

**TIMKEN**



**TIMKEN® DEEP GROOVE BALL BEARING CATALOG**



## **ABOUT THE TIMKEN COMPANY**

As a global leader in bearings and power transmission systems, Timken focuses on precise solution design, materials and craftsmanship to deliver reliable and efficient performance that improves productivity and uptime. Timken offers a full range of bearings, belts, chains, couplings, gears and lubricants, along with rebuild and repair services.

Timken (NYSE; TKR; [www.timken.com](http://www.timken.com)) applies its proven expertise in metallurgy, tribology and mechanical power transmission to create innovative approaches to customers' complex needs. Global availability of products and engineering talent, combined with exceptional service delivery across markets, makes Timken a preferred choice worldwide.

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### **DEEP GROOVE BALL BEARINGS**

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## TIMKEN® DEEP GROOVE BALL BEARINGS

**All-Around Timken Reliability:** Our deep groove ball bearings deliver reliable performance in a wide range of applications and conditions. With super-finished raceways and controlled geometries, our premium design helps ensure consistent quality.

**Extended Product Offering:** Our portfolio includes standard, thin-section, narrow, wide and miniature and extra-small deep groove ball bearings that span 3 mm to 400 mm bore sizes. The extended product line includes a complete offering of open, shields, seals and snap ring combinations.

**Easy Interchange:** Designed as metric bearings, our deep groove ball bearings follow ISO standards and are dimensionally interchangeable with competitor metric products.

**Premium Lubricants:** For reduced torque and a quieter operation, Mobil Polyrex™ EM premium lubricant comes standard on all Timken sealed and shielded deep groove ball bearings. This electric motor bearing grease has a wide operating temperature range from -29° C to 177° C.

**Brass Cage Availability:** Deep groove ball bearings with brass cages (available in select sizes) can deliver extra strength and durability in the most unrelenting conditions:

- Extreme shock loads
- High vibrations
- High forces due to acceleration

**Quiet Running for Electric Motor Quality:** Deep groove ball bearings are frequently used in electric motor applications to minimize vibration and noise. To meet our longstanding electric motor quality guidelines for deep groove ball bearings we designed in:

- Super finishing on raceways to reduce friction
- Preferred clearance designation (C3)
- Premium grease for high performance, low torque and less noise

Timken deep groove ball bearings have lower vibration levels than competitors during independent electric motor application testing.

*Mobil and Polyrex™ lubricant are trademarks of Exxon Mobil Corporation.*



### HOW TO USE THIS CATALOG

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

This publication contains dimensions, tolerances and load ratings, as well as engineering sections describing fitting practices for shafts and housings, internal clearances and other bearing features. For mounting information, please use the Timken Engineering Manual (order no. 10424). It provides valuable assistance in the initial consideration of the type and characteristics of the bearings that may best suit your particular needs.

## ***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**

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.

### **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 engineer.

### **STORAGE**

Timken suggests the following storage guidelines for our finished products (bearings, components and assemblies, 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.
- The storage area temperature should be maintained between 0° C and 40° C; 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 cataloged 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.

**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, including its limited warranty and remedy, which 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](http://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](http://www.timken.com) for the most recent version of the Timken® Deep Groove Ball Bearing Catalog.



**ENGINEERING**

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This engineering section is not intended to be comprehensive, but does serve as a useful guide in bearing selection.



To view the complete engineering catalog and other Timken catalogs, go to [www.timken.com/catalogs](http://www.timken.com/catalogs) for interactive versions, or to download a catalog app for your smart phone or mobile device scan the QR code or go to [timkencatalogs.squawqr.com](http://timkencatalogs.squawqr.com).

## 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 400 mm bore, and maximum outside diameter (O.D.) of 600 mm. Timken continues to expand the offering of deep groove ball bearings with larger sizes to be introduced. Contact your Timken sales representative for questions and new opportunities.

## 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, miniature and extra-small constructions. The offering includes:

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

## CONFIGURATIONS

Variations may differ based on bearing size and/or series.

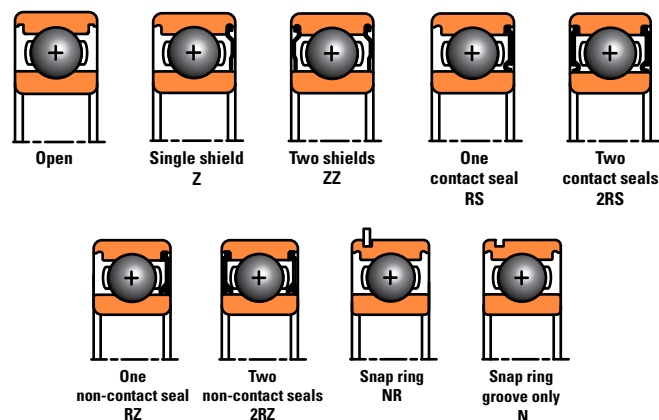


Fig. 1. Deep groove ball bearing configurations.



## 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 describes the most common cage types.

**TABLE 1. COMMON CAGE TYPES**

| Type         | Two-Piece Riveted Steel Cage   | One-Piece Stainless Steel Crown-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.                                 | 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.          | 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. |

## BEARING SHIELDS AND SEALS

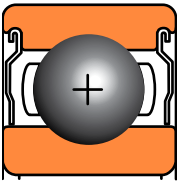
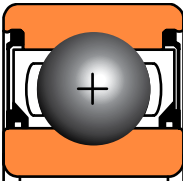
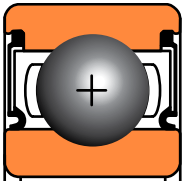
Bearing shields and seals help keep lubricant in and dust, water and other contaminants out.

Timken shielded deep groove ball bearings are available with one or two shields for coarse debris. Single shielded bearings allow for re-lubrication from the open side.

Sealed ball bearings are available with one or two seals for improved protection in harsh environments. Offered in contact or non-contact configurations, Timken seals use high-performance Nitrile Buna Rubber with reinforced low-carbon steel case for standard operating temperatures.

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

**TABLE 2. CHARACTERISTICS OF SHIELDS AND SEALS**

| Type                  | Shields<br>One = Z<br>Two = ZZ  | Non-Contact Seals<br>One = RZ<br>Two = 2RZ   | Contact Seals<br>One = RS<br>Two = 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 shield(s) and non-contact seal(s) due to seal lip contact                 |
| Operating Temperature | -50° C to +120° C   | -40° C to +120° C  | -40° C to +120° C   |
| Grease Retention      | Good  | Better than shield(s)  | Excellent   |
| Dust Resistance       | Good  | Better than shield(s)  | Excellent   |
| Torque                | Low   | Low  | Greater than shield(s) and non-contact seal(s) due to seal lip 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.

## BEARING LUBRICATION

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 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 is an overview of the common characteristics for the grease used in this product.

**TABLE 3. LUBRICATION**

| Product Name      | Brand Name | Min. Temp | Max. Temp | Base Oil Type | Thickener | Color | Characteristics and Application                                 |
|-------------------|------------|-----------|-----------|---------------|-----------|-------|---|
| Mobil Polyrex™ EM | Mobil      | -29° C    | 177° C    | Mineral Oil   | Polyurea  | Blue  | Electric motor grease; very good resistance to water/salt water |

NOTE: For other grease options consult your Timken sales engineer.

## 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 mm<sup>2</sup> 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 deep groove 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  $C_{0r}$ ) 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 ( $C_{0r}$ ).

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

In the manufacturing of deep groove 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

The RIC symbols for miniature and extra-small deep groove ball bearings 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. RIC – MINIATURE AND EXTRA-SMALL DEEP GROOVE BALL BEARINGS**

| 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 with no clearance designation in the part number are made with the MC3 normal clearance.

## RIC OF STANDARD DEEP GROOVE BALL BEARINGS

The RIC designations for standard deep groove ball bearings 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 standard deep groove ball bearings.

**TABLE 5. RIC – STANDARD DEEP GROOVE BALL BEARINGS**

| 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   |      |
| 2.5               | 6     | 0                         | 7    | 2        | 13   | 8    | 23   | -    | -    | -    | -    |
| 6                 | 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  |
| 225               | 250   | 2                         | 40   | 30       | 95   | 85   | 160  | 145  | 225  | 205  | 300  |
| 250               | 280   | 2                         | 45   | 35       | 105  | 90   | 170  | 155  | 245  | 225  | 340  |
| 280               | 315   | 2                         | 55   | 40       | 115  | 100  | 190  | 175  | 270  | 245  | 370  |
| 315               | 355   | 3                         | 60   | 45       | 125  | 110  | 210  | 195  | 300  | 275  | 410  |
| 355               | 400   | 3                         | 70   | 55       | 145  | 130  | 240  | 225  | 340  | 315  | 460  |

## 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. INNER RING – TOLERANCES**

| Bearing Bore |       | Bore Deviation  | Width Variation | Radial Runout | Face Runout with Bore | Axial Runout | Width Deviation Inner and Outer Rings |         |
|--------------|-------|-----------------|-----------------|---------------|-----------------------|--------------|---------------------------------------|---------|
| d            |       | $\Delta d_{mp}$ | $V_{BS}$        | $K_{ia}$      | $S_d$                 | $S_{ia}$     | $\Delta Bs$ and $\Delta Cs$           |         |
| over         | incl. | P0              | P0, P6          | P0            | P5                    | P5           | P0, P6                                | P5      |
| mm           | mm    | $\mu m$         | $\mu m$         | $\mu m$       | $\mu m$               | $\mu m$      | $\mu m$                               | $\mu m$ |
| 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. OUTER RING – TOLERANCES**

| Bearing O.D. |       | Outside Deviation | Width Variation | Radial Runout | Axial Runout | Outside Diameter Runout With Face |
|--------------|-------|-------------------|-----------------|---------------|--------------|-----------------------------------|
| D            |       | $\Delta D_{mp}$   | $V_{CS}$        | $K_{ea}$      | $S_{ea}$     | $S_D$                             |
| over         | incl. | P0                | P0              | P0            | P5           | P5                                |
| mm           | mm    | $\mu m$           | $\mu m$         | $\mu m$       | $\mu m$      | $\mu m$                           |
| 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, over-loading or high speed.
- Capability for machining the bearing seats (grinding, turning or boring).
- Shaft and housing section and material.
- Mounting and setting conditions.

