

TIMKEN



TIMKEN® DEEP GROOVE BALL BEARING CATALOG



www.lager-technik.eu

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) 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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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. To order the catalog, please contact your Timken sales engineer and request a copy of the Timken Engineering Manual (order number 10424).

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

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

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

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



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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 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.

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 250 mm. Timken continues to expand the offering of deep groove ball bearings with larger sizes to be introduced.

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. Details of the variations for each are listed in the product tables on pages 21–28.

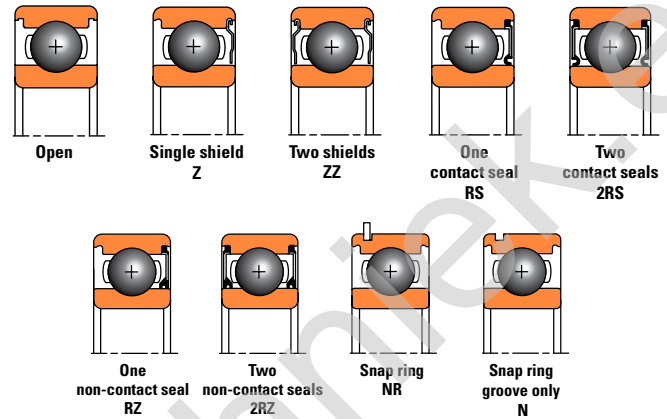


Fig. 1. Deep groove ball bearing configurations.

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

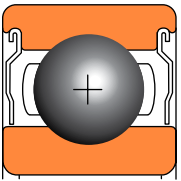
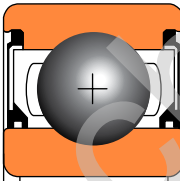
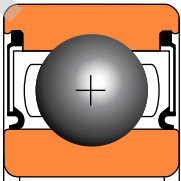
Bearing shields and seals help keep lubricant in and dust, water and other contaminants out.

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 One = Z Two = ZZ	Non-Contact Seals One = RZ Two = 2RZ	Contact Seals One = RS 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 ZZ/2RZ due to seal contact
Operating Temperature	-50° C to +120° C	-40° C to +120° C	-40° C to +120° C
Grease Retention	Good	Better than ZZ type	Excellent
Dust Resistance	Good	Better than ZZ type	Excellent
Torque	Low	Low	Higher than ZZ/2RZ due to seal contact

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

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 mm² develops. Since fatigue is a statistical phenomenon, the life of an individual bearing is impossible to predetermine precisely. Bearings that may appear to be identical can exhibit considerable life scatter when tested under identical conditions. Thus, it is necessary to base life predictions on a statistical evaluation of a large number of bearings operating under similar conditions. The Weibull distribution function is the accepted standard for predicting the life of a population of bearings at any given reliability level.

RATING LIFE

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

DYNAMIC LOAD RATING

Published dynamic load ratings for 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		Δd_{mp}	V_{BS}	K_{ia}	S_d	S_{ia}	ΔBs and ΔCs	
over	incl.	P0	P0, P6	P0	P5	P5	P0, P6	P5
mm	mm	μm	μm	μm	μm	μm	μm	μm
2.5	10	-8	15	10	7	7	-120	-40
10	18	-8	20	10	7	7	-120	-80
18	30	-10	20	13	8	8	-120	-120
30	50	-12	20	15	8	8	-120	-120
50	80	-15	25	20	8	8	-150	-150
80	120	-20	25	25	9	9	-200	-200
120	150	-25	30	30	10	10	-250	-250
150	180	-25	30	30	10	10	-250	-250
180	250	-30	30	40	11	13	-300	-300
250	315	-35	35	50	13	15	-350	-350
315	400	-40	40	60	15	20	-400	-400

TABLE 7. OUTER RING – TOLERANCES

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

FITTING PRACTICE

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

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

- Precision class of the bearing.
- Rotating or stationary ring.
- Type of layout (single- or double-row bearings).
- Type and direction of load (continuous/alternate rotating).
- Particular running conditions like shocks, vibrations, 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.

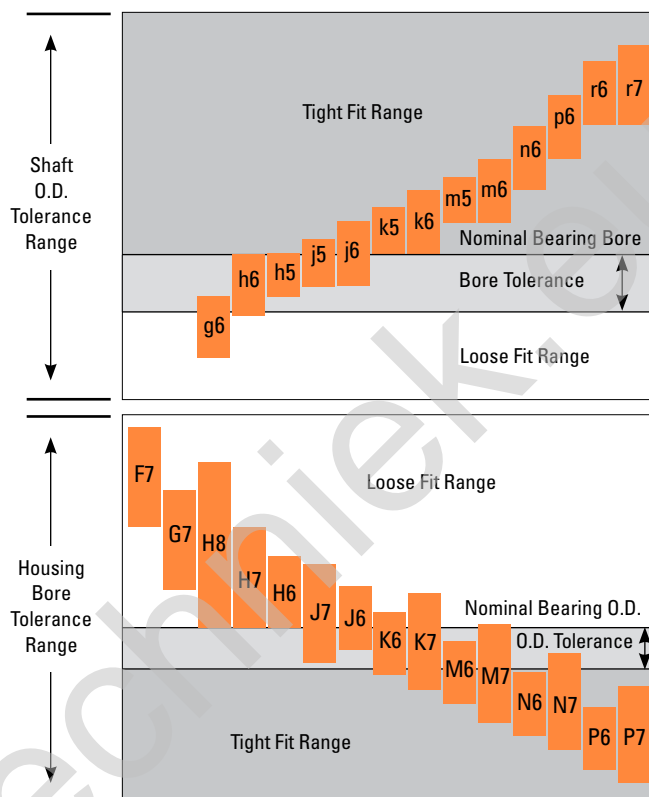


Fig. 2. Shaft and housing fit selection.

