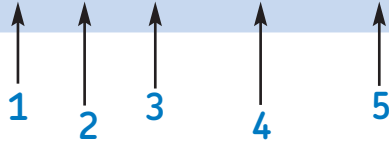




# Deep groove ball bearings

6200-2Z J/C3 HC5 GJN



## 1. Seals, shields & snap rings:

<b>RS</b>	Contact seal of synthetic rubber (NBR) on one side for bearings up to 52 mm O.D.
<b>RS1</b>	Contact seal of synthetic rubber (NBR) on one side for bearings above 52 mm O.D.
<b>RS2</b>	Contact seal of synthetic rubber (FRM) on one side for high temperature capability
<b>RSL</b>	Low friction seal of synthetic rubber (NBR) on one side for bearings up to 52 mm O.D.
<b>RZ</b>	Low friction seal of synthetic rubber (NBR) on one side for bearings above 52 mm O.D.
<b>Z</b>	Shield on one side
<b>2RSH</b>	Contact seal of synthetic rubber (NBR) on both sides for bearings up to 52 mm O.D.
<b>2RS2</b>	Contact seal of synthetic rubber (FPM) on both sides for high temperature capability
<b>2RSL</b>	Low friction seal of synthetic rubber (NBR) on both sides for bearings up to 52 mm O.D.
<b>2RZ</b>	Low friction seal of synthetic rubber (NBR) on both sides for bearings above 52 mm O.D.
<b>2Z</b>	Shields on both sides
<b>NR</b>	Snap ring groove and snap ring on outer ring

## 2. Cage designs:

<b>J</b>	Pressed steel cage, ball guided (not marked on bearings)
<b>M</b>	Machined brass cage, rolling element guided
<b>TC</b>	Phenolic cage, inner ring guided
<b>Y</b>	Pressed brass cage, ball guided
<b>TN9</b>	Cage of glass fiber reinforced polyamide 6.6, ball guided

## 3. Clearance/tolerance:

<b>C1</b>	Clearance < C2
<b>C2</b>	Clearance < Normal
<b>(C0)*</b>	Normal clearance
<b>C3</b>	Clearance > Normal
<b>C4</b>	Clearance > C3
<b>C08</b>	ABEC5 running accuracy inner and outer
<b>C78</b>	Combination of C70 and C08
<b>C70</b>	Reduced I.R. and O.R. diameter
<b>C782</b>	C78 and C2 clearance
<b>C783</b>	C78 and C3 clearance

\* Not marked on bearing or package.

Note: C3 clearance, J-steel cages and quiet running characteristics available in JEM bearings. See page 27.

## 4. Suffix:

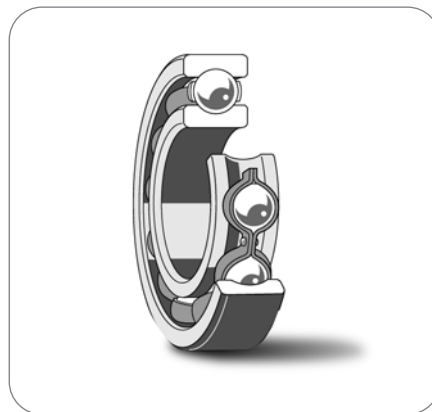
<b>HC4</b>	Full ceramic bearing
<b>HC5</b>	Ceramic ball set
<b>VA201</b>	Special specifications for kiln trucks
<b>VA208</b>	Special specifications for high temperature applications

## 5. Lubrication:

<b>GJN</b>	High temperature, long life NLGI 2 grease with urea thickener and mineral oil
<b>WT</b>	Wide temperature range, long life NLGI 2-3 grease with urea thickener and ester oil
<b>HT51</b>	High temperature NLGI 2 grease with polyurea thickener and mineral oil
<b>LHT23</b>	Long life, quiet running NLGI 2 grease with lithium thickener and ester oil
<b>MT47</b>	Medium temperature, quiet running NLGI 2 grease with lithium thickener and mineral oil
<b>MT33</b>	Medium temperature, quiet running NLGI 3 grease with lithium thickener and mineral oil
<b>LHT30</b>	Dow Corning Molykote 44 Medium
<b>LHT64</b>	Shell Aeroshell #7, MIL-G-23827
<b>W64</b>	Solid oil
<b>LT10</b>	Low temperature NLGI 2 grease with lithium thickener and diester oil

## Technical features

<b>Boundary dimensions</b>	In accordance with ISO 15-1998
<b>Tolerances</b>	Normal, ABEC 1 P6 (SKF Explorer)
<b>Running accuracy</b>	Up to 52 mm O.D. – P5, ABEC 5 52 mm to 110 mm O.D. – P6, ABEC 3 >110 mm O.D. – Normal, ABEC 1
<b>Heat stabilization</b>	257° F (125° C)
<b>Misalignment</b>	2 minutes of arc
<b>Cage material</b>	
<b>Standard</b>	Steel
<b>Optional</b>	Machined brass (M)
<b>Axial load – max</b>	0.5 x C <sub>0</sub> for 6200, 6300 and 6400 series 0.25 x C <sub>0</sub> for 61800, 61900 and 6000 series
<b>Seals</b>	2RS1 – Synthetic rubber (NBR) seals 2RS2 – Synthetic rubber (FRM) seals
<b>Shields</b>	2Z – Stamped steel



*Single row  
deep groove ball bearing  
(data tables on page 32)  
and ABEC 5  
(data tables on page 46)*



*Single row  
deep groove ball bearing  
Max type  
(data tables on page 47)*

## Introduction

Deep groove ball bearings are used in a particularly wide variety of applications. They are relatively simple in design, non-separable, capable of operating at high and even very high speeds, and require little attention or maintenance in service provided the customer selects the appropriate bearing specifications for his application. These characteristics coupled with a price advantage make deep groove ball bearings the most popular of all rolling bearings.

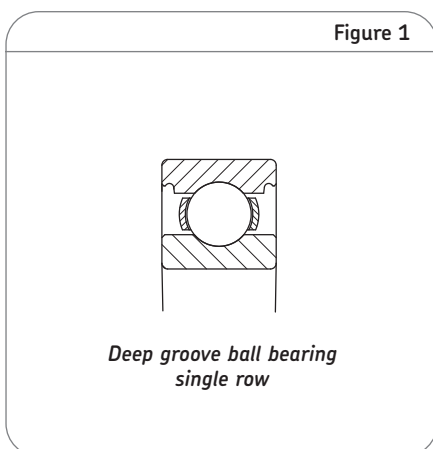
SKF produces deep groove ball bearings in a large number of designs and sizes. The most numerous are the single row bearings without filling slots (Conrad assembly). The bearings with filling slots described in the section starting on page 47 are used in special applications and consequently only a limited range is produced.

## Basic design

### Deep groove ball bearings, single row

SKF single row deep groove ball bearings have deep, uninterrupted raceways and a high degree of conformity between balls and raceways. This enables them to carry axial loads in both directions in addition to radial loads even at high speeds. Single row deep groove ball bearings are suitable for a wide variety of applications and are therefore produced in a large number of sizes and designs.

Single row deep groove ball bearings of the basic design, i.e. open at both sides, (Figure 1) are produced by SKF in several series and in a very wide range of diameters. Those bearings of the basic design which are also produced as shielded or sealed bearings may, for manufacturing reasons, have recessed outer ring shoulders to take the shields or seals.



### ABEC 5 single row bearings

SKF produces single row deep groove ball bearings in a higher precision class (ABEC 5). These products are most frequently used in high-speed applications or where precision is critical as in cutting tools, electric motors, handheld tools, and spindles. ABEC 5 bearings are produced in the 6200 and 6300 series and are available in an open version only. They can be supplied with either a brass (Y) or phenolic (TC) cage.

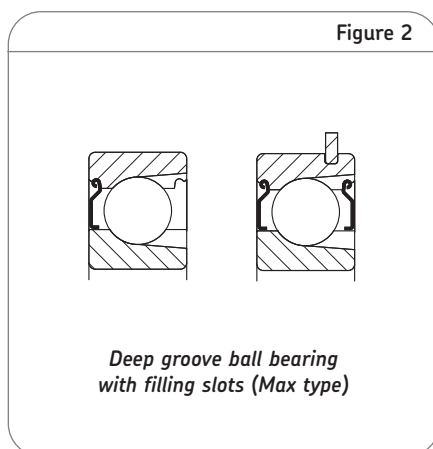
### Deep groove ball bearings with filling slots (Max type)

Single row deep groove ball bearings with filling slots incorporate a greater number of balls than the corresponding size without filling slot, and have a filling slot in both outer and inner rings. The radial load carrying capacity is higher than that of bearings without filling slot, but their axial load carrying capacity is small. They are also unable to operate at the high speeds normally associated with deep groove ball bearings.

SKF deep groove ball bearings with filling slots are available in various designs to meet market demands. The most common are described below (Figure 2) and are listed in the tables on page 47.

## SKF Explorer class bearings

High performance SKF Explorer deep groove ball bearings are **printed in blue** in the product tables. The higher performance of SKF Explorer deep groove ball bearings also includes quieter running. SKF Explorer bearings retain the designation of the earlier standard bearings. However, each bearing and its box are marked with the name "SKF Explorer". Additional details on SKF Explorer performance class bearings can be found on page 23.



## Product highlights

### Fast, quiet, robust bearings

If the application is demanding and quiet running, smoothness, strength and low heat generation are mandatory—SKF deep groove ball bearings fit the bill.

### Quiet running

High precision balls and specially designed raceway grinding equipment are used by SKF to produce some of the quietest running bearings available.

### Quality performance in demanding applications

Capable of meeting the severest demands in terms of operating speed, operating temperature, vibration, high running accuracy, low friction, and the ability to function in a contaminated environment with available seals and shields.

### Optimized internal geometry

The internal geometry has been optimized for longer life, quieter running, improved seal attachment, low friction and increased ability to accommodate slight misalignments without reducing bearing life.