Fig. 2 is a graphical representation of 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, on the following pages, provide the resultant fits based on standard ISO tolerances for shaft and housing.

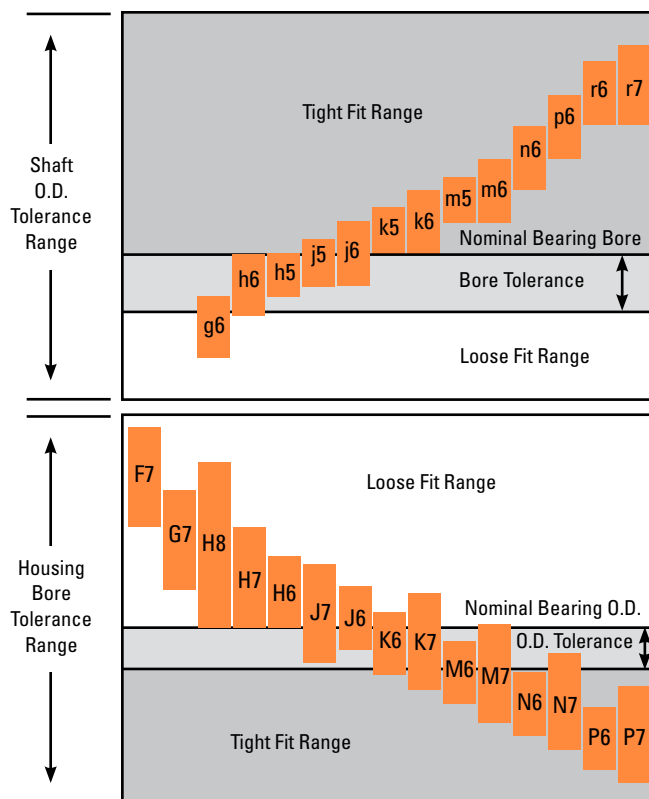


Fig. 2. Shaft and housing fit selection.

# SHAFT TOLERANCES: DEEP GROOVE BALL BEARINGS

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

# HOUSING TOLERANCES: DEEP GROOVE BALL BEARINGS

TABLE 9. HOUSING TOLERANCES: DEEP GROOVE 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           |          |     |
| 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 |     |

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





**DEEP GROOVE BALL BEARINGS**

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### NOMENCLATURE

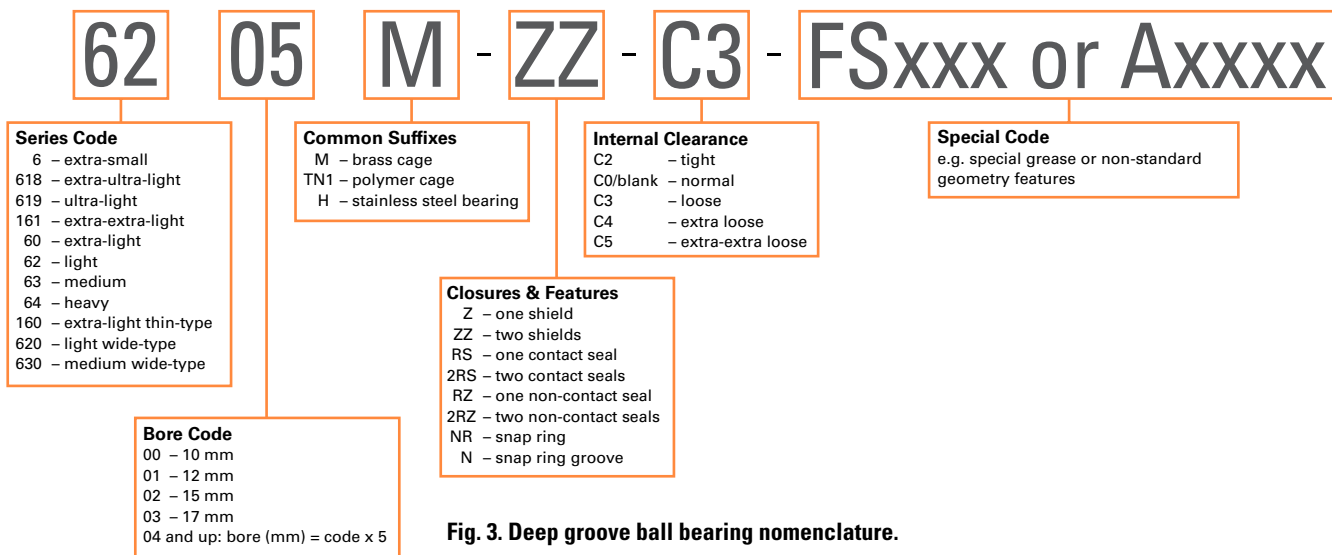


Fig. 3. Deep groove ball bearing nomenclature.

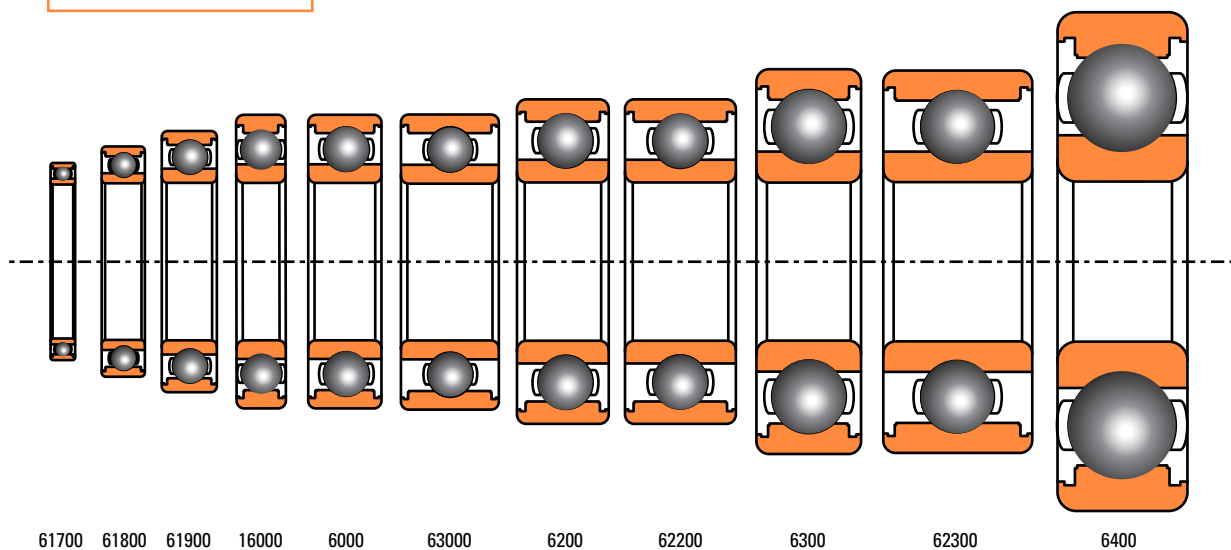


Fig. 4. Timken deep groove ball bearing series.

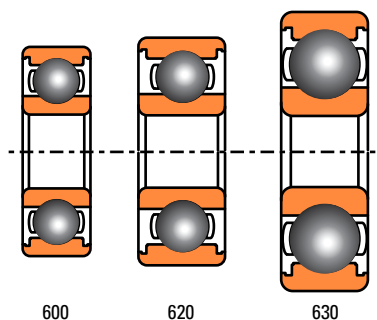


Fig. 5. Timken miniature and extra-small deep groove ball bearing series.

