	.75	24 x 8.7	0.8	47.13	46.87	82.13	81.87	39.994	39.988	90.008	90
MM40BS100	40 (6)	100 (8)	20 (120)	.82	18 x 12.7	0.8	47.13	46.87	90.13	89.87	39.994	39.988	100.007	100
MM45BS75	45 (6)	75 (7)	15 (120)	.25	20 x 8.7	0.8	52.13	51.87	69.13	68.87	39.994	39.988	72.007	72
MM45BS100	45 (6)	100 (8)	20 (120)	.76	18 x 12.7	0.8	54.13	53.87	90.13	89.87	44.994	44.988	100.008	100
MM50BS90	50 (6)	90 (8)	15 (120)	.41	24 x 8.7	0.8	59.13	58.87	82.13	81.87	49.994	49.988	90.008	90
MM50BS100	50 (6)	100 (8)	20 (120)	.71	18 x 12.7	0.8	59.13	58.87	90.13	89.87	49.994	49.988	100.008	100
MM55BS90	55 (7)	90 (8)	15 (150)	.36	24 x 8.7	0.8	63.13	62.87	82.13	81.87	54.993	54.986	90.008	90
MM55BS120	55 (7)	120 (8)	20 (150)	1.14	21 x 12.7	1	65.13	64.87	110.13	109.87	54.993	54.986	120.008	120
MM60BS120	60 (7)	120 (8)	20 (150)	1.06	21 x 12.7	1	70.13	69.87	110.13	109.87	59.993	59.986	120.008	120
MM75BS110	75 (7)	110 (8)	15 (150)	.46	30 x 8.7	0.8	84.13	83.87	102.13	101.87	74.993	74.986	110.008	110
MM100BS150	100 (8)	150 (9)	20 (200)	1.28	26 x 12.7	1	110.13	109.87	138.13	137.87	99.992	99.984	150.009	150

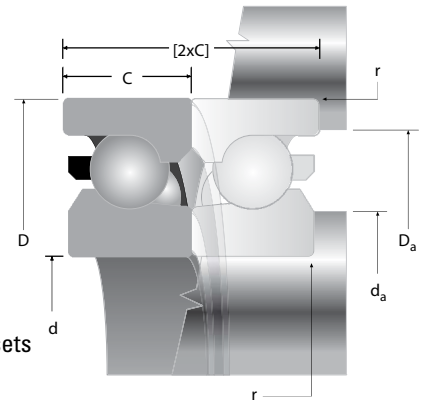
(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").

(2) ABMA STD 20 (r_{as} max).

BALL SCREW SUPPORT SERIES

DIMENSIONAL SIZES – METRIC SERIES (INCH UNITS)

- Designed for maximum axial rigidty, low drag torque, and extreme control of lateral eccentricity.
- Manufactured to ABEC 9 axial tolerances.
- Nonseparable angular-contact type design (60˚ contact angle).
- Manufactured to ABEC 7 radial and envelope tolerances.
- Maximum complement of balls.
- Supplied prelubricated with heavy-duty grease NLGI #2.
- Packaged in DB arrangement [can be mounted in duplexed pairs and in multiplexed sets in either Back-to-Back (DB), Face-to-Face (DF) or Tandem (DT) arrangements].



Bearing Number	d Bore	D O.D.	C Width(1)	Wt.(3)	Ball Qty. x Dia.	r Rad.(2)	d_a(Shaft) Max.	d_a(Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Dia. Max.	Shaft Dia. Min.	Housing Dia. Max.	Housing Dia. Min.
INCH	mm/tol: +0; -(µm)			lbs.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
MM12BS32	0.4724 (1.5)	1.2598 (2.5)	0.3937 (31)	0.09	11 x 3/16	0.031	0.6941	0.6839	1.0484	1.0382	0.4723	0.4721	1.2601	1.2598
MM15BS35	0.5906 (1.5)	1.3780 (2.5)	0.4331 (31)	0.11	13 x 3/16	0.031	0.8122	0.8020	1.1665	1.1563	0.5904	0.5902	1.3782	1.3780
MM17BS47	0.6693 (1.5)	1.8504 (2.5)	0.5906 (31)	0.29	12 x 5/32	0.031	0.9106	0.9004	1.6390	1.6287	0.6691	0.6690	1.8506	1.8504
MM20BS47	0.7874 (2)	1.8504 (2.5)	0.5906 (47)	0.26	12 x 5/32	0.031	1.0287	1.0185	1.6390	1.6287	0.7872	0.7870	1.8506	1.8504
MM25BS52	0.9843 (2)	2.0472 (3)	0.5906 (47)	0.37	13 x 5/32	0.031	1.2453	1.2350	1.7177	1.7075	0.9841	0.9839	2.0475	2.0472
MM25BS62	0.9843 (2)	2.4409 (3)	0.5906 (47)	0.51	17 x 5/32	0.031	1.3831	1.3728	2.2098	2.1996	0.9841	0.9839	2.4412	2.4409
MM30BS62	1.1811 (2)	2.4409 (3)	0.5906 (47)	0.46	17 x 5/32	0.031	1.5799	1.5697	2.2098	2.1996	1.1809	1.1807	2.4412	2.4409
MM30BS72	1.1811 (2)	2.8346 (3)	0.5906 (47)	0.71	18 x 11/32	0.031	1.5799	1.5697	2.2098	2.1996	1.1809	1.1807	2.8349	2.8346
MM35BS72	1.3780 (2.5)	2.8346 (3)	0.5906 (47)	0.64	18 x 11/32	0.031	1.6587	1.6484	2.5248	2.5146	1.3777	1.3775	2.8349	2.8346
MM35BS100	1.3780 (2.5)	3.9370 (3)	0.7874 (47)	1.90	18 x 1/2	0.031	1.6587	1.6484	3.5484	3.5382	1.3777	1.3775	3.9373	3.9370
MM40BS72	1.5748 (2.5)	2.8346 (3)	0.5906 (47)	0.55	18 x 11/32	0.031	1.8555	1.8453	2.5248	2.5146	1.5746	1.5743	2.8349	2.8346
MM40BS90	1.5748 (2.5)	3.5433 (3)	0.5906 (47)	1.08	24 x 11/32	0.031	1.8555	1.8453	3.2335	3.2232	1.5746	1.5743	3.5436	3.5433
MM40BS90-20	1.5748 (2.5)	3.5433 (3)	0.7874 (47)	1.46	24 x 11/32	0.031	1.8555	1.8453	3.2335	3.2232	1.5746	1.5743	3.5436	3.5433
MM40BS90-23	1.5748 (2.5)	3.5433 (3)	0.9055 (47)	1.65	24 x 11/32	0.031	1.8555	1.8453	3.2335	3.2232	1.5746	1.5743	3.5436	3.5433
MM40BS100	1.5748 (2.5)	3.9370 (3)	0.7874 (47)	1.81	18 x 1/2	0.031	1.8555	1.8453	3.5484	3.5382	1.5746	1.5743	3.9373	3.9370
MM45BS75	1.7717 (2.5)	2.9528 (3)	0.5906 (47)	0.55	20 x 11/32	0.031	2.0524	2.0421	2.7217	2.7114	1.7714	1.7712	2.9530	2.9528
MM45BS100	1.7717 (2.5)	3.9370 (3)	0.7874 (47)	1.68	18 x1/2	0.031	2.1311	2.1209	3.5484	3.5382	1.7714	1.7712	3.9373	3.9370
MM50BS90	1.9685 (2.5)	3.5433 (3)	0.5906 (47)	0.90	24 x 11/32	0.031	2.3280	2.3177	3.2335	3.2232	1.9683	1.9680	3.5436	3.5433
MM50BS100	1.9685 (2.5)	3.9370 (3)	0.7874 (47)	1.57	18 x1/2	0.031	2.3280	2.3177	3.5484	3.5382	1.9683	1.9680	3.9373	3.9370
MM55BS90	2.1654 (3)	3.5433 (3)	0.5906 (59)	0.79	24 x 11/32	0.031	2.4854	2.4752	3.2335	3.2232	2.1651	2.1648	3.5436	3.5433
MM55BS120	2.1654 (3)	4.7244 (3)	0.7874 (59)	2.51	21 x 1/2	0.039	2.5642	2.5539	4.3358	4.3256	2.1651	2.1648	4.7247	4.7244
MM60BS120	2.3622 (3)	4.7244 (3)	0.7874 (59)	2.34	21 x 1/2	0.039	2.7610	2.7508	4.3358	4.3256	2.3619	2.3617	4.7247	4.7244
MM75BS110	2.9528 (3)	4.3307 (3)	0.5906 (59)	1.01	30 x 11/32	0.031	3.3122	3.3020	4.0209	4.0106	2.9525	2.9522	4.3310	4.3307
MM100BS150	3.9370 (3)	5.9055 (3.5)	0.7874 (79)	2.82	26 x 1/2	0.039	4.3358	4.3256	5.4382	5.4280	3.9367	3.9364	5.9059	5.9055

(1)Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").

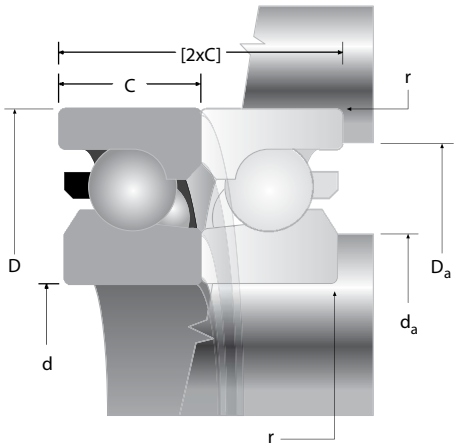
(2)ABMA STD 20 (r_{as} max).

(3)Single bearing.

BALL SCREW SUPPORT SERIES

DIMENSIONAL SIZES – INCH SERIES

- Designed for maximum axial rigidity, low drag torque, and extreme control of lateral eccentricity.
- Manufactured to ABEC 9 axial tolerances.
- Nonseparable angular-contact type design (60° contact angle).
- Manufactured to ABEC 7 radial and envelope tolerances.
- Maximum complement of balls.
- Supplied prelubricated with heavy-duty grease NLGI #2.
- Packaged in DB arrangement [can be mounted in duplexed pairs and in multiplexed sets in either Back-to-Back (DB), Face-to-Face (DF) or Tandem (DT) arrangements].