### Large product assortment

Available in a wide range (2.5 to 800 mm inside bore diameter), the basic SKF design is available with a choice of shields, seals and snap rings. In addition, SKF produces max-type deep groove ball bearings with a filling slot.

### JEM bearings

In the USA, SKF offers bearings with C3 internal clearance, as the standard for quiet running characteristics packaged as JEM bearings.

### GJN grease provided as standard in JEM bearings

SKF provides GJN, a high temperature urea based grease, as the standard for all JEM deep groove ball bearings. GJN is accepted by major OEM electric motor manufacturers in the U.S. and offers a wide range of operating temperature and is quiet running.

## Introduction

## Variations

### Bearings with shields

Bearings with shields, designation suffix Z or ZZ, are produced in one of two designs, depending on the bearing series and size (**Figure 3**). The shields are made of sheet steel and normally have a cylindrical extension in the shield bore to form a long sealing gap with the inner ring shoulder.

Shielded bearings are primarily intended for applications where the inner ring rotates. If the outer ring rotates, there is a risk that the grease will leak from the bearing at high speeds.

### Bearings with low friction seals

SKF deep groove ball bearings with low-friction seals, designation suffixes RSL, 2RSL or RZ, 2RZ are manufactured in two designs depending on bearing series and size (**Figure 4**).

- Bearings in the 60, 62 and 63 series up to 52 mm outside diameter are equipped with RSL seals to design **(a)**.
- Other bearings have RZ seals **(b)**.

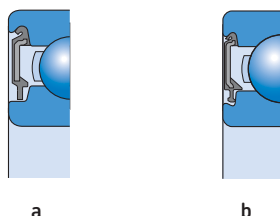
The seals form an extremely narrow gap with the cylindrical surface of the inner ring shoulder or recess profile and are practically non-contracting. Because of this, bearings fitted with low-friction seals can be operated at the same high speeds as bearings with Z shields, but with improved seal performance.

The low-friction seals are made of oil and wear-resistant acrylonitrile butadiene rubber (NBR) with a sheet steel reinforcement. The permissible operating temperature range for these seals is  $-40^{\circ}$  to  $+212^{\circ}$  F ( $-40^{\circ}$  to  $+100^{\circ}$  C) and up to  $+250^{\circ}$  F ( $+120^{\circ}$  C) for brief periods.

Figure 3



Figure 4



### Bearings with contact seals

Bearings with contact seals, designation suffixes RSH, 2RSH or RS1, 2RS1 are manufactured in three designs depending on bearing series and size (**Figure 5**).

- Bearings in the 60, 62 and 63 series up to 52 mm outside diameter are equipped with RSH seals to design **(a)**.
- Other bearings have RS1 seals, which seal against the cylindrical surface of the inner ring shoulder **(b)** indicated by dimension  $d_1$  in the product table or against a recess in the inner ring side face **(c)** indicated by dimension  $d_2$  in the product table.

The seals are inserted in recesses in the outer ring and provide good sealing at this position without deforming the outer ring. Standard seals are made of acrylonitrile butadiene rubber (NBR) with a sheet steel reinforcement. The permissible operating temperature range for these seals is  $-40^{\circ}$  to  $212^{\circ}$  F ( $-40^{\circ}$  to  $+100^{\circ}$  C) and up to  $+250^{\circ}$  F ( $+120^{\circ}$  C) for brief periods.

When sealed bearings are operated under extreme conditions, e.g. very high speeds or high temperatures, grease leakage may occur at the inner ring. For bearing arrangements where this would be detrimental, special design steps must be undertaken, please consult the SKF application engineering service.

### Bearings with snap ring groove

Deep groove ball bearings with a snap ring groove can simplify arrangement design as the bearings can be axially located in the housing by a snap (or retaining) ring (**Figure 6**). This saves space. Appropriate snap rings are shown in the product table with designation and dimensions and may be supplied separately or already mounted on the bearing.

Figure 5

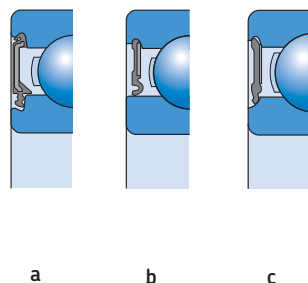
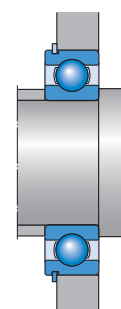


Figure 6



### Warning!

#### Safety precautions for fluoro rubber

Fluoro rubber is very stable and harmless in normal operating conditions up to  $+392^{\circ}$  F ( $+200^{\circ}$  C). However, if exposed to extreme temperatures above  $+572^{\circ}$  F ( $+300^{\circ}$  C), e.g. fire or the flame of a cutting torch, fluoro rubber seals give off hazardous fumes. These fumes can be harmful if inhaled, as well as to the eyes. In addition, once the seals have been heated to such temperatures, they are dangerous to handle even after they have cooled and should not touch the skin. If it is necessary to handle bearings with seals that have been subjected to high temperatures, such as when dismantling the bearing, the following safety precautions should be observed:

- Always wear protective goggles, gloves and appropriate breathing apparatus,
- Place the remains of the seals in an airtight plastic container marked with a symbol for "material will etch",
- Follow the safety precautions in the appropriate material safety data sheet (MSDS).

If there is unintentional contact with the seals, wash hands with soap and plenty of water and flush eyes with plenty of water and consult a doctor immediately. If the fumes have been inhaled, consult a doctor immediately.

The user is responsible for the correct use of the product during its service life and its proper disposal. SKF takes no responsibility for the improper handling of fluoro rubber seals or for any injury resulting from their use.

## Lubrication

Bearings with shields or seals at both sides are supplied as standard filled with a grease which has good rust inhibiting properties and which is suitable for operating temperatures between -22° and +230° F (-30° to +110° C). The bearings are lubricated for life and are maintenance free. **They should on no account be heated to temperatures above 250° F (120° C), nor should they be washed.** By special order, bearings with shields or seals can be supplied with other greases, e.g. for a temperature range of -40° to +300° F (-40° to +150° C).

The quantity of grease supplied is appropriate to the size of the bearing and normally fills between 25 and 35% of the free space in the bearing. Open bearings are supplied with a rust preservative that is compatible with most standard greases and **should not** be removed prior to mounting or lubricating.

## Masses

The masses given in the tables are for the basic design of the bearing. The mass of bearings with shield(s), seal(s) or snap ring groove differs only slightly from that of the basic bearing.

## Internal clearance

### Radial internal clearance (Table 1)

SKF single row deep groove ball bearings are produced with Normal radial internal clearance (CN or CO not marked on bearing) as standard. Radial clearance selection is based on factors such as high speed, operating temperature, shaft fits and axial movement limitations. The availability of bearings with clearances other than Normal should be checked before ordering. The suffix JEM indicates an internal clearance greater than Normal (C3). Many of the bearings, particularly the smaller sizes, are also available with radial internal clearance, which is greater than (C3) or less than (C2) Normal.

The values of the clearance limits for single row deep groove ball bearings are shown in **Table 1** and the values of the clearance limits for max type ball bearings are shown in **Table 3** on page 30. Both conform to ISO 5753-1991 (ABMA standard 20-1996) for the size range covered by this standard. The values apply to unmounted bearings under zero measuring load.

Table 1

Bore diameter d		Radial internal clearance																			
		C2				Normal				C3				C4				C5			
over	incl.	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
mm		µm	in	µm	in	µm	in	µm	in	µm	in	µm	in	µm	in	µm	in	µm	in	µm	in
2.5	10	0	7	0.0000	0.0003	2	13	0.0001	0.0005	8	23	0.0003	0.0009	14	29	0.0006	0.0011	20	37	0.0008	0.0015
10	18	0	9	0.0000	0.0004	3	18	0.0001	0.0007	11	25	0.0004	0.0010	18	33	0.0007	0.0013	25	45	0.0010	0.0018
18	24	0	10	0.0000	0.0004	5	20	0.0002	0.0008	13	28	0.0005	0.0011	20	36	0.0008	0.0014	28	48	0.0011	0.0019
24	30	1	11	0.0000	0.0004	5	20	0.0002	0.0008	13	28	0.0005	0.0011	23	41	0.0009	0.0016	30	53	0.0012	0.0021
30	40	1	11	0.0000	0.0004	6	20	0.0002	0.0008	15	33	0.0006	0.0013	28	46	0.0011	0.0018	40	64	0.0016	0.0025
40	50	1	11	0.0000	0.0004	6	23	0.0002	0.0009	18	36	0.0007	0.0014	30	51	0.0012	0.0020	45	73	0.0018	0.0029
50	65	1	15	0.0000	0.0006	8	28	0.0003	0.0011	23	43	0.0009	0.0017	38	61	0.0015	0.0024	55	90	0.0022	0.0035
65	80	1	15	0.0000	0.0006	10	30	0.0004	0.0012	25	51	0.0010	0.0020	46	71	0.0018	0.0028	65	105	0.0026	0.0041
80	100	1	18	0.0000	0.0007	12	36	0.0005	0.0014	30	58	0.0012	0.0023	53	84	0.0021	0.0033	75	120	0.0030	0.0047
100	120	2	20	0.0001	0.0008	15	41	0.0006	0.0016	36	66	0.0014	0.0026	61	97	0.0024	0.0038	90	140	0.0035	0.0055
120	140	2	23	0.0001	0.0009	18	48	0.0007	0.0019	41	81	0.0016	0.0032	71	114	0.0028	0.0045	105	160	0.0041	0.0063
140	160	2	23	0.0001	0.0009	18	53	0.0007	0.0021	46	91	0.0018	0.0036	81	130	0.0032	0.0051	120	180	0.0047	0.0071
160	180	2	25	0.0001	0.0010	20	61	0.0008	0.0024	53	102	0.0021	0.0040	91	147	0.0036	0.0058	135	200	0.0053	0.0079
180	200	2	30	0.0001	0.0012	25	71	0.0010	0.0028	63	117	0.0025	0.0046	107	163	0.0042	0.0064	150	230	0.0059	0.0091
200	225	4	32	0.0002	0.0013	28	82	0.0011	0.0032	73	132	0.0029	0.0052	120	187	0.0047	0.0074	175	255	0.0069	0.0100
225	250	4	36	0.0002	0.0014	31	92	0.0012	0.0036	87	152	0.0034	0.0060	140	217	0.0055	0.0085	205	290	0.0081	0.0114
250	280	4	39	0.0002	0.0015	36	97	0.0014	0.0038	97	162	0.0038	0.0064	152	237	0.0060	0.0093	255	320	0.0100	0.0126
280	315	8	45	0.0003	0.0018	42	110	0.0017	0.0043	110	180	0.0043	0.0071	175	260	0.0069	0.0102	260	360	0.0102	0.0142
315	355	8	50	0.0003	0.0020	50	120	0.0020	0.0047	120	200	0.0047	0.0079	200	290	0.0079	0.0114	290	405	0.0114	0.0159
355	400	8	60	0.0003	0.0024	60	140	0.0024	0.0055	140	230	0.0055	0.0091	230	330	0.0091	0.0130	330	460	0.0130	0.0181
400	450	10	70	0.0004	0.0028	70	160	0.0028	0.0063	160	260	0.0063	0.0102	260	370	0.0102	0.0146	370	520	0.0146	0.0205
450	500	10	80	0.0004	0.0031	80	180	0.0031	0.0071	180	290	0.0071	0.0114	290	410	0.0114	0.0161	410	570	0.0161	0.0224
500	560	20	90	0.0008	0.0035	90	200	0.0035	0.0079	200	320	0.0079	0.0126	320	460	0.0126	0.0181	460	630	0.0181	0.0248
560	630	20	100	0.0008	0.0039	100	220	0.0039	0.0087	220	350	0.0087	0.0138	350	510	0.0138	0.0201	510	700	0.0201	0.0276
630	710	30	120	0.0012	0.0047	120	250	0.0047	0.0098	250	390	0.0098	0.0154	390	560	0.0154	0.0220	560	780	0.0220	0.0307
710	800	30	130	0.0012	0.0051	130	280	0.0051	0.0110	280	440	0.0110	0.0173	440	620	0.0173	0.0244	620	860	0.0244	0.0339
800	900	30	150	0.0012	0.0059	150	310	0.0059	0.0122	310	490	0.0122	0.0193	490	690	0.0193	0.0272	690	960	0.0272	0.0378
900	1 000	40	160	0.0016	0.0063	160	340	0.0063	0.0134	340	540	0.0134	0.0213	540	760	0.0213	0.0299	760	1040	0.0299	0.0409
1 000	1 120	40	170	0.0016	0.0067	170	370	0.0067	0.0146	370	590	0.0146	0.0232	590	840	0.0232	0.0331	840	1120	0.0331	0.0441

