

TIMKEN



TIMKEN® DEEP GROOVE BALL BEARING CATALOG



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Официальный дистрибьютор TIMKEN в Украине



DEEP GROOVE BALL BEARING CATALOG INDEX

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GROW STRONGER WITH TIMKEN

Every day, people around the world count on the strength of Timken. Our expertise in metallurgy, friction management and mechanical power transmission helps them accelerate improvements in productivity and uptime.

We supply products and services that can help keep your operations moving forward, whether you need drive train kits for commercial vehicles, durable housings for bearings in dirty environments, couplings that avoid metal-to-metal contact between motors and gearboxes, repair services for bearings and gearboxes, roller chain for dry, abrasive and high-moisture applications, or other products or services for your applications.

When you choose Timken, you receive more than high-quality products and services: you gain a worldwide team of highly trained and experienced Timken people committed to working collaboratively with you to improve your business.

Globally, our 14,000 people provide reliable answers for a wide range of operations in manufacturing, mining, medical equipment, aerospace, transportation, oil and gas – and other diverse industries.



INCREASE YOUR EQUIPMENT UPTIME

In addition to high-quality bearings and mechanical power transmission components, we provide valuable integrated products and services. For example, we offer repair services and monitoring equipment that can alert you to problems before they impact your uptime.

Additionally, we offer a broad selection of seals, premium lubricants, lubricators, couplings and chain to keep your operations moving smoothly.

Our technology centers in the United States, Europe and Asia help pioneer tomorrow's innovations with extensive basic and applied scientific research programs. Through internal development and strategic acquisition of innovative companies, we continue to expand our portfolio of highly engineered bearings and components.



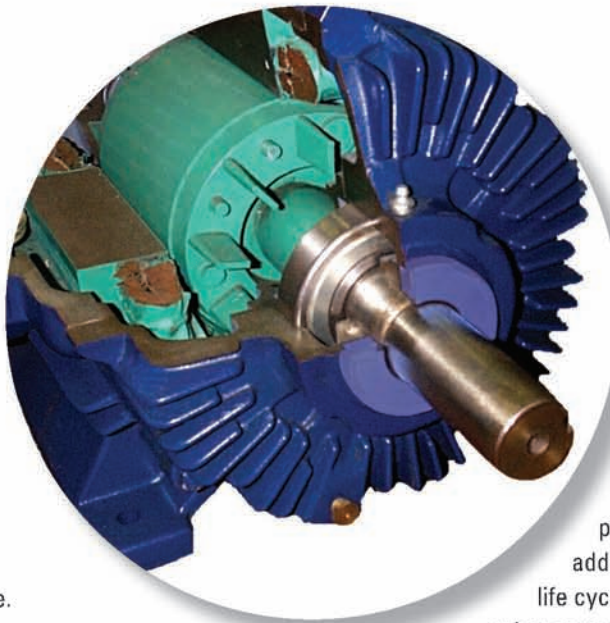
INDUSTRIAL INNOVATOR

Today, manufacturing and processing equipment handles heavier loads, faster speeds and greater expectations than ever before. As finished-product quality requirements increase, producers continue to place a premium on equipment uptime and performance.

Timken has more than a century of experience developing bearings and related solutions that help equipment run more efficiently in a wide range of applications. As the leader in friction-management and power-transmission solutions for industrial markets, Timken helps operators improve their equipment's performance and uptime. We accomplish this by providing custom solutions – from bearings that stand up to the harshest environments to condition monitoring that minimizes maintenance costs and improves plant productivity.

INNOVATION AND CUSTOMER SUPPORT

Timken operates technology centers around the world dedicated to developing innovative concepts and products that help you operate more efficiently. Our technical leadership and customer support reaches far beyond our products. Timken customers have access to sales and service engineering support at their plants, and options for additional support from application engineers who specialize in a variety of industrial applications.



CORE CAPABILITIES

Timken has evolved from its early roots as a bearing producer to a supplier offering much more, including friction-management and power-transmission solutions that add value throughout the complete life cycle of a system. Our material

enhancements improve bearing life and can help protect against debris and corrosion – two

challenges encountered frequently in various industrial applications. Our precision manufacturing capabilities and commitment to quality ensure global consistency in design and manufacturing at every Timken facility. A global distribution network provides our customers with easy access to Timken products and services throughout the world.

We leverage these core capabilities as we work with original equipment manufacturers (OEM) and designers to integrate our technologies into equipment so that end users can enjoy the performance benefits of Timken products from the first day of operation. OEMs depend on Timken for our engineering expertise, manufacturing capabilities and emphasis on reliable performance.

PRODUCTS AND SERVICES

We offer equipment builders and operators one of the most extensive friction-management product and service portfolios in the industry.

We also strictly adhere to the Timken Quality Management System in every plant worldwide, so each bearing product meets the same high-quality standards – no matter where in the world it is manufactured.

BEARINGS

Timken provides a broad range of bearing designs and configurations for use in mobile, industrial and auxiliary equipment.

Bearing types include:

- Tapered roller bearings** – Tapered roller bearings are uniquely designed to manage both thrust and radial loads, and are available in single- and multi-row designs with a wide range of assembly options. Our extensive offering of tapered roller bearing combinations offers equipment builders and operators simple, reliable and less costly design solutions.
- Cylindrical roller bearings** – This design generally offers the highest possible radial load capacity for a given size compared to other roller bearing types. Single-row and double-row cylindrical roller bearings are ideal for many mill stand, gear drive and other auxiliary equipment applications, while four-row cylindrical roller bearings are used in roll neck applications. Timken offers both single and multi-row cylindrical roller bearings. Custom designs are available upon request for specific applications.
- Spherical roller bearings** – Spherical roller bearings offer high radial and moderate thrust capacity together with maximum static and dynamic misalignment capability. Timken® spherical roller bearings provide high-static load capacity and advanced geometry that reduces friction

and heat generation. These bearings are available in a range of dimensional stability configurations to suit elevated operating temperatures.

- Thrust bearings** – Thrust bearings are available in ball, cylindrical, spherical and tapered designs. Thrust bearings are ideal for applications experiencing heavy axial loads, and they are used extensively in heavy industrial processing equipment.



- **Ball bearings** – Ball bearings are used extensively in auxiliary applications that have light loads and/or high-speed conditions. Timken offers a range of radial, thrust and angular contact ball bearings in both metric and inch sizes. Please contact your Timken sales engineer for detailed information on these product ranges.

HOUSED UNITS

Maintaining critical uptime can require more durable, heavy-duty components capable of protecting spherical, tapered and ball bearings in debris-filled, contaminated or high-moisture environments. Timken has engineered a lineup of housed units – one of the broadest available – to meet these various demands and offer the ideal level of bearing protection.

SNT/SAF PLUMMER (PILLOW) BLOCK HOUSED UNITS

Customizable design, interchangeable components and reliable spherical roller bearings deliver the heavy-duty performance that helps protect equipment and improve uptime in the harshest environments.

- Variety of sealing options keep grease in and contamination out
- Easily convert from fixed to float configurations in the field
- Easy-to-remove cap for inspections, replacement and maintenance

SPHERICAL ROLLER BEARING SOLID BLOCK HOUSED UNITS

Cast steel housings with high-performance spherical roller bearings deliver outstanding durability in extreme conditions, including severe shock loads and vibration.

- Multiple sealing options provide protection from contaminants in the harshest environments
- Can be mounted and aligned in 15 minutes with a variety of available shaft-locking mechanisms
- Easily convert from fixed to float configurations in the field

TYPE E TAPERED ROLLER BEARING HOUSED UNITS

A new standard in performance, Type E tapered roller bearing housed units are ideal for fixed positions and can withstand the most demanding conditions with less downtime and maintenance.

- Seal provides industry-leading protection against contamination
- Optimized internal geometries offer the highest dynamic load ratings in the industry for improved bearing life and performance

BALL BEARING HOUSED UNITS

Timken has delivered innovations that offer advanced performance, including wide inner ring bearing and ball bearing housed units. Easy installation, multi-seal design and multiple housing styles help ball bearing housed units support a wide range of demanding applications and conditions.



- Provide advanced protection against contaminants in a robust, compact unit
- Withstand static misalignment of +/- 3 degrees
- Effective grease retention, and reduced debris and moisture ingress improve performance

REVOLVO SPLIT CYLINDRICAL ROLLER BEARING HOUSED UNIT

Reduce installation time in tight spaces and trapped applications. Revolve's line of split-to-the-shaft cylindrical roller bearing housed units enables the bearing to be installed without requiring access to the shaft ends.

HIGH-PERFORMANCE BEARING SOLUTIONS

Timken provides a variety of high-performance bearing solutions, including Timken® AquaSpexx®, DuraSpexx® and thin dense chrome bearings for corrosion protection. Our debris-resistant bearings are ideal for contaminated and/or marginal lubrication conditions.

We also provide customized bearing solutions such as special race profiles to meet special application requirements.

In addition to component geometry and metallurgy, we find many ways to enhance bearing performance by applying unique surface finishes and special coatings on rollers, raceways and other functional surfaces.



Engineered surfaces and topographical modifications reduce surface roughness to lower levels rather than what can be achieved through conventional grinding and honing methods. We also offer proprietary coatings that can create a surface up to four times harder than steel with twice the elasticity. For more information on Timken high-performance bearings and engineered surfaces, contact a Timken sales representative.

POWER TRANSMISSION COMPONENTS AND SYSTEMS

Timken offers an expanding range of power transmission components including seals, couplings and engineered chain.

Timken develops seals using advanced material and process solutions that help protect machinery and minimize plant downtime. We offer a comprehensive line of large-bore oil and grease seals, and metallic and non-metallic bearing isolators.

Timken® Quick-Flex® couplings are highly durable and need minimal maintenance. They are easy to install and require no lubrication. The couplings are designed to connect motors and gearboxes with other moving equipment with capacity to transmit the same or more torque than a gear coupling in the same dimensions. The Quick-Flex coupling's innovative design utilizes an advanced elastomeric element to transmit the torque and eliminates any interference between coupling hubs that can damage equipment.

Timken manufactures precision roller chains that meet demanding steel industry applications. We build chains to precise specifications for strength and maximum wear life. The offering includes a complete line of roller chains, attachment chains and engineered conveyor chains.





LUBRICANTS AND LUBRICATION SYSTEMS

Serving industries around the world, Timken lubricants and lubrication systems are essential in maximizing performance, productivity and uptime.

Leveraging our expertise in tribology and anti-friction bearings, we've developed lubricants – including 27 formulations of grease – that help ensure smooth operation. Our single- and multi-point lubricators, in addition to Interlube automated lubrication delivery systems, dispense precise amounts of grease, saving time and money over manual application.

- High-temperature, anti-wear and water-resistant additives optimize consistent operation in even the most challenging environments.
- Multifaceted delivery systems serve virtually any application – from simple, single-point needs to multi-point or progressive systems where an automated process can maximize uptime and reduce maintenance costs.
- Patented chain lubrication systems inject oil where it's needed for reduced wear.

MAINTENANCE TOOLS

Timken maintenance tools may extend bearing life by facilitating proper installation, removal and service. They also help simplify maintenance practices. We provide induction heaters, impact fitting tools, and hydraulic and mechanical pullers.

SERVICES

Used bearings and related components often can be returned to their original specifications with less time and cost than purchasing new. We offer complete remanufacture and reconditioning services for many components including bearings, chocks, housings, rolls and more.

Our gearbox repair service providers are globally recognized as experts in power transmission solutions for heavy industrial markets, repairing nearly all large gearbox makes or models, with onsite emergency breakdown service available if needed.

Timken offers a full range of maintenance and reconditioning services through our remanufacturing and repair operations. Using these services can lead to improved plant efficiency and reduced overall production costs.

TRAINING

We offer industry-specific training programs designed for plant professionals, as well as onsite customized training to meet your specific needs. Our training programs are available at select locations around the world and cover every phase of bearing performance. Class time is balanced with extensive hands-on training and tours of Timken facilities.



HOW TO USE THIS CATALOG

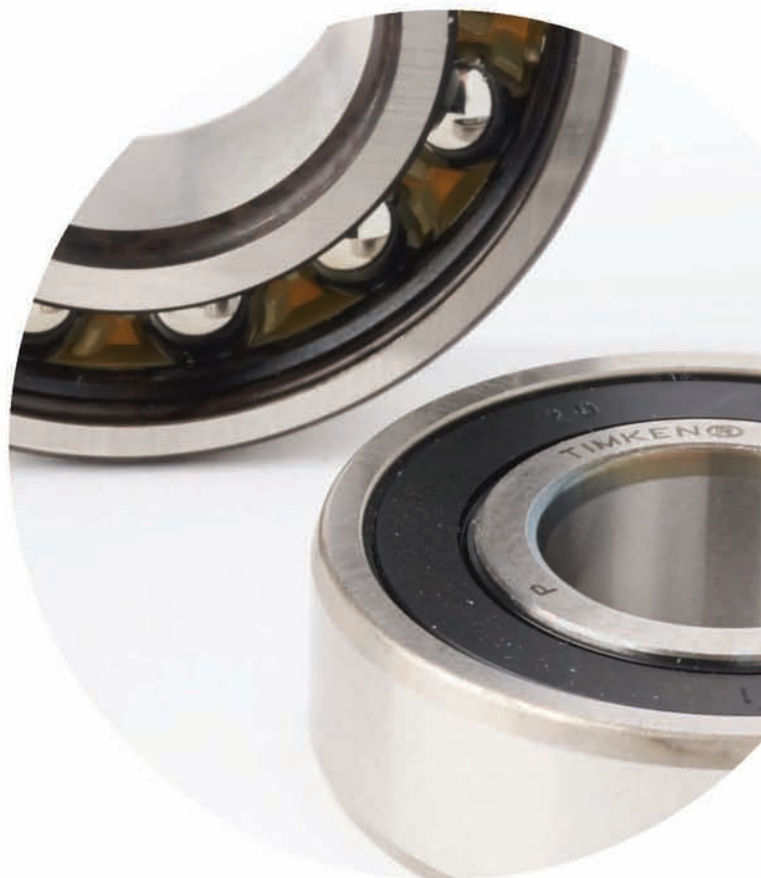
We designed this catalog to help you find the Timken bearings best suited to your specifications.

Timken offers an extensive range of bearings and accessories in both metric and imperial sizes. Contact your Timken sales engineer to learn more about our complete line for the special needs of your application.

This publication contains dimensions, tolerances and load ratings, as well as engineering sections describing fitting practices for shafts and housings, internal clearances, materials and other bearing features. It provides valuable assistance in the initial consideration of the type and characteristics of the bearings that may best suit your particular needs.

ISO and ANSI/ABMA, as used in this publication, refer to the International Organization for Standardization and the American National Standards Institute/American Bearing Manufacturers Association.

Updates are made periodically to this catalog. Visit www.timken.com for the most recent version of the Timken® Deep Groove Ball Bearing Catalog.



SHELF LIFE AND STORAGE OF GREASE-LUBRICATED BEARINGS AND COMPONENTS

To help you get the most value from our products, Timken provides guidelines for the shelf life of grease-lubricated ball and roller bearings, components and assemblies. Shelf life information is based on Timken and industry test data and experience.