STANDARD 6000 SERIES

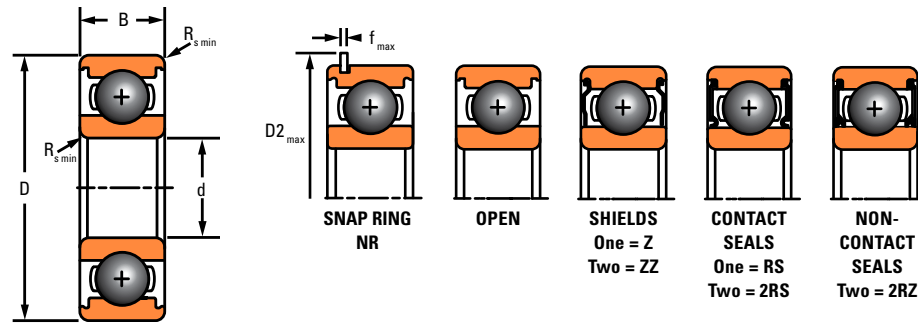


TABLE 10. STANDARD 6000 SERIES

| Bearing No. | Features |    |    |     |     |    | Boundary Dimensions |        |         |                           |                    |                  | Load Ratings           |                        | Reference Speed |         | Weight |
|-------------|----------|----|----|-----|-----|----|---------------------|--------|---------|---------------------------|--------------------|------------------|------------------------|------------------------|-----------------|---------|--------|
|             |          |    |    |     |     |    | Bore d              | O.D. D | Width B | Radius R <sub>s min</sub> | D <sub>2 max</sub> | f <sub>max</sub> | Dynamic C <sub>r</sub> | Static C <sub>0r</sub> | Grease RPM      | Oil RPM |        |
| Description | Z        | ZZ | RS | 2RS | 2RZ | NR | mm                  | mm     | mm      | mm                        | mm                 | mm               | kN                     | kN                     | RPM             | RPM     | kg     |
| 6000        | •        | •  | •  | •   | •   | •  | 10                  | 26     | 8       | 0.3                       | 29.2               | 0.70             | 4.60                   | 2.00                   | 26000           | 38000   | 0.020  |
| 6200        | •        | •  | •  | •   |     | •  | 10                  | 30     | 9       | 0.6                       | 34.7               | 1.12             | 5.10                   | 2.40                   | 22000           | 32000   | 0.030  |
| 6300        | •        | •  | •  | •   |     | •  | 10                  | 35     | 11      | 0.6                       | 39.7               | 1.12             | 8.10                   | 3.50                   | 20000           | 29000   | 0.050  |
| 6001        | •        | •  | •  | •   |     | •  | 12                  | 28     | 8       | 0.3                       | 30.8               | 0.85             | 5.10                   | 2.40                   | 23000           | 33000   | 0.020  |
| 6201        | •        | •  | •  | •   | •   | •  | 12                  | 32     | 10      | 0.6                       | 36.7               | 1.12             | 6.80                   | 3.00                   | 21000           | 30000   | 0.040  |
| 6301        | •        | •  | •  | •   |     | •  | 12                  | 37     | 12      | 1.0                       | 41.3               | 1.12             | 9.70                   | 4.20                   | 19000           | 27000   | 0.060  |
| 6002        | •        | •  | •  | •   |     | •  | 15                  | 32     | 9       | 0.3                       | 36.7               | 1.12             | 5.60                   | 2.80                   | 20000           | 30000   | 0.030  |
| 6202        | •        | •  | •  | •   | •   | •  | 15                  | 35     | 11      | 0.6                       | 39.7               | 1.12             | 7.60                   | 3.70                   | 19000           | 28000   | 0.050  |
| 6302        | •        | •  | •  | •   | •   | •  | 15                  | 42     | 13      | 1.0                       | 46.3               | 1.12             | 11.40                  | 5.40                   | 16000           | 24000   | 0.080  |
| 6003        | •        | •  | •  | •   |     | •  | 17                  | 35     | 10      | 0.3                       | 39.7               | 1.12             | 6.00                   | 3.30                   | 19000           | 28000   | 0.040  |
| 6203        | •        | •  | •  | •   | •   | •  | 17                  | 40     | 12      | 0.6                       | 44.6               | 1.12             | 9.60                   | 4.80                   | 17000           | 25000   | 0.070  |
| 6303        | •        | •  | •  | •   | •   | •  | 17                  | 47     | 14      | 1.0                       | 52.7               | 1.12             | 13.60                  | 6.60                   | 15000           | 22000   | 0.120  |
| 6004        | •        | •  | •  | •   | •   | •  | 20                  | 42     | 12      | 0.6                       | 46.3               | 1.12             | 9.40                   | 5.00                   | 17000           | 25000   | 0.070  |
| 6204        | •        | •  | •  | •   | •   | •  | 20                  | 47     | 14      | 1.0                       | 52.7               | 1.12             | 12.80                  | 6.60                   | 15000           | 22000   | 0.100  |
| 6304        | •        | •  | •  | •   | •   | •  | 20                  | 52     | 15      | 1.1                       | 57.9               | 1.12             | 15.90                  | 7.80                   | 13000           | 20000   | 0.140  |
| 6005        | •        | •  | •  | •   | •   | •  | 25                  | 47     | 12      | 0.6                       | 52.7               | 1.12             | 10.10                  | 5.80                   | 14000           | 21000   | 0.080  |
| 6205        | •        | •  | •  | •   | •   | •  | 25                  | 52     | 15      | 1.0                       | 57.9               | 1.12             | 14.00                  | 7.90                   | 14000           | 20000   | 0.130  |
| 6305        | •        | •  | •  | •   |     | •  | 25                  | 62     | 17      | 1.1                       | 67.7               | 1.70             | 20.60                  | 11.20                  | 12000           | 17000   | 0.220  |
| 6405        |          |    |    |     |     | •  | 25                  | 80     | 21      | 1.5                       | 86.6               | 1.70             | 36.10                  | 18.80                  | 10000           | 15000   | 0.530  |
| 6006        | •        | •  | •  | •   | •   | •  | 30                  | 55     | 13      | 1.0                       | 60.7               | 1.12             | 13.20                  | 8.30                   | 12000           | 18000   | 0.110  |
| 6206        | •        | •  | •  | •   | •   | •  | 30                  | 62     | 16      | 1.0                       | 67.7               | 1.70             | 19.50                  | 11.30                  | 11000           | 16000   | 0.200  |
| 6306        | •        | •  | •  | •   | •   | •  | 30                  | 72     | 19      | 1.1                       | 78.6               | 1.70             | 26.60                  | 15.00                  | 10000           | 15000   | 0.350  |
| 6406        |          |    |    |     |     | •  | 30                  | 90     | 23      | 1.5                       | 96.5               | 2.46             | 47.30                  | 24.50                  | 9300            | 13000   | 0.740  |
| 6007        | •        | •  | •  | •   | •   | •  | 35                  | 62     | 14      | 1.0                       | 67.7               | 1.70             | 15.90                  | 10.30                  | 11000           | 16000   | 0.150  |
| 6207        | •        | •  | •  | •   | •   | •  | 35                  | 72     | 17      | 1.1                       | 78.6               | 1.70             | 25.70                  | 15.30                  | 10000           | 14000   | 0.290  |
| 6307        | •        | •  | •  | •   | •   | •  | 35                  | 80     | 21      | 1.5                       | 86.6               | 1.70             | 33.40                  | 19.20                  | 9300            | 13000   | 0.450  |
| 6307M       |          |    |    |     |     |    | 35                  | 80     | 21      | 1.5                       | —                  | —                | 33.40                  | 19.20                  | 9300            | 13000   | 0.550  |
| 6407        |          |    |    |     |     |    | 35                  | 100    | 25      | 1.5                       | —                  | —                | 55.50                  | 29.40                  | 8500            | 12000   | 0.950  |
| 6008        | •        | •  | •  | •   | •   | •  | 40                  | 68     | 15      | 1.0                       | 74.6               | 1.70             | 16.80                  | 11.50                  | 10000           | 15000   | 0.190  |
| 6208        | •        | •  | •  | •   | •   | •  | 40                  | 80     | 18      | 1.1                       | 86.6               | 1.70             | 29.50                  | 18.10                  | 8800            | 13000   | 0.370  |
| 6308        | •        | •  | •  | •   | •   | •  | 40                  | 90     | 23      | 1.5                       | 96.5               | 2.46             | 40.70                  | 24.00                  | 8500            | 12000   | 0.640  |
| 6408        |          |    |    |     |     | •  | 40                  | 110    | 27      | 2.0                       | 116.6              | 2.46             | 63.70                  | 34.60                  | 7800            | 11000   | 1.250  |
| 6009        | •        | •  | •  | •   | •   | •  | 45                  | 75     | 16      | 1.0                       | 81.6               | 1.70             | 19.90                  | 14.00                  | 9200            | 13000   | 0.230  |
| 6209        | •        | •  | •  | •   |     | •  | 45                  | 85     | 19      | 1.1                       | 91.6               | 1.70             | 31.20                  | 20.30                  | 8200            | 12000   | 0.420  |
| 6309        | •        | •  | •  | •   | •   | •  | 45                  | 100    | 25      | 1.5                       | 106.5              | 2.46             | 48.80                  | 29.30                  | 7800            | 11000   | 0.840  |
| 6309M       |          |    |    | •   |     |    | 45                  | 100    | 25      | 1.5                       | —                  | —                | 48.80                  | 29.30                  | 7800            | 11000   | 1.025  |
| 6409        |          |    |    |     |     | •  | 45                  | 120    | 29      | 2.0                       | 129.7              | 2.82             | 77.20                  | 45.20                  | 7200            | 10000   | 1.550  |
| 6010        | •        | •  | •  | •   | •   | •  | 50                  | 80     | 16      | 1.0                       | 86.6               | 1.70             | 21.80                  | 16.50                  | 8300            | 12000   | 0.250  |
| 6210        | •        | •  | •  | •   | •   | •  | 50                  | 90     | 20      | 1.1                       | 96.5               | 2.46             | 35.00                  | 23.20                  | 7700            | 11000   | 0.460  |
| 6310        | •        | •  | •  | •   |     | •  | 50                  | 110    | 27      | 2.0                       | 116.6              | 2.46             | 57.50                  | 35.30                  | 7200            | 10000   | 1.050  |
| 6310M       |          |    |    |     |     |    | 50                  | 110    | 27      | 2.0                       | —                  | —                | 57.50                  | 35.30                  | 7200            | 10000   | 1.260  |
| 6410        |          |    |    |     |     |    | 50                  | 130    | 31      | 2.1                       | —                  | —                | 83.10                  | 49.40                  | 6800            | 9700    | 1.900  |
| 6011        | •        | •  | •  | •   |     | •  | 55                  | 90     | 18      | 1.1                       | 96.5               | 2.46             | 28.30                  | 22.40                  | 7800            | 11000   | 0.360  |

Speed ratings are for open bearings. Use 50 to 60 percent of the published speed ratings for bearings with contact seals.