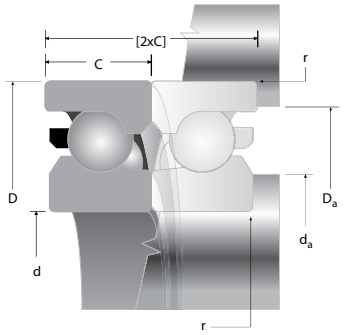
INCHES DIMENSIONAL SIZES - BALL SCREW SUPPORT SERIES

Bearing Number	d Bore	D O.D.	C Width[1]	Wt.[4]	Ball Qty. x Dia.	r Rad.[2]	d_a(Shaft) Max.	d_a(Shaft) Min.	D_a (Housing) Max.	D_a (Housing) Min.	Shaft Dia. Max.	Shaft Dia. Min.	Housing Dia. Max.	Housing Dia. Min.
INCHES	in/tol: +0; -.000(X)			lbs.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
MM9306WI2H	0.7874 (2)	1.8504 (2.5)	0.625 (47)	0.28	12 x 5/16	0.031	1.083	1.073	1.641	1.631	0.7872	0.787	1.8507	1.8504
MM9308WI2H	0.9385 (2)	2.4409 (3)	0.625 (47)	0.56	17 x 5/16	0.031	1.321	1.311	2.179	2.169	0.9383	0.9381	2.4412	2.4409
MM9310WI2H	1.5000 (2.5)	2.8346 (3)	0.6250 (47)	0.62	18 x 11/32	0.031	1.865	1.855	2.479	2.469	1.4997	1.4994	2.8349	2.8346
MM9311WI3H	1.7510 (2.5)	3.0000 (3)	0.6250 (47)	0.63	20 x 11/32	0.031	2.057	2.047	2.672	2.662	1.7507	1.7504	3.0003	3.0000
MM9313WI5H	2.2500 (3)	3.5433 (3)	0.6250 (59)	0.80	24 x 11/32	0.031	2.577	2.567	3.196	3.186	2.2497	2.2494	3.5436	3.5433
MM9316WI3H	3.0000 (3)	4.3307 (3)	0.6250 (59)	1.04	30 x 11/32	0.031	3.380	3.370	4.000	3.990	2.9997	2.9994	4.3310	4.3307
MM9321WI3	4.0000 (3)	5.7087 (3.5)	0.8750 (79)	2.60	37 x 3/8	0.039	4.418	4.408	5.301	5.291	3.9997	3.9994	5.7091	5.7087
MM9326WI6H	5.0000 (3)	7.0866 (4)	0.8750 (98)	3.85	35 x 1/2	0.039	5.669	5.659	6.611	6.601	4.9997	4.9994	7.0870	7.0866
MWTRIC	mm/tol:+0; -(mm)			kg	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
MM9306WI2H	20 (5)	47 (6)	15.88 (120)	0.13	12 x 7.9	0.8	27.508	27.254	41.681	41.427	19.995	19.990	47.008	47.000
MM9308WI2H	23.8 (5)	62.0 (7)	15.88 (120)	0.25	17 x 7.9	0.8	33.553	33.299	55.347	55.093	23.833	23.828	62.006	61.999
MM9310WI2H	38.1 (6)	72 (7)	15.88 (120)	0.28	18 x 8.7	0.8	47.371	47.117	62.967	62.713	38.092	38.085	72.006	71.999
MM9311WI3H	44.5 (6)	76.2 (7)	15.88 (120)	0.29	20 x 8.7	0.8	52.248	51.994	67.869	67.615	44.468	44.460	76.208	76.200
MM9313WI5H	57.2 (7)	90 (7)	15.88 (150)	0.36	24 x 8.7	0.8	65.456	65.202	81.178	80.924	57.142	57.135	90.007	90.000
MM9316WI3H	76.2 (7)	110 (7)	15.88 (150)	0.47	30 x 8.7	0.8	85.852	85.598	101.600	101.346	76.192	76.185	110.007	110.000
MM9321WI3	101.6 (7)	145 (9)	22.23 (200)	1.18	37 x 9.5	1	112.217	111.963	134.645	134.391	101.592	101.585	145.011	145.001
MM9326WI6H	127 (7)	180 (10)	22.23 (250)	1.75	35 x 12.7	1	143.993	143.739	167.919	167.665	126.992	126.985	180.010	180.000

(1) Width tolerance of preloaded bearing set +0/-0.25 mm (+0/-0.010").
(2) Refer to engineering section for width tolerance of preloaded ball screw support bearings.
(3) ABMA Std. 20 (r_{as} max).
(4) Single bearing.

BALL SCREW SUPPORT SERIES

PERFORMANCE DATA METRIC SERIES (METRIC UNITS)

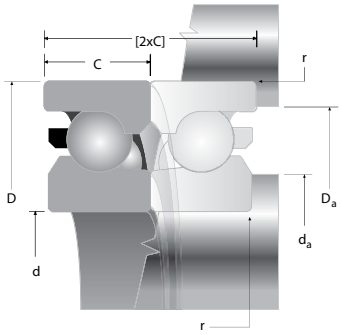


Bearing Number	Static Limiting Thrust Capacity[3] T_L	Dynamic Axial Thrust Load Rating[1][3] C_{ae}	Max. Speed	Axial Spring Constant[3]	Drag Torque (preloaded set)	Preload[2][3] (Heavy)
	N	N	RPM	N/µm	N-m	N
METRIC SERIES - METRIC UNITS - DUH						
MM12BS32DUH	11400	9500	7300	425	0.28	1000
MM15BS35DUH	13700	10400	6400	490	0.30	1200
MM17BS47DUH	24900	24900	4700	750	0.32	3110
MM20BS47DUH	24900	24900	4700	750	0.32	3110
MM25BS52DUH	27100	26000	4300	780	.39	2700
MM25BS62DUH	35600	29800	3300	1050	0.44	4450
MM30BS62DUH	35600	29800	3300	1050	0.44	4450
MM30BS72DUH	45400	36300	2900	1260	0.44	6230
MM35BS72DUH	45400	36300	2900	1260	0.44	6230
MM40BS72DUH	45400	36300	2900	1260	0.44	6230
MM45BS75DUH	50700	38500	2700	1380	0.56	6670
MM40BS90DUH	60900	41400	2200	1660	0.82	8010
MM40BS90-20DUH	60900	41400	2200	1660	.82	8010
MM40BS90-23DUH	60900	41400	2200	1660	.82	8010
MM50BS90DUH	60900	41400	2200	1660	0.82	8010
MM55BS90DUH	60900	41400	2200	1660	0.82	8010
MM35BS100DUH	93400	71200	2000	1750	1.02	12900
MM40BS100DUH	93400	71200	2000	1750	1.02	12900
MM45BS100DUH	93400	71200	2000	1750	1.02	12900
MM50BS100DUH	93400	71200	2000	1750	1.02	12900
MM75BS110DUH	77000	44500	1700	2080	1.00	9790
MM55BS120DUH	133400	75600	1700	2150	1.36	15570
MM60BS120DUH	133400	75600	1700	2150	1.36	15570
MM100BS150DUH	115600	57400	1300	3400	2.18	21350
METRIC SERIES - METRIC UNITS - QUH						
MM12BS32QUH	22800	15400	5100	850	0.56	2000
MM15BS35QUH	27400	16850	4500	980	0.60	2400
MM17BS47QUH	49800	40500	3300	1510	0.64	6230
MM20BS47QUH	49800	40500	3300	1510	0.64	6230
MM25BS52QUH	54300	42300	3000	1560	0.49	5400
MM25BS62QUH	71200	48500	2300	2100	0.88	8900
MM30BS62QUH	71200	48500	2300	2100	0.88	8900
MM30BS72QUH	90700	58700	2000	2520	0.88	12450
MM35BS72QUH	90700	58700	2000	2520	0.88	12450
MM40BS72QUH	90700	58700	2000	2520	0.88	12450
MM45BS75QUH	101400	62700	1900	2770	1.12	13340
MM40BS90QUH	121900	67200	1500	3330	1.64	16010
MM50BS90QUH	121900	67200	1500	3330	1.64	16010
MM55BS90QUH	121900	67200	1500	3330	1.64	16010
MM35BS100QUH	186800	115600	1400	3500	2.04	25800
MM40BS100QUH	186800	115600	1400	3500	2.04	25800
MM45BS100QUH	186800	115600	1400	3500	2.04	25800
MM50BS100QUH	186800	115600	1400	3500	2.04	25800
MM75BS110QUH	153900	72100	1200	4170	2.00	19570
MM55BS120QUH	266900	122800	1200	4310	2.72	31140
MM60BS120QUH	266900	122800	1200	4310	2.72	31140
MM100BS150QUH	231300	93400	900	6790	4.36	42700

[1] Based on 1500 hours L_{10} life and permissable speed.
[2] Heavy preload is standard.
[3] Data presented is for a single bearing in a DUH set and for two bearings in a QUH set mounted DB or DF.

BALL SCREW SUPPORT SERIES

PERFORMANCE DATA METRIC SERIES (INCH UNITS)