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 12T	6	0 14T	6	2 14T	8	2 16T	-		-		-		-	
6	1 14T	9	1 17T	9	4 17T	12	4 20T	16	8 24T	20	12 28T	23	15 31T	27	15 35T
7	1 15T	10	1 18T	12	6 20T	15	6 23T	19	10 27T	24	15 32T	28	19 36T	34	19 42T
9	1 17T	12	1 20T	15	7 23T	18	7 26T	23	12 31T	29	18 37T	34	23 42T	41	23 49T
11	2 21T	15	2 25T	17	8 27T	21	8 31T	28	15 38T	35	22 45T	41	28 49T	49	28 59T
13	2 25T	18	2 30T	20	9 32T	25	9 37T	33	17 45T	42	26 54T	50	34 62T	59	34 71T
15	2 30T	21	2 36T	24	11 39T	30	11 45T	39	20 54T	51	32 66T	62	41 -77T	73	41 88T
18	3 38T	25	3 45T	28	13 48T	35	13 55T	45	23 65T	59	37 79T	76	51 96T	89	51 109T
21	3 46T	28	3 53T	33	15 58T	40	15 65T	52	27 77T	68	43 93T	90	65 115T	105	65 130T
24	4 54T	33	4 63T	37	17 67T	46	17 76T	60	31 90T	79	50 109T	106	77 136T	123	77 153T
24	4 54T	33	4 63T	37	17 67T	46	17 76T	60	31 90T	79	50 109T	109	80 139T	126	80 156T
24	4 54T	33	4 63T	37	17 67T	46	17 76T	60	31 90T	79	50 109T	113	84 143T	130	84 160T
27	4 62T	36	4 71T	43	20 78T	52	20 87T	66	34 101T	88	56 123T	126	94 161T	146	94 181T
27	4 62T	36	4 71T	43	20 78T	52	20 87T	66	34 101T	88	56 123T	130	98 165T	150	98 185T
29	4 69T	40	4 80T	46	21 86T	57	21 97T	73	37 113T	98	62 138T	144	108 184T	165	108 205T
29	4 69T	40	4 80T	46	21 86T	57	21 97T	73	37 113T	98	62 138T	150	114 190T	171	114 211T
32	5 77T	45	5 90T	50	23 95T	63	23 108T	80	40 125T	108	68 153T	166	126 211T	189	126 234T
32	5 77T	45	5 90T	50	23 95T	63	23 108T	80	40 125T	108	68 153T	172	132 217T	195	132 240T
29	0 79T	44	0 94T	56	26 105T	70	26 120T	88	44 138T	122	78 172T	194	150 244T	220	150 270T
29	0 79T	44	0 94T	56	26 105T	70	26 120T	88	44 138T	122	78 172T	199	155 249T	225	155 275T
32	0 107T	50	0 125T	62	30 137T	80	30 155T	100	50 175T	138	88 213T	225	175 300T	255	175 330T
32	0 107T	50	0 125T	62	30 137T	80	30 155T	100	50 175T	138	88 213T	235	185 310T	265	185 340T
36	0 136T	56	0 156T	70	34 170T	90	34 190T	112	56 212T	156	100 256T	266	210 366T	300	210 400T
36	0 136T	56	0 156T	70	34 170T	90	34 190T	112	56 212T	156	100 256T	276	220 376T	310	220 410T
42	0 167T	66	0 191T	82	40 207T	106	40 231T	132	66 257T	186	120 311T	316	250 441T	355	250 480T
42	0 167T	66	0 191T	82	40 207T	106	40 231T	132	66 257T	186	120 311T	326	260 451T	365	260 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	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm	µm								
6	10	0	-8	28	13	13L 32L		20	5	5L 28L		9	0	0L 17L		15	0	0L 23L		22	0	0L 30L		5	-4	4T 13L		8	-7	7T 16L
10	18	0	-8	34	16	16L 42L		24	6	6L 32L		11	0	0L 19L		18	0	0L 26L		27	0	0L 35L		6	-5	5T 14L		10	-8	8T 18L
18	30	0	-9	41	20	20L 50L		28	7	7L 37L		13	0	0L 22L		21	0	0L 30L		33	0	0L 42L		8	-5	5T 10 17L		12	-9	9T 21L
30	50	0	-11	50	25	25L 61L		34	9	9L 45L		16	0	0L 27L		25	0	0L 36L		39	0	0L 50L		10	-6	6T 21L		14	-11	11T 25L
50	80	0	-13	60	30	30L 73L		40	10	10L 53L		19	0	0L 32L		30	0	0L 43L		46	0	0L 59L		13	-6	6T 26L		18	-12	12T 31L
80	120	0	-15	71	36	36L 86L		47	12	12L 62L		22	0	0L 37L		35	0	0L 50L		54	0	0L 69L		16	-6	6T 31L		22	-13	13T 37L
120	150	0	-18	83	43	43L 101L		54	14	14L 72L		25	0	0L 43L		40	0	0L 58L		63	0	0L 81L		18	-7	7T 36L		26	-14	14T 44L
150	180	0	-25	83	43	43L 108L		54	14	14L 79L		25	0	0L 50L		40	0	0L 65L		63	0	0L 88L		18	-7	7T 43L		26	-14	14T 51L
180	250	0	-30	96	50	50L 126L		61	15	15L 91L		29	0	0L 59L		46	0	0L 76L		72	0	0L 102L		22	-7	7T 52L		30	-16	16T 60L
250	315	0	-35	108	56	56L 143L		69	17	17L 104L		32	0	0L 67L		52	0	0L 87L		81	0	0L 116L		25	-7	7T 60L		36	-16	16T 71L
315	400	0	-40	119	62	62L 159L		75	18	18L 115L		36	0	0L 76L		57	0	0L 97L		89	0	0L 129L		29	-7	7T 69L		39	-18	18T 79L
400	500	0	-45	131	68	68L 176L		83	20	20L 128L		40	0	0L 85L		63	0	0L 108L		97	0	0L 142L		33	-7	7T 78L		43	-20	20T 88L
500	630	0	-50	146	76	76L 196L		92	22	22L 142L		44	0	0L 94L		70	0	0L 120L		110	0	0L 160L		37	-7	7T 87L		48	-22	22T 98L
630	800	0	-75	160	80	80L 235L		104	24	24L 179L		50	0	0L 125L		80	0	0L 155L		125	0	0L 200L		40	-10	10T 115L		56	-24	24T 131L
800	1000	0	-100	176	86	86L 276L		116	26	26L 216L		56	0	0L 156L		90	0	0L 190L		140	0	0L 240L		46	-10	10T 146L		64	-26	26T 164L
1000	1250	0	-125	203	98	98L 328L		133	28	28L 258L		66	0	0L 191L		105	0	0L 230L		165	0	0L 290L		56	-10	10T 181L		77	-28	28T 202L
1250	1600	0	-160	235	110	110L 395L		155	30	30L 315L		78	0	0L 238L		125	0	0L 285L		195	0	0L 355L		68	-10	10T 228L		95	-30	30T 255L
1600	2000	0	-200	270	120	120L 470L		182	32	32L 382L		92	0	0L 292L		150	0	0L 350L		230	0	0L 430L		82	-10	10T 282L		118	-32	32T 318L
2000	2500	0	-250	305	130	130L 555L		209	34	34L 459L		110	0	0L 360L		175	0	0L 425L		280	0	0L 530L		100	-10	10T 350L		141	-34	34T 391L