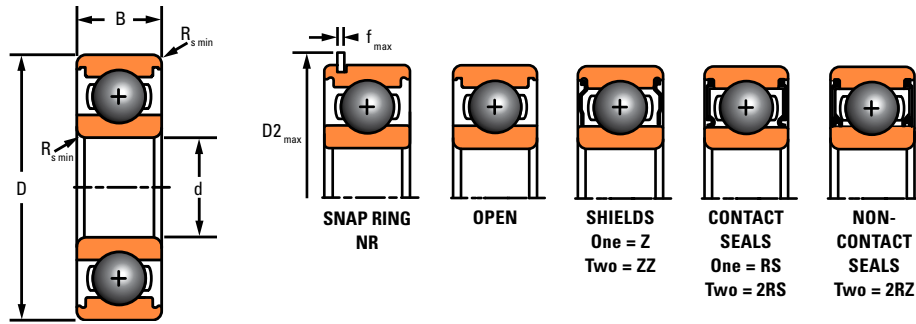
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# DEEP GROOVE BALL BEARINGS

## STANDARD 6000 SERIES

### STANDARD 6000 SERIES

– continued

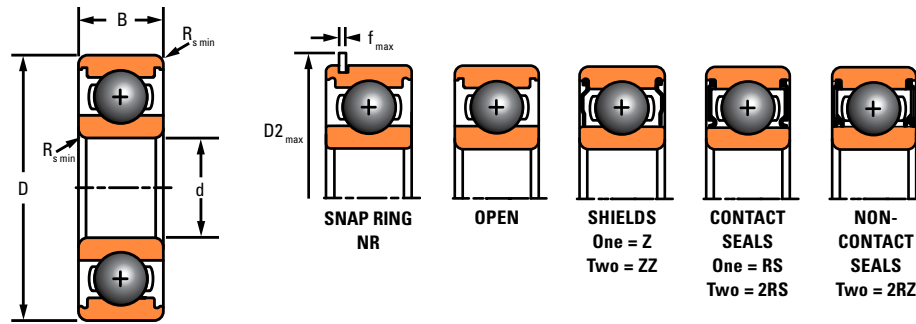


Continued from Table 10.

| Bearing No. | Features |    |    |     |     |    | Boundary Dimensions |        |         |                     |              |             | Load Ratings  |                 | Reference Speed |         | Weight |
|-------------|----------|----|----|-----|-----|----|---------------------|--------|---------|---------------------|--------------|-------------|---------------|-----------------|-----------------|---------|--------|
|             |          |    |    |     |     |    | Bore d              | O.D. D | Width B | Radius $R_{s\ min}$ | $D2_{\ max}$ | $f_{\ max}$ | Dynamic $C_r$ | Static $C_{0r}$ | Grease RPM      | Oil RPM |        |
| Description | Z        | ZZ | RS | 2RS | 2RZ | NR | mm                  | mm     | mm      | mm                  | mm           | mm          | kN            | kN              | RPM             | RPM     | kg     |
| 6211        | •        | •  | •  | •   |     | •  | 55                  | 100    | 21      | 1.5                 | 106.5        | 2.46        | 43.40         | 29.20           | 7000            | 10000   | 0.610  |
| 6211M       |          |    |    |     |     |    | 55                  | 100    | 21      | 1.5                 | –            | –           | 43.40         | 29.20           | 7000            | 10000   | 0.724  |
| 6311        | •        | •  | •  | •   | •   | •  | 55                  | 120    | 29      | 2.0                 | 129.7        | 2.82        | 71.50         | 44.60           | 6700            | 10000   | 1.350  |
| 6311M       |          |    |    |     |     |    | 55                  | 120    | 29      | 2.0                 | –            | –           | 71.50         | 44.60           | 6700            | 10000   | 1.642  |
| 6411        |          |    |    |     |     | •  | 55                  | 140    | 33      | 2.1                 | 149.7        | 2.82        | 100.70        | 62.40           | 6300            | 9100    | 2.300  |
| 6012        | •        | •  | •  | •   | •   | •  | 60                  | 95     | 18      | 1.1                 | 101.6        | 2.46        | 29.50         | 22.70           | 7200            | 10000   | 0.390  |
| 6212        | •        | •  | •  | •   |     | •  | 60                  | 110    | 22      | 1.5                 | 116.6        | 2.46        | 47.80         | 32.90           | 6500            | 9300    | 0.780  |
| 6212M       |          |    |    |     |     |    | 60                  | 110    | 22      | 1.5                 | –            | –           | 47.80         | 32.90           | 6500            | 9300    | 0.932  |
| 6312        | •        | •  | •  | •   |     | •  | 60                  | 130    | 31      | 2.1                 | 139.7        | 2.82        | 81.80         | 51.80           | 6400            | 9100    | 1.700  |
| 6312M       |          |    |    |     |     |    | 60                  | 130    | 31      | 2.1                 | –            | –           | 81.80         | 51.80           | 6400            | 9100    | 2.141  |
| 6412        |          |    | •  |     |     |    | 60                  | 150    | 35      | 2.1                 | –            | –           | 109.00        | 70.10           | 6000            | 8600    | 2.730  |
| 6013        | •        | •  | •  | •   |     | •  | 65                  | 100    | 18      | 1.1                 | 106.5        | 2.46        | 30.50         | 23.50           | 6700            | 9700    | 0.430  |
| 6213        | •        | •  | •  | •   |     | •  | 65                  | 120    | 23      | 1.5                 | 129.7        | 2.82        | 57.20         | 40.00           | 6000            | 8600    | 0.990  |
| 6213M       |          |    |    |     |     |    | 65                  | 120    | 23      | 1.5                 | –            | –           | 57.20         | 40.00           | 6000            | 8600    | 1.218  |
| 6313        | •        | •  | •  | •   |     | •  | 65                  | 140    | 33      | 2.1                 | 149.7        | 2.82        | 92.60         | 59.70           | 6000            | 8600    | 2.100  |
| 6313M       |          |    |    |     |     |    | 65                  | 140    | 33      | 2.1                 | –            | –           | 92.60         | 59.70           | 6000            | 8600    | 2.539  |
| 6413        |          |    |    |     |     |    | 65                  | 160    | 37      | 2.1                 | –            | –           | 118.00        | 78.60           | 5700            | 8200    | 3.300  |
| 6014        | •        | •  | •  | •   | •   | •  | 70                  | 110    | 20      | 1.1                 | 116.6        | 2.46        | 38.60         | 30.40           | 6400            | 9300    | 0.570  |
| 6214        | •        | •  | •  | •   |     | •  | 70                  | 125    | 24      | 1.5                 | 134.7        | 2.82        | 60.80         | 44.00           | 5700            | 8300    | 1.100  |
| 6314        | •        | •  | •  | •   |     | •  | 70                  | 150    | 35      | 2.1                 | 159.7        | 2.82        | 104.00        | 68.00           | 5700            | 8200    | 2.500  |
| 6314M       |          |    |    |     |     |    | 70                  | 150    | 35      | 2.1                 | –            | –           | 104.00        | 68.00           | 5700            | 8200    | 3.172  |
| 6015        | •        | •  | •  | •   |     | •  | 75                  | 115    | 20      | 1.1                 | 121.6        | 2.46        | 40.10         | 33.10           | 6000            | 8700    | 0.600  |
| 6015M       |          |    |    |     |     |    | 75                  | 115    | 20      | 1.1                 | –            | –           | 40.10         | 33.10           | 6000            | 8700    | 0.636  |
| 6215        | •        | •  | •  | •   |     | •  | 75                  | 130    | 25      | 1.5                 | 139.7        | 2.82        | 66.10         | 49.30           | 5500            | 7900    | 1.200  |
| 6315        | •        | •  | •  | •   |     | •  | 75                  | 160    | 37      | 2.1                 | 169.7        | 2.82        | 113.40        | 76.50           | 5400            | 7800    | 3.000  |
| 6016        | •        | •  | •  | •   | •   | •  | 80                  | 125    | 22      | 1.1                 | 134.7        | 2.82        | 47.50         | 39.80           | 5800            | 8400    | 0.820  |
| 6016M       |          |    |    |     |     |    | 80                  | 125    | 22      | 1.1                 | –            | –           | 47.50         | 39.80           | 5800            | 8400    | 0.999  |
| 6216        | •        | •  | •  | •   |     | •  | 80                  | 140    | 26      | 2.0                 | 149.7        | 2.82        | 72.70         | 53.00           | 5200            | 7500    | 1.400  |
| 6216M       |          |    |    |     |     |    | 80                  | 140    | 26      | 2.0                 | –            | –           | 72.70         | 53.00           | 5200            | 7500    | 1.678  |
| 6316        | •        | •  | •  | •   |     | •  | 80                  | 170    | 39      | 2.1                 | –            | –           | 123.00        | 86.50           | 5200            | 7500    | 3.600  |
| 6316M       |          |    |    |     |     |    | 80                  | 170    | 39      | 2.1                 | –            | –           | 123.00        | 86.50           | 5200            | 7500    | 4.480  |
| 6017        | •        | •  | •  | •   |     | •  | 85                  | 130    | 22      | 1.1                 | 139.7        | 2.82        | 52.80         | 44.50           | 5400            | 7900    | 0.850  |
| 6017M       |          |    |    |     |     |    | 85                  | 130    | 22      | 1.1                 | –            | –           | 52.80         | 44.50           | 5400            | 7900    | 1.064  |
| 6217        | •        | •  | •  | •   |     | •  | 85                  | 150    | 28      | 2.0                 | –            | –           | 83.20         | 63.80           | 5000            | 7200    | 1.800  |
| 6217M       |          |    |    |     |     |    | 85                  | 150    | 28      | 2.0                 | –            | –           | 83.20         | 63.80           | 5000            | 7200    | 2.175  |
| 6317        | •        | •  | •  | •   |     | •  | 85                  | 180    | 41      | 3.0                 | 192.9        | 3.10        | 132.70        | 96.50           | 5000            | 7200    | 4.250  |
| 6317M       |          |    |    |     |     |    | 85                  | 180    | 41      | 3.0                 | –            | –           | 132.70        | 96.50           | 5000            | 7200    | 5.298  |
| 6018        | •        | •  | •  | •   |     | •  | 90                  | 140    | 24      | 1.5                 | 149.7        | 2.82        | 58.00         | 50.60           | 5300            | 7600    | 1.120  |
| 6218        | •        | •  | •  | •   |     | •  | 90                  | 160    | 30      | 2.0                 | 169.7        | 2.82        | 96.00         | 71.50           | 4800            | 6900    | 2.150  |
| 6218M       |          |    |    |     |     |    | 90                  | 160    | 30      | 2.0                 | –            | –           | 96.00         | 71.50           | 4800            | 6900    | 2.230  |
| 6318        | •        | •  | •  | •   |     | •  | 90                  | 190    | 43      | 3.0                 | –            | –           | 142.60        | 107.20          | 4800            | 6900    | 4.900  |
| 6318M       |          |    |    |     |     |    | 90                  | 190    | 43      | 3.0                 | –            | –           | 142.60        | 107.20          | 4800            | 6900    | 6.129  |

Speed ratings are for open bearings. Use 50 to 60 percent of the published speed ratings for bearings with contact seals.