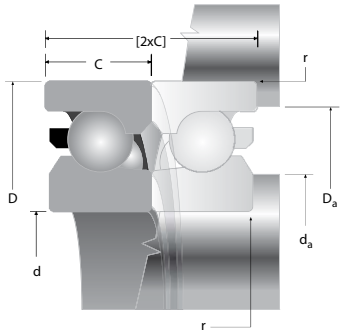


Bearing Number	Static Limiting Thrust Capacity[3] T_L	Dynamic Axial Thrust Load Rating[1][3] C_{ae}	Max. Speed	Axial Spring Constant[3]	Drag Torque (preloaded set)	Preload[2][3] (Heavy)
	lbs.	lbs.	RPM	10^6 lbs./in.	in.-lbs.	lbs.
METRIC SERIES - INCH UNITS - DUH						
MM12BS32DUH	2600	2140	7300	2.4	2.48	200
MM15BS35DUH	3100	2340	6400	2.8	2.65	300
MM17BS47DUH	5600	5600	4700	4.3	2.83	700
MM20BS47DUH	5600	5600	4700	4.3	2.83	700
MM25BS52DUH	6100	5850	4300	4.5	3.45	600
MM25BS62DUH	8000	6700	3300	6	3.88	1000
MM30BS62DUH	8000	6700	3300	6	3.88	1000
MM30BS72DUH	10200	8160	2900	7.2	3.88	1400
MM35BS72DUH	10200	8160	2900	7.2	3.88	1400
MM40BS72DUH	10200	8160	2900	7.2	3.88	1400
MM45BS75DUH	11400	8660	2700	7.9	4.96	1500
MM40BS90DUH	13700	9310	2200	9.5	7.26	1800
MM40BS90DUH-20	13700	9310	2200	9.5	7.26	1800
MM40BS90DUH-23	13700	9310	2200	9.5	7.26	1800
MM50BS90DUH	13700	9310	2200	9.5	7.26	1800
MM55BS90DUH	13700	9310	2200	9.5	7.26	1800
MM35BS100DUH	21000	16010	2000	10	9.03	2900
MM40BS100DUH	21000	16010	2000	10	9.03	2900
MM45BS100DUH	21000	16010	2000	10	9.03	2900
MM50BS100DUH	21000	16010	2000	10	9.03	2900
MM75BS110DUH	17300	10000	1700	11.9	8.85	2200
MM55BS120DUH	30000	17000	1700	12.3	12.04	3500
MM60BS120DUH	30000	17000	1700	12.3	12.04	3500
MM100BS150DUH	26000	12900	1300	19.4	19.29	4800
METRIC SERIES - INCH UNITS - QUH						
MM12BS32QUH	5100	3500	5100	4.9	4.96	400
MM15BS35QUH	6200	3800	4500	5.6	5.31	500
MM17BS47QUH	11200	9100	3300	8.6	5.65	1400
MM20BS47QUH	11200	9100	3300	8.6	5.65	1400
MM25BS52QUH	12200	9500	3000	8.9	6.90	1200
MM25BS62QUH	16000	10900	2300	12	7.78	2000
MM30BS62QUH	16000	10900	2300	12	7.78	2000
MM30BS72QUH	20400	13200	2000	14.4	7.78	2800
MM35BS72QUH	20400	13200	2000	14.4	7.78	2800
MM40BS72QUH	20400	13200	2000	14.4	7.78	2800
MM45BS75QUH	22800	14100	1900	15.8	9.92	3000
MM40BS90QUH	27400	15100	1500	19	14.51	3600
MM50BS90QUH	27400	15100	1500	19	14.51	3600
MM55BS90QUH	27400	15100	1500	19	14.51	3600
MM35BS100QUH	42000	26000	1400	20	18.05	5800
MM40BS100QUH	42000	26000	1400	20	18.05	5800
MM45BS100QUH	42000	26000	1400	20	18.05	5800
MM50BS100QUH	42000	26000	1400	20	18.05	5800
MM75BS110QUH	34600	16200	1200	23.8	17.70	4400
MM55BS120QUH	60000	27600	1200	24.6	24.08	7000
MM60BS120QUH	60000	27600	1200	24.6	24.08	7000
MM100BS150QUH	52000	21000	900	38.8	38.59	9600

[1] Based on 1500 hours L_{10} life and permissable speed.
[2] Heavy preload is standard.
[3] Data presented is for a single bearing in a DUH set and for two bearings in a QUH set mounted DB or DF.

BALL SCREW SUPPORT SERIES

PERFORMANCE DATA INCH SERIES (INCH UNITS)



Bearing Number	Static Limiting Thrust Capacity[3] T_L	Dynamic Axial Thrust Load Rating[1][3] C_{ae}	Max. Speed	Axial Spring Constant[3]	Drag Torque (preloaded set)	Preload[2][3] (Heavy)
	lbs.	lbs.	RPM	10^6 lbs./in.	in.-lbs.	lbs.
INCH SERIES - INCH UNITS - DUH / QUH						
MM9306WI2HDUH	5600	5600	4700	4.30	2.83	700
MM9308WI2HDUH	8000	6700	3300	6.00	3.89	1000
MM9310WI2HDUH	10200	8150	2900	7.20	3.89	1400
MM9311WI3HDUH	11400	8650	2700	7.90	4.96	1500
MM9313WI5HDUH	13700	9300	2200	9.50	7.26	1800
MM9316WI3HDUH	17300	10000	1700	11.90	8.85	2200
MM9321WI3DUH	26000	12900	1300	19.40	9.01	4800
MM9326WI6HDUH	42000	21200	1000	20.70	11.1	6000
MM9306WI2HQUH	11200	9100	3300	8.60	5.66	1400
MM9308WI2HQUH	16000	10900	2300	12.00	7.78	2000
MM9310WI2HQUH	20400	13200	2000	14.40	7.78	2800
MM9311WI3HQUH	22800	14100	1900	15.80	9.92	3000
MM9313WI5HQUH	27400	15100	1500	19.00	14.52	3600
MM9316WI3HQUH	34600	16200	1200	23.80	17.7	4400
MM9321WI3QUH	52000	21000	900	38.80	18.02	9600
MM9326WI6HQUH	84000	34400	700	41.40	22.22	12000
	N	N	RPM	N/µm	N-m	N
INCH SERIES - METRIC UNITS - DUH / QUH						
MM9306WI2HDUH	24900	24900	4700	750	0.32	3110
MM9308WI2HDUH	35600	29800	3300	1050	0.44	4450
MM9310WI2HDUH	45400	36300	2900	1260	0.44	6230
MM9311WI3HDUH	50700	38500	2700	1380	0.56	6670
MM9313WI5HDUH	60900	41400	2200	1660	0.82	8010
MM9316WI3HDUH	77000	44500	1700	2080	1	9790
MM9321WI3DUH	115700	57400	1300	3400	1.02	21350
MM9326WI6HDUH	186800	94300	1000	3630	1.26	26690
MM9306WI2HQUH	49800	40500	3300	1510	0.64	6230
MM9308WI2HQUH	71200	48500	2300	2100	0.88	8900
MM9310WI2HQUH	90700	58700	2000	2520	0.88	12450
MM9311WI3HQUH	101400	62700	1900	2770	1.12	13340
MM9313WI5HQUH	121900	67200	1500	3330	1.64	16010
MM9316WI3HQUH	153900	72100	1200	4170	2	19570
MM9321WI3QUH	231300	93400	900	6800	2.04	42700
MM9326WI6HQUH	373600	153000	700	7250	2.51	53380

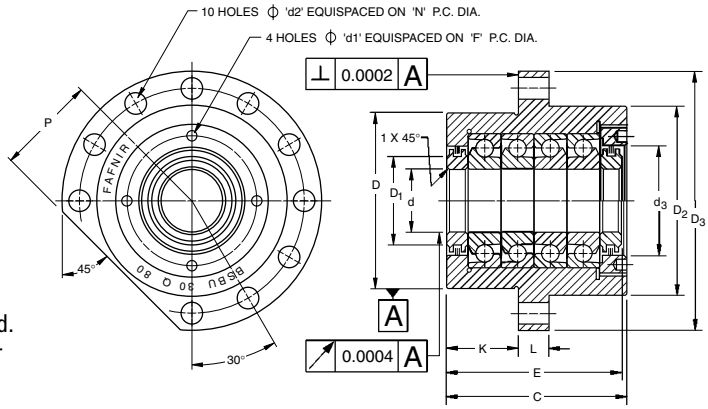
[1] Based on 1500 hours L_{10} life and permissable speed.
[2] Heavy preload is standard.
[3] Data presented is for a single bearing in a DUH set and for two bearings in a QUH set mounted DB or DF.

D

BSBU D

STANDARD AND HEAVY-DUTY BEARINGS

- Designed and developed to give the machine manufacturer a ready-made unit providing excellent stiffness and accuracy in ball screw applications.
- Units combine the features of MM-BS-DU (Duplex) ball screw bearings with an accurately manufactured housing and laminar ring seals.
- Each unit is prepacked with a measured quantity of high quality bearing grease and requires no further lubrication.
- Units are supplied with the bearings in pairs mounted in the "DB" ("O") arrangement.
- Other bearing arrangements can be accommodated if required. Please consult your Timken representative with details of your requirements or for suggested shaft and housing fits.



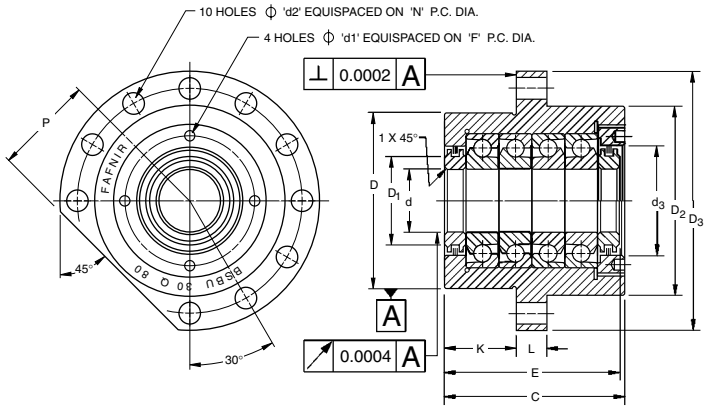
STANDARD SERIES – DIMENSIONAL TOLERANCES ± .13 mm (± 0.005") UNLESS OTHERWISE STATED.