SHELF LIFE POLICY

Shelf life should be distinguished from lubricated bearing/component design life as follows:

- Shelf life of the grease-lubricated bearing/component represents the period of time prior to use or installation.
- The shelf life is a portion of the anticipated aggregate design life. It is impossible to accurately predict design life due to variations in lubricant bleed rates, oil migration, operating conditions, installation conditions, temperature, humidity and extended storage.
- Shelf life values, available from Timken, represent a maximum limit and assume adherence to the storage and handling guidelines suggested in this catalog or by a Timken associate. Deviations from the Timken storage and handling guidelines may reduce shelf life. Any specification or operating practice that defines a shorter shelf life should be used.

Timken cannot anticipate the performance of the grease lubricant after the bearing or component is installed or placed in service.

TIMKEN IS NOT RESPONSIBLE FOR THE SHELF LIFE OF ANY BEARING/COMPONENT LUBRICATED BY ANOTHER PARTY.

European REACH Compliance

Timken lubricants, greases and similar products sold in standalone containers or delivery systems are subject to the European REACH (Registration, Evaluation, Authorization and Restriction of CHemicals) directive. For import into the European Union, Timken can sell and provide only those lubricants and greases that are registered with ECHA (European CHemical Agency). For further information, please contact your Timken sales engineer.

STORAGE

Timken suggests the following storage guidelines for its finished 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 the Timken shelf life guidelines 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 and the surfaces should be dry.
- 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.

Due to the fact that Timken is not familiar with your particular storage conditions, we strongly suggest following these guidelines. However, you may be required by circumstances or applicable government requirements to adhere to stricter storage requirements.

Most bearing components typically ship protected with a corrosion-preventive compound that is not a lubricant. These components may be used in oil-lubricated applications without removal of the corrosion-preventive compound. When using some specialized grease lubrications, we advise you to remove the corrosion-preventive compound before packing the bearing components with suitable grease.

Be careful in selecting lubrication, however, since different lubricants are often incompatible.

When you receive a bearing shipment, do not remove products from their packaging until they are ready for mounting so they do not become corroded or contaminated.

Store bearings and bearing housings in an appropriate atmosphere so they remain protected for the intended period.



**WARNING**

Failure to observe the following warnings could create a risk of death or serious injury.

Proper maintenance and handling practices are critical. Always follow installation instructions and maintain proper lubrication.

Tensile stresses can be very high in tightly fitted bearing components. Attempting to remove such components by cutting the cone (inner race) may result in a sudden shattering of the component, causing fragments of metal to be forcefully expelled. Always use properly guarded presses or bearing pullers to remove bearings from shafts, and always use suitable personal protective equipment, including safety glasses.

CAUTION

Failure to follow these cautions may result in property damage.

The products catalogued are application-specific. Any use in applications other than those intended could lead to equipment failure or to reduced equipment life.

Use of improper bearing fits may cause damage to equipment.

Do not use damaged bearings. The use of a damaged bearing can result in equipment damage.

NOTE

Do not attempt to disassemble unitized bearings. Components may become damaged and affect the performance and service life of the bearing.

Do not mix components of matched assemblies. Mixing components can reduce the service life of the bearing.

NOT TO BE USED AS A DESIGN MANUAL.

This is not a manual for the selection of bearings for new applications. Whenever it is necessary to select Timken bearings for new applications, consult the Timken Engineering Manual (order no. 10424) or get in touch with the nearest office of The Timken Company.

Never use steam or hot water when cleaning the bearings because these methods can create rust or corrosion.

Do not heat components with an open flame.

Do not heat bearing beyond 120° C (250° F).

DISCLAIMER

This catalog is provided solely to give you analysis tools and data to assist you in your product selection. Product performance is affected by many factors beyond the control of Timken. Therefore, the suitability and feasibility of all product selection must be validated by you.

Timken products are sold subject to Timken's terms and conditions of sale, which include its limited warranty and remedy, may be found at <http://www.timken.com/termsandconditionsofsale>. Please consult with your Timken sales engineer for more information and assistance.

Every reasonable effort has been made to ensure the accuracy of the information in this writing, but no liability is accepted for errors, omissions or for any other reason.

COMPLIANCE

To view the complete engineering catalog, please visit www.timken.com. To order the catalog, please contact your Timken sales engineer and request a copy of the Timken Engineering Manual (order number 10424).

European REACH compliance Timken-branded lubricants, greases and similar products sold in stand-alone containers or delivery systems are subject to the European REACH (Registration, Evaluation, Authorization and Restriction of CHemicals) directive. For import into the European Union, Timken can sell and provide only those lubricants and greases that are registered with ECHA (European CHemical Agency). For further information, please contact your Timken sales engineer.

The Timken Company products shown in this catalog may be directly or indirectly subject to a number of regulatory standards and directives originating from authorities in the USA, European Union and around the world including: REACH (EC 1907/2006, RoHS (2011/65/EU), ATEX (94/9/EC), 'CE' MARKING (93/68/EEC), CONFLICT MINERALS (Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act).

For any questions or concerns regarding the compliance or applicability of Timken products to these or other unspecified standards, please contact your Timken sales engineer or customer services representative.

Updates are made periodically to this catalog. Visit www.timken.com for the most recent version of the Timken® Deep Groove Ball Bearing Catalog.

ENGINEERING

This engineering section is not intended to be comprehensive, but does serve as a useful guide in deep groove ball bearing selection. To view the complete engineering catalog, please visit www.timken.com. To order the catalog, contact your Timken sales engineer and request a copy of the Timken Engineering Manual (order no.10424).

The following topics are covered within this section:

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BEARING SIZE RANGE

Deep groove ball bearings are available in a variety of sizes and are the most popular of the rolling bearings. This type of bearing supports radial load and a small degree of axial load in both directions simultaneously. Deep groove ball bearings are popular due to their versatility, affordability, and capability to run at high speeds.

Timken offers deep groove ball bearings in a wide range of sizes and configurations. Offered sizes range from 3 mm to 160 mm bore, and maximum outside diameter of 250 mm. Timken continues to expand the offering of deep groove ball bearings with larger sizes to be introduced.

DEEP GROOVE BALL BEARING TYPES

There are several series of deep groove ball bearings that have been standardized by bearing manufacturers. The boundary dimensions for standard metric bearings are contained in the general plans as specified in ISO (International Organization for Standardization) standard 15:2011 for radial rolling bearings.

The Timken offering includes standard, thin section, narrow, wide, extra small and miniature constructions. Those are offered in several variations including the following:

- Open basic design
- With shields
- With contact seals
- With non-contact seals
- With a snap ring groove only
- With a snap ring on the outer ring O.D.

DEEP GROOVE BALL BEARING CONFIGURATIONS

Variations may differ based on bearing size and/or series. Details of the variations for each are listed in the product tables on pages 29–34.

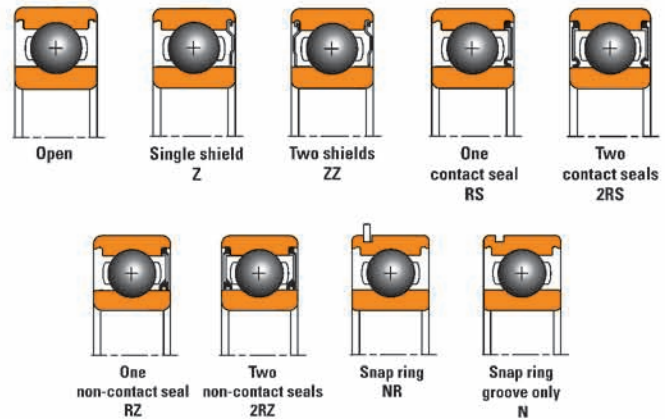


Fig. 1. Deep groove ball bearing variations.

BALL BEARING CAGES






Cages (also referred to as retainers) make a vital contribution to overall bearing performance. They maintain uniform ball spacing in the bearing as the balls pass into and out of the load zone.

Cages can impact several bearing operational characteristics such as:

- Maximum rotational speed
- Torque characteristics
- Temperature limits
- Lubricant flow

There are a number of different cage types that are commonly used in deep groove ball bearings, the most popular being the riveted steel cage. Table 1 below describes the most common ball bearing cage types.

TABLE 1. COMMON BALL BEARING CAGE TYPES

| Type | Two-Piece Riveted Steel Cage | One-Piece Stainless Steel Crown Type Cage | Pressed-Steel Finger Type Cage | One-Piece Polymer Crown Type Cage | Machined-Brass Cage |
|--------------|--|--|--|--|---|
| Design |  |  |  |  |  |
| Construction | Two pressed-steel half cages are fixed together with rivets; ball-piloted cage provides good uniformity of ball-to-pocket clearance. | Pressed stainless steel cage guided by inner ring. | Two pressed steel half cages fixed together by formed fingers. | One-piece molded snap-in 6/6 nylon cage. | Two identical half cages made from solid brass, fixed together with rivets. |
| Advantages | Designed to reduce frictional torque; high rigidity and strength, making it the cage of choice for most applications. | Best performance in low-speed applications where low torque is preferred. | General purpose ball-riding design. | Tough and flexible especially in situations of misalignment; resistant to most solvents, oils and greases. | Superior strength enables this cage to be used in heavily loaded and high-speed applications. |

SHIELDS AND SEALS

Bearing seals and shields help prevent lubricant from leaking out, and prevent dust, water and other external contaminants from entering into the bearing.

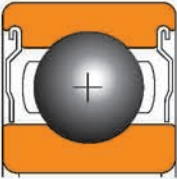
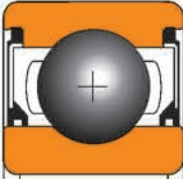
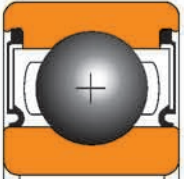
Shielded Timken deep groove ball bearings are available with one shield, designated by suffix Z, or two shields, designated by suffix ZZ. A shield on one side provides protection against the entrance of coarse debris and makes it possible to re-lubricate the bearing from the open side.

Sealed deep groove ball bearings are available with one or two contact seals (suffix RS and 2RS), and with one or two non-contact seals (suffix RZ and 2RZ). Timken seals use high-performance Nitrile Buna Rubber (NBR) seal material reinforced by a low carbon steel case for standard operating temperatures. FKM (Viton®*) seals can be made available for higher operating temperatures.

Double shielded or sealed bearings are pre-lubricated with the correct amount of Timken suggested ball bearing grease and are designed for applications where re-lubrication is not required.

The following table summarizes the main characteristics of Timken ball bearing shields and seals.

TABLE 2. CHARACTERISTICS OF TIMKEN BALL BEARING SHIELDS AND SEALS

| Type | Shields ZZ | Non-Contact Seals 2RZ | Contact Seals 2RS |
|-----------------------|--|---|--|
| Construction |  |  |  |
| Material | Low carbon pressed steel | Nitrile Buna Rubber with steel case | Nitrile Buna Rubber with steel case |
| Speed Capability | High speed | High speed | Less than ZZ/2RZ due to seal contact |
| Operating Temperature | -50 to +120° C | -40 to +120° C | -40 to +120° C |
| Grease Retention | Good | Better than ZZ type | Excellent |
| Dust Resistance | Good | Better than ZZ type | Excellent |
| Torque | Low | Low | Higher than ZZ/2RZ due to seal contact |

NOTE: The above operating temperature ranges are for standard shielded and sealed bearings. If higher temperature capability is needed, alternative bearing, grease or seal materials may be considered. Please contact your Timken sales engineer for such requirements.

*Viton® a registered trademark of DuPont Performance Elastomers L.L.C.

LUBRICATION

Ball bearings must be lubricated to minimize friction between balls and raceways, as well as between balls and cages. Lubricants also help to protect the bearings from corrosion and, in some cases, to dissipate heat.

Timken open ball bearings, as well as single-sealed/shielded bearings, are supplied with rust preventive (RP) covering all bearing surfaces. For such bearings, the end user selects and applies the desired lubrication type and quantity as required by the application.

Timken double-sealed and double-shielded deep groove ball bearings are factory pre-lubricated with water-resistant grease chosen for chemical and mechanical stability. The standard grease preferred by Timken for deep groove ball bearings is Mobil Polyrex™ EM. This is a mineral-oil based, advanced polyurea-thickened grease that maintains proper lubrication for a wide range of operating temperatures from -29° C to

177° C. Mobil Polyrex™ EM provides protection against rust and corrosion, and additional protection under mild salt-water wash conditions. This grease also is widely preferred in electric motor applications.

The standard factory grease fill is 30 percent to 50 percent for most Timken double-sealed/shielded ball bearings. This accommodates most applications. The type and amount of grease needed varies depending on operating conditions and bearing series. Most bearings can be filled with customer-specified greases upon request to meet specific application needs. Aside from Mobil Polyrex™ EM grease, Timken also offers a range of other proven and popular greases suitable for a wide range of applications.

Table 3 provides an overview of some of the most common greases available for general applications.

TABLE 3. COMMON DEEP GROOVE BALL BEARING GREASES

| Product Name | Brand Name | Min Temp (° C) | Max Temp (° C) | Base Oil Type | Thickener | Color | Characteristics and Application |
|-------------------------|-------------|----------------|----------------|-------------------------|----------------|---------------------|---|
| Mobil Polyrex™ EM | Mobil | -29 | 177 | Mineral Oil | Polyurea | Blue | Electric motor grease; very good resistance to water/salt water |
| BEACON™ 325 | Exxon | -54 | 121 | Diester | Lithium Soap | Tan (Light) | Low torque, quiet running |
| Mobilgrease 28 | Mobil | -54 | 177 | Hydrocarbon (Synthetic) | Clay (Organic) | Red (Dark) | Wide temp range |
| Chevron SRI Grease 2 | Chevron | -29 | 177 | Mineral Oil | Polyurea | Green to Blue-Green | Electric motor grease; very good resistance to water/salt water |
| Multemp SRL | Kyodo Yushi | -40 | 149 | Oil (Synthetic) | Lithium | Brown (Light) | Low torque, quiet running |
| Shell® Alvania EP No. 2 | Shell | -10 | 149 | Hydrocarbon (Synthetic) | Lithium Soap | Brown (Dark) | All-purpose grease |

BEARING LIFE

The selection of the appropriate bearing for a given application is dependent on several performance criteria. These include bearing fatigue life, rotating precision, power requirement, temperature limits, speed capabilities and sound requirements. This section deals primarily with bearing life as related to material-associated fatigue.

Bearing life is defined as the length of time, or number of revolutions, until a fatigue spall of 6 mm² develops. Since fatigue is a statistical phenomenon, the life of an individual bearing is impossible to predetermine precisely. 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 the accepted standard for predicting 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.

DYNAMIC LOAD RATING

Published dynamic load ratings for Timken ball bearings are based on the industry standard procedure outlined in ISO 281:2007. This rating, designated as C_r , is defined as the radial load under which a population of bearings will achieve a L_{10} life of one million revolutions. Radial load is assumed to be constant in magnitude and direction for radial ball bearings.

STATIC LOAD RATING

The basic static load rating for Timken bearings (designated as C_0) as defined in ISO 76:2006 is based on a maximum contact stress within a non-rotating bearing of 4200 MPa at the center of the most heavily loaded rolling element and raceway contact.

Such 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 rotated 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 sales engineer.

SPEED RATING

THERMAL REFERENCE SPEED

The thermal reference speed is the bearing thermal equilibrium speed based on industry standard reference conditions outlined in ISO 15312:2003. Thermal equilibrium balances the heat generated by the bearing, with heat conduction through the housing and shaft. This standard applies to both bath oil lubricated and 30 percent grease fill packed bearings. It excludes any heat removed by a circulating lubricant. This standard also excludes the outer ring rotating application and heat generated by contact seals.