Continued on next page.



Continued from Table 10.

| Bearing No. | Features |    |    |     |     |    | Boundary Dimensions |        |         |                           |                    |                  | Load Ratings           |                        | Reference Speed |         | Weight |
|-------------|----------|----|----|-----|-----|----|---------------------|--------|---------|---------------------------|--------------------|------------------|------------------------|------------------------|-----------------|---------|--------|
|             |          |    |    |     |     |    | Bore d              | O.D. D | Width B | Radius R <sub>s min</sub> | D <sub>2 max</sub> | f <sub>max</sub> | Dynamic C <sub>r</sub> | Static C <sub>0r</sub> | Grease RPM      | Oil RPM |        |
| Description | Z        | ZZ | RS | 2RS | 2RZ | NR | mm                  | mm     | mm      | mm                        | mm                 | mm               | kN                     | kN                     | RPM             | RPM     | kg     |
| 6019        | •        | •  | •  | •   |     |    | 95                  | 145    | 24      | 1.5                       | –                  | –                | 60.50                  | 51.00                  | 5000            | 7300    | 1.180  |
| 6219        | •        | •  | •  | •   |     |    | 95                  | 170    | 32      | 2.1                       | –                  | –                | 109.00                 | 82.00                  | 4700            | 6700    | 2.600  |
| 6219M       |          |    |    |     |     |    | 95                  | 170    | 32      | 2.1                       | –                  | –                | 109.00                 | 82.00                  | 4700            | 6700    | 3.167  |
| 6319        | •        | •  | •  | •   |     |    | 95                  | 200    | 45      | 3.0                       | –                  | –                | 152.70                 | 118.00                 | 4600            | 6600    | 5.750  |
| 6319M       |          |    |    |     |     |    | 95                  | 200    | 45      | 3.0                       | –                  | –                | 152.70                 | 118.00                 | 4600            | 6600    | 7.106  |
| 6020        | •        | •  | •  | •   |     | •  | 100                 | 150    | 24      | 1.5                       | 159.7              | 2.82             | 60.20                  | 54.20                  | 4800            | 6900    | 1.250  |
| 6020M       |          |    |    |     |     |    | 100                 | 150    | 24      | 1.5                       | –                  | –                | 60.20                  | 54.20                  | 4800            | 6900    | 1.466  |
| 6220        | •        | •  | •  | •   |     |    | 100                 | 180    | 34      | 2.1                       | –                  | –                | 122.00                 | 92.70                  | 4500            | 6500    | 3.200  |
| 6220M       |          |    |    |     |     |    | 100                 | 180    | 34      | 2.1                       | –                  | –                | 122.00                 | 92.70                  | 4500            | 6500    | 3.915  |
| 6320        | •        | •  | •  | •   |     |    | 100                 | 215    | 47      | 3.0                       | –                  | –                | 173.00                 | 140.20                 | 4400            | 6200    | 6.980  |
| 6320M       |          |    |    |     |     |    | 100                 | 215    | 47      | 3.0                       | –                  | –                | 173.00                 | 140.20                 | 4400            | 6200    | 8.540  |
| 6021        | •        | •  |    | •   |     |    | 105                 | 160    | 26      | 2.0                       | –                  | –                | 69.20                  | 61.20                  | 4700            | 6700    | 1.600  |
| 6021M       |          |    |    |     |     |    | 105                 | 160    | 26      | 2.0                       | –                  | –                | 69.20                  | 61.20                  | 4700            | 6700    | 1.908  |
| 6221        |          | •  |    |     |     | •  | 105                 | 190    | 36      | 2.1                       | 202.9              | 3.10             | 133.00                 | 105.00                 | 4400            | 6300    | 3.710  |
| 6321        |          |    |    |     |     |    | 105                 | 225    | 49      | 3.0                       | –                  | –                | 183.70                 | 153.10                 | 4200            | 6000    | 8.110  |
| 6321M       |          |    |    |     |     |    | 105                 | 225    | 49      | 3.0                       | –                  | –                | 183.70                 | 153.10                 | 4200            | 6000    | 9.983  |
| 6022        | •        | •  |    | •   |     | •  | 110                 | 170    | 28      | 2.0                       | 182.9              | 3.10             | 82.00                  | 73.00                  | 4600            | 6600    | 1.930  |
| 6222        | •        | •  | •  | •   |     |    | 110                 | 200    | 38      | 2.1                       | –                  | –                | 144.00                 | 117.00                 | 4300            | 6100    | 4.440  |
| 6222M       |          |    |    |     |     |    | 110                 | 200    | 38      | 2.1                       | –                  | –                | 144.00                 | 117.00                 | 4300            | 6100    | 5.333  |
| 6322        |          | •  | •  |     |     |    | 110                 | 240    | 50      | 3.0                       | –                  | –                | 205.00                 | 178.30                 | 3900            | 5500    | 9.480  |
| 6322M       |          |    |    |     |     |    | 110                 | 240    | 50      | 3.0                       | –                  | –                | 205.00                 | 178.30                 | 3900            | 5500    | 11.815 |
| 6024        | •        | •  | •  | •   |     | •  | 120                 | 180    | 28      | 2.0                       | 192.9              | 3.10             | 88.10                  | 79.30                  | 4200            | 6100    | 2.030  |
| 6024M       |          |    |    |     |     |    | 120                 | 180    | 28      | 2.0                       | –                  | –                | 88.10                  | 79.30                  | 4200            | 6100    | 2.500  |
| 6224        |          | •  | •  | •   |     |    | 120                 | 215    | 40      | 2.1                       | –                  | –                | 155.30                 | 131.10                 | 4000            | 5700    | 5.160  |
| 6224M       |          |    |    |     |     |    | 120                 | 215    | 40      | 2.1                       | –                  | –                | 155.30                 | 131.10                 | 4000            | 5700    | 6.615  |
| 6324        |          |    |    |     |     |    | 120                 | 260    | 55      | 3.0                       | –                  | –                | 227.60                 | 207.40                 | 3600            | 5100    | 12.400 |
| 6324M       |          |    |    |     |     |    | 120                 | 260    | 55      | 3.0                       | –                  | –                | 227.60                 | 207.40                 | 3600            | 5100    | 12.960 |
| 6026        |          | •  |    | •   |     | •  | 130                 | 200    | 33      | 2.0                       | 212.9              | 3.10             | 250.90                 | 96.80                  | 4100            | 5900    | 3.150  |
| 6026M       |          |    |    |     |     |    | 130                 | 200    | 33      | 2.0                       | –                  | –                | 250.90                 | 96.80                  | 4100            | 5900    | 3.799  |
| 6226        |          | •  | •  | •   |     |    | 130                 | 230    | 40      | 3.0                       | –                  | –                | 165.00                 | 148.00                 | 3700            | 5200    | 5.850  |
| 6226M       |          |    |    |     |     |    | 130                 | 230    | 40      | 3.0                       | –                  | –                | 165.00                 | 148.00                 | 3700            | 5200    | 7.540  |
| 6326        |          |    |    |     |     |    | 130                 | 280    | 58      | 4.0                       | –                  | –                | 250.90                 | 238.70                 | 3300            | 4600    | 15.300 |
| 6326M       |          |    |    |     |     |    | 130                 | 280    | 58      | 4.0                       | –                  | –                | 250.90                 | 238.70                 | 3300            | 4600    | 18.150 |
| 6028        |          | •  |    | •   |     |    | 140                 | 210    | 33      | 2.0                       | –                  | –                | 274.00                 | 101.80                 | 3800            | 5600    | 3.500  |
| 6028M       |          |    |    |     |     |    | 140                 | 210    | 33      | 2.0                       | –                  | –                | 274.00                 | 101.80                 | 3800            | 5600    | 4.275  |
| 6228        |          |    | •  |     |     |    | 140                 | 250    | 42      | 3.0                       | –                  | –                | 166.00                 | 150.00                 | 3400            | 4900    | 7.450  |
| 6228M       |          |    |    |     |     |    | 140                 | 250    | 42      | 3.0                       | –                  | –                | 166.00                 | 150.00                 | 3400            | 4900    | 8.460  |
| 6328        |          |    |    |     |     |    | 140                 | 300    | 62      | 4.0                       | –                  | –                | 253.00                 | 254.00                 | 3100            | 4300    | 18.500 |
| 6328M       |          |    |    |     |     |    | 140                 | 300    | 62      | 4.0                       | –                  | –                | 253.00                 | 254.00                 | 3100            | 4300    | 22.980 |
| 6030        |          | •  |    | •   |     |    | 150                 | 225    | 35      | 2.1                       | –                  | –                | 131.70                 | 124.50                 | 3600            | 5200    | 4.900  |
| 6030M       |          |    |    |     |     |    | 150                 | 225    | 35      | 2.1                       | –                  | –                | 131.70                 | 124.50                 | 3600            | 5200    | 4.960  |
| 6230        |          |    |    |     |     |    | 150                 | 270    | 45      | 3.0                       | –                  | –                | 176.00                 | 168.00                 | 3200            | 4500    | 9.400  |

Speed ratings are for open bearings. Use 50 to 60 percent of the published speed ratings for bearings with contact seals.

