TIMKEN



TIMKEN® CORROSION-RESISTANT 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) 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® CORROSION-RESISTANT DEEP GROOVE BALL BEARINGS FOR FOOD & BEVERAGE INDUSTRY

Today's consumers are demanding safer and healthier food. This is prompting governments to enforce more stringent food safety regulations. Food and beverage manufacturers/producers need premium products that deliver the machinery uptime and food safety that they, their customers and their governments expect.

Meet these challenges head-on with Timken. Our corrosion-resistant deep groove ball bearings are an ideal fit for a variety of applications: poultry deboning machines, conveyor rolls, form-fill seal machines, filling and seaming equipment, combination weighers and labeling equipment.

Corrosion-resistant materials and food-grade lubricant can help elevate food safety and production uptime with improved reliability. These materials protect the bearing against corrosion and a variety of wet and dry contaminants.

- Rings, balls and cages are made of stainless steel and provide corrosion resistance and metal detectability.
- Food-grade optically detectable Blue FDA/EC sealed bearings come factory filled with NSF H1 registered water-resistant grease chosen for chemical and mechanical stability.
- General industrial shielded and black-sealed bearings come factory filled with a premium, water-resistant grease that maintains proper lubrication for a wide range of operating temperatures.

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 more 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.

Updates are made periodically to this catalog.
Visit **www.timken.com/catalogs** for the most recent version of the Timken® Corrosion-Resistant Ball Bearing Catalog.



SHELF LIFE AND STORAGE OF GREASE-LUBRICATED BEARINGS AND COMPONENTS

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

SHELF LIFE

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

Shelf life of the grease-lubricated bearing and 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 removing the product from its packaging, cleaning is suggested just before installation for certain food and beverage applications.
- When removing a product that is not individually packaged from a bulk pack container, the container should be resealed immediately after the product is removed.
- Do not use product that has exceeded its shelf life as defined in the Timken shelf life guidelines statement.
- The storage area temperature should be maintained between 0° C (32° F) and 40° C (104° F); temperature fluctuations should be minimized.
- The relative humidity should be maintained below 60 percent and the surfaces should be dry.
- The storage area should be kept free from airborne contaminants such as, but not limited to, dust, dirt, harmful vapors, etc.
- The storage area should be isolated from undue vibration.
- Extreme conditions of any kind should be avoided.

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

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

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

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

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

⚠ WARNING

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

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

Tensile stresses can be very high in tightly fitted bearing components. Attempting to remove such components by cutting the inner ring 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). 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 compliancy or applicability of Timken products to these or other unspecified standards, please contact your Timken sales engineer or customer services representative.

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SIZE RANGE

Deep groove ball bearings are available in a variety of sizes and are the most popular of the rolling bearings (fig. 1). 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 continues to expand its offering of corrosion-resistant deep groove ball bearings in a wide range of sizes and configurations.

Offered sizes range from 6 mm to 50 mm bore and maximum outside diameter (O.D.) of 90 mm. In addition, Timken offers deep groove ball bearings in standard, thin-section and narrow constructions in the following configurations:

- Open design
- Double shields
- Double contact seals

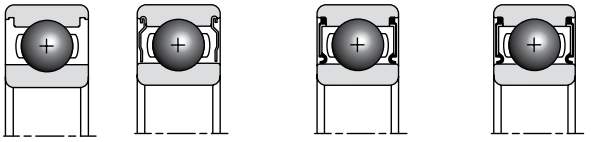


Fig. 1. Bearing configurations.

MATERIALS

Timken corrosion-resistant deep groove ball bearings have stainless steel rings, balls, cages and shields. The materials were selected for resistance to corrosion and performance. The cages and shields are made from a high-chromium austenitic stainless steel. The rings and balls are made from a high-chromium martensitic stainless steel that allows for load carrying capacity and corrosion resistance.

CAGES

Cages (also referred to as retainers) maintain uniform ball spacing in the bearing as the balls pass into and out of the load zone.

Timken corrosion-resistant deep groove ball bearings feature a two-piece riveted cage. It is made from stainless steel for superior corrosion resistance as well as metal detectability for higher food safety.