The ISO 15312 thermal reference speed rating calculations are based on the following assumptions:

- The bearing ambient temperature is 20° C.
- The tolerable bearing/housing interface temperature is 70° C.
- Oil and grease lubricants are considered.
 - For radial bearings with oil lubrication: ISO VG 32 oil.
 - For radial bearings with grease lubrication: ISO VG 150 grease.
- The radial loads assume a normal clearance (C0 or CN).
- For radial bearings, the applied load is 5 percent of the static load rating (C_0).

Thermal reference speed ratings assume the bearing has been sufficiently broken in. During the break-in process, temperatures may exceed the tolerable limit. Break-in commonly takes between 10 to 36 hours.

Standard bearing materials and lubricants can generally withstand temperatures up to and beyond 100° C. For this reason, a permissible temperature of 100° C was assumed for the thermal speed rating calculation. Contact your Timken sales engineer if your application requires speeds above the Timken published values.

LIMITING SPEED

For certain ball bearing types and sizes, cage behavior becomes the limiting factor to bearing operating speed. For such bearings, the thermal speed rating per ISO 15312:2003 is not shown. Instead, Timken publishes limiting speeds for those bearings, as is the case for thin-section and extra-small deep groove ball bearings.

For bearings with contact seals, the speed rating also is impacted by the speed of the seal. In general, bearings with contact seals have speed ratings that are 50 percent to 60 percent of the published speed rating of the equivalent open bearing.

RADIAL INTERNAL CLEARANCE (RIC)

In the manufacture of ball bearings, it is standard practice to assemble rings and rolling elements with a specified internal clearance. This characteristic is necessary to absorb the loss of clearance due to press fitting the bearing rings at mounting or due to expansion of bearings, shafts and housings. Internal clearance in an application is an important factor that has a significant influence on bearing performance.

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

Internal clearance reduces due to press fitting the bearing rings on the shaft or in the housing. This reduced internal clearance in the bearings at mounted condition is called mounted radial internal clearance.

RIC OF MINIATURE AND EXTRA SMALL DEEP GROOVE BALL BEARINGS < 10 MM BORE

The RIC symbols for miniature and extra small deep groove ball bearings with bore size less than 10 mm are as follows:

- MC1 – Extra tight
- MC2 – Tight
- MC3 – Normal or regular
- MC4 – Loose
- MC5 – Extra loose
- MC6 – Extra-extra loose

Table 4 provides the selection of RIC for miniature and extra small deep groove ball bearings.

TABLE 4. RADIAL INTERNAL CLEARANCE – MINIATURE AND EXTRA SMALL DEEP GROOVE BALL BEARINGS < 10 MM BORE

| Radial Internal Clearance | | | | | | | | | | | |
|---------------------------|------|---------------|------|---------------|------|---------------|------|---------------|------|---------------|------|
| MC1 | | MC2 | | MC3 | | MC4 | | MC5 | | MC6 | |
| Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| μm | | μm | | μm | | μm | | μm | | μm | |
| 0 | 5 | 3 | 8 | 5 | 10 | 8 | 13 | 13 | 20 | 20 | 28 |

Standard miniature and extra-small deep groove ball bearings (< 10 mm bore) with no clearance designation in the part number are made with the MC3 normal clearance.

RIC OF DEEP GROOVE BALL BEARINGS ≥ 10 MM BORE

The RIC designations for standard deep groove ball bearings (≥ 10 mm bore) are as follows:

- C2 – Tight
- CN or C0 – Normal or regular
- C3 – Loose
- C4 – Extra loose
- C5 – Extra-extra loose

Table 5 below provides the selection of bearing internal clearances for deep groove ball bearings with bore size 10 mm and above.

TABLE 5. RADIAL INTERNAL CLEARANCE – DEEP GROOVE BALL BEARINGS ≥ 10 MM BORE

| Bore Diameter (d) | | Radial Internal Clearance | | | | | | | | | |
|-------------------|------------|---------------------------|------|---------------|------|---------------|------|---------------|------|---------------|------|
| | | C2 | | CN or C0 | | C3 | | C4 | | C5 | |
| Over | Incl. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| mm | | μm | | μm | | μm | | μm | | μm | |
| only 10 | | 0 | 7 | 2 | 13 | 8 | 23 | 14 | 29 | 20 | 37 |
| 10 | 18 | 0 | 9 | 3 | 18 | 11 | 25 | 18 | 33 | 25 | 45 |
| 18 | 24 | 0 | 10 | 5 | 20 | 13 | 28 | 20 | 36 | 28 | 48 |
| 24 | 30 | 1 | 11 | 5 | 20 | 13 | 28 | 23 | 41 | 30 | 53 |
| 30 | 40 | 1 | 11 | 6 | 20 | 15 | 33 | 28 | 46 | 40 | 64 |
| 40 | 50 | 1 | 11 | 6 | 23 | 18 | 36 | 30 | 51 | 45 | 73 |
| 50 | 65 | 1 | 15 | 8 | 28 | 23 | 43 | 38 | 61 | 55 | 90 |
| 65 | 80 | 1 | 15 | 10 | 30 | 25 | 51 | 46 | 71 | 65 | 105 |
| 80 | 100 | 1 | 18 | 12 | 36 | 30 | 58 | 53 | 84 | 75 | 120 |
| 100 | 120 | 2 | 20 | 15 | 41 | 36 | 66 | 61 | 97 | 90 | 140 |
| 120 | 140 | 2 | 23 | 18 | 48 | 41 | 81 | 71 | 114 | 105 | 160 |
| 140 | 160 | 2 | 23 | 18 | 53 | 46 | 91 | 81 | 130 | 120 | 180 |
| 160 | 180 | 2 | 25 | 20 | 61 | 53 | 102 | 91 | 147 | 135 | 200 |
| 180 | 200 | 2 | 30 | 25 | 71 | 63 | 117 | 107 | 163 | 150 | 230 |
| 200 | 225 | 2 | 35 | 25 | 85 | 75 | 140 | 125 | 195 | 175 | 265 |

DEEP GROOVE BALL BEARING TOLERANCES

Ball bearings are manufactured to a number of specifications, with each having classes that define tolerances on dimensions such as bore, outer diameter, width and runout.

Standard Timken deep groove ball bearings maintain normal tolerances (P0) according to the current ISO 492 standard. For applications where running tolerance is critical, P6 or P5 tolerances are recommended.

The term “deviation” is defined as the difference between a single ring dimension and the nominal dimension. For metric tolerances, the normal dimension is at a +0 mm tolerance. The deviation is the tolerance range for the listed parameter. Variation is defined as the difference between the largest and smallest measurement of a given parameter for an individual ring.

Tables 6 and 7 provide tolerances for deep groove ball bearing inner and outer rings respectively.

TABLE 6. RADIAL BALL BEARING TOLERANCES – INNER RING

| Bearing Bore | | Bore Deviation | Width Variation | Radial Runout | Face Runout with Bore | Axial Runout | Width Deviation Inner and Outer Rings | |
|--------------|-------|-----------------|-----------------|---------------|-----------------------|--------------|---------------------------------------|---------|
| d | | Δd_{mp} | V_{BS} | K_{ia} | S_d | S_{ia} | ΔB_s and ΔC_s | |
| over | incl. | P0 | P0, P6 | P0 | P5 | P5 | P0, P6 | P5 |
| mm | mm | μm | μm | μm | μm | μm | μm | μm |
| 2.5 | 10 | -8 | 15 | 10 | 7 | 7 | -120 | -40 |
| 10 | 18 | -8 | 20 | 10 | 7 | 7 | -120 | -80 |
| 18 | 30 | -10 | 20 | 13 | 8 | 8 | -120 | -120 |
| 30 | 50 | -12 | 20 | 15 | 8 | 8 | -120 | -120 |
| 50 | 80 | -15 | 25 | 20 | 8 | 8 | -150 | -150 |
| 80 | 120 | -20 | 25 | 25 | 9 | 9 | -200 | -200 |
| 120 | 150 | -25 | 30 | 30 | 10 | 10 | -250 | -250 |
| 150 | 180 | -25 | 30 | 30 | 10 | 10 | -250 | -250 |
| 180 | 250 | -30 | 30 | 40 | 11 | 13 | -300 | -300 |
| 250 | 315 | -35 | 35 | 50 | 13 | 15 | -350 | -350 |
| 315 | 400 | -40 | 40 | 60 | 15 | 20 | -400 | -400 |

TABLE 7. RADIAL BALL BEARING TOLERANCES – OUTER RING

| Bearing O.D. | | Outside Deviation | Width Variation | Radial Runout | Axial Runout | Outside Diameter Runout With Face |
|--------------|-------|-------------------|-----------------|---------------|--------------|-----------------------------------|
| D | | ΔD_{mp} | V_{CS} | K_{sa} | S_{ea} | S_D |
| over | incl. | P0 | P0 | P0 | P5 | P5 |
| mm | mm | μm | μm | μm | μm | μm |
| 6 | 18 | -8 | 15 | 15 | 8 | 8 |
| 18 | 30 | -9 | 15 | 15 | 8 | 8 |
| 30 | 50 | -11 | 20 | 20 | 8 | 8 |
| 50 | 80 | -13 | 25 | 25 | 10 | 8 |
| 80 | 120 | -15 | 25 | 35 | 11 | 9 |
| 120 | 150 | -18 | 30 | 40 | 13 | 10 |
| 150 | 180 | -25 | 30 | 45 | 14 | 10 |
| 180 | 250 | -30 | 30 | 50 | 15 | 11 |
| 250 | 315 | -35 | 35 | 60 | 18 | 13 |
| 315 | 400 | -40 | 40 | 70 | 20 | 13 |
| 400 | 500 | -45 | 45 | 80 | 23 | 15 |
| 500 | 630 | -50 | 50 | 100 | 25 | 18 |

FITTING PRACTICE

As a general guideline, bearing rings mounted on a rotating member should have an interference fit. Loose fits may permit the ring to creep or turn, and wear the mating surface and backing shoulder. This wear can result in excessive bearing looseness and damage the bearing, shaft or housing.

The choice of fitting practices will mainly depend upon the following parameters:

- Precision class of the bearing.
- Rotating or stationary ring.
- Type of layout (single- or 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.

Fig. 2 is a graphical representation of roller bearing shaft and housing fit selection that conforms to accepted industry standards and practices. The bars designated 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.

Tables 8 and 9 provide the resultant fits for deep groove ball bearings based on standard ISO tolerances for shaft and housing.

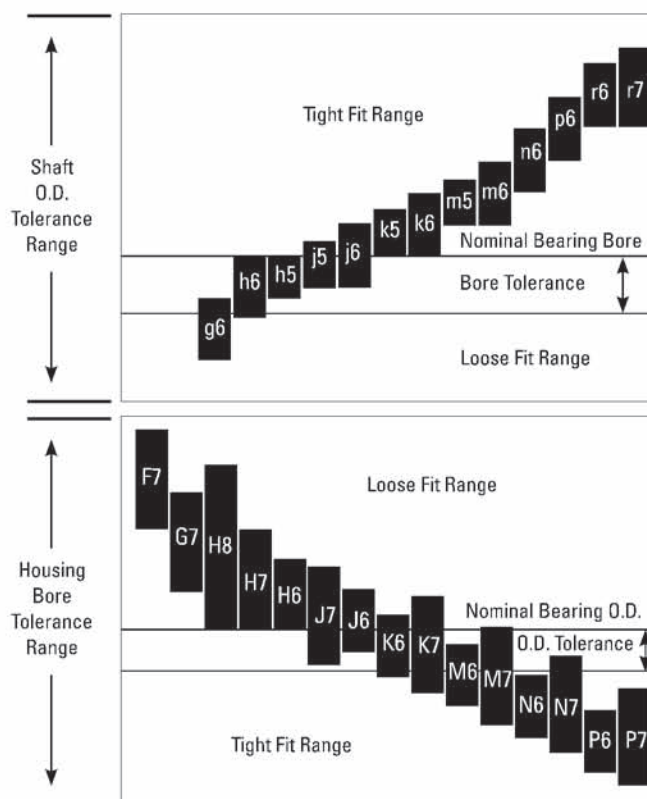


Fig. 2. Shaft and housing fit selection.