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

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DEEP GROOVE BALL BEARINGS

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NOMENCLATURE

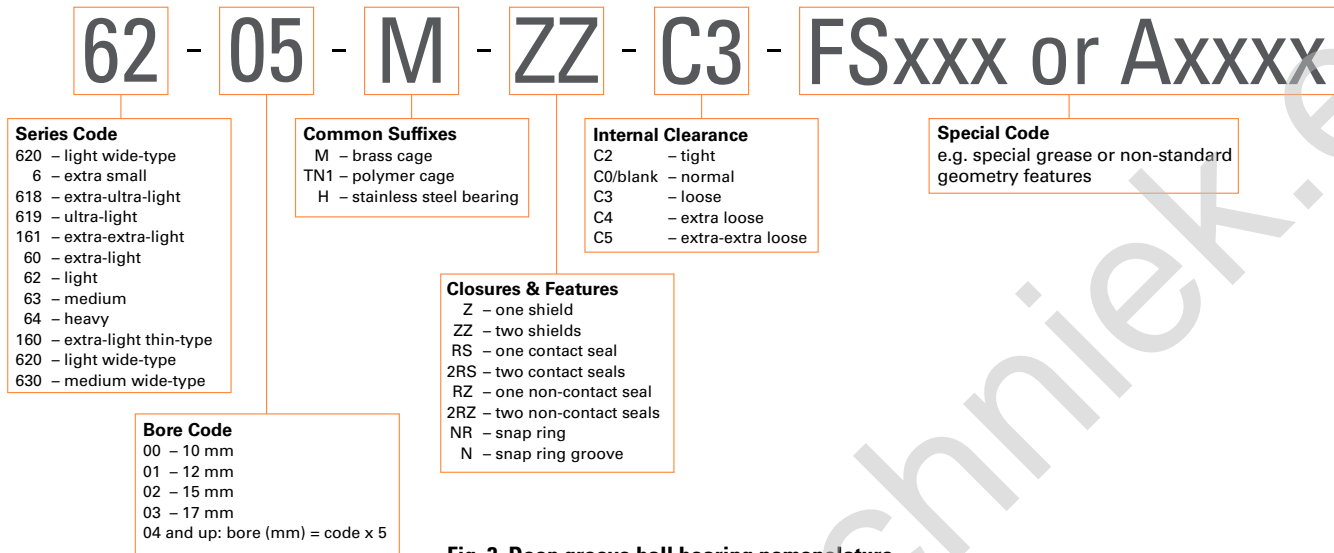


Fig. 3. Deep groove ball bearing nomenclature.

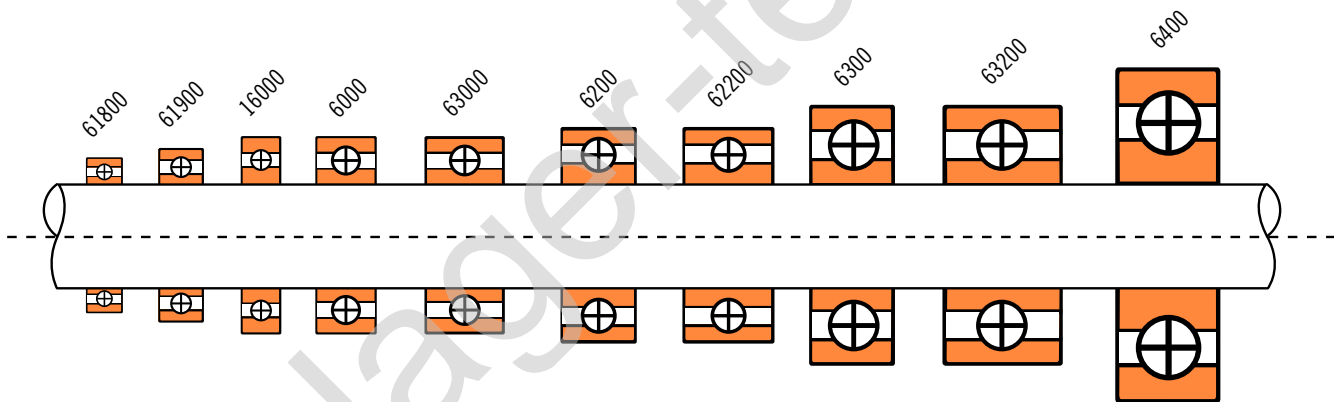


Fig. 4. Timken deep groove ball bearing series.