## Introduction

### Loads

#### Equivalent dynamic bearing load for single bearings, Conrad type

$$P = F_r \text{ when } F_a / F_r \leq e$$

$$P = XF_r + YF_a \text{ when } F_a / F_r > e$$

where

$P$  = equivalent dynamic bearing load  
 $F_r$  = radial load acting on the bearing  
 $F_a$  = axial load acting on the bearing  
 $X, Y$  and  $e$  = factors from **Table 2**

The  $X$  and  $Y$  factors required for the calculation of the equivalent bearing load of deep groove ball bearings are dependent on the ratio of the axial load  $F_a$  to the basic static load rating  $C_0$ . They are also influenced by the magnitude of the radial internal clearance; increased clearance enables heavier axial loads to be carried.

If the bearings are mounted with the usual fits (tolerance j5 to n6 depending on shaft diameter, and J7 for the housing) the values of  $e, X$  and  $Y$  given in **Table 2** can be used to calculate the equivalent load. If a clearance greater than Normal is chosen because a reduction in clearance will be obtained in operation, for example, as a result of strong heating of the inner ring, then the values of the factors under Normal clearance should be used.

#### Equivalent dynamic bearing load for single row deep groove ball bearings with filling slots

$$P = F_r + F_a$$

provided  $F_a / F_r \leq 0.6$

Bearings with filling slots are unsuitable for axial loads  $F_a$  greater than  $0.6 F_r$  and deep groove ball bearings without filling slot should be used instead.

### Minimum load

**In order to provide satisfactory operation of all ball and roller bearings they must always be subjected to a given minimum load.**

This is also true of deep groove ball bearings, particularly if they run at high speeds where the inertia forces of the balls and cage, and the friction in the lubricant can have a detrimental influence on the rolling conditions in the bearing and may cause damaging sliding movements to occur between the balls and the raceways.

The requisite minimum radial load to be applied in such cases can be determined by using the Interactive Engineering Catalog on the SKF website [www.skf.com](http://www.skf.com) or by contacting SKF Applications Engineering.

However, the weight of the components supported by the bearing, together with the external forces, often exceeds the requisite minimum load. If this is not the case, an additional radial load **must** be applied to the bearing; for example, by increasing belt tension, by applying a preload to the inner or outer rings, or by using springs.

### Frequency vibration data

Frequency vibration data is available on the SKF website [www.skf.com](http://www.skf.com) in the Interactive Engineering Catalog or by contacting SKF Applications Engineering.

### Special solutions using deep groove ball bearings

- Bearings with inch boundary dimensions
- High temperature (kiln truck) bearings for extreme temperatures
- Stainless steel bearings for water/moist environments
- INSOCCOAT for electrically insulating a bearing from stray current
- Bearings with ceramic balls for extreme speed or electrical insulation
- Double row deep groove (4200 series) for increased load

Details on these special solution products are available in other SKF publications, which can be supplied upon request.

Table 2

#### Calculation factors for single row deep groove ball bearings

Single bearings and bearing pairs in tandem

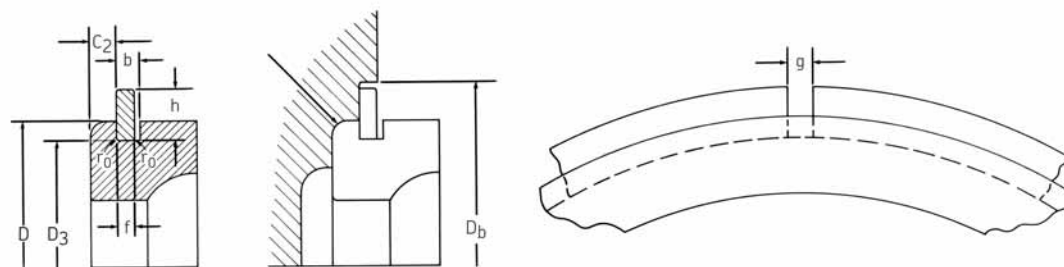
$F_a/C_0$	Normal clearance			C3 clearance			C4 clearance		
	$e$	$X$	$Y$	$e$	$X$	$Y$	$e$	$X$	$Y$
<b>0.025</b>	0.22	0.56	2.0	0.31	0.46	1.75	0.4	0.44	1.42
<b>0.04</b>	0.24	0.56	1.8	0.33	0.46	1.62	0.42	0.44	1.36
<b>0.07</b>	0.27	0.56	1.6	0.36	0.46	1.46	0.44	0.44	1.27
<b>0.13</b>	0.31	0.56	1.4	0.41	0.46	1.30	0.48	0.44	1.16
<b>0.25</b>	0.37	0.56	1.2	0.46	0.46	1.14	0.53	0.44	1.05
<b>0.5</b>	0.44	0.56	1.0	0.54	0.46	1.00	0.56	0.44	1.00

Table 3

#### Radial internal clearance of deep groove ball bearings with filling slots

Bore diameter		Radial internal clearance											
$d$	over incl.	C2				Normal				C3			
		min	max	min	max	min	max	min	max	min	max		
mm		$\mu\text{m}$	in	$\mu\text{m}$	in	$\mu\text{m}$	in	$\mu\text{m}$	in	$\mu\text{m}$	in	$\mu\text{m}$	in
<b>18</b>	<b>24</b>	0	10	0.0000	0.0004	5	20	0.0002	0.0008	13	28	0.0005	0.0011
<b>24</b>	<b>30</b>	1	11	0.0000	0.0004	5	20	0.0002	0.0008	13	28	0.0005	0.0011
<b>30</b>	<b>40</b>	1	11	0.0000	0.0004	6	20	0.0002	0.0008	15	33	0.0006	0.0013
<b>40</b>	<b>50</b>	1	11	0.0000	0.0004	6	23	0.0002	0.0009	18	36	0.0007	0.0014
<b>50</b>	<b>65</b>	1	15	0.0000	0.0006	8	28	0.0003	0.0011	23	43	0.0009	0.0017
<b>65</b>	<b>80</b>	1	15	0.0000	0.0006	10	30	0.0004	0.0012	25	51	0.0010	0.0020
<b>80</b>	<b>100</b>	1	18	0.0000	0.0007	12	36	0.0005	0.0014	30	58	0.0012	0.0023





Snap ring and snap ring groove dimensions

Table 4

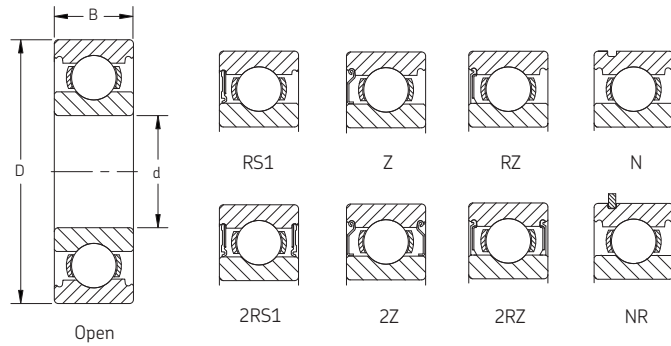
## Snap ring and groove dimensions - ball bearings