Shaft Dia.	Unit Number	C	d	d_1	d_2	d_3	D	D_1	D_2	D_3	E	F	K	L	N	P	Wt.
mm	(Bearing Set)	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.
17	**BSBU17D60**	**47.0**	**17.000 16.996**	**4.3**	**6.6**	**36.0**	**60.000 59.987**	**26.0**	**64.0**	**90.0**	**44.26 43.24**	**42.5**	**32.0**	**13.0**	**76.0**	**32**	**1.1**
	(MM17BS47DUH)	1.85	0.6693 0.6691	0.17	0.26	1.42	2.3622 2.3617	1.02	2.52	3.54	1.742 1.702	1.67	1.26	0.51	2.99	1.26	2.42
20	**BSBU20D60**	**47.0**	**20.000 19.996**	**4.3**	**6.6**	**36.0**	**60.000 59.987**	**26.0**	**64.0**	**90.0**	**44.26 43.24**	**42.5**	**32.0**	**13.0**	**76.0**	**32**	**1.1**
	(MM20BS47DUH)	1.85	0.7874 0.7872	0.17	0.26	1.42	2.3622 2.3617	1.02	2.52	3.54	1.742 1.702	1.67	1.26	0.51	2.99	1.26	2.42
25	**BSBU25D80**	**52.0**	**25.000 24.996**	**4.3**	**9.2**	**50.0**	**80.000 79.987**	**40.0**	**88.0**	**120.0**	**50.26 49.24**	**59.5**	**32.0**	**15.0**	**102.0**	**44**	**2.3**
	(MM25BS62DUH)	2.05	0.9842 0.9841	0.17	0.36	1.97	3.1496 3.1491	1.57	3.46	4.72	1.979 1.938	2.34	1.26	0.59	4.02	1.73	5.06
30	**BSBU30D80**	**52.0**	**30.000 29.996**	**4.3**	**9.2**	**50.0**	**80.000 79.987**	**40.0**	**88.0**	**120.0**	**50.26 49.24**	**59.5**	**32.0**	**15.0**	**102.0**	**44**	**2.2**
	(MM30BS62DUH)	2.05	1.1811 1.1809	0.17	0.36	1.97	3.1496 3.1491	1.57	3.46	4.72	1.979 1.938	2.34	1.26	0.59	4.02	1.73	4.84
35	**BSBU35D90**	**52.0**	**35.000 34.995**	**4.3**	**9.2**	**60.0**	**90.000 89.985**	**46.0**	**98.0**	**130.0**	**50.26 49.24**	**66.5**	**32.0**	**15.0**	**113.0**	**49**	**3.2**
	(MM35BS72DUH)	2.05	1.378 1.3778	0.17	0.36	2.36	3.5433 3.5427	1.81	3.86	5.12	1.979 1.938	2.62	1.26	0.59	4.45	1.93	7.04
40	**BSBU40D90**	**52.0**	**40.000 39.995**	**4.3**	**9.2**	**60.0**	**90.000 89.985**	**46.0**	**98.0**	**130.0**	**50.26 49.24**	**66.5**	**32.0**	**15.0**	**113.0**	**49**	**3.1**
	(MM40BS72DUH)	2.05	1.5748 1.5746	0.17	0.36	2.36	3.5433 3.5427	1.81	3.86	5.12	1.979 1.938	2.62	1.26	0.59	4.45	1.93	6.82
HEAVY-DUTY SERIES																	
35	**BSBU35D124**	**66.0**	**35.000 34.995**	**5.3**	**11.4**	**76.0**	**124.000 123.982**	**66.0**	**128.0**	**165.0**	**64.26 63.24**	**90.0**	**43.5**	**17.0**	**146.0**	**64**	**6.3**
	(MM35BS100DUH)	2.60	1.3780 1.3778	0.21	0.45	2.99	4.8819 4.8812	2.6	5.04	6.50	2.530 2.490	3.54	1.71	0.67	5.75	2.52	13.86
40	**BSBU40D124**	**66.0**	**40.000 39.995**	**5.3**	**11.4**	**76.0**	**124.000 123.982**	**66.0**	**128.0**	**165.0**	**64.26 63.24**	**90.0**	**43.5**	**17.0**	**146.0**	**64**	**6.1**
	(MM40BS100DUH)	2.60	1.5748 1.5746	0.21	0.45	2.99	4.8819 4.8812	2.6	5.04	6.50	2.530 2.490	3.54	1.71	0.67	5.75	2.52	13.42
45	**BSBU45D124**	**66.0**	**45.000 44.995**	**5.3**	**11.4**	**76.0**	**124.000 123.982**	**66.0**	**128.0**	**165.0**	**64.26 63.24**	**90.0**	**43.5**	**17.0**	**146.0**	**64**	**6.0**
	(MM45BS100DUH)	2.60	1.7716 1.7714	0.21	0.45	2.99	4.8819 4.8812	2.6	5.04	6.50	2.530 2.490	3.54	1.71	0.67	5.75	2.52	13.2
50	**BSBU50D124**	**66.0**	**50.000 49.995**	**5.3**	**11.4**	**76.0**	**124.000 123.982**	**66.0**	**128.0**	**165.0**	**64.26 63.24**	**90.0**	**43.5**	**17.0**	**146.0**	**64**	**5.9**
	(MM50BS100DUH)	2.60	1.9685 1.9683	0.21	0.45	2.99	4.8819 4.8812	2.6	5.04	6.50	2.530 2.490	3.54	1.71	0.67	5.75	2.52	12.898

BSBU Q

STANDARD AND HEAVY-DUTY BEARINGS

- Similar in design and features to the series BSBU D except MM-BS-QU Quadruplex bearings are used.
- Units are supplied with the bearings in quad sets mounted in the "DB" ("O") arrangement.
- Consult your Timken representative for suggested shaft.



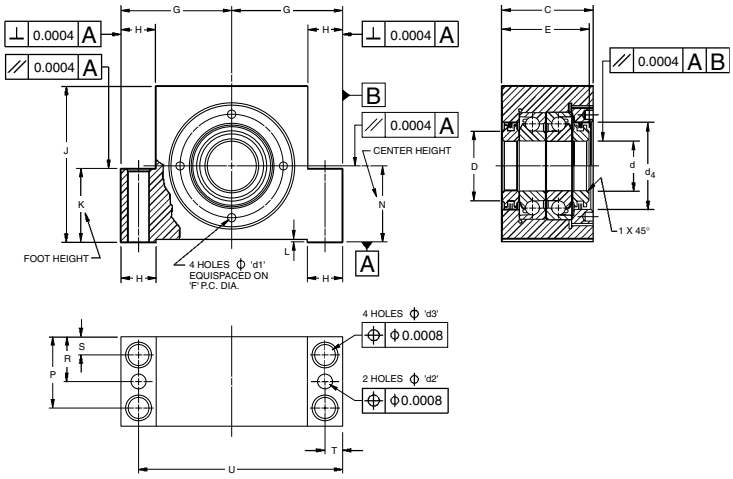
STANDARD SERIES – DIMENSIONAL TOLERANCES ± 0.005" ± .13 mm (± 0.005") UNLESS OTHERWISE STATED.

Shaft Dia.	Unit Number	C	d	d_1	d_2	d_3	D	D_1	D_2	D_3	E	F	K	L	N	P	Wt.
mm	(Bearing Set)	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.
17	**BSBU17Q60**	**77.0**	**17.000 16.996**	**4.3**	**6.6**	**36.0**	**60.000 59.987**	**26.0**	**64.0**	**90.0**	**74.26 72.74**	**42.5**	**32.0**	**13.0**	**76.0**	**32.0**	**1.7**
	(MM17BS47QUH)	3.03	0.6693 0.6690	0.17	0.26	1.42	2.3622 2.3617	1.02	2.52	3.54	2.924 2.864	1.67	1.26	0.51	2.99	1.26	3.74
20	**BSBU20Q60**	**77.0**	**20.000 19.996**	**4.3**	**6.6**	**36.0**	**60.000 59.987**	**26.0**	**64.0**	**90.0**	**74.26 72.74**	**42.5**	**32.0**	**13.0**	**76.0**	**32.0**	**1.7**
	(MM20BS47QUH)	3.03	0.7874 0.7872	0.17	0.26	1.42	2.3622 2.3617	1.02	2.52	3.54	2.924 2.864	1.67	1.26	0.51	2.99	1.26	3.74
25	**BSBU25Q80**	**82.0**	**25.000 24.996**	**4.3**	**9.2**	**50.0**	**80.000 79.987**	**40.0**	**88.0**	**120.0**	**80.26 78.74**	**59.5**	**32.0**	**15.0**	**102.0**	**44.0**	**3.5**
	(MM25BS62QUH)	3.23	0.9842 0.9841	0.17	0.36	1.97	3.1496 3.1491	1.57	3.46	4.72	3.160 3.100	2.34	1.26	0.59	4.02	1.73	7.7
30	**BSBU30Q80**	**82.0**	**30.000 29.996**	**4.3**	**9.2**	**50.0**	**80.000 79.987**	**40.0**	**88.0**	**120.0**	**80.26 78.74**	**59.5**	**32.0**	**15.0**	**102.0**	**44.0**	**3.4**
	(MM30BS62QUH)	3.23	1.1811 1.1809	0.17	0.36	1.97	3.1496 3.1491	1.57	3.46	4.72	3.160 3.100	2.34	1.26	0.59	4.02	1.73	7.48
35	**BSBU35Q90**	**82.0**	**35.000 34.995**	**4.3**	**9.2**	**60.0**	**90.000 89.985**	**46.0**	**98.0**	**130.0**	**80.26 78.74**	**66.5**	**32.0**	**15.0**	**113.0**	**49.0**	**4.6**
	(MM35BS72QUH	3.23	1.3780 1.3778	0.17	0.36	2.36	3.5433 3.5427	1.81	3.86	5.12	3.160 3.100	2.62	1.26	0.59	4.45	1.93	10.12
40	**BSBU40Q90**	**82.0**	**40.000 39.995**	**4.3**	**9.2**	**60.0**	**90.000 89.985**	**46.0**	**98.0**	**130.0**	**80.26 78.74**	**66.5**	**32.0**	**15.0**	**113.0**	**49.0**	**4.5**
	(MM40BS72QUH)	3.23	1.5748 1.5746	0.17	0.36	2.36	3.5433 3.5427	1.81	3.86	5.12	3.160 3.100	2.62	1.26	0.59	4.45	1.93	9.9
HEAVY-DUTY SERIES																	
35	**BSBU35Q124**	**106.0**	**35.000 34.995**	**5.3**	**11.4**	**76.0**	**124.000 123.982**	**66.0**	**128.0**	**165.0**	**104.26 102.74**	**90.0**	**43.5**	**17.0**	**146.0**	**64.0**	**10.1**
	(MM35BS100QUH)	4.17	1.3780 1.3778	0.21	0.45	2.99	4.8819 4.8812	2.6	5.04	6.5	4.105 4.045	3.54	1.71	0.67	5.75	2.52	22.22
40	**BSBU40Q124**	**106.0**	**40.000 39.995**	**5.3**	**11.4**	**76.0**	**124.000 123.982**	**66.0**	**128.0**	**165.0**	**104.26 102.74**	**90.0**	**43.5**	**17.0**	**146.0**	**64.0**	**9.7**
	(MM40BS100QUH)	4.17	1.5748 1.5746	0.21	0.45	2.99	4.8819 4.8812	2.6	5.04	6.5	4.105 4.045	3.54	1.71	0.67	5.75	2.52	21.34
45	**BSBU45Q124**	**106.0**	**45.000 44.995**	**5.3**	**11.4**	**76.0**	**124.000 123.982**	**66.0**	**128.0**	**165.0**	**104.26 102.74**	**90.0**	**43.5**	**17.0**	**146.0**	**64.0**	**9.5**
	(MM45BS100QUH)	4.17	1.7716 1.7714	0.21	0.45	2.99	4.8819 4.8812	2.6	5.04	6.5	4.105 4.045	3.54	1.71	0.67	5.75	2.52	20.9
50	**BSBU50Q124**	**106.0**	**50.000 49.995**	**5.3**	**11.4**	**76.0**	**124.000 123.982**	**66.0**	**128.0**	**165.0**	**104.26 102.74**	**90.0**	**43.5**	**17.0**	**146.0**	**64.0**	**9.3**
	(MM50BS100QUH)	4.17	1.9685 1.9683	0.21	0.45	2.99	4.8819 4.8812	2.6	5.04	6.5	4.105 4.045	3.54	1.71	0.67	5.75	2.52	20.46

BSPB D

STANDARD AND HEAVY-DUTY BEARINGS

- Design of bearing pillow block unit for ball screw applications.
- Incorporates similar features to the series BSBU D but is designed to bolt down onto a flat surface, parallel to the ball screw axis.
- In the standard unit, pilot holes for dowels are provided.
- Units with finished holes for dowels can be supplied by special order if required.
- Consult your Timken representative for suggested shaft.