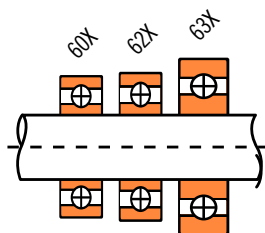


Fig. 5. Timken miniature and extra-small deep groove ball bearing series.

**STANDARD
6000 SERIES**

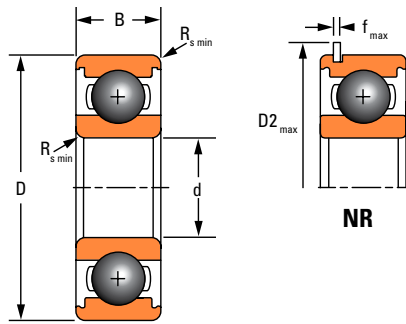


TABLE 10. STANDARD 6000 SERIES

Bearing No.	Boundary Dimensions						Load Ratings		Thermal Reference Speed		Weight
	Bore	O.D.	Width	Radius			Dynamic	Static	Grease	Oil	
	d	D	B	R _{s min}	D _{2 max}	f _{max}	C _r	C _{0r}	RPM	RPM	
Description	mm	mm	mm	mm	mm	mm	kN	kN	RPM	RPM	kg
6000	10	26	8	0.3	29.2	0.7	4.6	2	26000	38000	0.02
6200	10	30	9	0.6	34.7	1.12	5.1	2.4	22000	32000	0.03
6300	10	35	11	0.6	39.7	1.12	8.1	3.5	20000	29000	0.05
6001	12	28	8	0.3	30.8	0.85	5.1	2.4	23000	33000	0.02
6201	12	32	10	0.6	36.7	1.12	6.8	3	21000	30000	0.04
6301	12	37	12	1	41.3	1.12	9.7	4.2	19000	27000	0.06
6002	15	32	9	0.3	36.7	1.12	5.6	2.8	20000	30000	0.03
6202	15	35	11	0.6	39.7	1.12	7.6	3.7	19000	28000	0.05
6302	15	42	13	1	46.3	1.12	11.4	5.4	16000	24000	0.08
6003	17	35	10	0.3	39.7	1.12	6	3.3	19000	28000	0.04
6203	17	40	12	0.6	44.6	1.12	9.6	4.8	17000	25000	0.07
6303	17	47	14	1	52.7	1.12	13.6	6.6	15000	22000	0.12
6004	20	42	12	0.6	46.3	1.12	9.4	5	17000	25000	0.07
6204	20	47	14	1	52.7	1.12	12.8	6.6	15000	22000	0.1
6304	20	52	15	1.1	57.9	1.12	15.9	7.8	13000	20000	0.14
6005	25	47	12	0.6	52.7	1.12	10.1	5.8	14000	21000	0.08
6205	25	52	15	1	57.9	1.12	14	7.9	14000	20000	0.13
6305	25	62	17	1.1	67.7	1.7	20.6	11.2	12000	17000	0.22
6405	25	80	21	1.5	86.6	1.7	36.1	18.8	10000	15000	0.53
6006	30	55	13	1	60.7	1.12	13.2	8.3	12000	18000	0.11
6206	30	62	16	1	67.7	1.7	19.5	11.3	11000	16000	0.2
6306	30	72	19	1.1	78.6	1.7	26.6	15	10000	15000	0.35
6406	30	90	23	1.5	96.5	2.46	47.3	24.5	9300	13000	0.74
6007	35	62	14	1	67.7	1.7	15.9	10.3	11000	16000	0.15
6207	35	72	17	1.1	78.6	1.7	25.7	15.3	10000	14000	0.29
6307	35	80	21	1.5	86.6	1.7	33.4	19.2	9300	13000	0.45
6407	35	100	25	1.5	106.5	2.46	55.5	29.4	8500	12000	0.95
6008	40	68	15	1	74.6	1.7	16.8	11.5	10000	15000	0.19
6208	40	80	18	1.1	86.6	1.7	29.5	18.1	8800	13000	0.37
6308	40	90	23	1.5	96.5	2.46	40.7	24	8500	12000	0.64
6408	40	110	27	2	116.6	2.46	63.7	34.6	7800	11000	1.25
6009	45	75	16	1	81.6	1.7	19.9	14	9200	13000	0.23
6209	45	85	19	1.1	91.6	1.7	31.2	20.3	8200	12000	0.42
6309	45	100	25	1.5	106.5	2.46	48.8	29.3	7800	11000	0.84
6409	45	120	29	2	129.7	2.82	77.2	45.2	7200	10000	1.55
6010	50	80	16	1	86.6	1.7	21.8	16.5	8300	12000	0.25
6210	50	90	20	1.1	96.5	2.46	35	23.2	7700	11000	0.46
6310	50	110	27	2	116.6	2.46	57.5	35.3	7200	10000	1.05
6410	50	130	31	2.1	139.7	2.82	83.1	49.4	6800	9700	1.9
6011	55	90	18	1.1	96.5	2.46	28.3	22.4	7800	11000	0.36
6211	55	100	21	1.5	106.5	2.46	43.4	29.2	7000	10000	0.61
6311	55	120	29	2	129.7	2.82	71.5	44.6	6700	10000	1.35
6411	55	140	33	2.1	149.7	2.82	100.7	62.4	6300	9100	2.3

Most bearings in this series up to 60 mm bore also can be made available in stainless steel (AISI 440C material). Timken stainless-steel bearing numbers are designated using the "H" suffix (e.g. 6203H-2RS). Please contact your Timken sales engineer with any questions.