Other bearing operational characteristics impacted by cages include:

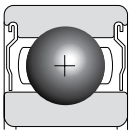
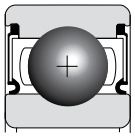
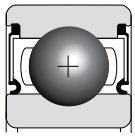
- Maximum rotational speed
- Torque characteristics
- Temperature limits
- Lubricant flow

BEARING SHIELDS AND SEALS

Bearing shields and seals help keep lubricant in and dust, water and other contaminants out. Timken corrosion-resistant deep groove ball bearings are available with double shields for coarse debris or double seals for improved protection in harsh environments. Timken seals are available in black or optically-detectable blue and use high-performance Nitrile Buna Rubber with steel cases for standard operating temperatures.

Table 1 summarizes the main characteristics of shields and seals.

TABLE 1.
CHARACTERISTICS OF SHIELDS AND SEALS

Type	Double Stainless Shields (ZZ)	Double Contact Seals (2RS)	Double Blue FDA/EC Contact Seals (2RSF)
Construction			
Material	Stainless steel, pressed steel	Black Nitrile Buna Rubber with steel case	Blue FDA/EC Nitrile Buna Rubber with steel case*
Speed Capability	High speed	Less than shielded	Less than shielded
Operating Temperature	-50° C to +120° C (-58° F to +248° F)	-40° C to +120° C (-40° F to +248° F)	-40° C to +120° C (-40° F to +248° F)
Grease Retention	Good	Excellent	Excellent
Dust Resistance	Good	Excellent	Excellent
Torque	Low	Greater than shielded	Greater than shielded

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.

*Complies with FDA guidelines for indirect food additives under 21 CFR 177.2600 'Rubber articles intended for repeated use', and meets the requirements of EC 1935/2004 'materials and articles intended to come into contact with food'.

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 it relates to material-associated fatigue.

Bearing life is defined as the length of time, or number of revolutions, until a fatigue spall of 6 mm^2 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 differences in life 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[1]. 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 1 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[1].

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.

[1] For corrosion-resistant deep groove ball bearings, a material-specific factor was considered to account for the characteristics of stainless steel that reduces the load carrying capacity.

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 (68° F).
- The tolerable bearing/housing interface temperature is 70° C (158° F).
- 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 (212° F). For this reason, a permissible temperature of 100° C (212° F) was assumed for the thermal speed rating calculation. Contact your Timken sales engineer if your application requires speeds above the published Timken 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 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 2 provides the selection of bearing internal clearances for standard deep groove ball bearings.

TABLE 2.
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

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 3 and 4 provide tolerances for deep groove ball bearing inner and outer rings respectively.

TABLE 3.
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

TABLE 4.
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

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 5 and 6 on the following pages provide the resultant fits based on standard ISO tolerances for shaft and housing.

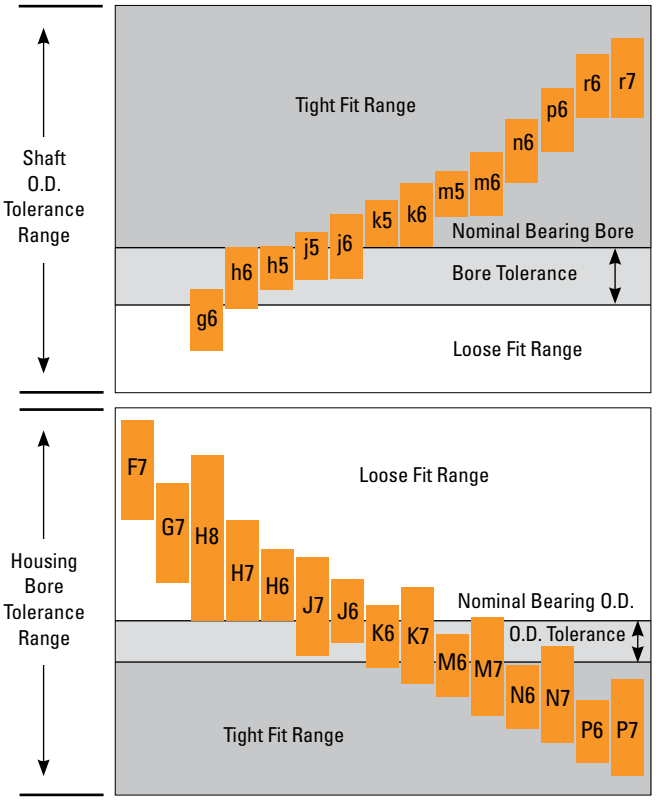


Fig. 2. Shaft and housing fit selection.