Outer ring O.D.		Groove dia. max.		Groove location max.		Groove width min.		Fillet radius max.		Ring thickness max.		Ring section height max.		Ring gap		End cover	
D		D <sub>3</sub>		C <sub>2</sub>		b		r <sub>0</sub>		f		h		g		D <sub>b</sub>	
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
40	1.5748	38.10	1.500	2.06	0.081	1.35	0.053	0.4	0.016	1.12	0.044	3.25	0.128	3	0.12	45	1.8
47	1.8504	44.60	1.756	2.46	0.097	1.35	0.053	0.4	0.016	1.12	0.044	4.04	0.159	4	0.15	53	2.1
52	2.0472	49.73	1.958	2.46	0.097	1.35	0.053	0.4	0.016	1.12	0.044	4.04	0.159	4	0.15	58	2.3
62	2.4409	59.61	2.347	3.28	0.129	1.90	0.075	0.6	0.024	1.70	0.067	4.04	0.159	4	0.15	68	2.7
72	2.8346	68.81	2.709	3.28	0.129	1.90	0.075	0.6	0.024	1.70	0.067	4.85	0.191	5	0.19	80	3.1
80	3.1496	76.81	3.024	3.28	0.129	1.90	0.075	0.6	0.024	1.70	0.067	4.85	0.191	5	0.19	88	3.5
85	3.3464	81.81	3.221	3.28	0.129	1.90	0.075	0.6	0.024	1.70	0.067	4.85	0.191	5	0.19	93	3.7
90	3.5400	86.79	3.417	3.28	0.129	2.70	0.106	0.6	0.024	2.46	0.097	4.85	0.191	5	0.19	98	3.9
100	3.9370	96.80	3.811	3.28	0.129	2.70	0.106	0.6	0.024	2.46	0.097	4.85	0.191	5	0.19	108	4.3
110	4.3307	106.81	4.205	3.28	0.129	2.70	0.106	0.6	0.024	2.46	0.097	4.85	0.191	5	0.19	118	4.6
120	4.7244	115.21	4.536	4.06	0.160	3.10	0.122	0.6	0.024	2.82	0.111	7.21	0.284	7	0.28	131	5.2
125	4.9210	120.22	4.733	4.06	0.160	3.10	0.122	0.6	0.024	2.82	0.111	7.21	0.284	7	0.28	136	5.4
130	5.1181	125.22	4.930	4.06	0.160	3.10	0.122	0.6	0.024	2.82	0.111	7.21	0.284	7	0.28	141	5.6
140	5.5118	135.23	5.324	4.90	0.193	3.10	0.122	0.6	0.024	2.82	0.111	7.21	0.284	7	0.28	151	5.9
150	5.9055	145.24	5.718	4.90	0.193	3.10	0.122	0.6	0.024	2.82	0.111	7.21	0.284	7	0.28	161	6.3
160	6.2992	155.22	6.111	4.90	0.193	3.10	0.122	0.6	0.024	2.82	0.111	7.21	0.284	7	0.28	171	6.7
170	6.6929	163.65	6.443	5.69	0.224	3.50	0.138	0.6	0.024	3.10	0.122	9.60	0.378	10	0.39	184	7.2
180	7.0866	173.66	6.837	5.69	0.224	3.50	0.138	0.6	0.024	3.10	0.122	9.60	0.378	10	0.39	194	7.6
190	7.4803	183.64	7.230	5.69	0.224	3.50	0.138	0.6	0.024	3.10	0.122	9.60	0.378	10	0.39	204	8.0
200	7.8740	193.65	7.624	5.69	0.224	3.50	0.138	0.6	0.024	3.10	0.122	9.60	0.378	10	0.39	214	8.4

Note: Does not include 6000 series bearings

# Deep groove ball bearings

Single row  
 Conrad  
 Open, sealed, shielded and snap ring  
 Standard and **SKF Explorer**  
 Series: 607 — 6026  
 Size: 7 mm — 130 mm  
 0.2756 in — 5.1181 in



Designation	Principal dimensions						Basic load ratings				Speed rating <sup>1</sup>			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Sealed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf			Limiting speed r/min		
607	7	0.2756	19	0.7480	6	0.2362	2 340	530	950	210	85 000	53 000	24 000	0.01	0.02
608	8	0.3150	22	0.8661	7	0.2756	3 450	780	1 370	310	75 000	48 000	22 000	0.01	0.03
609	9	0.3543	24	0.9449	7	0.2756	3 900	880	1 660	370	70 000	43 000	19 000	0.01	0.03
6000	10	0.3937	26	1.0236	8	0.3150	4 750	1 070	1 960	440	67 000	40 000	19 000	0.02	0.04
6001	12	0.4724	28	1.1024	8	0.3150	5 400	1 210	2 360	530	60 000	38 000	17 000	0.02	0.05
6002	15	0.5906	32	1.2598	9	0.3543	5 850	1 320	2 850	640	50 000	32 000	14 000	0.03	0.07
6003	17	0.6693	35	1.3780	10	0.3937	6 370	1 430	3 250	730	45 000	28 000	13 000	0.04	0.09
6004	20	0.7874	42	1.6535	12	0.4724	9 950	2 240	5 000	1 120	38 000	24 000	11 000	0.07	0.15
6005	25	0.9843	47	1.8504	12	0.4724	11 900	2 680	6 550	1 470	32 000	20 000	9 500	0.08	0.18
6006	30	1.1811	55	2.1654	13	0.5118	13 800	3 100	8 300	1 870	28 000	17 000	8 000	0.12	0.26
6007	35	1.3780	62	2.4409	14	0.5512	16 800	3 780	10 200	2 290	24 000	15 000	7 000	0.16	0.35
6008	40	1.5748	68	2.6772	15	0.5906	17 800	4 000	11 600	2 610	22 000	14 000	6 300	0.19	0.42
6009	45	1.7717	75	2.9528	16	0.6299	22 100	4 970	14 600	3 280	20 000	12 000	5 600	0.25	0.55
6010	50	1.9685	80	3.1496	16	0.6299	22 900	5 150	16 000	3 600	18 000	11 000	5 000	0.26	0.57
6011	55	2.1654	90	3.5433	18	0.7087	29 600	6 650	21 200	4 770	16 000	10 000	4 500	0.39	0.86
6012	60	2.3622	95	3.7402	18	0.7087	30 700	6 900	23 200	5 220	15 000	9 500	4 300	0.42	0.93
6013	65	2.5591	100	3.9370	18	0.7087	31 900	7 170	25 000	5 620	14 000	9 000	4 000	0.44	0.97
6014	70	2.7559	110	4.3307	20	0.7874	39 700	8 920	31 000	6 970	13 000	8 000	3 600	0.60	1.32
6015	75	2.9528	115	4.5276	20	0.7874	41 600	9 350	33 500	7 530	12 000	7 500	3 400	0.64	1.41
6016	80	3.1496	125	4.9213	22	0.8661	49 400	11 110	40 000	8 990	11 000	7 000	3 200	0.85	1.87
6017	85	3.3465	130	5.1181	22	0.8661	52 000	11 690	43 000	9 670	11 000	6 700	3 000	0.89	1.96
6018	90	3.5433	140	5.5118	24	0.9449	60 500	13 600	50 000	11 240	10 000	6 300	2 800	1.15	2.54
6019	95	3.7402	145	5.7087	24	0.9449	63 700	14 320	54 000	12 140	9 500	6 000	2 800	1.20	2.65
6020	100	3.9370	150	5.9055	24	0.9449	63 700	14 320	54 000	12 140	9 500	5 600	2 600	1.25	2.76
6021	105	4.1339	160	6.2992	26	1.0236	76 100	17 110	65 500	14 720	8 500	5 300	2 400	1.60	3.53
6022	110	4.3307	170	6.6929	28	1.1024	85 200	19 200	73 500	16 520	8 000	5 000	2 400	1.95	4.30
6024	120	4.7244	180	7.0866	28	1.1024	88 400	19 900	80 000	17 980	7 500	4 800	3 400	2.05	4.52
6026	130	5.1181	200	7.8740	33	1.2992	112 000	25 200	100 000	22 500	7 000	4 300	2 000	3.15	6.9

<sup>1</sup> For shielded limiting speed ratings, contact SKF Applications Engineering.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Single row