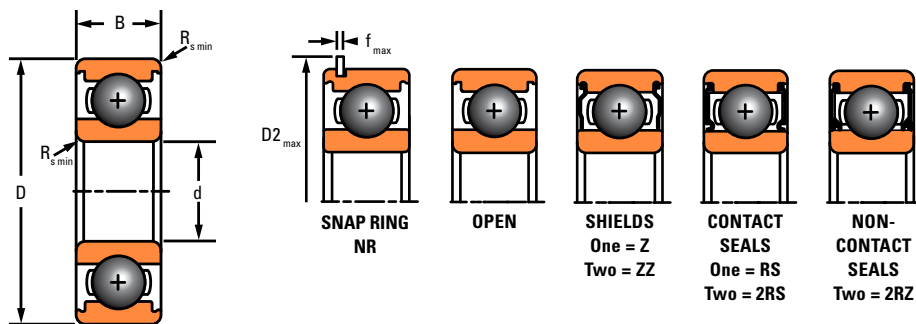
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# DEEP GROOVE BALL BEARINGS

## STANDARD 6000 SERIES

### STANDARD 6000 SERIES

– continued



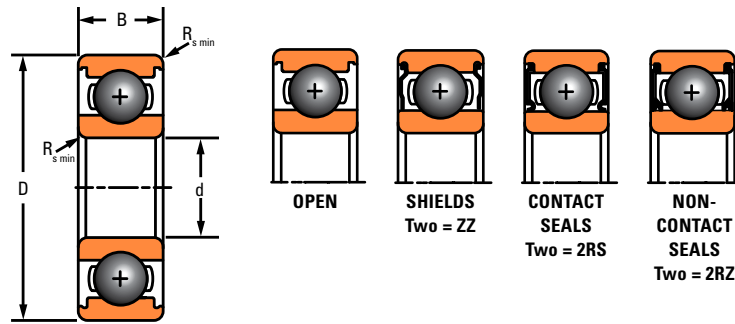
Continued from Table 10.

| Bearing No. | Features |    |    |     |     |    | Boundary Dimensions |        |         |                     |              | Load Ratings |               | Reference Speed |            | Weight |         |
|-------------|----------|----|----|-----|-----|----|---------------------|--------|---------|---------------------|--------------|--------------|---------------|-----------------|------------|--------|---------|
|             |          |    |    |     |     |    | Bore d              | O.D. D | Width B | Radius $R_{s\ min}$ | $D2_{\ max}$ | $f_{\ max}$  | Dynamic $C_r$ | Static $C_{0r}$ | Grease RPM |        | Oil RPM |
| Description | Z        | ZZ | RS | 2RS | 2RZ | NR | mm                  | mm     | mm      | mm                  | mm           | kN           | kN            | RPM             | RPM        | kg     |         |
| 6230M       |          |    |    |     |     |    | 150                 | 270    | 45      | 3.0                 | –            | –            | 176.00        | 168.00          | 3200       | 4500   | 11.900  |
| 6330        |          |    |    |     |     |    | 150                 | 320    | 65      | 4.0                 | –            | –            | 274.00        | 270.00          | 2800       | 4000   | 22.000  |
| 6330M       |          |    |    |     |     |    | 150                 | 320    | 65      | 4.0                 | –            | –            | 274.00        | 270.00          | 2800       | 4000   | 28.200  |
| 6032        | •        |    |    | •   |     |    | 160                 | 240    | 38      | 2.1                 | –            | –            | 136.60        | 135.40          | 3500       | 5100   | 5.150   |
| 6032M       |          |    |    |     |     |    | 160                 | 240    | 38      | 2.1                 | –            | –            | 136.60        | 135.40          | 3500       | 5100   | 6.230   |
| 6232        |          |    |    |     |     |    | 160                 | 290    | 48      | 3.0                 | –            | –            | 185.00        | 186.00          | 2900       | 4200   | 11.700  |
| 6232M       |          |    |    |     |     |    | 160                 | 290    | 48      | 3.0                 | –            | –            | 185.00        | 186.00          | 2900       | 4200   | 15.300  |
| 6332        |          |    |    |     |     |    | 160                 | 340    | 68      | 4.0                 | –            | –            | 301.00        | 317.00          | 2600       | 3700   | 26.000  |
| 6332M       |          |    |    |     |     |    | 160                 | 340    | 68      | 4.0                 | –            | –            | 301.00        | 317.00          | 2600       | 3700   | 32.900  |
| 6034        |          |    |    |     |     |    | 170                 | 260    | 42      | 2.1                 | –            | –            | 168.00        | 172.00          | 3300       | 4800   | 6.700   |
| 6034M       |          |    |    |     |     |    | 170                 | 260    | 42      | 2.1                 | –            | –            | 168.00        | 172.00          | 3300       | 4800   | 8.320   |
| 6234        |          |    |    |     |     |    | 170                 | 310    | 52      | 4.0                 | –            | –            | 212.00        | 223.00          | 2700       | 3900   | 14.500  |
| 6234M       |          |    |    |     |     |    | 170                 | 310    | 52      | 4.0                 | –            | –            | 212.00        | 223.00          | 2700       | 3900   | 19.140  |
| 6334        |          |    |    |     |     |    | 170                 | 360    | 72      | 4.0                 | –            | –            | 335.50        | 378.10          | 2400       | 3400   | 30.700  |
| 6334M       |          |    |    |     |     |    | 170                 | 360    | 72      | 4.0                 | –            | –            | 335.50        | 378.10          | 2400       | 3400   | 38.800  |
| 6036        |          |    |    |     |     |    | 180                 | 280    | 46      | 2.1                 | –            | –            | 189.00        | 198.00          | 3100       | 4500   | 8.800   |
| 6036M       |          |    |    |     |     |    | 180                 | 280    | 46      | 2.1                 | –            | –            | 189.00        | 198.00          | 3100       | 4500   | 10.692  |
| 6236        |          |    |    |     |     |    | 180                 | 320    | 52      | 4.0                 | –            | –            | 227.00        | 241.00          | 2600       | 3700   | 15.100  |
| 6236M       |          |    |    |     |     |    | 180                 | 320    | 52      | 4.0                 | –            | –            | 227.00        | 241.00          | 2600       | 3700   | 21.386  |
| 6336        |          |    |    |     |     |    | 180                 | 380    | 75      | 4.0                 | –            | –            | 355.00        | 405.00          | 2300       | 3200   | 35.600  |
| 6336M       |          |    |    |     |     |    | 180                 | 380    | 75      | 4.0                 | –            | –            | 355.00        | 405.00          | 2300       | 3200   | 45.770  |
| 6038        |          |    |    |     |     |    | 190                 | 290    | 46      | 2.1                 | –            | –            | 172.00        | 200.00          | 3000       | 4300   | 9.100   |
| 6038M       |          |    |    |     |     |    | 190                 | 290    | 46      | 2.1                 | –            | –            | 172.00        | 200.00          | 3000       | 4300   | 11.010  |
| 6238        |          |    |    |     |     |    | 190                 | 340    | 55      | 4.0                 | –            | –            | 378.00        | 439.00          | 2400       | 3400   | 18.200  |
| 6238M       |          |    |    |     |     |    | 190                 | 340    | 55      | 4.0                 | –            | –            | 378.00        | 439.00          | 2400       | 3400   | 23.600  |
| 6338        |          |    |    |     |     |    | 190                 | 400    | 78      | 5.0                 | –            | –            | 255.00        | 281.00          | 2200       | 3000   | 41.000  |
| 6338M       |          |    |    |     |     |    | 190                 | 400    | 78      | 5.0                 | –            | –            | 255.00        | 281.00          | 2200       | 3000   | 51.370  |
| 6040        |          |    |    |     |     |    | 200                 | 310    | 51      | 2.1                 | –            | –            | 218.00        | 243.00          | 2800       | 4000   | 11.900  |
| 6040M       |          |    |    |     |     |    | 200                 | 310    | 51      | 2.1                 | –            | –            | 218.00        | 243.00          | 2800       | 4000   | 14.540  |
| 6240        |          |    |    |     |     |    | 200                 | 360    | 58      | 4.0                 | –            | –            | 269.00        | 310.00          | 2300       | 3200   | 21.600  |
| 6240M       |          |    |    |     |     |    | 200                 | 360    | 58      | 4.0                 | –            | –            | 269.00        | 310.00          | 2300       | 3200   | 28.050  |
| 6340        |          |    |    |     |     |    | 200                 | 420    | 80      | 5.0                 | –            | –            | 380.00        | 445.00          | 2100       | 2900   | 46.300  |
| 6340M       |          |    |    |     |     |    | 200                 | 420    | 80      | 5.0                 | –            | –            | 380.00        | 445.00          | 2100       | 2900   | 46.450  |
| 6044M       |          |    |    |     |     |    | 220                 | 340    | 56      | 3.0                 | –            | –            | 247.00        | 290.00          | 2600       | 3600   | 17.750  |
| 6244M       |          |    |    |     |     |    | 220                 | 400    | 65      | 4.0                 | –            | –            | 296.00        | 365.00          | 2100       | 2900   | 3.700   |
| 6344M       |          |    |    |     |     |    | 220                 | 460    | 88      | 5.0                 | –            | –            | 410.00        | 520.00          | 1900       | 2600   | 72.700  |
| 6048M       |          |    |    |     |     |    | 240                 | 360    | 56      | 3.0                 | –            | –            | 255.00        | 315.00          | 2300       | 3300   | 17.900  |
| 6052M       |          |    |    |     |     |    | 260                 | 400    | 65      | 4.0                 | –            | –            | 291.00        | 375.00          | 2100       | 3000   | 30.480  |
| 6252M       |          |    |    |     |     |    | 260                 | 480    | 80      | 5.0                 | –            | –            | 390.00        | 530.00          | 1700       | 2400   | 666.000 |
| 6056M       |          |    |    |     |     |    | 280                 | 420    | 65      | 4.0                 | –            | –            | 302.00        | 405.00          | 2000       | 2800   | 31.000  |
| 6064M       |          |    |    |     |     |    | 320                 | 480    | 74      | 4.0                 | –            | –            | 371.00        | 540.00          | 1700       | 2400   | 46.000  |
| 6072M       |          |    |    |     |     |    | 360                 | 540    | 82      | 5.0                 | –            | –            | 460.00        | 720.00          | 1500       | 2100   | 69.000  |
| 6080M       |          |    |    |     |     |    | 400                 | 600    | 90      | 5.0                 | –            | –            | 520.00        | 865.00          | 1300       | 1900   | 85.800  |

Speed ratings are for open bearings. Use 50 to 60 percent of the published speed ratings for bearings with contact seals.