SHAFT TOLERANCES: CORROSION-RESISTANT DEEP GROOVE BALL BEARINGS

TABLE 5.
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		
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

HOUSING TOLERANCES: CORROSION-RESISTANT DEEP GROOVE BALL BEARINGS

TABLE 6.
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		
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

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		
7	1	1T 15T	10	1	1T 18T	12	6	6T 20T	15	6	6T 23T	19	10	10T 27T	24	15	15T 32T	28	19	19T 36T	34	19	19T 42T
9	1	1T 17T	12	1	1T 20T	15	7	7T 23T	18	7	7T 26T	23	12	12T 31T	29	18	18T 37T	34	23	23T 42T	41	23	23T 49T
11	2	2T 21T	15	2	2T 25T	17	8	8T 27T	21	8	8T 31T	28	15	15T 38T	35	22	22T 45T	41	28	28T 49T	49	28	28T 59T
13	2	2T 25T	18	2	2T 30T	20	9	9T 32T	25	9	9T 37T	33	17	17T 45T	42	26	26T 54T	50	34	34T 62T	59	34	34T 71T

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		
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

LUBRICATION

GREASE

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 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. Open bearings used in food and beverage applications should be cleaned prior to installation.

Timken double-sealed and double-shielded stainless steel deep groove ball bearings also are available with food-grade grease. Fuchs Cassida RLS2 was selected for its rust-, corrosion- and water-resistance. This is a synthetic-oil based, aluminum complex-thickened grease that is registered by the NSF under the H1 category and complies with the FDA's guidelines for lubricants with incidental food contacts under 21.CFR 178.3570. In addition, it is ISO 21469, Kosher and Halal certified. Fuchs Cassida RLS2 maintains proper lubrication for a wide range of operating temperatures from -35° C to 120° C (-31° F to 248° F).

As an option, Timken double-sealed and double-shielded deep groove ball bearings are factory pre-lubricated with industry-grade grease selected for a wide range of application conditions. This grease maintains proper lubrication in operating temperatures ranging from -29° C to 150° C (-20° F to 302° F) and provides protection against corrosion. With low noise properties, it 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.

SOLID LUBE

Timken® Solid Lube provides a lubricating alternative to grease in harsh environments.

Solid Lube is a micro-porous polymer structure combined with high-performance oils and additives. It completely fills the free volume in the bearing between the races, rolling elements and the cage. Thanks to its micro-porous structure, the solid lubricant can contain up to three times as much oil as a similar volume of grease.

During bearing rotation, the solid lubricant polymer releases the appropriate amount of oil to lubricate the rolling elements and raceways.

Timken Solid Lube features are:

- **Hygienic.** Its unique makeup helps prevent lube from contaminating food products. Some Solid Lube grades have NSF H1 registration.
- **Protected.** Full-fill and large-oil reservoirs help guard against washdown and ingress of contaminants for safe and reliable operation.
- **Cost-effective.** Timken Solid Lube can help reduce your operating costs and increase operational productivity.
- **Versatile.** With a wide range of Solid Lube solutions, we can match application requirements, including extreme temperatures or washdown environments.

Timken FVSL613 Solid Lube option contains an NSF H1-registered synthetic oil that complies with FDA guidelines for lubricants with incidental food contact under 21.CFR 178.3570. It maintains proper lubrication for a wide range of operating temperatures from -45° C to 93° C (-49° F to 199° F) and provides protection against corrosion.

For bearings with Solid Lube, the speed is limited by the maximum operating temperature of the Solid Lube. For deep groove ball bearing with FVSL613, the limiting speed N_{lim} is given by:

$$N_{lim}=300000/(0.5*(d+D))$$

In the equation above, d represents the bearing bore, while D represents the bearing outside diameter, both in millimeter.

Remarks:

1. Limiting speed of bearings with integral seals is 50 percent of the calculated value.
2. The limiting speed of bearings with Solid Lube is given for temperature of the bearing environment of 20° C (68° F). As a significant increase in bearing operating temperature is expected, the speed rating is reduced when bearing environment is above 20° C (68° F). For further information, please contact your Timken engineer.

Other Solid Lube options are available for applications with higher temperatures, extreme chemical harshness or for industrial applications. For further information regarding NSF-registered Solid Lube options, please contact your Timken engineer.