TABLE 8. SHAFT TOLERANCES: RADIAL BALL BEARINGS

| Bearing Bore | | g6 | | h5 | | h6 | | j5 | | js5 | | js6 | | j6 | |
|-------------------|-----------|-------------------|------------|-------------------|-------------|-------------------|-------------|-------------------|-------------|-------------------|----------------|-------------------|----------------|-------------------|-------------|
| Nominal (Max.) | Tolerance | Shaft Diameter | Fit | Shaft Diameter | Fit | Shaft Diameter | Fit | Shaft Diameter | Fit | Shaft Diameter | Fit | Shaft Diameter | Fit | Shaft Diameter | Fit |
| Over | Incl. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. | Min. |
| mm | µm | µm | | µm | | µm | | µm | | µm | | µm | | µm | |
| — 3 | 0 -8 | -2 -8 | 8L 6T | 0 -4 | 4L 8T | 0 -6 | 6L 8T | 2 -2 | 2L 10T | 2 -2 | 2L 10T | 3 -3 | 3L 11T | 4 -2 | 2L 12T |
| 3 6 | 0 -8 | -4 -12 | 12L 4T | 0 -5 | 5L 8T | 0 -8 | 8L 8T | 3 -2 | 2L 11T | 2.5 -2.5 | 2.5L 10.5T | 4 -4 | 4L 12T | 6 -2 | 2L 14T |
| 6 10 | 0 -8 | -5 -14 | 14L 3T | 0 -6 | 6L 8T | 0 -9 | 9L 8T | 4 -2 | 2L 12T | 3 -3 | 3L 11T | 4.5 -4.5 | 4.5L 12.5T | 7 -2 | 2L 15T |
| 10 18 | 0 -8 | -6 -17 | 17L 2T | 0 -8 | 8L 8T | 0 -11 | 11L 8T | 5 -3 | 3L 13T | 4 -4 | 4L 12T | 5.5 -5.5 | 5.5L 13.5T | 8 -3 | 3L 16T |
| 18 30 | 0 -10 | -7 -20 | 20L 3T | 0 -9 | 9L 10T | 0 -13 | 13L 10T | 5 -4 | 4L 15T | 4.5 -4.5 | 4.5L 14.5T | 6.5 -6.5 | 6.5L 16.5T | 9 -4 | 4L 19T |
| 30 50 | 0 -12 | -9 -25 | 25L 3T | 0 -11 | 11L 12T | 0 -16 | 16L 12T | 6 -5 | 5L 18T | 5.5 -5.5 | 5.5L 17.5T | 8 -8 | 8L 20T | 11 -5 | 5L 23T |
| 50 80 | 0 -15 | -10 -29 | 29L 5T | 0 -13 | 13L 15T | 0 -19 | 19L 15T | 6 -7 | 7L 21T | 6.5 -6.5 | 6.5L 21.5T | 9.5 -9.5 | 9.5L 24.5T | 12 -7 | 7L 27T |
| 80 120 | 0 -20 | -12 -34 | 34L 8T | 0 -15 | 15L 20T | 0 -22 | 22L 20T | 6 -9 | 9L 26T | 7.5 -7.5 | 7.5L 27.5T | 11 -11 | 11L 31T | 13 -9 | 9L 33T |
| 120 180 | 0 -25 | -14 -39 | 39L 11T | 0 -18 | 18L 25T | 0 -25 | 25L 25T | 7 -11 | 11L 32T | 9 -9 | 9L 34T | 12.5 -12.5 | 12.5L 37.5T | 14 -11 | 11L 39T |
| 180 200 | 0 -30 | -15 -44 | 44L 15T | 0 -20 | 20L 30T | 0 -29 | 29L 30T | 7 -13 | 13L 37T | 10 -10 | 10L 40T | 14.5 -14.5 | 14.5L 44.5T | 16 -13 | 13L 46T |
| 200 225 | 0 -30 | -15 -44 | 44L 15T | 0 -20 | 20L 30T | 0 -29 | 29L 30T | 7 -13 | 13L 37T | 10 -10 | 10L 40T | 14.5 -14.5 | 14.5L 44.5T | 16 -13 | 13L 46T |
| 225 250 | 0 -30 | -15 -44 | 44L 15T | 0 -20 | 20L 30T | 0 -29 | 29L 30T | 7 -13 | 13L 37T | 10 -10 | 10L 40T | 14.5 -14.5 | 14.5L 44.5T | 16 -13 | 13L 46T |
| 250 280 | 0 -35 | -17 -49 | 49L 18T | 0 -23 | 23L 35T | 0 -32 | 32L 35T | 7 -16 | 16L 42T | 11.5 -11.5 | 11.5L 46.5T | 16 -16 | 16L 51T | 16 -16 | 16L 51T |
| 280 315 | 0 -35 | -17 -49 | 49L 18T | 0 -23 | 23L 35T | 0 -32 | 32L 35T | 7 -16 | 16L 42T | 11.5 -11.5 | 11.5L 46.5T | 16 -16 | 16L 51T | 16 -16 | 16L 51T |
| 315 355 | 0 -40 | -18 -54 | 54L 22T | 0 -25 | 25L 40T | 0 -36 | 36L 40T | 7 -18 | 18L 47T | 12.5 -12.5 | 12.5L 52.5T | 18 -18 | 18L 58T | 18 -18 | 18L 58T |
| 355 400 | 0 -40 | -18 -54 | 54L 22T | 0 -25 | 25L 40T | 0 -36 | 36L 40T | 7 -18 | 18L 47T | 12.5 -12.5 | 12.5L 52.5T | 18 -18 | 18L 58T | 18 -18 | 18L 58T |
| 400 450 | 0 -45 | -20 -60 | 60L 25T | 0 -27 | 27L 45T | 0 -40 | 40L 45T | 7 -20 | 20L 52T | 13.5 -13.5 | 13.5L 58.5T | 20 -20 | 20L 65T | 20 -20 | 20L 65T |
| 450 500 | 0 -45 | -20 -60 | 60L 25T | 0 -27 | 27L 45T | 0 -40 | 40L 45T | 7 -20 | 20L 52T | 13.5 -13.5 | 13.5L 58.5T | 20 -20 | 20L 65T | 20 -20 | 20L 65T |
| 500 560 | 0 -50 | -22 -66 | 66L 28T | 0 -28 | 28L 50T | 0 -44 | 44L 50T | 8 -22 | 22L 58T | 14 -14 | 14L 64T | 22 -22 | 22L 72T | -22 -22 | 22L 72T |
| 560 630 | 0 -50 | -22 -66 | 66L 28T | 0 -28 | 28L 50T | 0 -44 | 44L 50T | 8 -22 | 22L 58T | 14 -14 | 14L 64T | 22 -22 | 22L 72T | -22 -22 | 22L 72T |
| 630 710 | 0 -75 | -24 -74 | 74L 51T | 0 -32 | 32L 75T | 0 -50 | 50L 75T | 10 -25 | 25L 85T | 16 -16 | 16L 91T | 25 -25 | 25L 100T | 25 -25 | 25L 100T |
| 710 800 | 0 -75 | -24 -74 | 74L 51T | 0 -32 | 32L 75T | 0 -50 | 50L 75T | 10 -25 | 25L 85T | 16 -16 | 16L 91T | 25 -25 | 25L 100T | 25 -25 | 25L 100T |
| 800 900 | 0 -100 | -26 -82 | 82L 74T | 0 -36 | 36L 100T | 0 -56 | 56L 100L | 12 -28 | 28L 112T | 18 -18 | 18L 118T | 28 -28 | 28L 128T | 28 -28 | 28L 128T |
| 900 1000 | 0 -100 | -26 -82 | 82L 74T | 0 -36 | 36L 100T | 0 -56 | 56L 100L | 12 -28 | 28L 112T | 18 -18 | 18L 118T | 28 -28 | 28L 128T | 28 -28 | 28L 128T |
| 1000 1120 | 0 -125 | -28 -94 | 94L 97T | 0 -42 | 42L 125T | 0 -66 | 66L 125T | 13 -33 | 33L 138T | 21 -21 | 21L 146T | 33 -33 | 33L 158T | 33 -33 | 33L 158T |
| 1120 1250 | 0 -125 | -28 -94 | 94L 97T | 0 -42 | 42L 125T | 0 -66 | 66L 125T | 13 -33 | 33L 138T | 21 -21 | 21L 146T | 33 -33 | 33L 158T | 33 -33 | 33L 158T |

| k5 | | | k6 | | | m5 | | | m6 | | | n6 | | | p6 | | | r6 | | | r7 | | |
|----------------|-----|------------|----------------|-----|------------|----------------|-----|-------------|----------------|-----|-------------|----------------|-----|-------------|----------------|-----|--------------|----------------|-----|--------------|----------------|-----|--------------|
| Shaft Diameter | Fit | | Shaft Diameter | Fit | | Shaft Diameter | Fit | | Shaft Diameter | Fit | | Shaft Diameter | Fit | | Shaft Diameter | Fit | | Shaft Diameter | Fit | | Shaft Diameter | Fit | |
| Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | |
| μm | | | μm | | | μm | | | μm | | | μm | | | μm | | | μm | | | μm | | |
| 4 | 0 | 0T 12T | 6 | 0 | 0T 14T | 6 | 2 | 2T 14T | 8 | 2 | 2T 16T | – | | – | | – | | – | | – | | | |
| 6 | 1 | 1T 14T | 9 | 1 | 1T 17T | 9 | 4 | 4T 17T | 12 | 4 | 4T 20T | 16 | 8 | 8T 24T | 20 | 12 | 12T 28T | 23 | 15 | 15T 31T | 27 | 15 | 15T 35T |
| 7 | 1 | 1T 15T | 10 | 1 | 1T 18T | 12 | 6 | 6T 20T | 15 | 6 | 6T 23T | 19 | 10 | 10T 27T | 24 | 15 | 15T 32T | 28 | 19 | 19T 36T | 34 | 19 | 19T 42T |
| 9 | 1 | 1T 17T | 12 | 1 | 1T 20T | 15 | 7 | 7T 23T | 18 | 7 | 7T 26T | 23 | 12 | 12T 31T | 29 | 18 | 18T 37T | 34 | 23 | 23T 42T | 41 | 23 | 23T 49T |
| 11 | 2 | 2T 21T | 15 | 2 | 2T 25T | 17 | 8 | 8T 27T | 21 | 8 | 8T 31T | 28 | 15 | 15T 38T | 35 | 22 | 22T 45T | 41 | 28 | 28T 49T | 49 | 28 | 28T 59T |
| 13 | 2 | 2T 25T | 18 | 2 | 2T 30T | 20 | 9 | 9T 32T | 25 | 9 | 9T 37T | 33 | 17 | 17T 45T | 42 | 26 | 26T 54T | 50 | 34 | 34T 62T | 59 | 34 | 34T 71T |
| 15 | 2 | 2T 30T | 21 | 2 | 2T 36T | 24 | 11 | 11T 39T | 30 | 11 | 11T 45T | 39 | 20 | 20T 54T | 51 | 32 | 32T 66T | 62 | 41 | 41T –77T | 73 | 41 | 41T 88T |
| 18 | 3 | 3T 38T | 25 | 3 | 3T 45T | 28 | 13 | 13T 48T | 35 | 13 | 13T 55T | 45 | 23 | 23T 65T | 59 | 37 | 37T 79T | 76 | 51 | 51T 96T | 89 | 51 | 51T 109T |
| 21 | 3 | 3T 46T | 28 | 3 | 3T 53T | 33 | 15 | 15T 58T | 40 | 15 | 15T 65T | 52 | 27 | 27T 77T | 68 | 43 | 43T 93T | 90 | 65 | 65T 115T | 105 | 65 | 65T 130T |
| 24 | 4 | 4T 54T | 33 | 4 | 4T 63T | 37 | 17 | 17T 67T | 46 | 17 | 17T 76T | 60 | 31 | 31T 90T | 79 | 50 | 50T 109T | 106 | 77 | 77T 136T | 123 | 77 | 77T 153T |
| 24 | 4 | 4T 54T | 33 | 4 | 4T 63T | 37 | 17 | 17T 67T | 46 | 17 | 17T 76T | 60 | 31 | 31T 90T | 79 | 50 | 50T 109T | 109 | 80 | 80T 139T | 126 | 80 | 80T 156T |
| 24 | 4 | 4T 54T | 33 | 4 | 4T 63T | 37 | 17 | 17T 67T | 46 | 17 | 17T 76T | 60 | 31 | 31T 90T | 79 | 50 | 50T 109T | 113 | 84 | 84T 143T | 130 | 84 | 84T 160T |
| 27 | 4 | 4T 62T | 36 | 4 | 4T 71T | 43 | 20 | 20T 78T | 52 | 20 | 20T 87T | 66 | 34 | 34T 101T | 88 | 56 | 56T 123T | 126 | 94 | 94T 161T | 146 | 94 | 94T 181T |
| 27 | 4 | 4T 62T | 36 | 4 | 4T 71T | 43 | 20 | 20T 78T | 52 | 20 | 20T 87T | 66 | 34 | 34T 101T | 88 | 56 | 56T 123T | 130 | 98 | 98T 165T | 150 | 98 | 98T 185T |
| 29 | 4 | 4T 69T | 40 | 4 | 4T 80T | 46 | 21 | 21T 86T | 57 | 21 | 21T 97T | 73 | 37 | 37T 113T | 98 | 62 | 62T 138T | 144 | 108 | 108T 184T | 165 | 108 | 108T 205T |
| 29 | 4 | 4T 69T | 40 | 4 | 4T 80T | 46 | 21 | 21T 86T | 57 | 21 | 21T 97T | 73 | 37 | 37T 113T | 98 | 62 | 62T 138T | 150 | 114 | 114T 190T | 171 | 114 | 114T 211T |
| 32 | 5 | 5T 77T | 45 | 5 | 5T 90T | 50 | 23 | 23T 95T | 63 | 23 | 23T 108T | 80 | 40 | 40T 125T | 108 | 68 | 68T 153T | 166 | 126 | 126T 211T | 189 | 126 | 126T 234T |
| 32 | 5 | 5T 77T | 45 | 5 | 5T 90T | 50 | 23 | 23T 95T | 63 | 23 | 23T 108T | 80 | 40 | 40T 125T | 108 | 68 | 68T 153T | 172 | 132 | 132T 217T | 195 | 132 | 132T 240T |
| 29 | 0 | 0T 79T | 44 | 0 | 0T 94T | 56 | 26 | 26T 105T | 70 | 26 | 26T 120T | 88 | 44 | 44T 138T | 122 | 78 | 78T 172T | 194 | 150 | 150T 244T | 220 | 150 | 150T 270T |
| 29 | 0 | 0T 79T | 44 | 0 | 0T 94T | 56 | 26 | 26T 105T | 70 | 26 | 26T 120T | 88 | 44 | 44T 138T | 122 | 78 | 78T 172T | 199 | 155 | 155T 249T | 225 | 155 | 155T 275T |
| 32 | 0 | 0T 107T | 50 | 0 | 0T 125T | 62 | 30 | 30T 137T | 80 | 30 | 30T 155T | 100 | 50 | 50T 175T | 138 | 88 | 88T 213T | 225 | 175 | 175T 300T | 255 | 175 | 175T 330T |
| 32 | 0 | 0T 107T | 50 | 0 | 0T 125T | 62 | 30 | 30T 137T | 80 | 30 | 30T 155T | 100 | 50 | 50T 175T | 138 | 88 | 88T 213T | 235 | 185 | 185T 310T | 265 | 185 | 185T 340T |
| 36 | 0 | 0T 136T | 56 | 0 | 0T 156T | 70 | 34 | 34T 170T | 90 | 34 | 34T 190T | 112 | 56 | 56T 212T | 156 | 100 | 100T 256T | 266 | 210 | 210T 366T | 300 | 210 | 210T 400T |
| 36 | 0 | 0T 136T | 56 | 0 | 0T 156T | 70 | 34 | 34T 170T | 90 | 34 | 34T 190T | 112 | 56 | 56T 212T | 156 | 100 | 100T 256T | 276 | 220 | 220T 376T | 310 | 220 | 220T 410T |
| 42 | 0 | 0T 167T | 66 | 0 | 0T 191T | 82 | 40 | 40T 207T | 106 | 40 | 40T 231T | 132 | 66 | 66T 257T | 186 | 120 | 120T 311T | 316 | 250 | 250T 441T | 355 | 250 | 250T 480T |
| 42 | 0 | 0T 167T | 66 | 0 | 0T 191T | 82 | 40 | 40T 207T | 106 | 40 | 40T 231T | 132 | 66 | 66T 257T | 186 | 120 | 120T 311T | 326 | 260 | 260T 451T | 365 | 260 | 260T 490T |