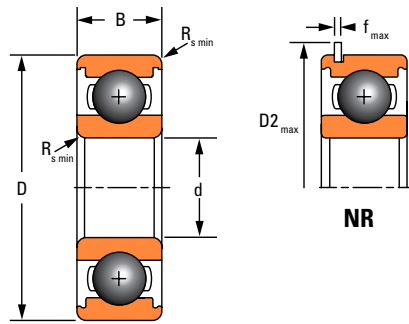
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DEEP GROOVE BALL BEARINGS

STANDARD 6000 SERIES

STANDARD 6000 SERIES

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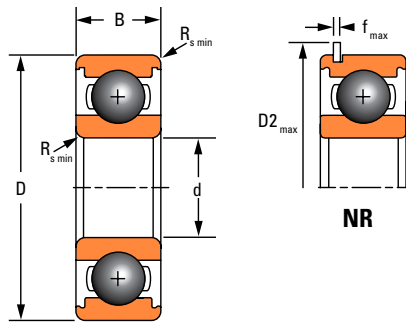


Continued from Table 10.

Bearing No.	Boundary Dimensions						Load Ratings		Thermal Reference Speed		Weight
	Bore	O.D.	Width	Radius	D2 _{max}	f _{max}	Dynamic	Static	Grease	Oil	
	d	D	B	R _{s min}			C _r	C _{0r}	RPM	RPM	
Description	mm	mm	mm	mm	mm	mm	kN	kN	RPM	RPM	kg
6012	60	95	18	1.1	101.6	2.46	29.5	22.7	7200	10000	0.39
6212	60	110	22	1.5	116.6	2.46	47.8	32.9	6500	9300	0.78
6312	60	130	31	2.1	139.7	2.82	81.8	51.8	6400	9100	1.7
6412	60	150	35	2.1	159.7	2.82	109	70.1	6000	8600	2.73
6013	65	100	18	1.1	106.5	2.46	30.5	23.5	6700	9700	0.43
6213	65	120	23	1.5	129.7	2.82	57.2	40	6000	8600	0.99
6313	65	140	33	2.1	149.7	2.82	92.6	59.7	6000	8600	2.1
6413	65	160	37	2.1	169.7	2.82	118	78.6	5700	8200	3.3
6014	70	110	20	1.1	116.6	2.46	38.6	30.4	6400	9300	0.57
6214	70	125	24	1.5	134.7	2.82	60.8	44	5700	8300	1.1
6314	70	150	35	2.1	159.7	2.82	104	68	5700	8200	2.5
6015	75	115	20	1.1	121.6	2.46	40.1	33.1	6000	8700	0.6
6215	75	130	25	1.5	139.7	2.82	66.1	49.3	5500	7900	1.2
6315	75	160	37	2.1	169.7	2.82	113.4	76.5	5400	7800	3
6016	80	125	22	1.1	134.7	2.82	47.5	39.8	5800	8400	0.82
6216	80	140	26	2	149.7	2.82	72.7	53	5200	7500	1.4
6316	80	170	39	2.1	182.9	3.1	123	86.5	5200	7500	3.6
6017	85	130	22	1.1	139.7	2.82	52.8	44.5	5400	7900	0.85
6217	85	150	28	2	159.7	2.82	83.2	63.8	5000	7200	1.8
6317	85	180	41	3	192.9	3.1	132.7	96.5	5000	7200	4.25
6018	90	140	24	1.5	149.7	2.82	58	50.6	5300	7600	1.12
6218	90	160	30	2	169.7	2.82	96	71.5	4800	6900	2.15
6318	90	190	43	3	202.9	3.1	142.6	107.2	4800	6900	4.9
6019	95	145	24	1.5	154.7	2.82	60.5	51	5000	7300	1.18
6219	95	170	32	2.1	182.9	3.1	109	82	4700	6700	2.6
6319	95	200	45	3	212.9	3.1	152.7	118	4600	6600	5.75
6020	100	150	24	1.5	159.7	2.82	60.2	54.2	4800	6900	1.25
6220	100	180	34	2.1	192.9	3.1	122	92.7	4500	6500	3.2
6320	100	215	47	3	227.8	3.1	173	140.2	4400	6200	6.98
6021	105	160	26	2	169.7	2.82	69.2	61.2	4700	6700	1.6
6221	105	190	36	2.1	202.9	3.1	133	105	4400	6300	3.71
6321	105	225	49	3	237	3.5	183.7	153.1	4200	6000	8.11
6022	110	170	28	2	182.9	3.1	82	73	4600	6600	1.93
6222	110	200	38	2.1	212.9	3.1	144	117	4300	6100	4.44
6322	110	240	50	3	252	3.5	205	178.3	3900	5500	9.48
6024	120	180	28	2	192.9	3.1	88.1	79.3	4200	6100	2.03

Most bearings in this series up to 60 mm bore also can be made available in stainless steel (AISI 440C material).
 Timken stainless-steel bearing numbers are designated using the "H" suffix (e.g. 6203H-2RS).
 Please contact your Timken sales engineer with any questions.

Continued on next page.



Continued from Table 10.