Conrad

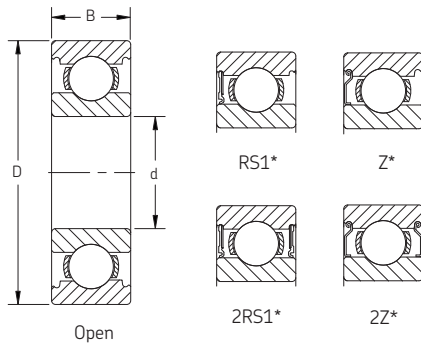
Open, sealed, shielded and snap ring

Standard

Series: 6028 — 60/800 N1MAS

Size: 140 mm — 800 mm

5.5118 in — 31.4960 in



Designation	Principal dimensions						Basic load ratings				Speed rating <sup>1</sup>			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Sealed				
	mm	in	mm	in	mm	in	N	lbf	N	lbf	Reference speed r/min	Limiting speed r/min	Limiting speed r/min	kg	lb
6028	140	5.5118	210	8.2677	33	1.2992	111 000	25 000	108 000	24 300	6 700	4 000	1 800	3.35	7.40
6030	150	5.9055	225	8.8583	35	1.3780	125 000	28 100	125 000	28 100	6 000	3 800	1 700	4.80	10.60
6032	160	6.2992	240	9.4488	38	1.4961	143 000	32 200	143 000	32 200	5 600	3 600	1 600	5.90	13.00
6034 M	170	6.6929	260	10.2362	42	1.6535	168 000	37 800	173 000	38 900	5 300	4 300	—	7.90	17.42
6036 M	180	7.0866	280	11.0236	46	1.8110	190 000	42 800	200 000	45 000	4 800	4 000	—	10.50	23.10
6038 M	190	7.4803	290	11.4173	46	1.8110	195 000	43 900	216 000	48 600	4 800	3 800	—	11.00	24.25
6040 M	200	7.8740	310	12.2047	51	2.0079	216 000	48 600	245 000	55 100	4 300	3 600	—	14.00	30.90
6044 M	220	8.6614	340	13.3858	56	2.2047	247 000	55 600	290 000	65 200	4 000	3 200	—	18.50	40.80
6048 M	240	9.4488	360	14.1732	56	2.2047	255 000	57 400	315 000	70 900	3 600	3 000	—	19.50	43.00
6052 M	260	10.2362	400	15.7480	65	2.5591	291 000	65 500	375 000	84 300	3 200	2 800	—	29.50	65.00
6056 M	280	11.0236	420	16.5354	65	2.5591	302 000	67 900	405 000	91 100	3 000	2 600	—	31.00	68.30
6060 M	300	11.8110	460	18.1102	74	2.9134	358 000	80 500	500 000	112 400	2 800	2 400	—	44.00	97.00
6064 M	320	12.5984	480	18.8976	74	2.9134	371 000	83 500	540 000	121 400	2 600	2 200	—	46.00	101.40
6068 M	340	13.3858	520	20.4724	82	3.2283	423 000	95 100	640 000	143 900	2 400	2 200	—	62.00	136.70
6072 M	360	14.1732	540	21.2598	82	3.2283	462 000	103 900	735 000	165 300	2 400	1 900	—	64.50	142.20
6076 M	380	14.9606	560	22.0472	82	3.2283	462 000	103 900	750 000	168 600	2 200	1 800	—	67.50	148.80
6080 M	400	15.7480	600	23.6220	90	3.5433	520 000	116 900	865 000	194 500	2 000	1 700	—	87.50	192.90
6084 M	420	16.5354	620	24.4094	90	3.5433	507 000	114 000	880 000	197 900	2 000	1 600	—	91.50	201.70
6088 M	440	17.3228	650	25.5906	94	3.7008	553 000	124 400	965 000	217 000	1 900	1 500	—	105.00	230.00
6092 MB	460	18.1102	680	26.7717	100	3.9370	582 000	130 900	1 060 000	238 300	1 800	1 500	—	120.00	260.00
6096 MB	480	18.8976	700	27.5591	100	3.9370	618 000	139 000	1 140 000	256 300	1 700	1 400	—	125.00	280.00
60/500 N1MAS	500	19.6850	720	28.3465	100	3.9370	605 000	136 100	1 140 000	256 300	1 600	1 300	—	135.00	300.00
60/560 N1MAS	560	22.0472	820	32.2835	115	4.5276	663 000	149 100	1 470 000	330 500	1 400	1 200	—	210.00	460.00
60/630 N1MBS	630	24.8031	920	36.2205	128	5.0394	819 000	184 200	1 760 000	395 700	1 200	1 000	—	285.00	630.00
60/670 N1MAS	670	26.3780	980	38.5827	136	5.3543	904 000	203 300	2 040 000	458 600	1 100	900	—	345.00	760.00
60/800 N1MAS	800	31.4960	1150	45.2755	155	6.1024	1 010 000	227 100	2 550 000	573 300	900	750	—	535.00	1180.00

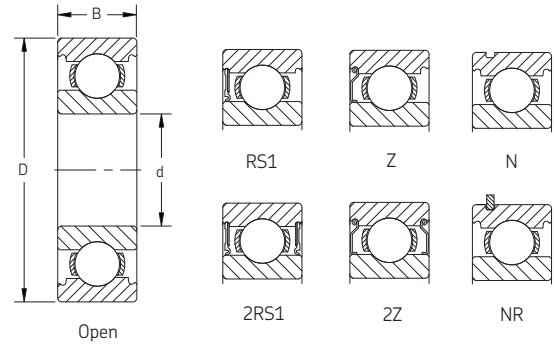
\* Feature may not be available in all sizes.

<sup>1</sup> For shielded limiting speed ratings, contact SKF Applications Engineering.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
Consult SKF USA Inc. prior to design change or order placement.

# Deep groove ball bearings

Single row  
 Conrad  
 Open, sealed, shielded and snap ring  
 Standard and **SKF Explorer**  
 Series: 623 — 6224  
 Size: 3 mm — 120 mm  
 0.1181 in — 4.7244 in

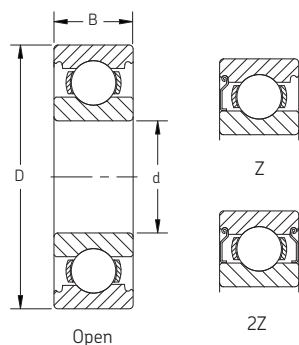


Designation	Principal dimensions						Basic load ratings				Speed rating <sup>1</sup>			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Limiting speed r/min	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf					
623	3	0.1181	10	0.3937	4	0.1575	540	120	180	40	130 000	80 000	40 000	0.01	0.01
624	4	0.1575	13	0.5118	5	0.1969	936	210	290	70	110 000	67 000	—	0.01	0.01
625	5	0.1969	16	0.6299	5	0.1969	1 140	260	380	90	95 000	60 000	—	0.01	0.02
626	6	0.2362	19	0.7480	6	0.2362	2 340	530	950	210	80 000	50 000	24 000	0.01	0.02
627	7	0.2756	22	0.8661	7	0.2756	3 450	780	1 370	310	70 000	45 000	22 000	0.01	0.03
629	9	0.3543	26	1.0236	8	0.3150	4 750	1 070	1 960	440	60 000	38 000	19 000	0.02	0.05
6200	10	0.3937	30	1.1811	9	0.3543	5 400	1 220	2 360	530	56 000	34 000	17 000	0.03	0.08
6201	12	0.4724	32	1.2598	10	0.3937	7 280	1 700	3 100	700	50 000	32 000	15 000	0.04	0.09
6202	15	0.5906	35	1.3780	11	0.4331	8 060	1 800	3 750	840	43 000	28 000	13 000	0.05	0.10
6203	17	0.6693	40	1.5748	12	0.4724	9 950	2 200	4 750	1 100	38 000	24 000	12 000	0.07	0.15
6204	20	0.7874	47	1.8504	14	0.5512	13 500	3 000	6 550	1 500	32 000	20 000	10 000	0.11	0.20
6205	25	0.9843	52	2.0472	15	0.5906	14 800	3 300	7 800	1 800	28 000	18 000	8 500	0.13	0.30
6206	30	1.1811	62	2.4409	16	0.6299	20 300	4 600	11 200	2 500	24 000	15 000	7 500	0.20	0.40
6207	35	1.3780	72	2.8346	17	0.6693	27 000	6 100	15 300	3 400	20 000	13 000	6 300	0.29	0.60
6208	40	1.5748	80	3.1496	18	0.7087	32 500	7 300	19 000	4 300	18 000	11 000	5 600	0.37	0.80
6209	45	1.7717	85	3.3465	19	0.7480	35 100	7 900	21 600	4 900	17 000	11 000	5 000	0.41	0.90
6210	50	1.9685	90	3.5433	20	0.7874	37 100	8 300	23 200	5 200	15 000	10 000	4 800	0.46	1.00
6211	55	2.1654	100	3.9370	21	0.8268	46 200	10 400	29 000	6 500	14 000	9 000	4 300	0.61	1.30
6212	60	2.3622	110	4.3307	22	0.8661	55 300	12 400	36 000	8 100	13 000	8 000	4 000	0.78	1.70
6213	65	2.5591	120	4.7244	23	0.9055	58 500	13 200	40 500	9 100	12 000	7 500	3 600	0.99	2.20
6214	70	2.7559	125	4.9213	24	0.9449	63 700	14 300	45 000	10 100	11 000	7 000	3 400	1.05	2.30
6215	75	2.9528	130	5.1181	25	0.9843	68 900	15 500	49 000	11 000	10 000	6 700	3 200	1.20	2.60
6216	80	3.1496	140	5.5118	26	1.0236	72 800	16 400	55 000	12 400	9 500	6 000	3 000	1.40	3.10
6217	85	3.3465	150	5.9055	28	1.1024	87 100	19 600	64 000	14 400	9 000	5 600	2 800	1.80	4.00
6218	90	3.5433	160	6.2992	30	1.1811	101 000	22 700	73 500	16 500	8 500	5 300	2 600	2.15	4.70
6219	95	3.7402	170	6.6929	32	1.2598	114 000	25 600	81 500	18 300	8 000	5 000	2 400	2.60	5.70
6220	100	3.9370	180	7.0866	34	1.3386	127 000	28 500	93 000	20 900	7 500	4 800	2 400	3.15	6.90
6221	105	4.1339	190	7.4803	36	1.4173	140 000	31 500	104 000	23 400	7 000	4 500	2 200	3.70	8.20
6222	110	4.3307	200	7.8740	38	1.4961	151 000	33 900	118 000	26 500	6 700	4 300	—	4.35	9.60
6224	120	4.7244	215	8.4646	40	1.5748	146 000	32 800	118 000	26 500	6 300	4 000	—	5.15	11.40

<sup>1</sup> For shielded limiting speed ratings, contact SKF Applications Engineering.