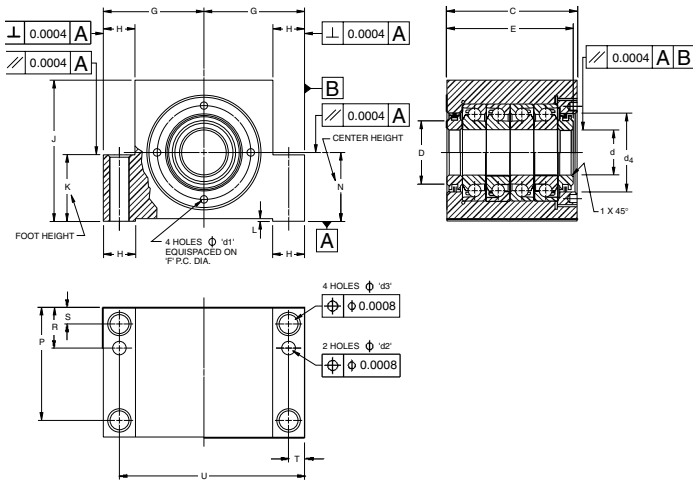


STANDARD SERIES – DIMENSIONAL TOLERANCES ±.13 mm (± 0.005") UNLESS OTHERWISE STATED.

Shaft Dia.	Unit Number	C	d	d_1	d_2	d_3	d_4	D	E	F	G	H	J	K	L	N	P	R	S	T	U	Wt.
mm	(Bearing Set)	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.
17	**BSPB17D32**	**47.000 46.950**	**17.000 16.996**	**4.3**	**7.8**	**9.0**	**36.0**	**26.0**	**44.26 43.24**	**42.5**	**47.000 46.987**	**17**	**62**	**32.0**	**1.0**	**32.000 31.987**	**38.0**	**22.0**	**9.0**	**8.5**	**85.5**	**1.5**
	(MM17BS47DUH)	1.850 1.848	0.6693 0.6691	0.17	0.31	0.35	1.42	1.02	1.742 1.702	1.67	1.8504 1.8499	0.67	2.44	1.26	0.04	1.2598 1.2593	1.50	0.87	0.35	0.33	3.37	3.3
20	**BSPB20D32**	**47.000 46.950**	**20.000 19.996**	**4.3**	**7.8**	**9.0**	**36.0**	**26.0**	**44.26 43.24**	**42.5**	**47.000 46.987**	**17**	**62**	**32.0**	**1.0**	**32.000 31.987**	**38.0**	**22.0**	**9.0**	**8.5**	**85.5**	**1.5**
	(MM20BS47DUH)	1.850 1.848	0.7874 0.7872	0.17	0.31	0.35	1.42	1.02	1.742 1.702	1.67	1.8504 1.8499	0.67	2.44	1.26	0.04	1.2598 1.2593	1.50	0.87	0.35	0.33	3.37	3.3
25	**BSPB25D42**	**52.000 51.950**	**25.000 24.996**	**4.3**	**9.8**	**11.0**	**50.0**	**40.0**	**50.26 49.24**	**59.5**	**62.500 62.487**	**20**	**85**	**42.0**	**1.0**	**42.000 41.987**	**42.0**	**25.0**	**10.0**	**10.0**	**115.0**	**2.8**
	(MM25BS62DUH)	2.047 2.045	0.9842 0.9841	0.17	0.39	0.43	1.97	1.57	1.979 1.938	2.34	2.4606 2.4601	0.79	3.35	1.65	0.04	1.6535 1.6530	1.65	0.98	0.39	0.39	4.53	6.16
30	**BSPB30D42**	**52.000 51.920**	**30.000 29.996**	**4.3**	**9.8**	**11.0**	**50.0**	**40.0**	**50.26 49.24**	**59.5**	**62.500 62.487**	**20**	**85**	**42.0**	**1.0**	**42.000 41.987**	**42.0**	**25.0**	**10.0**	**10.0**	**115.0**	**2.7**
	(MM30BS62DUH)	2.047 2.045	1.1811 1.1809	0.17	0.39	0.43	1.97	1.57	1.979 1.938	2.34	2.4606 2.4601	0.79	3.35	1.65	0.04	1.6535 1.6530	1.65	0.98	0.39	0.39	4.53	5.94
35	**BSPB35D50**	**52.000 51.950**	**35.000 34.995**	**4.3**	**13.0**	**13.0**	**60.0**	**46.0**	**50.26 49.24**	**66.5**	**68.000 67.987**	**20.5**	**95**	**50**	**1.0**	**50.000 49.987**	**42.0**	**25.0**	**10.0**	**10.0**	**126.0**	**3.8**
	(MM35BS72DUH)	2.047 2.045	1.3780 1.3778	0.17	0.51	0.51	2.36	1.81	1.979 1.938	2.62	2.6772 2.6767	0.81	3.74	1.97	0.04	1.9685 1.9680	1.65	0.98	0.39	0.39	4.96	8.36
40	**BSPB40D50**	**52.000 51.950**	**40.000 39.995**	**4.3**	**13.0**	**13.0**	**60.0**	**46.0**	**50.26 49.24**	**66.5**	**68.000 67.987**	**20.5**	**95**	**50.0**	**1.0**	**50.000 49.987**	**42.0**	**25.0**	**10.0**	**10.0**	**126.0**	**3.7**
	(MM40BS72DUH)	2.047 2.045	1.5748 1.5746	0.17	0.51	0.51	2.36	1.81	1.979 1.938	2.62	2.6772 2.6767	0.81	3.74	1.97	0.04	1.9685 1.9680	1.65	0.98	0.39	0.39	4.96	8.14
HEAVY-DUTY SERIES																						
35	**BSPB35D65**	**66.000 65.950**	**35.000 34.995**	**5.3**	**11.8**	**18.0**	**76.0**	**66.0**	**64.26 63.24**	**90.0**	**95.000 94.987**	**30.0**	**130.0**	**65.0**	**1.0**	**65.000 64.987**	**53.0**	**32.0**	**13.0**	**15.0**	**175.0**	**9.7**
	(MM35BS100DUH)	2.598 2.596	1.3780 1.3778	0.21	0.46	0.71	2.99	2.6	2.530 2.490	3.54	3.7402 3.7396	1.18	5.12	2.56	0.04	2.5590 2.5585	2.09	1.26	0.51	0.59	6.89	21.34
40	**BSPB40D65**	**66.000 65.950**	**40.000 39.995**	**5.3**	**11.8**	**18.0**	**76.0**	**66.0**	**64.26 63.24**	**90.0**	**95.000 94.987**	**30.0**	**130.0**	**65.0**	**1.0**	**65.000 64.987**	**53.0**	**32.0**	**13.0**	**15.0**	**175.0**	**9.5**
	(MM40BS100DUH)	2.598 2.596	1.5748 1.5746	0.21	0.46	0.71	2.99	2.6	2.530 2.490	3.54	3.7402 3.7396	1.18	5.12	2.56	0.04	2.5590 2.5585	2.09	1.26	0.51	0.59	6.89	20.9
45	**BSPB45D65**	**66.000 65.950**	**45.000 44.995**	**5.3**	**11.8**	**18.0**	**76.0**	**66.0**	**64.26 63.24**	**90.0**	**95.000 94.987**	**30.0**	**130.0**	**65.0**	**1.0**	**65.000 64.987**	**53.0**	**32.0**	**13.0**	**15.0**	**175.0**	**9.3**
	(MM45BS100DUH)	2.598 2.596	1.7716 1.7714	0.21	0.46	0.71	2.99	2.6	2.530 2.490	3.54	3.7402 3.7396	1.18	5.12	2.56	0.04	2.5590 2.5585	2.09	1.26	0.51	0.59	6.89	20.46
50	**BSPB50D65**	**66.000 65.950**	**50.000 49.995**	**5.3**	**11.8**	**18.0**	**76.0**	**66.0**	**64.26 63.24**	**90.0**	**95.000 94.987**	**30.0**	**130.0**	**65.0**	**1.0**	**65.000 64.987**	**53.0**	**32.0**	**13.0**	**15.0**	**175.0**	**9.1**
	(MM50BS100DUH)	2.598 2.596	1.9685 1.9683	0.21	0.46	0.71	2.99	2.6	2.530 2.490	3.54	3.7402 3.7396	1.18	5.12	2.56	0.04	2.5590 2.5585	2.09	1.26	0.51	0.59	6.89	20.02

BSPB Q
BALL SCREW SUPPORT
BEARING PILLOW BLOCK UNITS

- Similar in design and features to the Series BSPB D, except MM-BS-QU quadroplex bearings are used.
- Units are supplied with the bearings in quad sets mounted in the "DB" ("O") arrangement.
- Consult your Timken representative for suggested shaft fits.

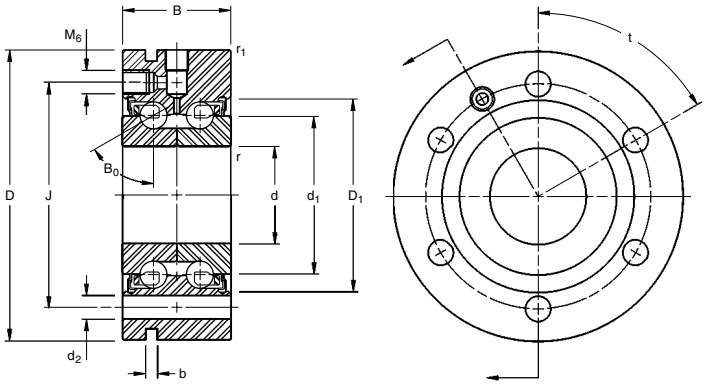


STANDARD SERIES – DIMENSIONAL TOLERANCES ± .13 mm (± 0.005") UNLESS OTHERWISE STATED.