TABLE 9. HOUSING TOLERANCES: RADIAL BALL BEARINGS

| Bearing O.D. | | F7 | | G7 | | H6 | | H7 | | H8 | | J6 | | J7 | |
|-------------------|-----------|-----------------|--------------|-----------------|-------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|--------------|-----------------|-------------|
| Nominal (Max.) | Tolerance | Housing Bore | Fit | Housing Bore | Fit | Housing Bore | Fit | Housing Bore | Fit | Housing Bore | Fit | Housing Bore | Fit | Housing Bore | Fit |
| Over Incl. | Max. Min. | Max. Min. | | Max. Min. | | Max. Min. | | Max. Min. | | Max. Min. | | Max. Min. | | Max. Min. | |
| mm | µm | µm | µm | µm | µm | µm | µm | µm | µm | µm | µm | µm | µm | µm | µm |
| 6 10 | 0 -8 | 28 13 | 13L 32L | 20 5 | 5L 28L | 9 0 | 0L 17L | 15 0 | 0L 23L | 22 0 | 0L 30L | 5 -4 | 4T 13L | 8 -7 | 7T 16L |
| 10 18 | 0 -8 | 34 16 | 16L 42L | 24 6 | 6L 32L | 11 0 | 0L 19L | 18 0 | 0L 26L | 27 0 | 0L 35L | 6 -5 | 5T 14L | 10 -8 | 8T 18L |
| 18 30 | 0 -9 | 41 20 | 20L 50L | 28 7 | 7L 37L | 13 0 | 0L 22L | 21 0 | 0L 30L | 33 0 | 0L 42L | 8 -5 | 5T 10 17L | 12 -9 | 9T 21L |
| 30 50 | 0 -11 | 50 25 | 25L 61L | 34 9 | 9L 45L | 16 0 | 0L 27L | 25 0 | 0L 36L | 39 0 | 0L 50L | 10 -6 | 6T 21L | 14 -11 | 11T 25L |
| 50 80 | 0 -13 | 60 30 | 30L 73L | 40 10 | 10L 53L | 19 0 | 0L 32L | 30 0 | 0L 43L | 46 0 | 0L 59L | 13 -6 | 6T 26L | 18 -12 | 12T 31L |
| 80 120 | 0 -15 | 71 36 | 36L 86L | 47 12 | 12L 62L | 22 0 | 0L 37L | 35 0 | 0L 50L | 54 0 | 0L 69L | 16 -6 | 6T 31L | 22 -13 | 13T 37L |
| 120 150 | 0 -18 | 83 43 | 43L 101L | 54 14 | 14L 72L | 25 0 | 0L 43L | 40 0 | 0L 58L | 63 0 | 0L 81L | 18 -7 | 7T 36L | 26 -14 | 14T 44L |
| 150 180 | 0 -25 | 83 43 | 43L 108L | 54 14 | 14L 79L | 25 0 | 0L 50L | 40 0 | 0L 65L | 63 0 | 0L 88L | 18 -7 | 7T 43L | 26 -14 | 14T 51L |
| 180 250 | 0 -30 | 96 50 | 50L 126L | 61 15 | 15L 91L | 29 0 | 0L 59L | 46 0 | 0L 76L | 72 0 | 0L 102L | 22 -7 | 7T 52L | 30 -16 | 16T 60L |
| 250 315 | 0 -35 | 108 56 | 56L 143L | 69 17 | 17L 104L | 32 0 | 0L 67L | 52 0 | 0L 87L | 81 0 | 0L 116L | 25 -7 | 7T 60L | 36 -16 | 16T 71L |
| 315 400 | 0 -40 | 119 62 | 62L 159L | 75 18 | 18L 115L | 36 0 | 0L 76L | 57 0 | 0L 97L | 89 0 | 0L 129L | 29 -7 | 7T 69L | 39 -18 | 18T 79L |
| 400 500 | 0 -45 | 131 68 | 68L 176L | 83 20 | 20L 128L | 40 0 | 0L 85L | 63 0 | 0L 108L | 97 0 | 0L 142L | 33 -7 | 7T 78L | 43 -20 | 20T 88L |
| 500 630 | 0 -50 | 146 76 | 76L 196L | 92 22 | 22L 142L | 44 0 | 0L 94L | 70 0 | 0L 120L | 110 0 | 0L 160L | 37 -7 | 7T 87L | 48 -22 | 22T 98L |
| 630 800 | 0 -75 | 160 80 | 80L 235L | 104 24 | 24L 179L | 50 0 | 0L 125L | 80 0 | 0L 155L | 125 0 | 0L 200L | 40 -10 | 10T 115L | 56 -24 | 24T 131L |
| 800 1000 | 0 -100 | 176 86 | 86L 276L | 116 26 | 26L 216L | 56 0 | 0L 156L | 90 0 | 0L 190L | 140 0 | 0L 240L | 46 -10 | 10T 146L | 64 -26 | 26T 164L |
| 1000 1250 | 0 -125 | 203 98 | 98L 328L | 133 28 | 28L 258L | 66 0 | 0L 191L | 105 0 | 0L 230L | 165 0 | 0L 290L | 56 -10 | 10T 181L | 77 -28 | 28T 202L |
| 1250 1600 | 0 -160 | 235 110 | 110L 395L | 155 30 | 30L 315L | 78 0 | 0L 238L | 125 0 | 0L 285L | 195 0 | 0L 355L | 68 -10 | 10T 228L | 95 -30 | 30T 255L |
| 1600 2000 | 0 -200 | 270 120 | 120L 470L | 182 32 | 32L 382L | 92 0 | 0L 292L | 150 0 | 0L 350L | 230 0 | 0L 430L | 82 -10 | 10T 282L | 118 -32 | 32T 318L |
| 2000 2500 | 0 -250 | 305 130 | 130L 555L | 209 34 | 34L 459L | 110 0 | 0L 360L | 175 0 | 0L 425L | 280 0 | 0L 530L | 100 -10 | 10T 350L | 141 -34 | 34T 391L |

HOUSING TOLERANCES: RADIAL BALL BEARINGS

| JS6 | | | K6 | | | K7 | | | M6 | | | M7 | | | N6 | | | N7 | | | P6 | | | P7 | | |
|---------------|----------------|--|---------------|---------------|--|---------------|---------------|--|---------------|---------------|--|---------------|---------------|--|---------------|---------------|--|---------------|---------------|--|---------------|---------------|--|---------------|---------------|--|
| Housing Bore | Fit | | Housing Bore | Fit | | Housing Bore | Fit | | Housing Bore | Fit | | Housing Bore | Fit | | Housing Bore | Fit | | Housing Bore | Fit | | Housing Bore | Fit | | Housing Bore | Fit | |
| Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | | Max. Min. | | |
| μm | μm | | μm | μm | | μm | μm | | μm | μm | | μm | μm | | μm | μm | | μm | μm | | μm | μm | | μm | μm | |
| 4.5 -4.5 | 4.5T 12.5L | | 2 -7 | 7T 10L | | 5 -10 | 10T 13L | | -3 -12 | 12T 5L | | 0 -15 | 15T 8L | | -7 -16 | 16T 1L | | -4 -19 | 19T 4L | | -12 -21 | 21T 4T | | -9 -24 | 24T 1T | |
| 5.5 -5.5 | 5.5T 13.5L | | 2 -9 | 9T 10L | | 6 -12 | 12T 14L | | -4 -15 | 15T 4L | | 0 -18 | 18T 8L | | -9 -20 | 20T 1T | | -5 -23 | 23T 3L | | -15 -26 | 26T 7T | | -11 -29 | 29T 3T | |
| 6.5 -6.5 | 6.5T 15.5L | | 2 -11 | 11T 11L | | 6 -15 | 15T 15L | | -4 -17 | 17T 5L | | 0 -21 | 21T 9L | | -11 -24 | 24T 2T | | -7 -28 | 28T 2L | | -18 -31 | 31T 9T | | -14 -35 | 35T 5T | |
| 8 -8 | 8T 19L | | 3 -13 | 13T 14L | | 7 -18 | 18T 18L | | -4 -20 | 20T 7L | | 0 -25 | 25T 11L | | -12 -28 | 28T 1T | | -8 -33 | 33T 3L | | -21 -37 | 37T 10T | | -17 -42 | 42T 6T | |
| 9.5 -9.5 | 9.5T 22.5L | | 4 -15 | 15T 17L | | 9 -21 | 21T 22L | | -5 -24 | 24T 8L | | 0 -30 | 30T 13L | | -14 -33 | 33T 1T | | -9 -39 | 39T 4L | | -26 -45 | 45T 13T | | -21 -51 | 51T 8T | |
| 11 -11 | 11T 26L | | 4 -18 | 18T 19L | | 10 -25 | 25T 25L | | -6 -28 | 28T 9L | | 0 -35 | 35T 15L | | -16 -38 | 38T 1T | | -10 -45 | 45T 5L | | -30 -52 | 52T 15T | | -24 -59 | 59T 9T | |
| 12.5 -12.5 | 12.5T 30.5L | | 4 -21 | 21T 22L | | 12 -28 | 28T 30L | | -8 -33 | 33T 10L | | 0 -40 | 40T 18L | | -20 -45 | 45T 2T | | -12 -52 | 52T 6L | | -36 -61 | 61T 18T | | -28 -68 | 68T 10T | |
| 12.5 -12.5 | 12.5T 37.5L | | 4 -21 | 21T 29L | | 12 -28 | 28T 37L | | -8 -33 | 33T 17L | | 0 -40 | 40T 25L | | -20 -45 | 45T 5L | | -12 -52 | 52T 13L | | -36 -61 | 61T 11T | | -28 -68 | 68T 3T | |
| 14.5 -14.5 | 14.5T 44.5L | | 5 -24 | 24T 35L | | 13 -33 | 33T 43L | | -8 -37 | 37T 22L | | 0 -46 | 46T 30L | | -22 -51 | 51T 8L | | -14 -60 | 60T 16L | | -41 -70 | 70T 11T | | -33 -79 | 79T 3T | |
| 16 -16 | 16T 51L | | 5 -27 | 27T 40L | | 16 -36 | 36T 51L | | -9 -41 | 41T 26L | | 0 -52 | 52T 35L | | -25 -57 | 57T 10L | | -14 -66 | 66T 21L | | -47 -79 | 79T 12T | | -36 -88 | 88T 1T | |
| 18 -18 | 18T 58L | | 7 -29 | 29T 47L | | 17 -40 | 40T 57L | | -10 -46 | 46T 30L | | 0 -57 | 57T 40L | | -26 -62 | 62T 14L | | -16 -73 | 73T 24L | | -51 -87 | 87T 11T | | -41 -98 | 98T 1T | |
| 20 -20 | 20T 65L | | 8 -32 | 32T 53L | | 18 -45 | 45T 63L | | -10 -50 | 50T 35L | | 0 -63 | 63T 45L | | -27 -67 | 67T 18L | | -17 -80 | 80T 28L | | -55 -95 | 95T 10T | | -45 -108 | 108T 0T | |
| 22 -22 | 22T 72L | | 0 -44 | 44T 50L | | 0 -70 | 70T 50L | | -26 -70 | 70T 24L | | -26 -96 | 96T 24L | | -44 -88 | 88T 6L | | -44 -114 | 114T 6L | | -78 -122 | 122T 28T | | -78 -148 | 148T 28T | |
| 25 -25 | 25T 100L | | 0 -50 | 50T 75L | | 0 -80 | 80T 75L | | -30 -80 | 80T 45L | | -30 -110 | 110T 45L | | -50 -100 | 100T 25L | | -50 -130 | 130T 25L | | -88 -138 | 138T 13T | | -88 -168 | 168T 13T | |
| 28 -28 | 28T 128L | | 0 -56 | 56T 100L | | 0 -90 | 90T 100L | | -34 -90 | 90T 66L | | -34 -124 | 124T 66L | | -56 -112 | 112T 44L | | -56 -146 | 146T 44L | | -100 -156 | 156T 0T | | -100 -190 | 190T 0T | |
| 33 -33 | 33T 158L | | 0 -66 | 66T 125L | | 0 -105 | 105T 125L | | -40 -106 | 106T 85L | | -40 -145 | 145T 85L | | -66 -132 | 132T 59L | | -66 -171 | 171T 59L | | -120 -186 | 186T 5L | | -120 -225 | 225T 5L | |
| 39 -39 | 39T 199L | | 0 -78 | 78T 160L | | 0 -125 | 125T 160L | | -48 -126 | 126T 112L | | -48 -173 | 173T 112L | | -78 -156 | 156T 82L | | -78 -203 | 203T 82L | | -140 -218 | 218T 20L | | -140 -265 | 265T 20L | |
| 46 -46 | 46T 246L | | 0 -92 | 92T 200L | | 0 -150 | 150T 200L | | -58 -150 | 150T 142L | | -58 -208 | 208T 142L | | -92 -184 | 184T 108L | | -92 -242 | 242T 108L | | -170 -262 | 262T 30L | | -170 -320 | 320T 30L | |
| 55 -55 | 55T 305L | | 0 -110 | 110T 250L | | 0 -175 | 175T 250L | | -68 -178 | 178T 182L | | -68 -243 | 243T 182L | | -110 -220 | 220T 140L | | -110 -285 | 285T 140L | | -195 -305 | 305T 55L | | -195 -370 | 370T 55L | |

DEEP GROOVE BALL BEARINGS

The basic designation for deep groove ball bearings consists of the code for the bearing series and bore, as well as seal/shield and internal clearance designations if featured in the bearing design.

| | |
|---------------------------------|----|
| Nomenclature..... | 28 |
| Standard 6000 Series..... | 29 |
| 61000 Thin-Section Series | 31 |
| 16000 Narrow Series | 32 |
| 62000-63000 Wide Series | 33 |
| Extra-Small 600 Series | 34 |



NOMENCLATURE

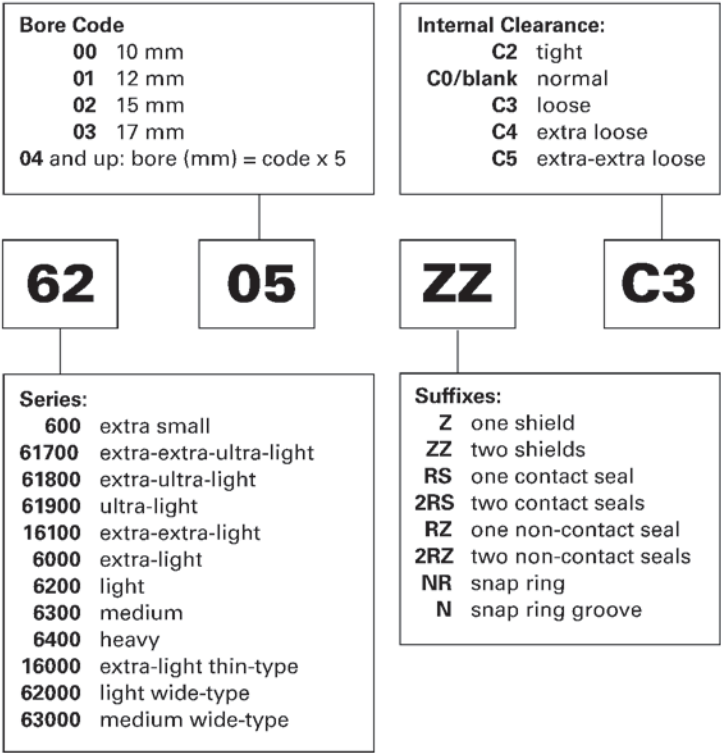


Fig. 3. Deep groove ball bearing nomenclature.