NOMENCLATURE

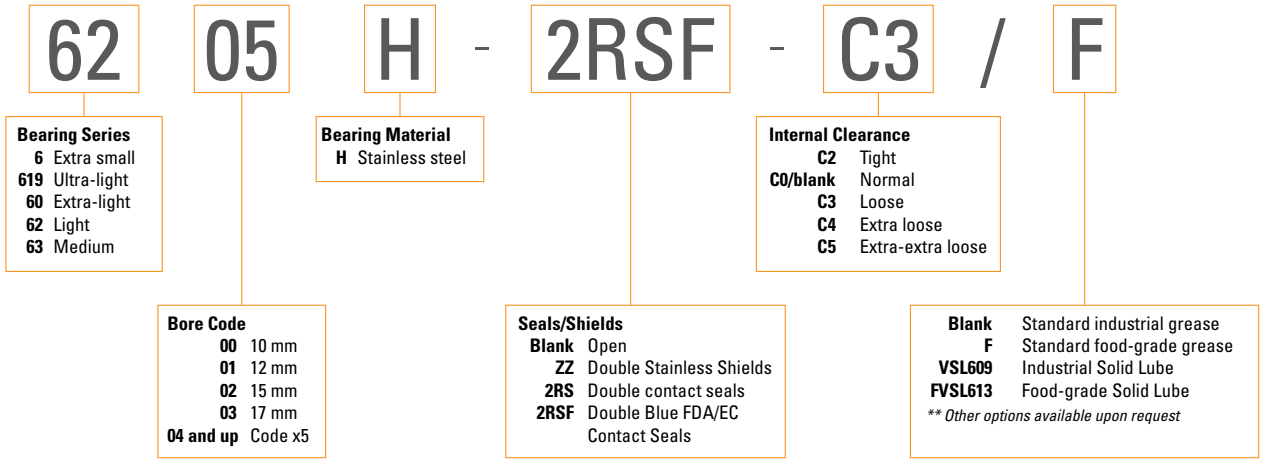


Fig. 3. Timken corrosion-resistant deep groove ball bearing nomenclature (metric).

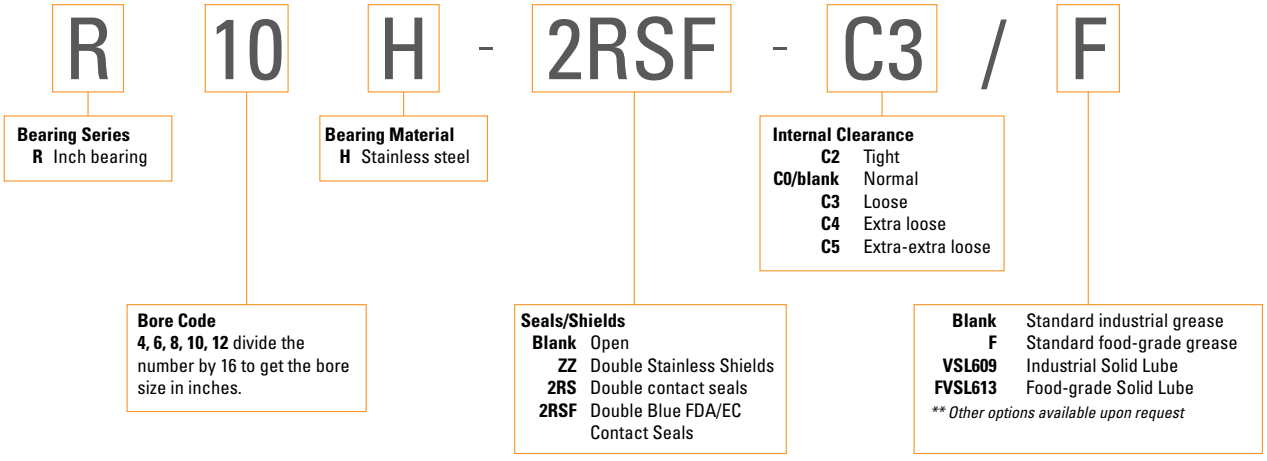
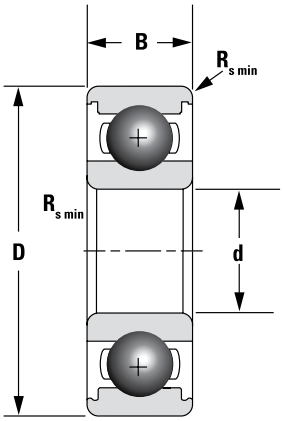
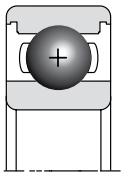


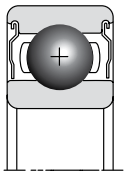
Fig. 4. Timken corrosion-resistant deep groove ball bearing nomenclature (imperial).