Shaft Dia.	Unit Number	C	d	d_1	d_2	d_3	d_4	D	E	F	G	H	J	K	L	N	P	R	S	T	U	Wt.
mm	(Bearing Set)	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.
17	**BSPB17Q32**	**77.00 76.95**	**17.000 16.996**	**4.3**	**7.8**	**9.0**	**36.0**	**26.0**	**74.26 72.74**	**42.5**	**47.000 46.987**	**17**	**62**	**32.0**	**1.0**	**32.000 31.987**	**38.0**	**22.0**	**9.0**	**8.5**	**85.5**	**1.5**
	(MM17BS47QUH)	3.031 3.03	0.6693 0.6691	0.17	0.31	0.35	1.42	1.02	2.924 2.864	1.67	1.8504 1.8499	0.67	2.44	1.26	0.04	1.2598 1.2593	1.50	0.87	0.35	0.33	3.37	3.3
20	**BSPB20Q32**	**77.00 76.95**	**20.000 19.996**	**4.3**	**7.8**	**9.0**	**36.0**	**26.0**	**74.26 72.74**	**42.5**	**47.000 46.987**	**17**	**62**	**32.0**	**1.0**	**32.000 31.987**	**38.0**	**22.0**	**9.0**	**8.5**	**85.5**	**1.5**
	(MM20BS47QUH)	3.031 3.03	0.7874 0.7872	0.17	0.31	0.35	1.42	1.02	2.924 2.864	1.67	1.8504 1.8499	0.67	2.44	1.26	0.04	1.2598 1.2593	1.50	0.87	0.35	0.33	3.37	3.3
25	**BSPB25Q42**	**82.00 81.95**	**25.000 24.996**	**4.3**	**9.8**	**11.0**	**50.0**	**40.0**	**80.26 78.74**	**59.5**	**62.500 62.487**	**20**	**85**	**42.0**	**1.0**	**42.000 41.987**	**42.0**	**25.0**	**10.0**	**10.0**	**115.0**	**2.8**
	(MM25BS62QUH)	3.228 3.226	0.9842 0.9841	0.17	0.39	0.43	1.97	1.57	3.16 3.1	2.34	2.4606 2.4601	0.79	3.35	1.65	0.04	1.6535 1.6530	1.65	0.98	0.39	0.39	4.53	6.16
30	**BSPB30Q42**	**82.00 81.95**	**30.000 29.996**	**4.3**	**9.8**	**11.0**	**50.0**	**40.0**	**80.26 78.74**	**59.5**	**62.500 62.487**	**20**	**85**	**42.0**	**1.0**	**42.000 41.987**	**42.0**	**25.0**	**10.0**	**10.0**	**115.0**	**2.7**
	(MM30BS62QUH)	3.228 3.226	1.1811 1.1809	0.17	0.39	0.43	1.97	1.57	3.16 3.1	2.34	2.4606 2.4601	0.79	3.35	1.65	0.04	1.6535 1.6530	1.65	0.98	0.39	0.39	4.53	5.94
35	**BSPB35Q50**	**82.00 81.95**	**35.000 34.995**	**4.3**	**13.0**	**13.0**	**60.0**	**46.0**	**80.26 78.74**	**66.5**	**68.000 67.987**	**20.5**	**95**	**50**	**1.0**	**50.000 49.987**	**42.0**	**25.0**	**10.0**	**10.0**	**126.0**	**3.8**
	(MM35BS72QUH)	3.228 3.226	1.3780 1.3778	0.17	0.51	0.51	2.36	1.81	3.16 3.1	2.62	2.6772 2.6767	0.81	3.74	1.97	0.04	1.9685 1.9680	1.65	0.98	0.39	0.39	4.96	8.36
40	**BSPB40Q50**	**82.00 81.95**	**40.000 39.995**	**4.3**	**13.0**	**13.0**	**60.0**	**46.0**	**80.26 78.74**	**66.5**	**68.000 67.987**	**20.5**	**95**	**50.0**	**1.0**	**50.000 49.987**	**42.0**	**25.0**	**10.0**	**10.0**	**126.0**	**3.7**
	(MM40BS72QUH)	4.173 4.171	1.5748 1.5746	0.17	0.51	0.51	2.36	1.81	4.105 4.045	2.62	2.6772 2.6767	0.81	3.74	1.97	0.04	1.9685 1.9680	1.65	0.98	0.39	0.39	4.96	8.14
HEAVY-DUTY SERIES																						
35	**BSPB35Q65**	**106.00 105.95**	**35.000 34.995**	**5.3**	**11.8**	**18.0**	**76.0**	**66.0**	**104.26 102.74**	**90.0**	**95.000 94.987**	**30.0**	**130.0**	**65.0**	**1.0**	**65.000 64.987**	**53.0**	**32.0**	**13.0**	**15.0**	**175.0**	**9.7**
	(MM35BS100QUH)	3.228 3.226	1.3780 1.3778	0.21	0.46	0.71	2.99	2.6	3.16 3.1	3.54	3.7402 3.7396	1.18	5.12	2.56	0.04	2.5590 2.5585	2.09	1.26	0.51	0.59	6.89	21.34
40	**BSPB40Q65**	**106.00 105.95**	**40.000 39.995**	**5.3**	**11.8**	**18.0**	**76.0**	**66.0**	**104.26 102.74**	**90.0**	**95.000 94.987**	**30.0**	**130.0**	**65.0**	**1.0**	**65.000 64.987**	**53.0**	**32.0**	**13.0**	**15.0**	**175.0**	**9.5**
	(MM40BS100QUH)	4.173 4.171	1.5748 1.5746	0.21	0.46	0.71	2.99	2.6	4.105 4.045	3.54	3.7402 3.7396	1.18	5.12	2.56	0.04	2.5590 2.5585	2.09	1.26	0.51	0.59	6.89	20.9
45	**BSPB45Q65**	**106.00 105.95**	**45.000 44.995**	**5.3**	**11.8**	**18.0**	**76.0**	**66.0**	**104.26 102.74**	**90.0**	**95.000 94.987**	**30.0**	**130.0**	**65.0**	**1.0**	**65.000 64.987**	**53.0**	**32.0**	**13.0**	**15.0**	**175.0**	**9.3**
	(MM45BS100QUH)	4.173 4.171	1.7716 1.7714	0.21	0.46	0.71	2.99	2.6	4.105 4.045	3.54	3.7402 3.7396	1.18	5.12	2.56	0.04	2.5590 2.5585	2.09	1.26	0.51	0.59	6.89	20.46
50	**BSPB50Q65**	**106.00 105.95**	**50.000 49.995**	**5.3**	**11.8**	**18.0**	**76.0**	**66.0**	**104.26 102.74**	**90.0**	**95.000 94.987**	**30.0**	**130.0**	**65.0**	**1.0**	**65.000 64.987**	**53.0**	**32.0**	**13.0**	**15.0**	**175.0**	**9.1**
	(MM50BS100QUH)	4.173 4.171	1.9685 1.9683	0.21	0.46	0.71	2.99	2.6	4.105 4.045	3.54	3.7402 3.7396	1.18	5.12	2.56	0.04	2.5590 2.5585	2.09	1.26	0.51	0.59	6.89	20.02

SEALED, DOUBLE-ROW BALL SCREW SUPPORT BEARINGS FLANGED STYLE

MMF SERIES



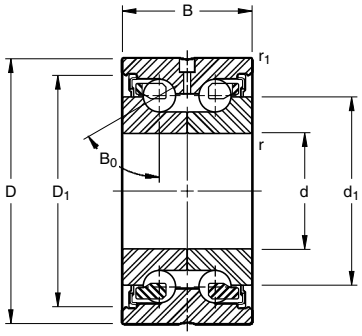
MMF Series Flanged

METRIC AND INCH DIMENSIONAL SIZES

Bearing Number	Bore d/Tol	O.D. D/Tol	Width B/Tol	Wt.	Outer Rs1 r1	Inner Rs r	Min. D1	Max. d1	Housing Shoulder Dia.	Shaft Shoulder Dia.	d2 Hole Dia.	Holes	b	Pitch Circle J	Hole Spacing t	Contact Angle B0	Heavy Series
METRIC	mm +0/ -(µm)			kg	mm	mm	mm	mm	mm	mm	mm	Qty.		mm	degrees		
MMF512BS55PP DM	12 (3.8)	55 (7.6)	25 (254)	0.40	0.6	0.3	33.1	25.0	32.0	19.0	6.5	3	3	42	120	60	
MMF515BS60PP DM	15 (3.8)	60 (7.6)	25 (254)	0.47	0.6	0.3	37.0	27.6	34.5	21.5	6.5	3	3	46	120	60	
MMF517BS62PP DM	17 (3.8)	62 (7.6)	25 (254)	0.49	0.6	0.3	37.8	28.4	36.5	23.5	6.5	3	3	48	120	60	
MMF520BS68PP DM	20 (5.1)	68 (7.6)	28 (254)	0.64	0.6	0.3	43.2	34.5	42.5	27.5	6.5	4	3	53	90	60	
MMF525BS75PP DM	25 (5.1)	75 (7.6)	28 (254)	0.76	0.6	0.3	49.5	40.6	48.0	33.5	6.5	4	3	58	90	60	
MMF530BS80PP DM	30 (5.1)	80 (7.6)	28 (254)	0.84	0.6	0.3	54.3	45.6	53.5	38.5	6.5	6	3	63	60	60	
MMF540BS100PP DM	40 (6.4)	100 (7.6)	34 (254)	1.50	0.6	0.3	68.7	57.5	67.0	49.0	8.5	4	3	80	90	60	
MMF550BS115PP DM	50 (6.4)	115 (7.6)	34 (254)	1.37	0.6	0.3	82.6	71.5	81.0	63.0	8.5	6	3	94	60	60	
MMF550BS140PP DM	50 (6.4)	140 (8.9)	54 (254)	4.89	0.6	0.6	99.6	81.1	98.5	66.0	10.5	12	3	113	30	60	H
MMF560BS145PP DM	60 (7.6)	145 (8.9)	45 (254)	4.28	0.6	0.6	100.0	89.0	98.0	72.0	8.5	8	3	120	45	60	
INCHES	in. +0/-(x)			lbs.	in.	in.	in.	in.	in.	in.	in.	Qty.		in.	degrees		
MMF512BS55PP DM	0.4724 (0.00015)	2.1654 (0.0003)	0.9843 (0.0100)	0.88	0.024	0.012	1.304	0.905	1.260	0.748	0.256	3	.118	1.654	120	60	
MMF515BS60PP DM	0.5906 (0.00015)	2.3622 (0.0003)	0.9843 (0.0100)	1.04	0.024	0.012	1.456	1.088	1.358	0.846	0.256	3	.118	1.811	120	60	
MMF517BS62PP DM	0.6693 (0.00015)	2.4409 (0.0003)	0.9843 (0.0100)	1.08	0.024	0.012	1.490	1.117	1.437	0.925	0.256	3	.118	1.890	120	60	
MMF520BS68PP DM	0.7874 (0.0002)	2.6772 (0.0003)	1.1024 (0.0100)	1.42	0.024	0.012	1.700	1.357	1.673	1.083	0.256	4	.118	2.087	90	60	
MMF525BS75PP DM	0.9843 (0.0002)	2.9528 (0.0003)	1.1024 (0.0100)	1.68	0.024	0.012	1.943	1.599	1.890	1.319	0.256	4	.118	2.283	90	60	
MMF530BS80PP DM	1.1811 (0.0002)	3.1496 (0.0003)	1.1024 (0.0100)	1.86	0.024	0.012	2.138	1.795	2.106	1.516	0.256	6	.118	2.480	60	60	
MMF540BS100PP DM	1.5748 (0.00025)	3.937 (0.0003)	1.3386 (0.0100)	3.41	0.024	0.012	2.704	2.264	2.638	1.929	0.335	4	.118	3.150	90	60	
MMF550BS115PP DM	1.9685 (0.00025)	4.5276 (0.0003)	1.3386 (0.0100)	4.37	0.024	0.012	3.250	2.815	3.189	2.408	0.335	6	.118	3.701	60	60	
MMF550BS140PP DM	1.9685 (0.00025)	5.5118 (0.00035)	2.1260 (0.0100)	10.78	0.024	0.024	3.919	3.192	3.878	2.598	0.413	12	.118	4.449	30	60	H
MMF560BS145PP DM	2.3622 (0.0003)	5.7087 (0.00035)	1.7717 (0.0100)	9.43	0.024	0.024	3.938	3.308	3.858	2.835	0.335	8	.118	4.724	45	60	