STANDARD 6000 SERIES

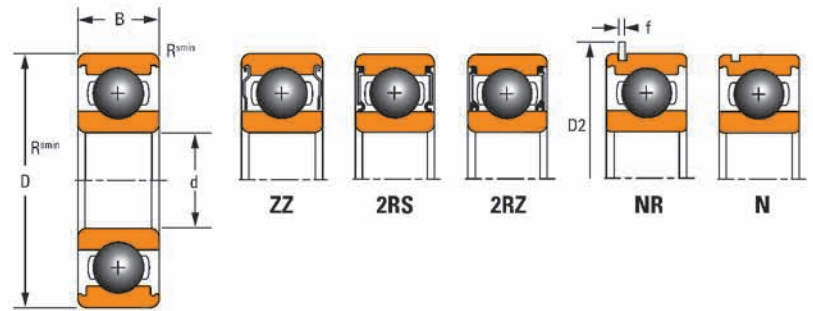


TABLE 10. STANDARD 6000 SERIES

| Bearing No. | | | | | | Boundary Dimensions | | | | | | Load Ratings | | Reference Speed | | Weight |
|-------------|----------|---------------|-------------------|-------------|-----------|---------------------|------|-------|-------------|-------------|------------|--------------|----------|-----------------|-------|--------|
| Description | Features | | | | | Bore | O.D. | Width | Radius | | | Dynamic | Static | Grease | Oil | |
| | Shields | Contact Seals | Non-Contact Seals | O.D. Groove | Snap Ring | | | | $R_{s\min}$ | $D2_{\max}$ | f_{\max} | | | | | |
| | | | | | | d | D | B | $R_{s\min}$ | $D2_{\max}$ | f_{\max} | C_r | C_{0r} | | | |
| | | | | | | mm | mm | mm | mm | mm | mm | kN | kN | RPM | RPM | kg |
| 6000 | ZZ | 2RS | 2RZ | N | NR | 10 | 26 | 8 | 0.3 | 29.2 | 0.70 | 4.60 | 2.00 | 26000 | 38000 | 0.020 |
| 6200 | ZZ | 2RS | 2RZ | N | NR | 10 | 30 | 9 | 0.6 | 34.7 | 1.12 | 5.10 | 2.40 | 22000 | 32000 | 0.030 |
| 6300 | ZZ | 2RS | 2RZ | N | NR | 10 | 35 | 11 | 0.6 | 39.7 | 1.12 | 8.10 | 3.40 | 20000 | 29000 | 0.050 |
| 6001 | ZZ | 2RS | 2RZ | N | NR | 12 | 28 | 8 | 0.3 | 30.8 | 0.85 | 5.00 | 2.40 | 23000 | 33000 | 0.020 |
| 6201 | ZZ | 2RS | 2RZ | N | NR | 12 | 32 | 10 | 0.6 | 36.7 | 1.12 | 6.80 | 3.00 | 21000 | 30000 | 0.040 |
| 6301 | ZZ | 2RS | 2RZ | N | NR | 12 | 37 | 12 | 1.0 | 41.3 | 1.12 | 9.70 | 4.20 | 19000 | 27000 | 0.060 |
| 6002 | ZZ | 2RS | 2RZ | N | NR | 15 | 32 | 9 | 0.3 | 36.7 | 1.12 | 5.60 | 2.80 | 20000 | 30000 | 0.030 |
| 6202 | ZZ | 2RS | 2RZ | N | NR | 15 | 35 | 11 | 0.6 | 39.7 | 1.12 | 7.60 | 3.70 | 19000 | 28000 | 0.050 |
| 6302 | ZZ | 2RS | 2RZ | N | NR | 15 | 42 | 13 | 1.0 | 46.3 | 1.12 | 11.30 | 5.40 | 16000 | 24000 | 0.080 |
| 6003 | ZZ | 2RS | 2RZ | N | NR | 17 | 35 | 10 | 0.3 | 39.7 | 1.12 | 6.00 | 3.30 | 19000 | 28000 | 0.040 |
| 6203 | ZZ | 2RS | 2RZ | N | NR | 17 | 40 | 12 | 0.6 | 44.6 | 1.12 | 9.60 | 4.80 | 17000 | 25000 | 0.070 |
| 6303 | ZZ | 2RS | 2RZ | N | NR | 17 | 47 | 14 | 1.0 | 52.7 | 1.12 | 13.50 | 6.60 | 15000 | 22000 | 0.120 |
| 6004 | ZZ | 2RS | 2RZ | N | NR | 20 | 42 | 12 | 0.6 | 46.3 | 1.12 | 9.40 | 5.00 | 17000 | 25000 | 0.070 |
| 6204 | ZZ | 2RS | 2RZ | N | NR | 20 | 47 | 14 | 1.0 | 52.7 | 1.12 | 12.80 | 6.60 | 15000 | 22000 | 0.100 |
| 6304 | ZZ | 2RS | 2RZ | N | NR | 20 | 52 | 15 | 1.1 | 57.9 | 1.12 | 15.90 | 7.90 | 13000 | 20000 | 0.140 |
| 6005 | ZZ | 2RS | 2RZ | N | NR | 25 | 47 | 12 | 0.6 | 52.7 | 1.12 | 10.10 | 5.80 | 14000 | 21000 | 0.080 |
| 6205 | ZZ | 2RS | 2RZ | N | NR | 25 | 52 | 15 | 1.0 | 57.9 | 1.12 | 14.00 | 7.90 | 14000 | 20000 | 0.130 |
| 6305 | ZZ | 2RS | 2RZ | N | NR | 25 | 62 | 17 | 1.1 | 67.7 | 1.70 | 22.40 | 11.50 | 12000 | 17000 | 0.220 |
| 6405 | — | — | — | N | NR | 25 | 80 | 21 | 1.5 | 86.6 | 1.70 | 36.10 | 18.80 | 10000 | 15000 | 0.530 |
| 6006 | ZZ | 2RS | 2RZ | N | NR | 30 | 55 | 13 | 1.0 | 60.7 | 1.12 | 13.20 | 8.30 | 12000 | 18000 | 0.110 |
| 6206 | ZZ | 2RS | 2RZ | N | NR | 30 | 62 | 16 | 1.0 | 67.7 | 1.70 | 19.50 | 11.30 | 11000 | 16000 | 0.200 |
| 6306 | ZZ | 2RS | 2RZ | N | NR | 30 | 72 | 19 | 1.1 | 78.6 | 1.70 | 26.60 | 15.00 | 10000 | 15000 | 0.350 |
| 6406 | — | — | — | N | NR | 30 | 90 | 23 | 1.5 | 96.5 | 2.46 | 47.30 | 24.50 | 9300 | 13000 | 0.740 |
| 6007 | ZZ | 2RS | 2RZ | N | NR | 35 | 62 | 14 | 1.0 | 67.7 | 1.70 | 16.00 | 10.30 | 11000 | 16000 | 0.150 |
| 6207 | ZZ | 2RS | 2RZ | N | NR | 35 | 72 | 17 | 1.1 | 78.6 | 1.70 | 25.60 | 15.30 | 10000 | 14000 | 0.290 |
| 6307 | ZZ | 2RS | 2RZ | N | NR | 35 | 80 | 21 | 1.5 | 86.6 | 1.70 | 33.30 | 19.20 | 9300 | 13000 | 0.450 |
| 6407 | — | — | — | N | NR | 35 | 100 | 25 | 1.5 | 106.5 | 2.46 | 55.50 | 29.40 | 8500 | 12000 | 0.950 |
| 6008 | ZZ | 2RS | 2RZ | N | NR | 40 | 68 | 15 | 1.0 | 74.6 | 1.70 | 16.80 | 11.50 | 10000 | 15000 | 0.190 |
| 6208 | ZZ | 2RS | 2RZ | N | NR | 40 | 80 | 18 | 1.1 | 86.6 | 1.70 | 29.10 | 17.90 | 8800 | 13000 | 0.370 |
| 6308 | ZZ | 2RS | 2RZ | N | NR | 40 | 90 | 23 | 1.5 | 96.5 | 2.46 | 40.70 | 23.90 | 8500 | 12000 | 0.640 |
| 6408 | — | — | — | N | NR | 40 | 110 | 27 | 2.0 | 116.6 | 2.46 | 63.70 | 34.60 | 7800 | 11000 | 1.250 |
| 6009 | ZZ | 2RS | 2RZ | N | NR | 45 | 75 | 16 | 1.0 | 81.6 | 1.70 | 21.00 | 14.80 | 9100 | 13000 | 0.230 |
| 6209 | ZZ | 2RS | 2RZ | N | NR | 45 | 85 | 19 | 1.1 | 91.6 | 1.70 | 31.70 | 20.50 | 8200 | 12000 | 0.420 |
| 6309 | ZZ | 2RS | 2RZ | N | NR | 45 | 100 | 25 | 1.5 | 106.5 | 2.46 | 48.80 | 29.40 | 7800 | 11000 | 0.840 |
| 6409 | — | — | — | N | NR | 45 | 120 | 29 | 2.0 | 129.7 | 2.82 | 77.20 | 45.20 | 7200 | 10000 | 1.550 |
| 6010 | ZZ | 2RS | 2RZ | N | NR | 50 | 80 | 16 | 1.0 | 86.6 | 1.70 | 21.80 | 16.30 | 8300 | 12000 | 0.250 |
| 6210 | ZZ | 2RS | 2RZ | N | NR | 50 | 90 | 20 | 1.1 | 96.5 | 2.46 | 35.10 | 23.20 | 7700 | 11000 | 0.460 |
| 6310 | ZZ | 2RS | 2RZ | N | NR | 50 | 110 | 27 | 2.0 | 116.6 | 2.46 | 57.50 | 35.40 | 7200 | 10000 | 1.050 |
| 6410 | — | — | — | N | NR | 50 | 130 | 31 | 2.1 | 139.7 | 2.82 | 83.10 | 49.40 | 6800 | 9700 | 1.900 |
| 6011 | ZZ | 2RS | 2RZ | N | NR | 55 | 90 | 18 | 1.1 | 96.5 | 2.46 | 28.30 | 21.30 | 7800 | 11000 | 0.360 |
| 6211 | ZZ | 2RS | 2RZ | N | NR | 55 | 100 | 21 | 1.5 | 106.5 | 2.46 | 43.40 | 29.20 | 7000 | 10000 | 0.610 |
| 6311 | ZZ | 2RS | 2RZ | N | NR | 55 | 120 | 29 | 2.0 | 129.7 | 2.82 | 71.50 | 44.60 | 6700 | 10000 | 1.350 |
| 6411 | — | — | — | N | NR | 55 | 140 | 33 | 2.1 | 149.7 | 2.82 | 100.70 | 62.40 | 6300 | 9100 | 2.300 |

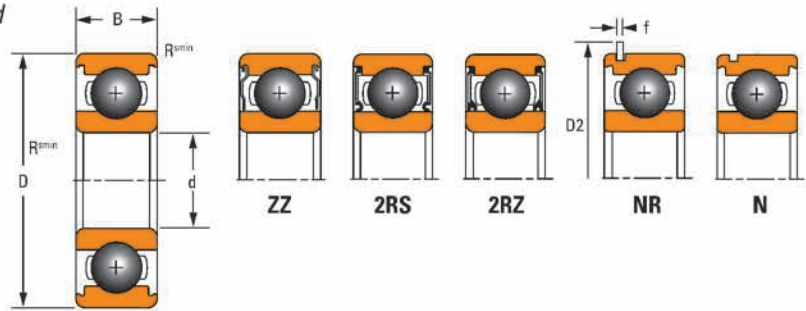
Most bearings in the 6000, 6200 and 6300 series up to 60 mm bore also can be made available in stainless steel (AISI 440C material).
Timken stainless steel bearing numbers are designated using the "H" suffix (e.g. 6203H-2RS).

Continued on next page.

DEEP GROOVE BALL BEARINGS

STANDARD 6000 SERIES

STANDARD 6000 SERIES – continued



Continued from Table 10.

| Description | Bearing No. | | | | | Boundary Dimensions | | | | | | Load Ratings | | Reference Speed | | Weight |
|-------------|-------------|---------------|-------------------|-------------|-----------|---------------------|------|-------|--------------------|--------------------|------------------|----------------|-----------------|-----------------|-------|--------|
| | Features | | | | | Bore | O.D. | Width | Radius | | | Dynamic | Static | Grease | Oil | |
| | Shields | Contact Seals | Non-Contact Seals | O.D. Groove | Snap Ring | d | D | B | R _{s min} | D _{2 max} | f _{max} | C _r | C _{0r} | RPM | RPM | |
| | | | | | | mm | mm | mm | mm | mm | mm | kN | kN | RPM | RPM | kg |
| 6012 | ZZ | 2RS | 2RZ | N | NR | 60 | 95 | 18 | 1.1 | 101.6 | 2.46 | 29.40 | 23.20 | 7200 | 10000 | 0.390 |
| 6212 | ZZ | 2RS | 2RZ | N | NR | 60 | 110 | 22 | 1.5 | 116.6 | 2.46 | 47.70 | 32.90 | 6500 | 9300 | 0.780 |
| 6312 | ZZ | 2RS | 2RZ | N | NR | 60 | 130 | 31 | 2.1 | 139.7 | 2.82 | 81.80 | 52.00 | 6300 | 9100 | 1.700 |
| 6412 | — | — | — | N | NR | 60 | 150 | 35 | 2.1 | 159.7 | 2.82 | 109.00 | 70.10 | 6000 | 8600 | 2.730 |
| 6013 | ZZ | 2RS | 2RZ | N | NR | 65 | 100 | 18 | 1.1 | 106.5 | 2.46 | 30.50 | 24.80 | 6700 | 9700 | 0.430 |
| 6213 | ZZ | 2RS | 2RZ | N | NR | 65 | 120 | 23 | 1.5 | 129.7 | 2.82 | 57.20 | 40.00 | 6000 | 8600 | 0.990 |
| 6313 | ZZ | 2RS | 2RZ | N | NR | 65 | 140 | 33 | 2.1 | 149.7 | 2.82 | 92.60 | 59.70 | 6000 | 8600 | 2.100 |
| 6413 | — | — | — | N | NR | 65 | 160 | 37 | 2.1 | 169.7 | 2.82 | 118.00 | 78.60 | 5700 | 8200 | 3.300 |
| 6014 | ZZ | 2RS | 2RZ | N | NR | 70 | 110 | 20 | 1.1 | 116.6 | 2.46 | 38.10 | 30.40 | 6400 | 9300 | 0.570 |
| 6214 | ZZ | 2RS | 2RZ | N | NR | 70 | 125 | 24 | 1.5 | 134.7 | 2.82 | 60.80 | 44.00 | 5700 | 8300 | 1.100 |
| 6314 | ZZ | 2RS | 2RZ | N | NR | 70 | 150 | 35 | 2.1 | 159.7 | 2.82 | 104.00 | 68.00 | 5700 | 8200 | 2.500 |
| 6015 | ZZ | 2RS | 2RZ | N | NR | 75 | 115 | 20 | 1.1 | 121.6 | 2.46 | 39.50 | 33.20 | 6000 | 8700 | 0.600 |
| 6215 | ZZ | 2RS | 2RZ | N | NR | 75 | 130 | 25 | 1.5 | 139.7 | 2.82 | 66.10 | 48.20 | 5500 | 8000 | 1.200 |
| 6315 | ZZ | 2RS | 2RZ | N | NR | 75 | 160 | 37 | 2.1 | 169.7 | 2.82 | 113.40 | 76.90 | 5400 | 7800 | 3.000 |
| 6016 | ZZ | 2RS | 2RZ | N | NR | 80 | 125 | 22 | 1.1 | 134.7 | 2.82 | 47.50 | 39.70 | 5800 | 8400 | 0.820 |
| 6216 | ZZ | 2RS | 2RZ | N | NR | 80 | 140 | 26 | 2.0 | 149.7 | 2.82 | 71.50 | 53.00 | 5200 | 7500 | 1.400 |
| 6316 | ZZ | 2RS | 2RZ | N | NR | 80 | 170 | 39 | 2.1 | 182.9 | 3.10 | 122.90 | 86.50 | 5200 | 7500 | 3.600 |
| 6017 | ZZ | 2RS | 2RZ | N | NR | 85 | 130 | 22 | 1.1 | 139.7 | 2.82 | 49.50 | 42.80 | 5400 | 7900 | 0.850 |
| 6217 | ZZ | 2RS | 2RZ | N | NR | 85 | 150 | 28 | 2.0 | 159.7 | 2.82 | 83.20 | 61.90 | 5000 | 7200 | 1.800 |
| 6317 | ZZ | 2RS | 2RZ | N | NR | 85 | 180 | 41 | 3.0 | 192.9 | 3.10 | 132.70 | 96.50 | 5000 | 7200 | 4.250 |
| 6018 | ZZ | 2RS | 2RZ | N | NR | 90 | 140 | 24 | 1.5 | 149.7 | 2.82 | 58.00 | 49.60 | 5300 | 7600 | 1.120 |
| 6218 | ZZ | 2RS | 2RZ | N | NR | 90 | 160 | 30 | 2.0 | 169.7 | 2.82 | 96.00 | 71.50 | 4800 | 6900 | 2.150 |
| 6318 | ZZ | 2RS | 2RZ | N | NR | 90 | 190 | 43 | 3.0 | 202.9 | 3.10 | 142.60 | 107.20 | 4800 | 6900 | 4.900 |
| 6019 | ZZ | 2RS | 2RZ | N | NR | 95 | 145 | 24 | 1.5 | 154.7 | 2.82 | 57.70 | 50.00 | 5000 | 7300 | 1.180 |
| 6219 | ZZ | 2RS | 2RZ | N | NR | 95 | 170 | 32 | 2.1 | 182.9 | 3.10 | 108.70 | 81.70 | 4700 | 6700 | 2.600 |
| 6319 | ZZ | 2RS | 2RZ | N | NR | 95 | 200 | 45 | 3.0 | 212.9 | 3.10 | 152.70 | 118.40 | 4600 | 6600 | 5.750 |
| 6020 | ZZ | 2RS | 2RZ | N | NR | 100 | 150 | 24 | 1.5 | 159.7 | 2.82 | 60.10 | 54.20 | 4800 | 6900 | 1.250 |
| 6220 | ZZ | 2RS | 2RZ | N | NR | 100 | 180 | 34 | 2.1 | 192.9 | 3.10 | 122.00 | 92.70 | 4500 | 6500 | 3.200 |
| 6320 | ZZ | 2RS | 2RZ | N | NR | 100 | 215 | 47 | 3.0 | 227.8 | 3.10 | 173.20 | 140.90 | 4400 | 6200 | 6.980 |
| 6021 | ZZ | 2RS | 2RZ | N | NR | 105 | 160 | 26 | 2.0 | 169.7 | 2.82 | 69.20 | 61.20 | 4700 | 6800 | 1.600 |
| 6221 | ZZ | 2RS | 2RZ | N | NR | 105 | 190 | 36 | 2.1 | 202.9 | 3.10 | 133.00 | 104.00 | 4400 | 6300 | 3.710 |
| 6321 | ZZ | 2RS | 2RZ | N | NR | 105 | 225 | 49 | 3.0 | 214.3 | 3.50 | 183.70 | 153.10 | 4200 | 6000 | 8.110 |
| 6022 | ZZ | 2RS | 2RZ | N | NR | 110 | 170 | 28 | 2.0 | 182.9 | 3.10 | 81.90 | 72.80 | 4600 | 6600 | 1.930 |
| 6222 | ZZ | 2RS | 2RZ | N | NR | 110 | 200 | 38 | 2.1 | 212.9 | 3.10 | 144.00 | 117.00 | 4300 | 6100 | 4.440 |
| 6322 | ZZ | 2RS | 2RZ | N | NR | 110 | 240 | 50 | 3.0 | 252.0 | 3.50 | 205.40 | 179.40 | 3900 | 5500 | 9.480 |
| 6024 | ZZ | 2RS | 2RZ | N | NR | 120 | 180 | 28 | 2.0 | 192.9 | 3.10 | 84.90 | 79.20 | 4200 | 6100 | 2.030 |
| 6224 | ZZ | 2RS | 2RZ | N | NR | 120 | 215 | 40 | 2.1 | 227.8 | 3.10 | 155.30 | 131.10 | 4000 | 5700 | 5.160 |
| 6026 | ZZ | 2RS | 2RZ | N | NR | 130 | 200 | 33 | 2.0 | 212.9 | 3.10 | 105.00 | 96.80 | 4100 | 5900 | 3.150 |
| 6226 | ZZ | 2RS | 2RZ | N | NR | 130 | 230 | 40 | 3.0 | 242.0 | 3.50 | 166.80 | 146.30 | 3700 | 5200 | 5.850 |
| 6028 | ZZ | 2RS | 2RZ | N | NR | 140 | 210 | 33 | 2.0 | 222.8 | 3.10 | 110.00 | 108.60 | 3800 | 5500 | 3.500 |
| 6228 | ZZ | 2RS | 2RZ | N | NR | 140 | 250 | 42 | 3.0 | 262.0 | 3.50 | 165.00 | 125.00 | 3500 | 5000 | 7.450 |
| 6030 | ZZ | 2RS | 2RZ | N | NR | 150 | 225 | 35 | 2.1 | 237.0 | 3.50 | 125.00 | 126.00 | 3600 | 5200 | 4.900 |
| 6032 | ZZ | 2RS | 2RZ | — | — | 160 | 240 | 38 | 2.1 | — | — | 137.00 | 135.00 | 3500 | 5100 | 5.150 |