Bearing No.	Boundary Dimensions						Load Ratings		Thermal Reference Speed		Weight
	Bore	O.D.	Width	Radius	D2 _{max}	f _{max}	Dynamic	Static	Grease	Oil	
	d	D	B	R _{s min}			C _r	C _{0r}	RPM	RPM	
Description	mm	mm	mm	mm	mm	mm	kN	kN	RPM	RPM	kg
6224	120	215	40	2.1	227.8	3.1	155.3	131.1	4000	5700	5.16
6324	120	260	55	3	—	—	227.6	207.4	3600	5100	12.4
6026	130	200	33	2	212.9	3.1	250.9	96.8	4100	5900	3.15
6226	130	230	40	3	242	3.5	253 165	165 148	3700	5200	5.85
6326	130	280	58	4	—	—	250.9	238.7	3300	4600	15.3
6028	140	210	33	2	222.8	3.1	274	101.8	3800	5600	3.5
6228	140	250	42	3	262	3.5	185 166	150	3400	4900	7.45
6328	140	300	62	4	—	—	253	254	3100	4300	18.5
6030	150	225	35	2.1	237	3.5	168 131.7	124.5	3600	5200	4.9
6230	150	270	45	3	—	—	176	168	3200	4500	9.4
6330	150	320	65	4	—	—	274	270	2800	4000	22
6032	160	240	38	2.1	—	—	189 136.6	135.4	3500	5100	5.15
6232	160	290	48	3	—	—	185	186	2900	4200	11.7
6332	160	340	68	4	—	—	301	317	2600	3700	26
6034	170	260	42	2.1	—	—	168	172	3300	4800	6.7
6234	170	310	52	4	—	—	212	223	2700	3900	14.5
6334	170	360	72	4	—	—	335.5	378.1	2400	3400	30.7
6036	180	280	46	2.1	—	—	189	198	3100	4500	8.8
6236	180	320	52	4	—	—	227	241	2600	3700	15.1
6336	180	380	75	4	—	—	355	405	2300	3200	35.6
6038	190	290	46	2.1	—	—	172	200	3000	4300	9.1
6238	190	340	55	4	—	—	378	439	2400	3400	18.2
6338	190	400	78	5	—	—	255	281	2200	3000	41
6040	200	310	51	2.1	—	—	218	243	2800	4000	11.9
6240	200	360	58	4	—	—	269	310	2300	3200	21.6
6340	200	420	80	5	—	—	380	445	2100	2900	46.3
6044	220	340	56	3	—	—	247	290	2600	3600	17.7
6244	220	400	65	4	—	—	296	365	2100	2900	37
6344	220	460	88	5	—	—	410	520	1900	2600	72.7
6048	240	360	56	3	—	—	255	315	2300	3300	17.9
6052	260	400	65	4	—	—	291	375	2100	3000	30.4
6252	260	480	80	5	—	—	390	530	1700	2400	66.6
6056	280	420	65	4	—	—	302	405	2000	2800	31
6064	320	480	74	4	—	—	371	540	1700	2400	46
6072	360	540	82	5	—	—	460	720	1500	2100	69
6080	400	600	90	5	—	—	520	865	1300	1900	85.8

Most bearings in this series up to 60 mm bore also can be made available in stainless steel (AISI 440C material).
 Timken stainless-steel bearing numbers are designated using the "H" suffix (e.g. 6203H-2RS).
 Please contact your Timken sales engineer with any questions.

THIN-SECTION 61000 SERIES

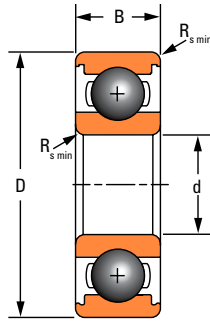
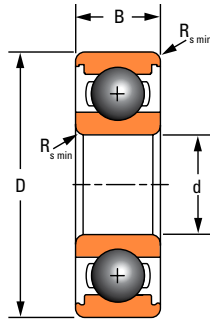


TABLE 11. THIN-SECTION 61000 SERIES

Bearing No.	Boundary Dimensions				Load Ratings		Limiting Speed		Weight
	Bore	O.D.	Width	Radius	Dynamic	Static	Grease	Oil	
	d	D	B	R _{s min}	C _r	C _{0r}	RPM	RPM	
	mm	mm	mm	mm	kN	kN	RPM	RPM	kg
61800	10	19	5	0.3	1.7	0.84	34000	40000	0.005
61900	10	22	6	0.3	2.7	1.3	31000	37000	0.009
61701	12	18	4	0.2	0.93	0.53	13000	15000	0.003
61801	12	21	5	0.3	1.9	1	30000	36000	0.005
61901	12	24	6	0.3	2.9	1.5	28000	33000	0.01
61702	15	21	4	0.2	0.94	0.58	11000	13000	0.003
61802	15	24	5	0.3	2.1	1.3	26000	31000	0.006
61902	15	28	7	0.3	4.3	2.3	24000	29000	0.015
61703	17	23	4	0.2	1	0.66	9500	11000	0.004
61803	17	26	5	0.3	2.2	1.5	24000	29000	0.007
61903	17	30	7	0.3	4.6	2.6	22000	26000	0.016
61704	20	27	4	0.2	1	0.72	8500	10000	0.005
61804	20	32	7	0.3	4	2.5	21000	25000	0.016
61904	20	37	9	0.3	6.4	3.7	19000	22000	0.033
61705	25	32	4	0.2	1.1	0.84	7000	8000	0.006
61805	25	37	7	0.3	4.3	2.9	18000	21000	0.02
61905	25	42	9	0.3	7	4.6	16000	19000	0.039
61706	30	37	4	0.2	1.1	0.95	5500	7000	0.007
61806	30	42	7	0.3	4.5	3.4	15000	18000	0.023
61906	30	47	9	0.3	7.2	5	14000	17000	0.044

The bearing sizes listed above also can be made available in stainless steel (AISI 440C material). Timken stainless-steel bearing numbers are designated using the "H" suffix (e.g. 61807H). Please contact your Timken sales engineer with any questions.