SEALED, DOUBLE-ROW BALL SCREW SUPPORT BEARINGS CARTRIDGE STYLE

MMN SERIES



MMN Series

METRIC AND INCH DIMENSIONAL SIZES

Bearing Number	Bore d/Tol	O.D. D/Tol	Width B/Tol	Wt.	Outer R_1	Inner r	Min. d_1	Max. dia.	Housing Shoulder Dia.	Shaft Shoulder Dia.	Contact Dia. B_o	Heavy Series
METRIC	**mm +0/ -(µm)**			**kg**	**mm**	**mm**	**mm**	**mm**	**mm**	**mm**	**degrees**	
MMN512BS42PP DM	12 (3.8)	42 (6.4)	25 (254)	0.20	0.6	0.3	33.1	25.0	32.0	19.0	60	
MMN515BS45PP DM	15 (3.8)	45 (6.4)	25 (254)	0.23	0.6	0.3	37.0	27.6	34.5	21.5	60	
MMN517BS47PP DM	17 (3.8)	47 (6.4)	25 (254)	0.24	0.6	0.3	37.8	28.4	36.5	23.5	60	
MMN520BS52PP DM	20 (5.1)	52 (7.6)	28 (254)	0.32	0.6	0.3	43.2	34.5	42.5	27.5	60	
MMN525BS57PP DM	25 (5.1)	57 (7.6)	28 (254)	0.35	0.6	0.3	49.3	40.6	48.0	33.5	60	
MMN530BS62PP DM	30 (5.1)	62 (7.6)	28 (254)	0.40	0.6	0.3	54.3	45.6	53.5	38.5	60	
MMN540BS75PPDM	40 (6.4)	75 (7.6)	34 (254)	0.64	0.6	0.3	68.7	57.5	67.0	49.0	60	
MMN550BS90PP DM	50 (6.4)	90 (7.6)	34 (254)	0.91	0.6	0.3	82.6	71.5	81.0	63.0	60	
MMN550BS110PP DM	50 (6.4)	110 (8.9)	54 (254)	2.42	0.6	0.6	99.6	81.1	98.5	66.0	60	H
MMN560BS110PP DM	60 (7.6)	110 (8.9)	45 (254)	1.82	0.6	0.6	100.0	84.0	98.0	72.0	60	
INCHES	**in. +0/-(x)**			**lbs.**	**in.**	**in.**	**in.**	**in.**	**in.**	**in.**	**degrees**	
MMN512BS42PP DM	0.4724 (0.00015)	1.6535 (0.00025)	0.9843 (.0100)	0.44	0.024	0.012	1.304	0.985	1.259	0.748	60	
MMN515BS45PP DM	0.5906 (0.00015)	1.7717 (0.00025)	0.9843 (0.0100)	0.50	0.024	0.012	1.456	1.088	1.358	0.846	60	
MMN517BS47PP DM	0.6693 (0.00015)	1.8504 (0.00025)	0.9843 (0.0100)	0.54	0.024	0.012	1.490	1.117	1.437	0.925	60	
MMN520BS52PP DM	0.7874 (0.0002)	2.0472 (0.0003)	1.1024 (0.0100)	0.70	0.024	0.012	1.700	1.357	1.673	1.083	60	
MMN525BS57PP DM	0.9843 (0.0002)	2.2441 (0.0003)	1.1024 (0.0100)	0.78	0.024	0.012	1.943	1.599	1.890	1.319	60	
MMN530BS62PP DM	1.1811 (0.0002)	2.4409 (0.0003)	1.1024 (0.0100)	0.88	0.024	0.012	2.138	1.795	2.106	1.516	60	
MMN540BS75PPDM	1.5748 (0.00025)	2.9528 (0.0003)	1.3386 (0.0100)	1.42	0.024	0.012	2.704	2.264	2.638	1.929	60	
MMN550BS90PP DM	1.9685 (0.00025)	3.5433 (0.0003)	1.3386 (0.0100)	2.02	0.024	0.012	3.250	2.815	3.189	2.408	60	
MMN550BS110PP DM	1.9685 (0.00025)	4.3307 (0.00035)	2.1260 (0.0100)	5.34	0.024	0.024	3.919	3.192	3.878	2.598	60	H
MMN560BS110PP DM	2.3622 (0.0003)	4.3307 (0.00035)	1.7717 (0.0100)	4.02	0.024	0.024	3.938	3.308	3.858	2.835	60	

EX-CELL-O SPINDLE BEARINGS

- "EX" Series (Timken® Fafnir® WI construction) designed to meet Ex-Cell-O replacement requirements for inch nominal spindles with bore and O.D. tolerances nominal to plus.
- "XWO" Series (Timken Fafnir WO separable construction) designed to meet Ex-Cell-O replacement requirements for inch nominal spindles with bore and O.D. tolerances nominal to minus.
- Measurement of shafts and housings (or reconditioning of parts) should determine replacement bearing style.
- Shafts and housings should be checked (and reworked) to avoid improper shaft and housing fits.
- Preload selection should be based on operating speed and lubrication system of spindle.

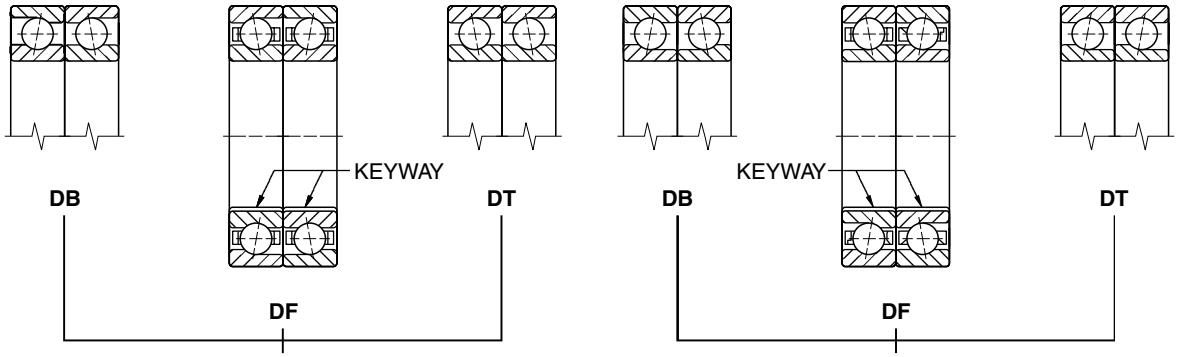
MM-EX

REPLACEMENT BEARINGS - FOR EX-CELL-O SPINDLES

Bearing Number	Ex-Cell-O Part No.	Preload lbs.	Bore (in.)		O.D. (in.)		Width - Pair (in.)		Maximum Speed (RPM)
			Max.	Min.	Max.	Min.	Max.	Min.	
MM20EXCR DU FS223	20	0	0.3752	.3750	1.1252	1.1250	0.6875	0.6775	65000
MM30EXCR DU FS223	30	0	0.6252	.6250	1.5002	1.5000	1.0000	0.9900	35000
MM30EXCR DU 5 #	30	5	0.6252	.6250	1.5002	1.5000	1.0000	0.9900	25000
MM50EXCR DU FS223	50	0	0.8127	.8125	2.0002	2.0000	1.0000	0.9900	30000
MM50EXCR DU 10 #	50	10	0.8127	.8125	2.0002	2.0000	1.0000	0.9900	18000
MM50EXCR DU 50 #	50	50	0.8127	.8125	2.0002	2.0000	1.0000	0.9900	5000
*MM55EXCR DU 10 #	55	10	0.8127	.8125	2.0002	2.0000	1.0000	0.9900	22000
MM57EXCR DU FS223	57	0	1.0627	1.0625	2.2502	2.2500	1.0000	0.9900	30000
MM57EXCR DU 10 #	57	10	1.0627	1.0625	2.2502	2.2500	1.0000	0.9900	15000
MM57EXCR DU 50 #	57	50	1.0627	1.0625	2.2502	2.2500	1.0000	0.9900	5000
MM67EXCR DU FS223	67	0	1.2502	1.2500	2.4377	2.4375	1.2500	1.2400	30000
MM67EXCR DU 10 #	67	10	1.2502	1.2500	2.4377	2.4375	1.2500	1.2400	12500
MM67EXCR DU 30 #	67	30	1.2502	1.2500	2.4377	2.4375	1.2500	1.2400	7500
MM67EXCR DU 75 #	67	75	1.2502	1.2500	2.4377	2.4375	1.2500	1.2400	4500
MM90EXCR DU 20 #	90	20	1.6252	1.6250	3.4377	3.4375	1.6250	1.6150	10000
MM90EXCR DU 100 #	90	100	1.6252	1.6250	3.4377	3.4375	1.6250	1.6150	4500
MM90EXCR DU 150 #	90	150	1.6252	1.6250	3.4377	3.4375	1.6250	1.6150	2700
MM90EXCR DU 250 #	90	250	1.6252	1.6250	3.4377	3.4375	1.6250	1.6150	900
**MM92EXCR DU 20 #	92	20	1.7502	1.7500	3.4377	3.4375	1.6250	1.6150	12000
**MM92EXCR DU 100 #	92	100	1.7502	1.7500	3.4377	3.4375	1.6250	1.6150	4500
**MM92EXCR DU 150 #	92	150	1.7502	1.7500	3.4377	3.4375	1.6250	1.6150	2700
**MM92EXCR DU 250 #	92	250	1.7502	1.7500	3.4377	3.4375	1.6250	1.6150	900
MM115EXCR DU 30 #	115	30	2.2502	2.2500	4.7502	4.7500	2.2500	2.2400	5000
MM115EXCR DU 250 #	115	250	2.2502	2.2500	4.7502	4.7500	2.2500	2.2400	3600
MM115EXCR DU 350 #	115	350	2.2502	2.2500	4.7502	4.7500	2.2500	2.2400	1800
MM135EXCR DU 20 #	135	20	1.2502	1.2500	2.6877	2.6875	1.2500	1.2400	8000
MM135EXCR DU 75 #	135	75	1.2502	1.2500	2.6877	2.6875	1.2500	1.2400	4000
MM155EXCR DU 150 #	155	150	2.7502	2.7500	4.7502	4.7500	2.2500	2.2400	4000
MM155EXCR DU 300 #	155	300	2.7502	2.7500	4.7502	4.7500	2.2500	2.2400	1800
MM165EXCR DU 200 #	165	200	3.5002	3.5000	6.3127	6.3125	3.0000	2.9900	2800
MM165EXCR DU 400 #	165	400	3.5002	3.5000	6.3127	6.3125	3.0000	2.9900	1200

These bearings not intended for new design applications. Consult your local Timken representative.
Do not interchange with MM-XWO.
* Four slots in outer ring faces.
** No keyway in bore.
FS-223 Zero to negative preload.