STANDARD 6000 SERIES

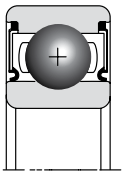




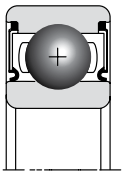
Open



Double Stainless Shields (ZZ)



Double Contact Seals (2RS)

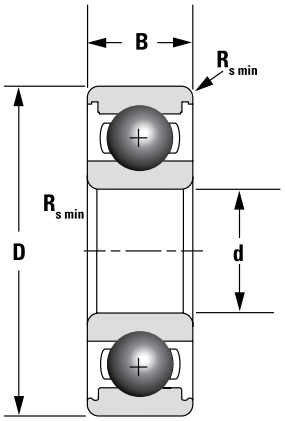


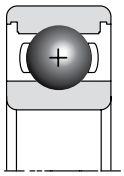
Double Blue FDA/EC Contact Seals (2RSF)

Bearing No.	Boundary Dimensions				Load Ratings		Reference Speed		Weight
Description	Bore d	O.D. D	Width B	Radius $R_{s\ min}$	Dynamic C_r	Static C_{0r}	Grease	Oil	
	mm	mm	mm	mm	kN	kN	RPM	RPM	kg
6000H	10	26	8	0.3	3.89	1.57	26000	38000	0.02
6200H	10	30	9	0.6	4.35	1.91	22000	32000	0.03
6300H	10	35	11	0.6	6.88	2.97	20000	29000	0.05
6001H	12	28	8	0.3	4.35	1.91	23000	33000	0.02
6201H	12	32	10	0.6	5.78	2.44	21000	30000	0.04
6301H	12	37	12	1	8.25	3.57	19000	27000	0.06
6002H	15	32	9	0.3	4.75	2.27	20000	30000	0.03
6202H	15	35	11	0.6	6.49	2.98	19000	28000	0.05
6302H	15	42	13	1	9.69	4.59	16000	24000	0.08
6003H	17	35	10	0.3	5.10	2.61	19000	28000	0.38
6203H	17	40	12	0.6	8.13	3.83	17000	25000	0.07
6303H	17	47	14	1	11.56	5.61	15000	22000	0.11
6004H	20	42	12	0.6	7.98	4.05	17000	25000	0.06
6204H	20	47	14	1	10.90	5.32	15000	22000	0.10
6304H	20	52	15	1.1	13.51	6.63	13000	20000	0.14
6005H	25	47	12	0.6	8.55	4.68	14000	21000	0.08
6205H	25	52	15	1	11.90	6.30	14000	20000	0.13
6305H	25	62	17	1.1	17.51	9.52	12000	17000	0.22
6006H	30	55	13	1	11.20	6.62	12000	18000	0.11
6206H	30	62	16	1	16.50	9.07	11000	16000	0.20
6306H	30	72	19	1.1	22.61	12.75	10000	15000	0.35
6007H	35	62	14	1	13.60	8.24	11000	16000	0.15
6207H	35	72	17	1.1	21.80	12.30	10000	14000	0.29
6307H	35	80	21	1.5	28.39	16.32	9300	13000	0.42
6008H	40	68	15	1	14.30	9.24	10000	15000	0.19
6208H	40	80	18	1.1	24.70	14.30	8800	13000	0.37
6009H	45	75	16	1	17.80	12.10	9200	13000	0.23
6209H	45	85	19	1.1	27.80	16.40	8200	12000	0.42
6010H	50	80	16	1	18.50	13.30	8300	12000	0.25
6210H	50	90	20	1.1	29.80	18.60	7700	11000	0.46

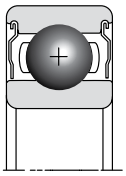
For different configurations of open, shielded and sealed bearings including food or industrial lubricants, please contact Timken sales for information and availability.