Continued on next page.



Continued from Table 11.

Bearing No.	Boundary Dimensions				Load Ratings		Limiting Speed		Weight
	Bore	O.D.	Width	Radius	Dynamic	Static	Grease	Oil	
Description	d	D	B	R _{s min}	C _r	C _{0r}	RPM	RPM	kg
	mm	mm	mm	mm	kN	kN			
61707	35	44	5	0.3	1.9	1.6	4900	6000	0.014
61807	35	47	7	0.3	4.7	3.8	13000	16000	0.027
61907	35	55	10	0.6	10.9	7.8	12000	14000	0.069
61708	40	50	6	0.3	2.5	2.2	4300	5000	0.021
61808	40	52	7	0.3	4.9	4.2	12000	14000	0.029
61908	40	62	12	0.6	13.7	9.9	11000	13000	0.101
61709	45	55	6	0.3	2.6	2.4	3900	4600	0.023
61809	45	58	7	0.3	6.2	5.4	11000	13000	0.034
61909	45	68	12	0.6	14.1	10.9	10000	11000	0.123
61710	50	62	6	0.3	2.7	2.7	3500	4100	0.034
61810	50	65	7	0.3	6.2	5.8	9500	11000	0.047
61910	50	72	12	0.6	14.5	11.7	9000	11000	0.123
61811	55	72	9	0.3	8.8	8.1	8600	10000	0.075
61911	55	80	13	1	16.6	14.1	8100	9600	0.168
61812	60	78	10	0.3	11.5	10.6	7900	9400	0.094
61912	60	85	13	1	20.2	17.3	7500	8900	0.18
61813	65	85	10	0.6	11.9	11.5	7300	8600	0.118
61913	65	90	13	1	17.3	16	7000	8300	0.198
61826	130	165	18	1.1	37.9	42.9	3400	5000	0.78
61830	150	190	20	1.1	49.1	57.1	3000	4500	1.17

The bearing sizes listed above also can be made available in stainless steel (AISI 440C material).
 Timken stainless-steel bearing numbers are designated using the "H" suffix (e.g. 61807H).
 Please contact your Timken sales engineer with any questions.

NARROW 16000 SERIES

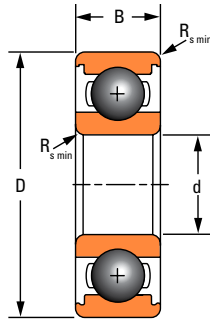


TABLE 12. NARROW 16000 SERIES

Bearing No.	Boundary Dimensions				Load Ratings		Limiting Speed		Weight
	Bore	O.D.	Width	Radius	Dynamic	Static	Grease	Oil	
	d	D	B	R _{s min}	C _r	C _{0r}	RPM	RPM	
	mm	mm	mm	mm	kN	kN	RPM	RPM	kg
16100	10	28	8	0.3	4.6	2	25000	37000	0.022
16101	12	30	8	0.3	5.1	2.4	22000	33000	0.024
16002	15	32	8	0.3	5.6	2.8	19000	27000	0.027
16003	17	35	8	0.3	6	3.3	17000	24000	0.03
16004	20	42	8	0.3	6.3	3.8	13000	20000	0.05
16005	25	47	8	0.3	7	4.6	11000	16000	0.06
16006	30	55	9	0.3	9.2	6.3	10000	14000	0.08
16007	35	62	9	0.3	12.2	8.8	8400	12000	0.1
16008	40	68	9	0.3	12.6	9.7	7400	11000	0.13
16009	45	75	10	0.6	15.6	12.2	6900	10000	0.17
16010	50	80	10	0.6	16.1	13.1	6300	9100	0.18
16011	55	90	11	0.6	19.4	16.3	5800	8500	0.26
16012	60	95	11	0.6	19.9	17.5	5400	7800	0.22
16013	65	100	11	0.6	20.5	18.7	5000	7300	0.29
16014	70	110	13	0.6	26.8	23.6	5000	7200	0.43
16015	75	115	13	0.6	27.6	25.3	4600	6700	0.45
16016	80	125	14	0.6	31.9	29.6	4400	6400	0.59
16017	85	130	14	0.6	32.6	31.6	4200	6100	0.57
16018	90	140	16	1	39.9	37	4200	6100	0.67
16019	95	145	16	1	42.7	41.9	3900	5700	0.71
16020	100	150	16	1	43.8	44.3	3800	5400	0.74
16021	105	160	18	1	51.8	50.6	3800	5400	1
16022	110	170	19	1	57.4	56.7	3600	5300	1.3
16024	120	180	19	1	58.8	60.4	3300	4800	1.4
16026	130	200	22	1.1	79.7	79.2	3200	4700	1.9
16028	140	210	22	1.1	82.1	85	3000	4400	2
16030	150	225	24	1.1	91.9	98.5	2900	4200	2.6
16032	160	240	25	1.5	99	108	2800	4000	4.2