TIMKEN MM-EX AND MM-XWO BEARINGS FOR REPLACEMENT ON EX-CELL-O SPINDLES



Old design, MM-EX
Bore and O.D. Tolerance
Nominal + Tolerance
"WI" Construction

New Design, MM-XWO
Bore and O.D. Tolerance
Nominal - Tolerance
"WO" Construction

MM-XWO

REPLACEMENT BEARINGS -FOR EX-CELL-O SPINDLES

Bearing Number	Ex-Cell-O Part No.	Preload lbs.	Bore (in.)		O.D. (in.)		Width - Pair (in.)		Maximum (RPM)		
			Max.	Min.	Max.	Min.	Max.	Min.	Grease	Oil	Mist
MM20XWOCRDU E9103A	XLO 20-107	0	0.37500	0.37485	1.1250	1.1248	0.6875	0.6675	40000	65000	80000
MM30XWOCRDU E9103C	XLO 30-57	10	0.62500	0.62485	1.5000	1.4998	1.0000	0.9800	27000	30000	35000
MM30XWOCRDU E9103A	XLO 30-107	0	0.62500	0.62485	1.5000	1.4998	1.0000	0.9800	35000	40000	60000
MM55XWOCRDU E9103E	XLO 55-27	50	0.81250	0.81235	2.0000	1.9998	1.0000	0.9800	5000	8000	12000
MM55XWOCRDU E9103C	XLO 55-57	20	0.81250	0.81235	2.0000	1.9998	1.0000	0.9800	20000	22000	24000
MM55XWOCRDU E9103A	XLO 55-107	0	0.81250	0.81235	2.0000	1.9998	1.0000	0.9800	24000	27000	45000
MM57XWOCRDU E9103F	XLO 57-17	100	1.06250	1.06235	2.2500	2.2498	1.0000	0.9800	2000	4000	6000
MM57XWOCRDU E9103C	XLO 57-57	20	1.06250	1.06235	2.2500	2.2498	1.0000	0.9800	18000	20000	22000
MM57XWOCRDU E9103A	XLO 57-107	0	1.06250	1.06235	2.2500	2.2498	1.0000	0.9800	22000	25000	35000
MM67XWOCRDU E9103F	XLO 67-17	90	1.25000	1.24980	2.4375	2.4373	1.2500	1.2300	36000	4500	6000
MM67XWOCRDU E9103C	XLO 67-57	20	1.25000	1.24980	2.4375	2.4373	1.2500	1.2300	12500	15000	20000
MM67XWOCRDU E9103A	XLO 67-107	0	1.25000	1.24980	2.4375	2.4373	1.2500	1.2300	16000	20000	30000
MM90XWOCRDU E9103F	XLO 90-17	250	1.62500	1.62480	3.4375	3.4372	1.6250	1.6050	1000	2000	4000
MM90XWOCRDU E9103D	XLO 90-47	175	1.62500	1.62480	3.4375	3.4372	1.6250	1.6050	3000	5000	8000
MM90XWOCRDU E9103C	XLO 90-57	100	1.62500	1.62480	3.4375	3.4372	1.6250	1.6050	5000	7000	11000
MM90XWOCRDU E9103A	XLO 90-77	20	1.62500	1.62480	3.4375	3.4372	1.6250	1.6050	10000	14000	20000
MM115XWOCRDU E9103E	XLO 115-27	300	2.25000	2.24980	4.7500	4.7496	2.2500	2.2300	1000	2000	3000
MM115XWOCRDU E9103C	XLO 115-47	150	2.25000	2.24980	4.7500	4.7496	2.2500	2.2300	3000	4500	7000
MM115XWOCRDU E9103A	XLO 115-77	30	2.25000	2.24980	4.7500	4.7496	2.2500	2.2300	6000	8000	15000
MM135XWOCRDU E9103C	XLO 135-67	50	1.25000	1.24980	2.6875	2.6873	1.2500	1.2300	6000	7000	12000
MM135XWOCRDU E9103A	XLO 135-10	70	1.25000	1.24980	2.6875	2.6873	1.2500	1.2300	15000	19000	28000
MM155XWOCRDU E9103D	XLO 155-37	300	2.75000	2.74980	4.7500	4.7496	2.2500	2.2300	1000	2000	3000
MM155XWOCRDU E9103B	XLO 155-67	150	2.75000	2.74980	4.7500	4.7496	2.2500	2.2300	4000	5000	6500
MM155XWOCRDU E9103A	XLO 155-87	50	2.75000	2.74980	4.7500	4.7496	2.2500	2.2300	6000	7000	10000
MM165XWOCRDU E9103E	XLO 165-27	800	3.50000	3.49975	6.3125	6.3121	3.0000	2.9800	500	1000	2000
MM165XWOCRDU E9103C	XLO 165-57	250	3.50000	3.49975	6.3125	6.3121	3.0000	2.9800	2000	3000	5000
MM165XWOCRDU E9103A	XLO 165-87	50	3.50000	3.49975	6.3125	6.3121	3.0000	2.9800	5000	6500	9000

Do not interchange with MM-EX.
MM-XWO produced to nominal minus tolerance.

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TIMKEN

GLOBAL LOCATIONS

	Offices	Plants	Distribution/ Service Centers	Technology Facilities
ARGENTINA				
Buenos Aires	●		●	
AUSTRALIA				
Ballarat	●		●	
Brisbane	●			
Melbourne	●			
Perth	●			
Sydney	●			
BELGIUM				
Brussels	●			
BRAZIL				
São Paulo	●	● ●	●	
Tamboré			●	
CANADA				
Bedford		●		
Edmonton	●			
Montreal	●			
St.Thomas	●	●		
Toronto	●			
CHINA				
Beijing	●			
Chengdu	●			
Hong Kong	●			
Shanghai	●		●	
Wuxi	●	● ●		
Yantai	●	●		
CZECH REPUBLIC				
Brno	●			●
Olomouc	●	●		
Prague	●			

GLOBAL LOCATIONS *- continued*

	Offices	Plants	Distribution/ Service Centers	Technology Facilities
ENGLAND				
Coventry	●		●	
Leicester	●	●		
Northampton	●	●		
Pontefract	●			
Sheffield	●		●	
Wednesfield	●			
Wolverhampton	●	● ●		
FRANCE				
Colmar	●	●		●
Fougeres		●		
Les Ulis	●			
Moult	●	●		
Paris	●			
Strasbourg	●		●	
Vierzon	●	●		●
GERMANY				
Haan	●			
Halle-Westfalen	●	●	●	●
Hannover	●			
Stuttgart	●			
HUNGARY				
Budapest	●			
INDIA				
Bangalore	●			●
Calcutta	●			
Jamshedpur	●	●		
New Delhi	●			
Pune	●			
ITALY				
Brescia	●	●		

	Offices	Plants	Distribution/ Service Centers	Technology Facilities
JAPAN				
Yokohama	●			
KOREA				
Seoul	●			
MEXICO				
Mexico City	●		●	
NETHERLANDS				
Medemblik	●	●	●	
POLAND				
Sosnowiec	●	●		
Warsaw	●			
ROMANIA				
Ploiesti	●	●		●
RUSSIA				
Moscow	●			
SINGAPORE				
Singapore	●		●	
SOUTH AFRICA				
Benoni	●	●	●	
SPAIN				
Bilbao	●	●	●	
Madrid	●			
TAIWAN				
Taipei	●			
TURKEY				
Istanbul	●			

GLOBAL LOCATIONS - *continued*

	Offices	Plants	Distribution/ Service Centers	Technology Facilities
UNITED STATES				
Altavista, VA		●		
Anaheim (Los Angeles), CA	●			
Ann Arbor, MI	●			
Atlanta, GA	●			
Bettendorf, IA	●			
Boca Raton, FL	●			
Bucyrus, OH		●	●	
Cairo, GA		●		
Canton (Ball Ground), GA		●		
Canton, OH	●	● ● ● ● ● ●		●
Carlyle, IL		●		
Charlotte, NC	●			
Chicago, IL	●			
Cincinnati, OH	●			
Cleveland, OH	●			
Clinton, SC		●		
Columbus (Tryon Peak), NC		●		
Dahlonega, GA		●		
Detroit, MI	●			
Eaton (St. Clair), OH		●		
Franklin (Sandycreek), PA			●	
Gaffney, SC		●		
Gilbert, AZ	●	●		
Hartford, CT	●			
Honea Path, SC		●		
Houston, TX	●			
Indianapolis, IN	●			
Iron Station (Lincolnton), NC		●		
Irving (Dallas), TX	●			
Jacksonville, FL	●			
Kansas City, KS	●			
Keene, NH	●	● ●		●
Knoxville, TN	●	●		

	Offices	Plants	Distribution/ Service Centers	Technology Facilities
UNITED STATES - *continued*				
Latrobe, PA	●	● ●	●	●
Lebanon, NH	●	●		●
Lenexa, KS		●		
Los Alamitos, CA	●	●		
Marlborough, MA	●			
Milwaukee, WI	●			
New Philadelphia, OH		●		
Niles, OH		●		
Norcross, GA		●		●
Northborough, MA			●	
Ogden, UT		●		
Peoria, IL	●			
Philadelphia, PA	●			
Pittsburgh, PA	●			
Pulaski, TN		●		
Randalman (Asheboro), NC		●		
Rutherfordton (Shiloh), NC		●		
Seattle, WA	●			
South Bend, IN		●		
Spartanburg (Duncan), SC			●	
Sterling Heights (Detroit), MI			● ●	
Sylvania, GA		●		
Torrington, CT	●			●
Union (Tyger River), SC		●		
Vienna (Youngstown), OH	●		●	
Walhalla, SC		●		
Wauseon, OH	●		●	
White House (Nashville), TN			●	
VENEZUELA				
Caracas	●			
TOTAL	**92**	**62**	**24**	**13**

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