Most bearings in the 6000, 6200 and 6300 series up to 60 mm bore also can be made available in stainless steel (AISI 440C material).
Timken stainless steel bearing numbers are designated using the "H" suffix (e.g. 6203H-2RS).

61000 THIN-SECTION SERIES

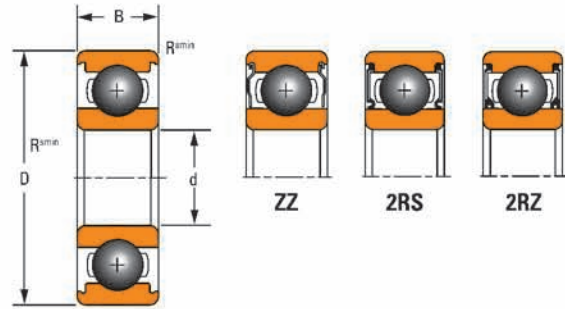


TABLE 11. 61000 THIN-SECTION SERIES

| Bearing No. | | | | Boundary Dimensions | | | | Load Ratings | | Limiting Speed | | Weight |
|-------------|----------|---------------|-------------------|---------------------|----------------|-----------------|--------|--------------|--------|----------------|-------|--------|
| Description | Features | | | Bore | O.D. | Width | Radius | Dynamic | Static | Grease | Oil | |
| | Shields | Contact Seals | Non-Contact Seals | | | | | | | | | |
| | d | D | B | R _{s min} | C _r | C _{0r} | RPM | RPM | | | | |
| | | | | mm | mm | mm | mm | kN | kN | RPM | RPM | kg |
| 61800 | ZZ | 2RS | 2RZ | 10 | 19 | 5 | 0.3 | 1.70 | 0.84 | 34000 | 40000 | 0.005 |
| 61900 | ZZ | 2RS | 2RZ | 10 | 22 | 6 | 0.3 | 2.70 | 1.30 | 31000 | 37000 | 0.009 |
| 61701 | ZZ | 2RS | — | 12 | 18 | 4 | 0.2 | 0.93 | 0.53 | 13000 | 15000 | 0.003 |
| 61801 | ZZ | 2RS | 2RZ | 12 | 21 | 5 | 0.3 | 1.90 | 1.00 | 30000 | 36000 | 0.005 |
| 61901 | ZZ | 2RS | 2RZ | 12 | 24 | 6 | 0.3 | 2.90 | 1.50 | 28000 | 33000 | 0.010 |
| 61702 | ZZ | 2RS | — | 15 | 21 | 4 | 0.2 | 0.94 | 0.58 | 11000 | 13000 | 0.003 |
| 61802 | ZZ | 2RS | 2RZ | 15 | 24 | 5 | 0.3 | 2.10 | 1.30 | 26000 | 31000 | 0.006 |
| 61902 | ZZ | 2RS | 2RZ | 15 | 28 | 7 | 0.3 | 4.30 | 2.30 | 24000 | 29000 | 0.015 |
| 61703 | ZZ | 2RS | — | 17 | 23 | 4 | 0.2 | 1.00 | 0.66 | 9500 | 11000 | 0.004 |
| 61803 | ZZ | 2RS | 2RZ | 17 | 26 | 5 | 0.3 | 2.20 | 1.50 | 24000 | 29000 | 0.007 |
| 61903 | ZZ | 2RS | 2RZ | 17 | 30 | 7 | 0.3 | 4.60 | 2.60 | 22000 | 26000 | 0.016 |
| 61704 | — | 2RS | — | 20 | 27 | 4 | 0.2 | 1.00 | 0.72 | 8500 | 10000 | 0.005 |
| 61804 | ZZ | 2RS | 2RZ | 20 | 32 | 7 | 0.3 | 4.00 | 2.50 | 21000 | 25000 | 0.016 |
| 61904 | ZZ | 2RS | 2RZ | 20 | 37 | 9 | 0.3 | 6.40 | 3.70 | 19000 | 22000 | 0.033 |
| 61705 | — | 2RS | — | 25 | 32 | 4 | 0.2 | 1.10 | 0.84 | 7000 | 8000 | 0.006 |
| 61805 | ZZ | 2RS | 2RZ | 25 | 37 | 7 | 0.3 | 4.30 | 2.90 | 18000 | 21000 | 0.020 |
| 61905 | ZZ | 2RS | 2RZ | 25 | 42 | 9 | 0.3 | 7.00 | 4.60 | 16000 | 19000 | 0.039 |
| 61706 | — | — | 2RZ | 30 | 37 | 4 | 0.2 | 1.10 | 0.95 | 5500 | 7000 | 0.007 |
| 61806 | ZZ | 2RS | 2RZ | 30 | 42 | 7 | 0.3 | 4.50 | 3.40 | 15000 | 18000 | 0.023 |
| 61906 | ZZ | 2RS | 2RZ | 30 | 47 | 9 | 0.3 | 7.20 | 5.00 | 14000 | 17000 | 0.044 |
| 61707 | — | 2RS | — | 35 | 44 | 5 | 0.3 | 1.90 | 1.60 | 4900 | 6000 | 0.014 |
| 61807 | ZZ | 2RS | 2RZ | 35 | 47 | 7 | 0.3 | 4.70 | 3.80 | 13000 | 16000 | 0.027 |
| 61907 | ZZ | 2RS | 2RZ | 35 | 55 | 10 | 0.6 | 10.90 | 7.80 | 12000 | 14000 | 0.069 |
| 61708 | — | 2RS | — | 40 | 50 | 6 | 0.3 | 2.50 | 2.20 | 4300 | 5000 | 0.021 |
| 61808 | ZZ | 2RS | 2RZ | 40 | 52 | 7 | 0.3 | 4.90 | 4.20 | 12000 | 14000 | 0.029 |
| 61908 | ZZ | 2RS | 2RZ | 40 | 62 | 12 | 0.6 | 13.70 | 9.90 | 11000 | 13000 | 0.101 |
| 61709 | — | 2RS | — | 45 | 55 | 6 | 0.3 | 2.60 | 2.40 | 3900 | 4600 | 0.023 |
| 61809 | ZZ | 2RS | 2RZ | 45 | 58 | 7 | 0.3 | 6.20 | 5.40 | 11000 | 13000 | 0.034 |
| 61909 | ZZ | 2RS | 2RZ | 45 | 68 | 12 | 0.6 | 14.10 | 10.90 | 10000 | 11000 | 0.123 |
| 61710 | — | 2RS | — | 50 | 62 | 6 | 0.3 | 2.70 | 2.70 | 3500 | 4100 | 0.034 |
| 61810 | ZZ | 2RS | 2RZ | 50 | 65 | 7 | 0.3 | 6.20 | 5.80 | 9500 | 11000 | 0.047 |
| 61910 | ZZ | 2RS | 2RZ | 50 | 72 | 12 | 0.6 | 14.50 | 11.70 | 9000 | 11000 | 0.123 |
| 61811 | ZZ | 2RS | 2RZ | 55 | 72 | 9 | 0.3 | 8.80 | 8.10 | 8600 | 10000 | 0.075 |
| 61911 | ZZ | 2RS | 2RZ | 55 | 80 | 13 | 1.0 | 16.60 | 14.10 | 8100 | 9600 | 0.168 |
| 61812 | ZZ | 2RS | 2RZ | 60 | 78 | 10 | 0.3 | 11.50 | 10.60 | 7900 | 9400 | 0.094 |
| 61912 | ZZ | 2RS | 2RZ | 60 | 85 | 13 | 1.0 | 20.20 | 17.30 | 7500 | 8900 | 0.180 |
| 61813 | ZZ | 2RS | — | 65 | 85 | 10 | 0.6 | 11.90 | 11.50 | 7300 | 8600 | 0.118 |
| 61913 | ZZ | 2RS | — | 65 | 90 | 13 | 1.0 | 17.30 | 16.00 | 7000 | 8300 | 0.198 |

The bearing sizes listed above also can be made available in stainless steel (AISI 440C material). Timken stainless steel bearing numbers are designated using the "H" suffix (e.g. 61807H).

16000 NARROW SERIES

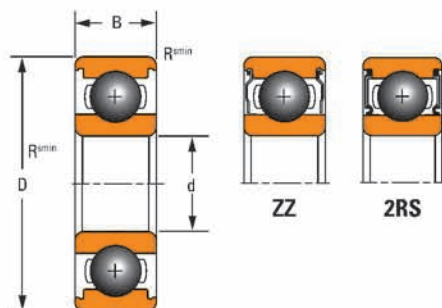


TABLE 12. 16000 NARROW SERIES

| Bearing No. | | | Boundary Dimensions | | | | Load Ratings | | Limiting Speed | | Weight |
|-------------|----------|---------------|---------------------|--------------------|----------------|-----------------|--------------|--------|----------------|-------|--------|
| Description | Features | | Bore | O.D. | Width | Radius | Dynamic | Static | Grease | Oil | |
| | Shields | Contact Seals | | | | | | | | | |
| | d | D | B | R _{s min} | C _r | C _{0r} | | | | | |
| | | | mm | mm | mm | mm | kN | kN | RPM | RPM | kg |
| 16100 | ZZ | — | 10 | 28 | 8 | 0.3 | 4.60 | 2.00 | 25000 | 37000 | 0.022 |
| 16101 | ZZ | 2RS | 12 | 30 | 8 | 0.3 | 5.10 | 2.40 | 22000 | 33000 | 0.024 |
| 16002 | ZZ | — | 15 | 32 | 8 | 0.3 | 5.60 | 2.80 | 19000 | 27000 | 0.027 |
| 16003 | ZZ | — | 17 | 35 | 8 | 0.3 | 6.00 | 3.30 | 17000 | 24000 | 0.030 |
| 16004 | — | — | 20 | 42 | 8 | 0.3 | 7.90 | 4.50 | 13000 | 20000 | 0.050 |
| 16005 | ZZ | — | 25 | 47 | 8 | 0.3 | 8.90 | 5.60 | 11000 | 16000 | 0.060 |
| 16006 | — | — | 30 | 55 | 9 | 0.3 | 11.20 | 7.40 | 10000 | 14000 | 0.080 |
| 16007 | — | — | 35 | 62 | 9 | 0.3 | 12.20 | 8.80 | 8400 | 12000 | 0.100 |
| 16008 | — | — | 40 | 68 | 9 | 0.3 | 12.60 | 9.70 | 7400 | 11000 | 0.130 |
| 16009 | — | — | 45 | 75 | 10 | 0.6 | 15.50 | 12.30 | 6900 | 10000 | 0.170 |
| 16010 | — | — | 50 | 80 | 10 | 0.6 | 16.00 | 13.20 | 6300 | 9100 | 0.180 |
| 16011 | — | — | 55 | 90 | 11 | 0.6 | 19.40 | 16.30 | 5800 | 8500 | 0.260 |
| 16012 | — | — | 60 | 95 | 11 | 0.6 | 19.90 | 17.60 | 5400 | 7800 | 0.220 |
| 16013 | — | — | 65 | 100 | 11 | 0.6 | 17.20 | 15.90 | 5000 | 7300 | 0.290 |
| 16014 | — | — | 70 | 110 | 13 | 0.6 | 26.80 | 23.60 | 5000 | 7200 | 0.430 |
| 16015 | — | — | 75 | 115 | 13 | 0.6 | 27.50 | 25.30 | 4600 | 6700 | 0.450 |
| 16016 | — | — | 80 | 125 | 14 | 0.6 | 31.70 | 29.70 | 4400 | 6400 | 0.590 |
| 16017 | — | — | 85 | 130 | 14 | 0.6 | 32.60 | 31.60 | 4200 | 6100 | 0.570 |
| 16018 | — | — | 90 | 140 | 16 | 1.0 | 39.90 | 37.00 | 4200 | 6100 | 0.670 |
| 16019 | — | — | 95 | 145 | 16 | 1.0 | 42.70 | 41.90 | 3900 | 5700 | 0.710 |
| 16020 | — | — | 100 | 150 | 16 | 1.0 | 43.80 | 44.30 | 3800 | 5400 | 0.740 |
| 16021 | — | — | 105 | 160 | 18 | 1.0 | 51.80 | 50.60 | 3800 | 5400 | 1.000 |
| 16022 | — | — | 110 | 170 | 19 | 1.0 | 57.40 | 56.70 | 3600 | 5300 | 1.300 |
| 16024 | — | — | 120 | 180 | 19 | 1.0 | 58.80 | 60.40 | 3300 | 4800 | 1.400 |
| 16026 | — | — | 130 | 200 | 22 | 1.1 | 79.70 | 79.20 | 3200 | 4700 | 1.900 |
| 16028 | — | — | 140 | 210 | 22 | 1.1 | 82.10 | 85.00 | 3000 | 4400 | 2.000 |
| 16030 | — | — | 150 | 225 | 24 | 1.1 | 91.90 | 98.50 | 2900 | 4200 | 2.600 |
| 16032 | — | — | 160 | 240 | 25 | 1.5 | 99.00 | 108.00 | 2800 | 4000 | 4.200 |