**WIDE
62000-63000
SERIES**

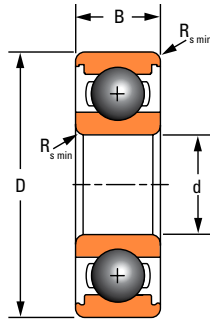


TABLE 13. WIDE 62000-63000 SERIES

Bearing No.	Boundary Dimensions				Load Ratings		Limiting Speed		Weight
	Bore	O.D.	Width	Radius	Dynamic	Static	Grease	Oil	
Description	d	D	B	R _{s min}	C _r	C _{0r}	RPM	RPM	kg
	mm	mm	mm	mm	kN	kN			
62200	10	30	14	0.6	6	2.4	29000	42000	0.04
62300	10	35	17	0.6	8.1	3.4	26000	38000	0.07
63000	10	26	12	0.3	4.6	2	33000	49000	0.03
62201	12	32	14	0.6	6.9	3.1	26000	37000	0.05
62301	12	37	17	1	9.8	4.2	23000	34000	0.08
63001	12	28	12	0.3	5.1	2.4	29000	43000	0.03
62202	15	35	14	0.6	7.8	3.8	22000	32000	0.05
62302	15	42	17	1	11.4	5.4	19000	28000	0.1
63002	15	32	13	0.3	5.6	2.8	25000	37000	0.04
62203	17	40	16	0.6	9.6	4.8	20000	30000	0.08
62303	17	47	19	1	13.5	6.6	18000	26000	0.14
63003	17	35	14	0.3	6	3.3	23000	34000	0.05
62204	20	47	18	1	12.7	6.6	18000	26000	0.12
62304	20	52	21	1.1	15.9	7.8	17000	24000	0.14
63004	20	42	16	0.6	9.4	5	20000	30000	0.09
62205	25	52	18	1	14	7.8	15000	22000	0.15
62305	25	62	24	1.1	22.5	11.6	14000	21000	0.3
63005	25	47	16	0.6	10.1	5.8	17000	25000	0.1
62206	30	62	20	1	19.5	11.2	13000	19000	0.23
62306	30	72	27	1.1	28.1	16	13000	18000	0.47
63006	30	55	19	1	13.2	8.3	15000	23000	0.15
62207	35	72	23	1.1	25.5	15.3	12000	17000	0.37
62307	35	80	31	1.5	33.2	19	12000	17000	0.62
63007	35	62	20	1	16	10.3	14000	20000	0.2
62208	40	80	23	1.1	30.7	19	10000	15000	0.44
62308	40	90	33	1.5	41	24	11000	15000	0.85
63008	40	68	21	1	16.8	11.6	12000	18000	0.24
62209	45	85	23	1.1	33.2	21.6	9200	13000	0.46
62309	45	100	36	1.5	52.7	31.5	9700	14000	1.1
62210	50	90	23	1.1	35.1	23.2	8500	12000	0.47
62310	50	110	40	2	61.8	38	9200	13000	1.5
62211	55	100	25	1.5	43.6	29	7800	11000	0.68
62311	55	120	43	2	71.5	45	8600	12000	2
62212	60	110	28	1.5	52.7	36	7500	11000	1
62312	60	130	46	2.1	81.8	51.9	8100	12000	2.5
62213	65	120	31	1.5	55.9	40.5	7200	10000	1.3
62214	70	125	31	1.5	60.5	45.5	6700	9700	1.4

MINIATURE AND EXTRA-SMALL 600 SERIES

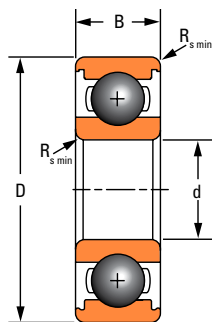


TABLE 14. MINIATURE AND EXTRA-SMALL 600 SERIES

Bearing No.	Boundary Dimensions				Load Ratings		Limiting Speed		Weight
	Bore	O.D.	Width	Radius	Dynamic	Static	Grease	Oil	
	d	D	B	R _{s min}	C _r	C _{0r}	RPM	RPM	
Description	mm	mm	mm	mm	kN	kN	RPM	RPM	kg
618/3	3	7	2	0.1	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	0.2	1.3	0.49	51000	60000	0.003
618/4	4	9	2.5	0.1	0.64	0.23	63000	75000	0.0006
619/4	4	11	4	0.15	1	0.35	57000	67000	0.0017
604	4	12	4	0.2	1	0.35	57000	67000	0.002
624	4	13	5	0.2	1.3	0.49	51000	60000	0.0027
634	4	16	5	0.3	1.3	0.52	46000	54000	0.005
618/5	5	11	3	0.15	0.72	0.28	54000	64000	0.0012
619/5	5	13	4	0.2	1.1	0.43	50000	59000	0.0021
605	5	14	5	0.2	1.3	0.51	48000	56000	0.003
625	5	16	5	0.3	1.7	0.67	44000	52000	0.004
635	5	19	6	0.3	2.3	0.89	38000	45000	0.008
618/6	6	13	3.5	0.15	1.1	0.44	48000	56000	0.0019
619/6	6	15	5	0.2	1.3	0.52	46000	54000	0.004
606	6	17	6	0.3	2.3	0.84	42000	49000	0.005
626	6	19	6	0.3	2.3	0.89	38000	45000	0.007
636	6	22	7	0.3	3.3	1.4	33000	39000	0.012
618/7	7	14	3.5	0.15	1.2	0.51	44000	52000	0.002
619/7	7	17	5	0.3	1.6	0.72	40000	47000	0.005
607	7	19	6	0.3	2.3	0.89	38000	45000	0.007
627	7	22	7	0.3	3.3	1.4	33000	39000	0.012
637	7	26	9	0.3	4.6	2	28000	33000	0.022
618/8	8	16	4	0.2	1.3	0.59	40000	47000	0.0032
619/8	8	19	6	0.3	2.2	0.91	37000	44000	0.006
608	8	22	7	0.3	3.3	1.4	33000	39000	0.011
628	8	24	8	0.3	3.3	1.4	31000	37000	0.017
638	8	28	9	0.3	4.6	2	28000	33000	0.027
618/9	9	17	4	0.2	1.3	0.66	37000	44000	0.0034
619/9	9	20	6	0.3	2.5	1.1	35000	42000	0.007
609	9	24	7	0.3	3.4	1.4	30000	36000	0.013
629	9	26	8	0.3	4.6	2	28000	33000	0.018
639	9	30	10	0.6	5.1	2.4	25000	30000	0.033

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

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