**THIN-SECTION  
61000 SERIES**



**TABLE 11. THIN-SECTION 61000 SERIES**

| Bearing No. | Features |     |     | Boundary Dimensions |           |            |                        | Load Ratings     |                    | Limiting Speed |            | Weight |
|-------------|----------|-----|-----|---------------------|-----------|------------|------------------------|------------------|--------------------|----------------|------------|--------|
|             |          |     |     | Bore<br>d           | O.D.<br>D | Width<br>B | Radius<br>$R_{s\ min}$ | Dynamic<br>$C_r$ | Static<br>$C_{0r}$ | Grease<br>RPM  | Oil<br>RPM |        |
| Description | ZZ       | 2RS | 2RZ | mm                  | mm        | mm         | mm                     | kN               | kN                 | RPM            | RPM        | kg     |
| 61800       |          | •   |     | 10                  | 19        | 5          | 0.3                    | 1.70             | 0.84               | 34000          | 40000      | 0.005  |
| 61900       | •        | •   |     | 10                  | 22        | 6          | 0.3                    | 2.70             | 1.30               | 31000          | 37000      | 0.009  |
| 61701       |          |     |     | 12                  | 18        | 4          | 0.2                    | 0.93             | 0.53               | 13000          | 15000      | 0.003  |
| 61801       | •        | •   |     | 12                  | 21        | 5          | 0.3                    | 1.90             | 1.00               | 30000          | 36000      | 0.005  |
| 61901       | •        | •   |     | 12                  | 24        | 6          | 0.3                    | 2.90             | 1.50               | 28000          | 33000      | 0.010  |
| 61702       |          |     |     | 15                  | 21        | 4          | 0.2                    | 0.94             | 0.58               | 11000          | 13000      | 0.003  |
| 61802       | •        | •   |     | 15                  | 24        | 5          | 0.3                    | 2.10             | 1.30               | 26000          | 31000      | 0.006  |
| 61902       | •        | •   |     | 15                  | 28        | 7          | 0.3                    | 4.30             | 2.30               | 24000          | 29000      | 0.015  |
| 61703       |          |     |     | 17                  | 23        | 4          | 0.2                    | 1.00             | 0.66               | 9500           | 11000      | 0.004  |
| 61803       | •        | •   |     | 17                  | 26        | 5          | 0.3                    | 2.20             | 1.50               | 24000          | 29000      | 0.007  |
| 61903       | •        | •   |     | 17                  | 30        | 7          | 0.3                    | 4.60             | 2.60               | 22000          | 26000      | 0.016  |
| 61704       |          |     |     | 20                  | 27        | 4          | 0.2                    | 1.00             | 0.72               | 8500           | 10000      | 0.005  |
| 61804       | •        | •   |     | 20                  | 32        | 7          | 0.3                    | 4.00             | 2.50               | 21000          | 25000      | 0.016  |
| 61904       | •        | •   |     | 20                  | 37        | 9          | 0.3                    | 6.40             | 3.70               | 19000          | 22000      | 0.033  |
| 61705       |          |     |     | 25                  | 32        | 4          | 0.2                    | 1.10             | 0.84               | 7000           | 8000       | 0.006  |
| 61805       | •        | •   |     | 25                  | 37        | 7          | 0.3                    | 4.30             | 2.90               | 18000          | 21000      | 0.020  |
| 61905       | •        | •   |     | 25                  | 42        | 9          | 0.3                    | 7.00             | 4.60               | 16000          | 19000      | 0.039  |
| 61706       |          |     |     | 30                  | 37        | 4          | 0.2                    | 1.10             | 0.95               | 5500           | 7000       | 0.007  |
| 61806       | •        | •   |     | 30                  | 42        | 7          | 0.3                    | 4.50             | 3.40               | 15000          | 18000      | 0.023  |
| 61906       | •        | •   |     | 30                  | 47        | 9          | 0.3                    | 7.20             | 5.00               | 14000          | 17000      | 0.044  |
| 61707       |          |     |     | 35                  | 44        | 5          | 0.3                    | 1.90             | 1.60               | 4900           | 6000       | 0.014  |
| 61807       | •        | •   |     | 35                  | 47        | 7          | 0.3                    | 4.70             | 3.80               | 13000          | 16000      | 0.027  |
| 61907       | •        |     | •   | 35                  | 55        | 10         | 0.6                    | 10.90            | 7.80               | 12000          | 14000      | 0.069  |
| 61708       |          |     |     | 40                  | 50        | 6          | 0.3                    | 2.50             | 2.20               | 4300           | 5000       | 0.021  |
| 61808       | •        | •   |     | 40                  | 52        | 7          | 0.3                    | 4.90             | 4.20               | 12000          | 14000      | 0.029  |
| 61908       | •        | •   |     | 40                  | 62        | 12         | 0.6                    | 13.70            | 9.90               | 11000          | 13000      | 0.101  |
| 61709       |          |     |     | 45                  | 55        | 6          | 0.3                    | 2.60             | 2.40               | 3900           | 4600       | 0.023  |
| 61809       | •        | •   |     | 45                  | 58        | 7          | 0.3                    | 6.20             | 5.40               | 11000          | 13000      | 0.034  |
| 61909       | •        | •   |     | 45                  | 68        | 12         | 0.6                    | 14.10            | 10.90              | 10000          | 11000      | 0.123  |
| 61710       |          |     |     | 50                  | 62        | 6          | 0.3                    | 2.70             | 2.70               | 3500           | 4100       | 0.034  |
| 61810       | •        | •   |     | 50                  | 65        | 7          | 0.3                    | 6.20             | 5.80               | 9500           | 11000      | 0.047  |
| 61910       | •        | •   |     | 50                  | 72        | 12         | 0.6                    | 14.50            | 11.70              | 9000           | 11000      | 0.123  |
| 61811       | •        | •   |     | 55                  | 72        | 9          | 0.3                    | 8.80             | 8.10               | 8600           | 10000      | 0.075  |
| 61911       |          | •   |     | 55                  | 80        | 13         | 1.0                    | 16.60            | 14.10              | 8100           | 9600       | 0.168  |
| 61812       | •        | •   |     | 60                  | 78        | 10         | 0.3                    | 11.50            | 10.60              | 7900           | 9400       | 0.094  |
| 61912       | •        | •   |     | 60                  | 85        | 13         | 1.0                    | 20.20            | 17.30              | 7500           | 8900       | 0.180  |
| 61813       | •        | •   |     | 65                  | 85        | 10         | 0.6                    | 11.90            | 11.50              | 7300           | 8600       | 0.118  |
| 61913       |          |     |     | 65                  | 90        | 13         | 1.0                    | 17.30            | 16.00              | 7000           | 8300       | 0.198  |
| 61826       |          | •   |     | 130                 | 165       | 18         | 1.1                    | 37.90            | 42.90              | 3400           | 5000       | 0.780  |
| 61830       |          |     |     | 150                 | 190       | 20         | 1.1                    | 49.10            | 57.10              | 3000           | 3700       | 1.170  |

Speed ratings are for open bearings. Use 50 to 60 percent of the published speed ratings for bearings with contact seals.