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Single row  
 Conrad  
 Open and shielded  
 Standard  
 Series: 6226 — 6256 M  
 Size: 130 mm — 280 mm  
 5.1181 in — 11.0236 in

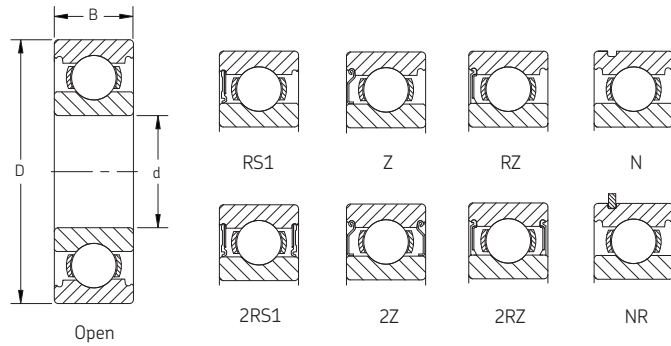


Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
6226	130	5.1181	230	9.0551	40	1.5748	156 000	35 100	132 000	29 700	5 600	3 600	5.80	12.80
6228	140	5.5118	250	9.8425	42	1.6535	165 000	37 100	150 000	33 700	5 300	3 400	7.45	16.40
6230	150	5.9055	270	10.6299	45	1.7717	174 000	39 100	166 000	37 300	5 000	3 200	9.40	20.70
6232	160	6.2992	290	11.4173	48	1.8898	186 000	41 800	186 000	41 800	4 500	3 000	14.50	32.00
6234 M	170	6.6929	310	12.2047	52	2.0472	212 000	47 700	224 000	50 400	4 300	3 800	17.50	38.60
6236 M	180	7.0866	320	12.5984	52	2.0472	229 000	51 500	240 000	54 000	4 000	3 600	18.50	40.80
6238 M	190	7.4803	340	13.3858	55	2.1654	255 000	57 300	280 000	62 900	3 800	3 400	23.00	50.70
6240 M	200	7.8740	360	14.1732	58	2.2835	270 000	60 700	310 000	69 700	3 600	3 200	28.00	61.70
6244 M	220	8.6614	400	15.7480	65	2.5591	296 000	66 500	365 000	82 100	3 200	3 000	37.00	81.60
6248 M	240	9.4488	440	17.3228	72	2.8346	358 000	80 500	465 000	104 500	3 000	2 600	51.00	112.40
6252 M	260	10.2362	480	18.8976	80	3.1496	390 000	87 700	530 000	119 100	2 600	2 400	65.50	144.40
6256 M	280	11.0236	500	19.6850	80	3.1496	423 000	95 100	600 000	134 900	2 600	2 200	71.00	156.50

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
 Consult SKF USA Inc. prior to design change or order placement.

# Deep groove ball bearings

Single row  
 Conrad  
 Open, sealed, shielded and snap ring  
 Standard and **SKF Explorer**  
 Series: 634 — 6332 M  
 Size: 4 mm — 160 mm  
 0.1575 in — 6.2992 in

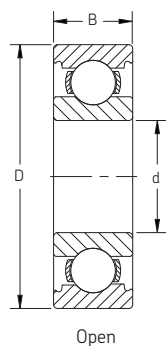


Designation	Principal dimensions						Basic load ratings				Speed rating <sup>1</sup>			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Sealed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf			Limiting speed r/min		
634	4	0.1575	16	0.6299	5	0.1969	1 110	200	380	100	95 000	60 000	28 000	0.01	0.10
635	5	0.1969	19	0.7480	6	0.2362	2 340	500	950	200	80 000	50 000	24 000	0.01	0.10
6300	10	0.3937	35	1.3780	11	0.4331	8 520	1 900	3 400	800	50 000	32 000	15 000	0.05	0.10
6301	12	0.4724	37	1.4567	12	0.4724	10 100	2 300	4 150	900	45 000	28 000	14 000	0.06	0.10
6302	15	0.5906	42	1.6535	13	0.5118	11 900	2 700	5 400	1 200	38 000	24 000	12 000	0.08	0.20
6303	17	0.6693	47	1.8504	14	0.5512	14 300	3 200	6 550	1 500	34 000	22 000	11 000	0.12	0.30
6304	20	0.7874	52	2.0472	15	0.5906	16 800	3 800	7 800	1 800	30 000	19 000	9 500	0.14	0.30
6305	25	0.9843	62	2.4409	17	0.6693	23 400	5 300	11 600	2 600	24 000	16 000	7 500	0.23	0.50
6306	30	1.1811	72	2.8346	19	0.7480	29 600	6 700	16 000	3 600	20 000	13 000	6 300	0.35	0.80
6307	35	1.3780	80	3.1496	21	0.8268	35 100	7 900	19 000	4 300	19 000	12 000	6 000	0.46	1.00
6308	40	1.5748	90	3.5433	23	0.9055	42 300	9 500	24 000	5 400	17 000	11 000	5 000	0.63	1.40
6309	45	1.7717	100	3.9370	25	0.9843	55 300	12 400	31 500	7 100	15 000	9 500	4 500	0.83	1.80
6310	50	1.9685	110	4.3307	27	1.0630	65 000	14 600	38 000	8 500	13 000	8 500	4 300	1.05	2.30
6311	55	2.1654	120	4.7244	29	1.1417	74 100	16 700	45 000	10 100	12 000	8 000	3 800	1.35	3.00
6312	60	2.3622	130	5.1181	31	1.2205	85 200	19 200	52 000	11 700	11 000	7 000	3 400	1.70	3.70
6313	65	2.5591	140	5.5118	33	1.2992	97 500	21 900	60 000	13 500	10 000	6 700	3 200	2.10	4.60
6314	70	2.7559	150	5.9055	35	1.3780	111 000	25 000	68 000	15 300	9 500	6 300	3 000	2.50	5.50
6315	75	2.9528	160	6.2992	37	1.4567	119 000	26 800	76 500	17 200	9 000	5 600	2 800	3.00	6.60
6316	80	3.1496	170	6.6929	39	1.5354	130 000	29 200	86 500	19 400	8 500	5 300	2 600	3.60	7.90
6317	85	3.3465	180	7.0866	41	1.6142	140 000	31 500	96 500	21 700	8 000	5 000	2 400	4.25	9.40
6318	90	3.5433	190	7.4803	43	1.6929	151 000	33 900	108 000	24 300	7 500	4 800	2 400	4.90	10.80
6319	95	3.7402	200	7.8740	45	1.7717	159 000	35 700	118 000	26 500	7 000	4 500	2 200	5.65	12.50
6320	100	3.9370	215	8.4646	47	1.8504	174 000	39 100	140 000	31 500	6 700	4 300	—	7.00	15.40
6321	105	4.1339	225	8.8583	49	1.9291	182 000	40 900	153 000	34 400	6 300	4 000	—	8.25	18.20
6322	110	4.3307	240	9.4488	50	1.9685	203 000	45 600	180 000	40 500	6 000	3 800	—	9.55	21.10
6324	120	4.7244	260	10.2362	55	2.1654	208 000	46 800	186 000	41 800	5 600	3 400	—	12.50	27.60
6326 M	130	5.1181	280	11.0236	58	2.2835	229 000	51 500	216 000	48 600	5 000	3 200	—	17.50	38.60
6328 M	140	5.5118	300	11.8110	62	2.4409	251 000	56 400	245 000	55 100	4 800	4 300	—	22.00	48.50
6330 M	150	5.9055	320	12.5984	65	2.5591	276 000	62 000	285 000	64 100	4 300	4 000	—	26.00	57.30
6332 M	160	6.2992	340	13.3858	68	2.6772	276 000	62 000	285 000	64 100	4 000	3 800	—	29.00	63.90

<sup>1</sup> For shielded limiting speed ratings, contact SKF Applications Engineering.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

Single row  
 Conrad  
 Open  
 Series: 6334 M — 6348 M  
 Standard  
 Size: 170 mm — 240 mm  
 6.6929 in — 9.4488 in

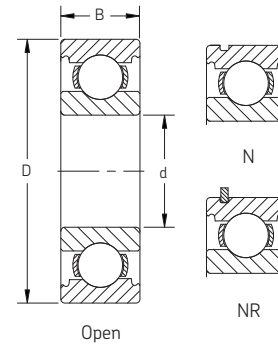


Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed		
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min	kg	lb
6334 M	170	6.6929	360	14.1732	72	2.8346	312 000	70 100	340 000	76 400	3 800	3 400	34.50	76.10
6336 M	180	7.0866	380	14.9606	75	2.9528	351 000	78 900	405 000	91 000	3 600	3 200	42.50	93.70
6338 M	190	7.4803	400	15.7480	78	3.0709	371 000	83 400	430 000	96 700	3 400	3 000	49.00	108.00
6344 M	220	8.6614	460	18.1102	88	3.4646	410 000	92 200	520 000	116 900	3 000	2 600	72.50	159.80
6348 M	240	9.4488	500	19.6850	95	3.7401	442 000	99 400	585 000	131 500	2 600	2 400	92.50	203.90

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
 Consult SKF USA Inc. prior to design change or order placement.

# Deep groove ball bearings

Single row  
 Conrad  
 Open and snap ring  
 Standard  
 Series: 6403 — 6420  
 Size: 17 mm — 100 mm  
 0.6693 in — 3.9370 in



Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
6403	17	0.6693	62	2.4409	17	0.6693	22 900	5 100	10 800	2 400	28 000	18 000	0.27	0.60
6404	20	0.7874	72	2.8346	19	0.7480	30 700	6 900	15 000	3 400	24 000	15 000	0.40	0.90
6405	25	0.9843	80	3.1496	21	0.8268	35 800	8 000	19 300	4 300	20 000	13 000	0.53	1.20
6406	30	1.1811	90	3.5433	23	0.9055	43 600	9 800	23 600	5 300	18 000	11 000	0.74	1.60
6407	35	1.3780	100	3.9370	25	0.9843	55 300	12 400	31 000	7 000	16 000	10 000	0.95	2.10
6408	40	1.5748	110	4.3307	27	1.0630	63 700	14 300	36 500	8 200	14 000	9 000	1.25	2.80
6409	45	1.7717	120	4.7244	29	1.1417	76 100	17 100	45 000	10 100	13 000	8 500	1.55	3.40
6410	50	1.9685	130	5.1181	31	1.2205	87 100	19 600	52 000	11 700	12 000	7 500	1.90	4.20
6411	55	2.1654	140	5.5118	33	1.2992	99 500	22 400	62 000	13 900	11 000	7 000	2.30	5.10
6412	60	2.3622	150	5.9055	35	1.3780	108 000	24 300	69 500	15 600	10 000	6 300	2.75	6.10
6413	65	2.5591	160	6.2992	37	1.4567	119 000	26 800	78 000	17 500	9 500	6 000	3.30	7.30
6414	70	2.7559	180	7.0866	42	1.6535	143 000	32 100	104 000	23 400	8 500	5 300	4.85	10.70
6415	75	2.9528	190	7.4803	45	1.7717	153 000	34 400	114 000	25 600	8 000	5 000	6.80	15.00
6416	80	3.1496	200	7.8740	48	1.8898	163 000	36 600	125 000	28 100	7 500	4 800	8.00	17.60
6417	85	3.3465	210	8.2677	52	2.0472	174 000	39 100	137 000	30 800	7 000	4 500	9.50	20.90
6418	90	3.5433	225	8.8583	54	2.1260	186 000	41 800	150 000	33 700	6 700	4 300	11.50	25.40
6420	100	3.9370	250	9.8425	58	2.2835	208 000	46 800	176 000	39 600	6 000	4 000	15.30	33.70