MINIATURE 600 AND THIN-SECTION 61000 SERIES

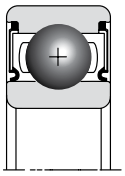




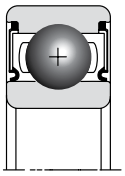
Open



Double Stainless Shields (ZZ)



Double Contact Seals (2RS)

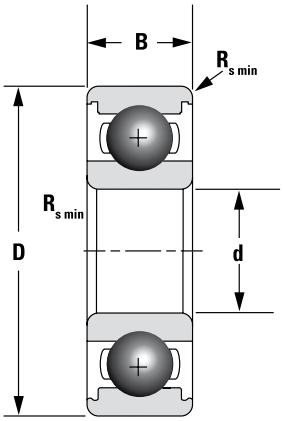


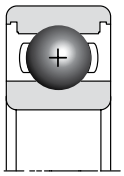
Double Blue FDA/EC Contact Seals (2RSF)

Bearing No.	Boundary Dimensions				Load Ratings		Reference Speed		Weight
Description	Bore d	O.D. D	Width B	Radius $R_{s\ min}$	Dynamic C_r	Static C_{0r}	Grease	Oil	
	mm	**mm**	**mm**	**mm**	**kN**	**kN**	RPM	RPM	**kg**
626H	**6**	**19**	**6**	**0.3**	**1.99**	**0.71**	38000	45000	**0.007**
618/8H	**8**	**16**	**4**	**0.2**	**1.07**	**0.47**	40000	47000	**0.003**
619/8H	**8**	**19**	**6**	**0.3**	**1.90**	**0.73**	37000	44000	**0.006**
608H	**8**	**22**	**7**	**0.3**	**2.80**	**1.09**	33000	39000	**0.011**
61900H	**10**	**22**	**6**	**0.3**	**2.29**	**1.02**	31000	37000	**0.009**
61901H	**12**	**24**	**6**	**0.3**	**2.46**	**1.17**	28000	33000	**0.01**
61902H	**15**	**28**	**7**	**0.3**	**3.68**	**1.80**	24000	29000	**0.015**
61903H	**17**	**30**	**7**	**0.3**	**3.90**	**2.05**	22000	26000	**0.016**
61904H	**20**	**37**	**9**	**0.3**	**5.42**	**2.95**	19000	22000	**0.033**

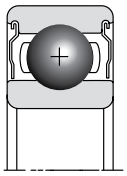
For different configurations of open, shielded and sealed bearings including food or industrial lubricants, please contact Timken sales for information and availability.

R-SERIES

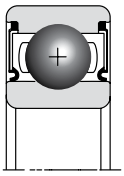




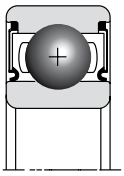
Open



Double Stainless Shields (ZZ)



Double Contact Seals (2RS)



Double Blue FDA/EC Contact Seals (2RSF)

Bearing No.	Boundary Dimensions								Load Ratings		Reference Speed		Weight
Description	Bore d		O.D. D		Width B		Radius $R_{s\ min}$		Dynamic C_r	Static C_{0r}	Grease	Oil	
	mm	in.	**mm**	in.	**mm**	in.	**mm**	in.	**kN**	**kN**	RPM	RPM	**kg**
R4H	**6.35**	0.250	**15.88**	0.625	**4.98**	0.196	**0.30**	0.01	**283.00**	**111.00**	30000	50000	**0.004**
R6H	**9.53**	0.375	**22.23**	0.875	**7.14**	0.281	**0.41**	0.02	**636.00**	**254.00**	22000	37000	**0.01**
R8H	**12.70**	0.500	**28.58**	1.125	**7.94**	0.313	**0.41**	0.02	**977.00**	**429.00**	18000	30000	**0.02**
R10H	**15.88**	0.625	**34.93**	1.375	**8.73**	0.344	**0.79**	0.03	**1146.00**	**587.00**	14000	23000	**0.03**
R12H	**19.05**	0.750	**41.28**	1.625	**11.11**	0.438	**0.79**	0.03	**1793.00**	**910.00**	12000	20000	**0.06**

For different configurations of open, shielded and sealed bearings including food or industrial lubricants, please contact Timken sales for information and availability.

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TIMKEN

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