# DEEP GROOVE BALL BEARINGS

## NARROW 16000 SERIES

### NARROW 16000 SERIES

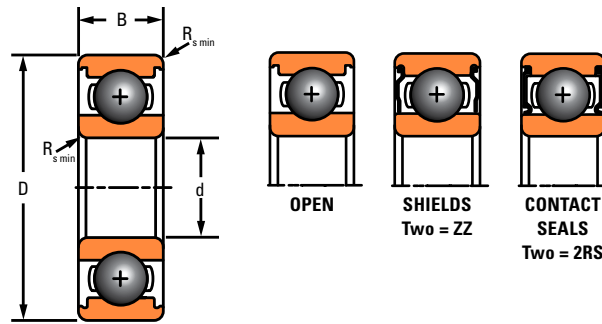


TABLE 12. NARROW 16000 SERIES

| Bearing No. | Features |     | Boundary Dimensions |           |            |                        | Load Ratings     |                    | Limiting Speed |       | Weight |
|-------------|----------|-----|---------------------|-----------|------------|------------------------|------------------|--------------------|----------------|-------|--------|
|             |          |     | Bore<br>d           | O.D.<br>D | Width<br>B | Radius<br>$R_{s\ min}$ | Dynamic<br>$C_r$ | Static<br>$C_{0r}$ | Grease         | Oil   |        |
| Description | ZZ       | 2RS | mm                  | mm        | mm         | mm                     | kN               | kN                 | RPM            | RPM   | kg     |
| 16100       | •        |     | 10                  | 28        | 8          | 0.3                    | 4.60             | 2.00               | 25000          | 37000 | 0.022  |
| 16101       | •        | •   | 12                  | 30        | 8          | 0.3                    | 5.10             | 2.40               | 22000          | 33000 | 0.024  |
| 16002       | •        |     | 15                  | 32        | 8          | 0.3                    | 5.60             | 2.80               | 19000          | 2600  | 0.027  |
| 16003       | •        |     | 17                  | 35        | 8          | 0.3                    | 6.00             | 3.30               | 17000          | 24000 | 0.030  |
| 16004       |          |     | 20                  | 42        | 8          | 0.3                    | 6.30             | 3.80               | 13000          | 20000 | 0.050  |
| 16005       | •        |     | 25                  | 47        | 8          | 0.3                    | 7.00             | 4.60               | 11000          | 16000 | 0.060  |
| 16006       |          |     | 30                  | 55        | 9          | 0.3                    | 9.20             | 6.30               | 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                    | 15.60            | 12.20              | 6900           | 10000 | 0.170  |
| 16010       |          |     | 50                  | 80        | 10         | 0.6                    | 16.10            | 13.10              | 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            | 17.50              | 5400           | 7800  | 0.220  |
| 16013       |          |     | 65                  | 100       | 11         | 0.6                    | 20.50            | 18.70              | 5000           | 7300  | 0.290  |
| 16014       |          |     | 70                  | 110       | 13         | 0.6                    | 26.80            | 23.60              | 5000           | 7100  | 0.430  |
| 16015       |          |     | 75                  | 115       | 13         | 0.6                    | 27.60            | 25.30              | 4600           | 6700  | 0.450  |
| 16016       |          |     | 80                  | 125       | 14         | 0.6                    | 31.90            | 29.60              | 4400           | 6200  | 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  |

Speed ratings are for open bearings. Use 50 to 60 percent of the published speed ratings for bearings with contact seals.

**WIDE  
62000-63000  
SERIES**

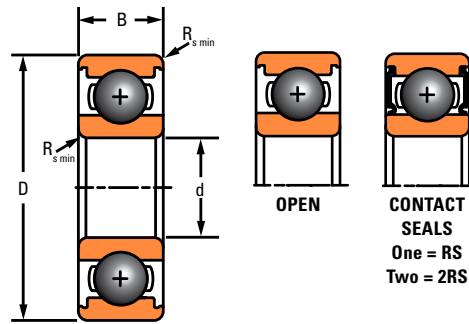


TABLE 13. WIDE 62000-63000 SERIES

| Bearing No. | Features |     | Boundary Dimensions |           |            |                              | Load Ratings              |                           | Limiting Speed |       | Weight |
|-------------|----------|-----|---------------------|-----------|------------|------------------------------|---------------------------|---------------------------|----------------|-------|--------|
|             |          |     | Bore<br>d           | O.D.<br>D | Width<br>B | Radius<br>R <sub>s min</sub> | Dynamic<br>C <sub>r</sub> | Static<br>C <sub>0r</sub> | Grease         | Oil   |        |
| Description | RS       | 2RS | mm                  | mm        | mm         | mm                           | kN                        | kN                        | RPM            | RPM   | kg     |
| 62200       |          | •   | 10                  | 30        | 14         | 0.6                          | 6.00                      | 2.40                      | 29000          | 42000 | 0.040  |
| 62300       |          | •   | 10                  | 35        | 17         | 0.6                          | 8.10                      | 3.40                      | 26000          | 38000 | 0.070  |
| 63000       |          | •   | 10                  | 26        | 12         | 0.3                          | 4.60                      | 2.00                      | 33000          | 49000 | 0.030  |
| 62201       |          | •   | 12                  | 32        | 14         | 0.6                          | 6.90                      | 3.10                      | 26000          | 37000 | 0.050  |
| 62301       |          | •   | 12                  | 37        | 17         | 1.0                          | 9.80                      | 4.20                      | 23000          | 34000 | 0.080  |
| 63001       |          | •   | 12                  | 28        | 12         | 0.3                          | 5.10                      | 2.40                      | 29000          | 43000 | 0.030  |
| 62202       |          | •   | 15                  | 35        | 14         | 0.6                          | 7.80                      | 3.80                      | 22000          | 32000 | 0.050  |
| 62302       |          | •   | 15                  | 42        | 17         | 1.0                          | 11.40                     | 5.40                      | 19000          | 28000 | 0.100  |
| 63002       |          | •   | 15                  | 32        | 13         | 0.3                          | 5.60                      | 2.80                      | 25000          | 37000 | 0.040  |
| 62203       |          | •   | 17                  | 40        | 16         | 0.6                          | 9.60                      | 4.80                      | 20000          | 30000 | 0.080  |
| 62303       |          | •   | 17                  | 47        | 19         | 1.0                          | 13.50                     | 6.60                      | 18000          | 26000 | 0.140  |
| 63003       |          | •   | 17                  | 35        | 14         | 0.3                          | 6.00                      | 3.30                      | 23000          | 34000 | 0.050  |
| 62204       |          | •   | 20                  | 47        | 18         | 1.0                          | 12.70                     | 6.60                      | 18000          | 26000 | 0.120  |
| 62304       |          | •   | 20                  | 52        | 21         | 1.1                          | 15.90                     | 7.80                      | 17000          | 24000 | 0.140  |
| 63004       |          | •   | 20                  | 42        | 16         | 0.6                          | 9.40                      | 5.00                      | 20000          | 30000 | 0.090  |
| 62205       |          | •   | 25                  | 52        | 18         | 1.0                          | 14.00                     | 7.80                      | 15000          | 22000 | 0.150  |
| 62305       |          | •   | 25                  | 62        | 24         | 1.1                          | 22.50                     | 11.60                     | 14000          | 21000 | 0.300  |
| 63005       |          | •   | 25                  | 47        | 16         | 0.6                          | 10.10                     | 5.80                      | 17000          | 25000 | 0.100  |
| 62206       |          | •   | 30                  | 62        | 20         | 1.0                          | 19.50                     | 11.20                     | 13000          | 19000 | 0.230  |
| 62306       |          | •   | 30                  | 72        | 27         | 1.1                          | 28.10                     | 16.00                     | 13000          | 18000 | 0.470  |
| 63006       |          | •   | 30                  | 55        | 19         | 1.0                          | 13.20                     | 8.30                      | 15000          | 23000 | 0.150  |
| 62207       |          | •   | 35                  | 72        | 23         | 1.1                          | 25.50                     | 15.30                     | 12000          | 17000 | 0.370  |
| 62307       |          | •   | 35                  | 80        | 31         | 1.5                          | 33.20                     | 19.00                     | 12000          | 17000 | 0.620  |
| 63007       | •        | •   | 35                  | 62        | 20         | 1.0                          | 16.00                     | 10.30                     | 14000          | 20000 | 0.200  |
| 62208       |          | •   | 40                  | 80        | 23         | 1.1                          | 30.70                     | 19.00                     | 10000          | 15000 | 0.440  |
| 62308       |          | •   | 40                  | 90        | 33         | 1.5                          | 41.00                     | 24.00                     | 11000          | 15000 | 0.850  |
| 63008       |          | •   | 40                  | 68        | 21         | 1.0                          | 16.80                     | 11.60                     | 12000          | 18000 | 0.240  |
| 62209       |          | •   | 45                  | 85        | 23         | 1.1                          | 33.20                     | 21.60                     | 9200           | 13000 | 0.460  |
| 62309       |          | •   | 45                  | 100       | 36         | 1.5                          | 52.70                     | 31.50                     | 9700           | 14000 | 1.100  |
| 62210       |          | •   | 50                  | 90        | 23         | 1.1                          | 35.10                     | 23.20                     | 8500           | 12000 | 0.470  |
| 62310       |          | •   | 50                  | 110       | 40         | 2.0                          | 61.80                     | 38.00                     | 9200           | 13000 | 1.500  |
| 62211       |          | •   | 55                  | 100       | 25         | 1.5                          | 43.60                     | 29.00                     | 7800           | 11000 | 0.680  |
| 62311       |          | •   | 55                  | 120       | 43         | 2.0                          | 71.50                     | 45.00                     | 8600           | 12000 | 2.000  |
| 62212       |          | •   | 60                  | 110       | 28         | 1.5                          | 52.70                     | 36.00                     | 7500           | 11000 | 1.000  |
| 62312       |          | •   | 60                  | 130       | 46         | 2.1                          | 81.80                     | 51.90                     | 8100           | 12000 | 2.500  |
| 62213       |          | •   | 65                  | 120       | 31         | 1.5                          | 55.90                     | 40.50                     | 7200           | 10000 | 1.300  |
| 62214       |          | •   | 70                  | 125       | 31         | 1.5                          | 60.50                     | 45.50                     | 6700           | 9700  | 1.400  |

Speed ratings are for open bearings. Use 50 to 60 percent of the published speed ratings for bearings with contact seals.

# DEEP GROOVE BALL BEARINGS

## MINIATURE AND EXTRA-SMALL 600 SERIES

### MINIATURE AND EXTRA-SMALL 600 SERIES

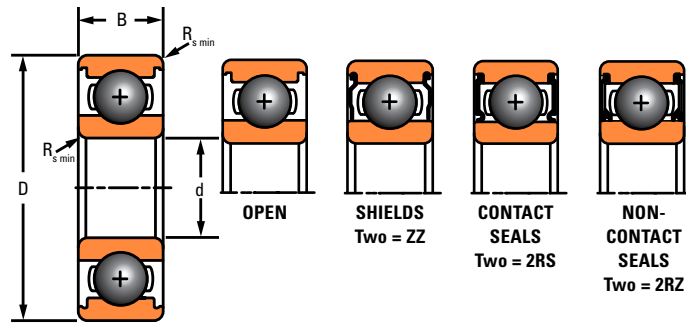


TABLE 14. MINIATURE AND EXTRA-SMALL 600 SERIES

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

Speed ratings are for open bearings. Use 50 to 60 percent of the published speed ratings for bearings with contact seals.





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