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Single row

Conrad

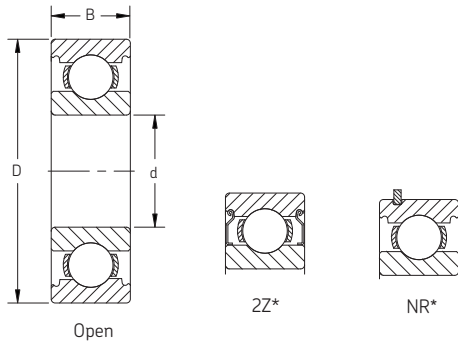
Open, shielded and snap ring

Standard and SKF Explorer

Series: 16002 — 16040

Size: 15 mm — 200 mm

0.5906 in — 7.8740 in



Designation	Principal dimensions						Basic load ratings				Speed rating <sup>1</sup>		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
16002	15	0.5906	32	1.2598	8	0.3150	5 850	1 300	2 850	600	50 000	32 000	0.03	0.06
16003	17	0.6693	35	1.3780	8	0.3150	6 370	1 400	3 250	700	45 000	28 000	0.03	0.07
16004	20	0.7874	42	1.6535	8	0.3150	7 280	1 600	4 050	900	38 000	24 000	0.05	0.11
16005	25	0.9843	47	1.8504	8	0.3150	8 060	1 800	4 750	1 100	32 000	20 000	0.06	0.10
16006	30	1.1811	55	2.1654	9	0.3543	11 900	2 700	7 350	1 700	28 000	17 000	0.09	0.19
16007	35	1.3780	62	2.4409	9	0.3543	13 000	2 900	8 150	1 800	24 000	15 000	0.11	0.24
16008	40	1.5748	68	2.6772	9	0.3543	13 800	3 100	9 150	2 100	22 000	14 000	0.13	0.29
16009	45	1.7717	75	2.9528	10	0.3937	16 500	3 700	10 800	2 400	20 000	12 000	0.17	0.37
16010	50	1.9685	80	3.1496	10	0.3937	16 800	3 800	11 400	2 600	18 000	11 000	0.18	0.40
16011	55	2.1654	90	3.5433	11	0.4331	20 300	4 600	14 000	3 100	16 000	10 000	0.26	0.57
16012	60	2.3622	95	3.7402	11	0.4331	20 800	4 700	15 000	3 400	15 000	9 500	0.28	0.62
16013	65	2.5591	100	3.9370	11	0.4331	22 500	5 100	16 600	3 700	14 000	9 000	0.30	0.66
16014	70	2.7559	110	4.3307	13	0.5118	29 100	6 500	25 000	5 600	13 000	8 000	0.43	0.90
16015	75	2.9528	115	4.5276	13	0.5118	30 200	6 800	27 000	6 100	12 000	7 500	0.46	1.00
16016	80	3.1496	125	4.9213	14	0.5512	35 100	7 900	31 500	7 100	11 000	7 000	0.60	1.30
16017	85	3.3465	130	5.1181	14	0.5512	35 800	8 000	33 500	7 500	11 000	6 700	0.63	1.40
16018	90	3.5433	140	5.5118	16	0.6299	43 600	9 800	39 000	8 800	10 000	6 300	0.85	1.90
16019	95	3.7402	145	5.7087	16	0.6299	44 800	10 100	41 500	9 300	9 500	6 000	0.89	2.00
16020	100	3.9370	150	5.9055	16	0.6299	46 200	10 400	44 000	9 900	9 500	5 600	0.91	2.00
16021	105	4.1339	160	6.2992	18	0.7087	54 000	12 100	51 000	11 500	8 500	5 300	1.20	2.65
16022	110	4.3307	170	6.6929	19	0.7480	60 200	13 500	57 000	12 800	8 000	5 000	1.45	3.20
16024	120	4.7244	180	7.0866	19	0.7480	63 700	14 300	64 000	14 400	7 500	4 800	1.60	3.50
16026	130	5.1181	200	7.8740	22	0.8661	83 200	18 700	81 500	18 300	7 000	4 300	2.35	5.20
16028	140	5.5118	210	8.2677	22	0.8661	80 600	18 100	86 500	19 400	6 700	4 000	2.50	5.50
16030	150	5.9055	225	8.8583	24	0.9449	92 200	20 700	98 000	22 000	6 000	3 800	3.15	6.90
16032	160	6.2992	240	9.4488	25	0.9843	99 500	22 400	108 000	24 300	5 600	3 600	3.70	8.20
16034	170	6.6929	260	10.2362	28	1.1024	119 000	26 800	129 000	29 000	5 300	3 200	5.00	11.00
16036	180	7.0866	280	11.0236	31	1.2205	138 000	31 000	146 000	32 800	4 800	4 000	6.60	14.60
16038	190	7.4803	290	11.4173	31	1.2205	148 000	33 300	166 000	37 300	4 800	3 000	7.90	17.40
16040	200	7.8740	310	12.2047	34	1.3386	168 000	37 800	190 000	42 700	4 300	2 800	8.85	19.50

\* Feature may not be available in all sizes.

<sup>1</sup> For shielded limiting speed ratings, contact SKF Applications Engineering.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

# Deep groove ball bearings

Single row

Conrad

Open and sealed

Standard

Series: 16044 — 16072

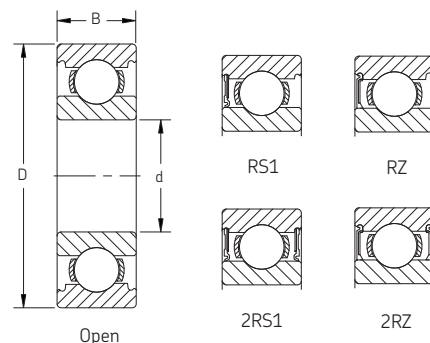
Size: 220 mm — 360 mm

8.6614 in — 14.1732 in

Series: 16100 — 16101

Size: 10 mm — 12 mm

0.3937 in — 0.4724 in



Designation	Principal dimensions						Basic load ratings				Speed rating			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Sealed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf			Limiting speed r/min		
<b>16044</b>	220	8.6614	340	13.3858	37	1.4567	174 000	39 100	204 000	45 900	4 000	2 400	–	11.50	25.40
<b>16048</b>	240	9.4488	360	14.1732	37	1.4567	178 000	40 000	220 000	49 500	3 600	3 000	–	14.50	32.00
<b>16052</b>	260	10.2362	400	15.7480	44	1.7323	238 000	53 500	310 000	69 700	3 200	2 800	–	21.50	47.40
<b>16056</b>	280	11.0236	420	16.5354	44	1.7323	242 000	54 400	335 000	75 300	3 000	2 600	–	23.00	50.70
<b>16060</b>	300	11.8110	460	18.1102	50	1.9685	286 000	64 300	405 000	91 000	2 800	2 400	–	32.00	70.50
<b>16064</b>	320	12.5984	480	18.8976	50	1.9685	281 000	63 200	405 000	91 000	2 600	2 200	–	34.00	75.00
<b>16068</b>	340	13.3858	520	20.4724	57	2.2441	345 000	77 600	520 000	116 900	2 400	2 000	–	45.00	99.20
<b>16072</b>	360	14.1732	540	21.2598	57	2.2441	351 000	78 900	550 000	123 600	2 400	1 900	–	49.00	108.00
<b>16100</b>	10	0.3937	28	1.1024	8	0.3150	4 620	1 000	1 960	400	63 000	40 000	–	0.02	0.05
<b>16101</b>	12	0.4724	30	1.1811	8	0.3150	5 070	1 100	2 360	500	56 000	34 000	16 000	0.02	0.05