62000-63000 WIDE SERIES

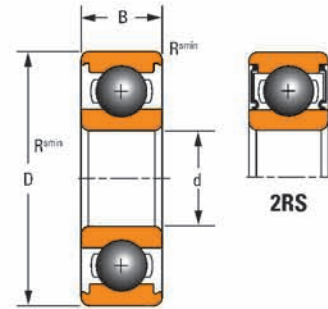


TABLE 13. 62000-63000 WIDE SERIES

| Bearing No. | | Boundary Dimensions | | | | Load Ratings | | Limiting Speed | | Weight |
|-------------|---------------|---------------------|------|-------|--------------------|----------------|-----------------|----------------|-------|--------|
| Description | Contact Seals | Bore | O.D. | Width | Radius | Dynamic | Static | Grease | Oil | |
| | | d | D | B | R _{s min} | C _r | C _{0r} | RPM | RPM | |
| | | mm | mm | mm | mm | kN | kN | RPM | RPM | kg |
| 62200 | 2RS | 10 | 30 | 14 | 0.6 | 6.00 | 2.60 | 29000 | 42000 | 0.040 |
| 62300 | 2RS | 10 | 35 | 17 | 0.6 | 8.10 | 3.40 | 26000 | 38000 | 0.070 |
| 63000 | 2RS | 10 | 26 | 12 | 0.3 | 4.60 | 2.00 | 33000 | 49000 | 0.030 |
| 62201 | 2RS | 12 | 32 | 14 | 0.6 | 6.90 | 3.10 | 26000 | 37000 | 0.050 |
| 62301 | 2RS | 12 | 37 | 17 | 1.0 | 9.70 | 4.20 | 23000 | 34000 | 0.080 |
| 63001 | 2RS | 12 | 28 | 12 | 0.3 | 5.10 | 2.40 | 29000 | 43000 | 0.030 |
| 62202 | 2RS | 15 | 35 | 14 | 0.6 | 7.70 | 3.80 | 22000 | 32000 | 0.050 |
| 62302 | 2RS | 15 | 42 | 17 | 1.0 | 11.30 | 5.40 | 19000 | 28000 | 0.100 |
| 63002 | 2RS | 15 | 32 | 13 | 0.3 | 5.60 | 2.80 | 25000 | 37000 | 0.040 |
| 62203 | 2RS | 17 | 40 | 16 | 0.6 | 9.60 | 4.80 | 20000 | 30000 | 0.080 |
| 62303 | 2RS | 17 | 47 | 19 | 1.0 | 13.60 | 6.60 | 18000 | 26000 | 0.140 |
| 63003 | 2RS | 17 | 35 | 14 | 0.3 | 6.00 | 3.30 | 23000 | 34000 | 0.050 |
| 62204 | 2RS | 20 | 47 | 18 | 1.0 | 12.80 | 6.60 | 18000 | 26000 | 0.120 |
| 62304 | 2RS | 20 | 52 | 21 | 1.1 | 15.90 | 7.90 | 17000 | 24000 | 0.140 |
| 63004 | 2RS | 20 | 42 | 16 | 0.6 | 9.40 | 5.00 | 20000 | 30000 | 0.090 |
| 62205 | 2RS | 25 | 52 | 18 | 1.0 | 14.00 | 7.90 | 15000 | 22000 | 0.150 |
| 62305 | 2RS | 25 | 62 | 24 | 1.1 | 23.60 | 12.10 | 14000 | 21000 | 0.300 |
| 63005 | 2RS | 25 | 47 | 16 | 0.6 | 10.10 | 5.80 | 17000 | 25000 | 0.100 |
| 62206 | 2RS | 30 | 62 | 20 | 1.0 | 19.50 | 11.30 | 13000 | 19000 | 0.230 |
| 62306 | 2RS | 30 | 72 | 27 | 1.1 | 28.20 | 15.80 | 13000 | 18000 | 0.470 |
| 63006 | 2RS | 30 | 55 | 19 | 1.0 | 13.20 | 8.30 | 15000 | 23000 | 0.150 |
| 62207 | 2RS | 35 | 72 | 23 | 1.1 | 25.70 | 15.30 | 12000 | 17000 | 0.370 |
| 62307 | 2RS | 35 | 80 | 31 | 1.5 | 33.30 | 19.20 | 12000 | 17000 | 0.620 |
| 63007 | 2RS | 35 | 62 | 20 | 1.0 | 16.00 | 10.30 | 14000 | 20000 | 0.200 |
| 62208 | 2RS | 40 | 80 | 23 | 1.1 | 29.10 | 17.90 | 10000 | 15000 | 0.440 |
| 62308 | 2RS | 40 | 90 | 33 | 1.5 | 40.70 | 23.90 | 11000 | 15000 | 0.850 |
| 63008 | 2RS | 40 | 68 | 21 | 1.0 | 16.80 | 11.60 | 12000 | 18000 | 0.240 |
| 62209 | 2RS | 45 | 85 | 23 | 1.1 | 32.70 | 20.50 | 9300 | 13000 | 0.460 |
| 62309 | 2RS | 45 | 100 | 36 | 1.5 | 37.20 | 26.30 | 9800 | 14000 | 1.100 |
| 62210 | 2RS | 50 | 90 | 23 | 1.1 | 35.10 | 23.20 | 8500 | 12000 | 0.470 |
| 62310 | 2RS | 50 | 110 | 40 | 2.0 | 47.60 | 35.70 | 9200 | 13000 | 1.500 |
| 62211 | 2RS | 55 | 100 | 25 | 1.5 | 43.40 | 29.20 | 7800 | 11000 | 0.680 |
| 62311 | 2RS | 55 | 120 | 43 | 2.0 | 71.50 | 45.00 | 8600 | 12000 | 2.000 |
| 62212 | 2RS | 60 | 110 | 28 | 1.5 | 47.50 | 32.50 | 7500 | 11000 | 1.000 |
| 62312 | 2RS | 60 | 130 | 46 | 2.1 | 81.80 | 51.90 | 8100 | 12000 | 2.500 |
| 62213 | 2RS | 65 | 120 | 31 | 1.5 | 55.90 | 40.50 | 7200 | 10000 | 1.300 |
| 62214 | 2RS | 70 | 125 | 31 | 1.5 | 60.50 | 45.50 | 6700 | 9700 | 1.400 |

EXTRA-SMALL 600 SERIES

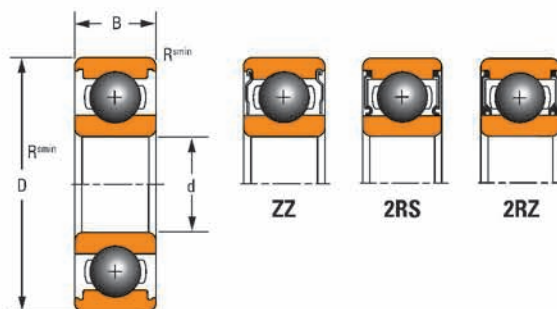


TABLE 14. EXTRA-SMALL 600 SERIES

| Bearing No. | | | | Boundary Dimensions | | | | Load Ratings | | Limiting Speed | | Weight |
|-------------|----------|------------------|--------------------------|---------------------|---------------|----------------|----------------------------------|-------------------------------|-------------------------------|-------------------|----------------|--------|
| Description | Features | | | Bore d | O.D. D | Width B | Radius R _{s min} | Dynamic C _r | Static C _{0r} | Grease RPM | Oil RPM | |
| | Shields | Contact Seals | Non- Contact Seals | | | | | | | | | |
| | | | | mm | mm | mm | mm | kN | kN | | | kg |
| 618/3 | ZZ | 2RS | 2RZ | 3 | 7 | 2 | 0.10 | 0.31 | 0.11 | 74000 | 88000 | 0.0003 |
| 619/3 | ZZ | 2RS | — | 3 | 8 | 3 | 0.15 | 0.56 | 0.18 | 70000 | 82000 | 0.0006 |
| 603 | ZZ | — | — | 3 | 9 | 3 | 0.15 | 0.57 | 0.19 | 66000 | 78000 | 0.0009 |
| 623 | ZZ | 2RS | 2RZ | 3 | 10 | 4 | 0.15 | 0.63 | 0.22 | 66000 | 78000 | 0.0016 |
| 633 | ZZ | 2RS | 2RZ | 3 | 13 | 5 | 0.20 | 1.30 | 0.49 | 51000 | 60000 | 0.0030 |
| 618/4 | ZZ | 2RS | 2RZ | 4 | 9 | 2.5 | 0.10 | 0.64 | 0.23 | 63000 | 75000 | 0.0006 |
| 619/4 | ZZ | 2RS | 2RZ | 4 | 11 | 4 | 0.15 | 1.00 | 0.35 | 57000 | 67000 | 0.0017 |
| 604 | ZZ | 2RS | 2RZ | 4 | 12 | 4 | 0.20 | 1.00 | 0.35 | 57000 | 67000 | 0.0020 |
| 624 | ZZ | 2RS | 2RZ | 4 | 13 | 5 | 0.20 | 1.30 | 0.49 | 51000 | 60000 | 0.0027 |
| 634 | ZZ | 2RS | 2RZ | 4 | 16 | 5 | 0.30 | 1.30 | 0.52 | 46000 | 54000 | 0.0050 |
| 618/5 | ZZ | 2RS | 2RZ | 5 | 11 | 3 | 0.15 | 0.72 | 0.28 | 54000 | 64000 | 0.0012 |
| 619/5 | ZZ | 2RS | 2RZ | 5 | 13 | 4 | 0.20 | 1.10 | 0.43 | 50000 | 59000 | 0.0021 |
| 605 | ZZ | 2RS | 2RZ | 5 | 14 | 5 | 0.20 | 1.30 | 0.51 | 48000 | 56000 | 0.0030 |
| 625 | ZZ | 2RS | 2RZ | 5 | 16 | 5 | 0.30 | 1.70 | 0.67 | 44000 | 52000 | 0.0040 |
| 635 | ZZ | 2RS | 2RZ | 5 | 19 | 6 | 0.30 | 2.30 | 0.89 | 38000 | 45000 | 0.0080 |
| 618/6 | ZZ | 2RS | 2RZ | 6 | 13 | 3.5 | 0.15 | 1.10 | 0.44 | 48000 | 56000 | 0.0019 |
| 619/6 | ZZ | 2RS | 2RZ | 6 | 15 | 5 | 0.20 | 1.30 | 0.52 | 46000 | 54000 | 0.0040 |
| 606 | ZZ | 2RS | 2RZ | 6 | 17 | 6 | 0.30 | 2.30 | 0.84 | 42000 | 49000 | 0.0050 |
| 626 | ZZ | 2RS | 2RZ | 6 | 19 | 6 | 0.30 | 2.30 | 0.89 | 38000 | 45000 | 0.0070 |
| 636 | ZZ | 2RS | 2RZ | 6 | 22 | 7 | 0.30 | 3.30 | 1.40 | 33000 | 39000 | 0.0120 |
| 618/7 | ZZ | 2RS | 2RZ | 7 | 14 | 3.5 | 0.15 | 1.20 | 0.51 | 44000 | 52000 | 0.0020 |
| 619/7 | ZZ | 2RS | 2RZ | 7 | 17 | 5 | 0.30 | 1.60 | 0.72 | 40000 | 47000 | 0.0050 |
| 607 | ZZ | 2RS | 2RZ | 7 | 19 | 6 | 0.30 | 2.30 | 0.89 | 38000 | 45000 | 0.0070 |
| 627 | ZZ | 2RS | 2RZ | 7 | 22 | 7 | 0.30 | 3.30 | 1.40 | 33000 | 39000 | 0.0120 |
| 637 | ZZ | 2RS | 2RZ | 7 | 26 | 9 | 0.30 | 4.60 | 2.00 | 28000 | 33000 | 0.0220 |
| 618/8 | ZZ | 2RS | 2RZ | 8 | 16 | 4 | 0.20 | 1.30 | 0.59 | 40000 | 47000 | 0.0032 |
| 619/8 | ZZ | 2RS | 2RZ | 8 | 19 | 6 | 0.30 | 2.20 | 0.91 | 37000 | 44000 | 0.0060 |
| 608 | ZZ | 2RS | 2RZ | 8 | 22 | 7 | 0.30 | 3.30 | 1.40 | 33000 | 39000 | 0.0110 |
| 628 | ZZ | 2RS | 2RZ | 8 | 24 | 8 | 0.30 | 3.30 | 1.40 | 31000 | 37000 | 0.0170 |
| 638 | ZZ | 2RS | 2RZ | 8 | 28 | 9 | 0.30 | 4.60 | 2.00 | 28000 | 33000 | 0.0270 |
| 618/9 | ZZ | 2RS | 2RZ | 9 | 17 | 4 | 0.20 | 1.30 | 0.66 | 37000 | 44000 | 0.0034 |
| 619/9 | ZZ | 2RS | 2RZ | 9 | 20 | 6 | 0.30 | 2.50 | 1.10 | 35000 | 42000 | 0.0070 |
| 609 | ZZ | 2RS | 2RZ | 9 | 24 | 7 | 0.30 | 3.40 | 1.40 | 30000 | 36000 | 0.0130 |
| 629 | ZZ | 2RS | 2RZ | 9 | 26 | 8 | 0.30 | 4.60 | 2.00 | 28000 | 33000 | 0.0180 |
| 639 | ZZ | 2RS | 2RZ | 9 | 30 | 10 | 0.60 | 5.10 | 2.40 | 25000 | 30000 | 0.0330 |

The bearing sizes listed above also can be made available in stainless steel (AISI 440C material).
Timken stainless steel bearing numbers are designated using the "H" suffix (e.g. 627H-2RS).