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

Single row

Conrad

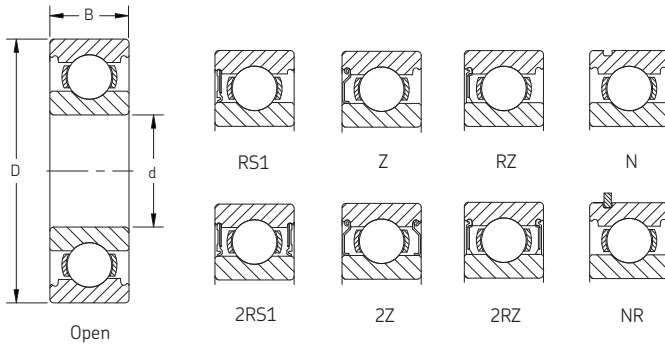
Open, sealed, shielded and snap ring

Standard

Series: 61800 — 61826

Size: 10 mm — 130 mm

0.3937 in — 5.1181 in



Designation	Principal dimensions						Basic load ratings				Speed rating <sup>1</sup>			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Sealed				
	mm	in	mm	in	mm	in	N	lbf	N	lbf	Reference speed r/min	Limiting speed r/min	Limiting speed r/min	kg	lb
61800	10	0.3937	19	0.7480	5	0.1969	1 380	300	585	100	80 000	48 000	22 000	0.01	0.01
61801	12	0.4724	21	0.8268	5	0.1969	1 430	300	670	200	70 000	43 000	20 000	0.01	0.01
61802	15	0.5906	24	0.9449	5	0.1969	1 560	400	800	200	60 000	38 000	17 000	0.01	0.02
61803	17	0.6693	26	1.0236	5	0.1969	1 680	400	930	200	56 000	34 000	16 000	0.01	0.02
61804	20	0.7874	32	1.2598	7	0.2756	4 030	900	2 320	500	45 000	28 000	13 000	0.02	0.04
61805	25	0.9843	37	1.4567	7	0.2756	4 360	1 000	2 600	600	38 000	24 000	11 000	0.02	0.05
61806	30	1.1811	42	1.6535	7	0.2756	4 490	1 000	2 900	700	32 000	20 000	9 500	0.03	0.06
61807	35	1.3780	47	1.8504	7	0.2756	4 750	1 100	3 200	700	28 000	18 000	8 000	0.03	0.07
61808	40	1.5748	52	2.0472	7	0.2756	4 940	1 100	3 450	800	26 000	16 000	7 500	0.03	0.07
61809	45	1.7717	58	2.2835	7	0.2756	6 630	1 500	6 100	1 400	22 000	14 000	6 700	0.04	0.09
61810	50	1.9685	65	2.5591	7	0.2756	6 760	1 500	6 800	1 500	20 000	13 000	6 000	0.05	0.10
61811	55	2.1654	72	2.8346	9	0.3543	9 040	2 000	8 800	2 000	19 000	12 000	5 300	0.08	0.20
61812	60	2.3622	78	3.0709	10	0.3937	11 900	2 700	11 400	2 600	17 000	11 000	4 800	0.11	0.20
61813	65	2.5591	85	3.3465	10	0.3937	12 400	2 800	12 700	2 900	16 000	10 000	4 500	0.13	0.30
61814	70	2.7559	90	3.5433	10	0.3937	12 400	2 800	13 200	3 000	15 000	9 000	4 300	0.14	0.30
61815	75	2.9528	95	3.7402	10	0.3937	12 700	2 900	14 300	3 200	14 000	8 500	4 000	0.15	0.30
61816	80	3.1496	100	3.9370	10	0.3937	13 000	2 900	15 000	3 400	13 000	8 000	3 600	0.15	0.30
61817	85	3.3465	110	4.3307	13	0.5118	19 500	4 400	20 800	4 700	12 000	7 500	3 400	0.27	0.60
61818	90	3.5433	115	4.5276	13	0.5118	19 500	4 400	22 000	4 900	11 000	7 000	3 200	0.28	0.60
61820	100	3.9370	125	4.9213	13	0.5118	19 900	4 500	24 000	5 400	10 000	6 300	3 000	0.31	0.70
61821	105	4.1339	130	5.1181	13	0.5118	20 800	4 700	19 600	4 400	10 000	6 300	2 800	0.32	0.70
61822	110	4.3307	140	5.5118	16	0.6299	28 100	6 300	26 000	5 800	9 500	5 600	2 600	0.60	1.30
61824	120	4.7244	150	5.9055	16	0.6299	29 100	6 500	28 000	6 300	8 500	5 300	2 400	0.65	1.40
61826	130	5.1181	165	6.4961	18	0.7087	37 700	8 500	43 000	9 700	8 000	4 800	2 200	0.93	2.10

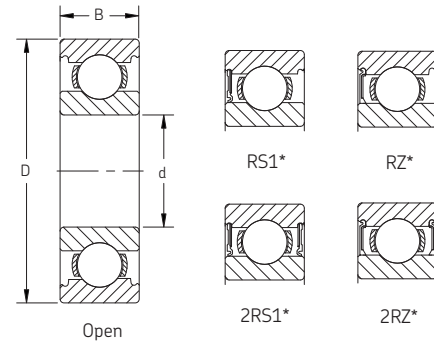
\* 61808-2RZ NR and 61812 NR are made to order products.

<sup>1</sup> For shielded limiting speed ratings, contact SKF Applications Engineering.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

# Deep groove ball bearings

Single row  
 Conrad  
 Open and sealed  
 Standard  
 Series: 61828 — 618/800 MA  
 Size: 140 mm — 800 mm  
 5.5118 in — 31.4961 in



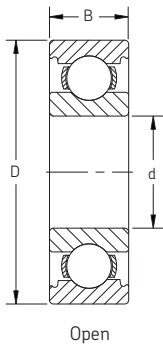
Designation	Principal dimensions						Basic load ratings				Speed rating			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Sealed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf			Limiting speed r/min		
61828	140	5.5118	175	6.8898	18	0.7087	39 000	8 800	46 500	10 500	7 500	4 500	2 000	0.99	2.20
61830	150	5.9055	190	7.4803	20	0.7874	48 800	11 000	61 000	13 700	6 700	4 300	—	1.40	3.10
61832	160	6.2992	200	7.8740	20	0.7874	49 400	11 100	64 000	14 400	6 300	4 000	—	1.45	3.20
61834	170	6.6929	215	8.4646	22	0.8661	61 800	13 900	78 000	17 500	6 000	3 600	—	1.90	4.20
61836	180	7.0866	225	8.8583	22	0.8661	62 400	14 000	81 500	18 300	5 600	3 400	—	2.00	4.40
61838	190	7.4803	240	9.4488	24	0.9449	76 100	17 100	98 000	22 000	5 300	3 200	—	2.60	5.70
61840	200	7.8740	250	9.8425	24	0.9449	76 100	17 100	102 000	22 900	5 000	3 200	—	2.70	6.00
61844	220	8.6614	270	10.6299	24	0.9449	78 000	17 500	110 000	24 700	4 500	2 800	—	3.00	6.60
61848	240	9.4488	300	11.8110	28	1.1024	108 000	24 300	150 000	33 700	4 000	2 600	—	4.50	9.90
61852	260	10.2362	320	12.5984	28	1.1024	111 000	25 000	163 000	36 600	3 800	2 400	—	4.80	10.60
61856	280	11.0236	350	13.7795	33	1.2992	138 000	31 000	200 000	45 000	3 400	2 200	—	7.40	16.30
61860 MA	300	11.8110	380	14.9606	38	1.4961	172 000	38 700	245 000	55 100	3 200	2 600	—	10.50	23.10
61864 MA	320	12.5984	400	15.7480	38	1.4961	172 000	38 700	255 000	57 300	3 000	2 400	—	11.00	24.30
61868 MA	340	13.3858	420	16.5354	38	1.4961	178 000	40 000	275 000	61 800	2 800	2 400	—	11.50	25.40
61872 MA	360	14.1732	440	17.3228	38	1.4961	182 000	40 900	285 000	64 100	2 600	2 200	—	12.00	26.50
61876 MA	380	14.9606	480	18.8976	46	1.8110	242 000	54 400	390 000	87 700	2 400	2 000	—	20.00	44.10
61880 MA	400	15.7480	500	19.6850	46	1.8110	247 000	55 500	405 000	91 000	2 400	1 900	—	20.50	45.20
61884 MA	420	16.5354	520	20.4724	46	1.8110	251 000	56 400	425 000	95 500	2 200	1 800	—	21.50	47.40
61888 MA	440	17.3228	540	21.2598	46	1.8110	255 000	57 300	440 000	98 900	2 200	1 800	—	22.50	49.60
61892 MA	460	18.1102	580	22.8346	56	2.2047	319 000	71 700	570 000	128 100	2 000	1 600	—	35.00	77.20
61896 MA	480	18.8976	600	23.6220	56	2.2047	325 000	73 100	600 000	134 900	1 900	1 600	—	36.50	80.50
618/500 MA	500	19.6850	620	24.4094	56	2.2047	332 000	74 600	620 000	139 400	1 800	1 500	—	40.50	89.30
618/530 MA	530	20.8661	650	25.5906	56	2.2047	332 000	74 600	655 000	147 200	1 700	1 400	—	39.50	87.10
618/560 MA	560	22.0472	680	26.7717	56	2.2047	345 000	77 600	695 000	156 200	1 600	1 300	—	42.00	92.60
618/600 MA	600	23.6220	730	28.7402	60	2.3622	364 000	81 800	765 000	172 000	1 500	1 200	—	52.00	114.60
618/630 MA	630	24.8031	780	30.7087	69	2.7165	442 000	99 400	965 000	216 900	1 400	1 100	—	73.00	160.90
618/670 MA	670	26.3780	820	32.2835	69	2.7165	442 000	99 400	1 000 000	224 800	1 300	1 100	—	83.50	184.10
618/710 MA	710	27.9528	870	34.2520	74	2.9134	475 000	106 800	1 100 000	247 300	1 200	1 000	—	93.50	206.10
618/750 MA	750	29.5276	920	36.2205	78	3.0709	527 000	118 500	1 250 000	281 000	1 100	900	—	110.00	242.50
618/800 MA	800	31.4961	980	38.5827	82	3.2283	559 000	125 700	1 370 000	308 000	1 000	850	—	130.00	286.60

\* Feature may not be available in all sizes.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

Single row  
Conrad  
Open  
Standard

Series: 618/850 MA — 618/1180 MA  
Size: 850 mm — 1180 mm  
33.4646 in — 46.4566 in

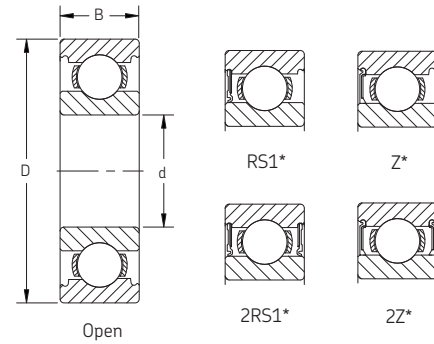


Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed		
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min	kg	lb
618/850 MA	850	33.4646	1 030	40.5512	82	3.2283	559 000	125 700	1 430 000	321 500	950	750	140.00	308.60
618/900 MA	900	35.4331	1 090	42.9134	85	3.3465	618 000	138 900	1 600 000	359 700	850	700	160.00	352.70
618/1000 MA	1 000	39.3701	1 220	48.0315	100	3.9370	637 000	143 200	1 800 000	404 600	750	600	245.00	540.10
618/1060 MA	1 060	41.7323	1 280	50.3937	100	3.9370	728 000	163 700	2 120 000	476 600	670	560	260.00	573.20
618/1120 MA	1 120	44.0944	1 360	53.5433	106	4.1732	741 000	166 600	2 200 000	494 600	630	530	315.00	694.40
618/1180 MA	1 180	46.4566	1 540	60.6299	160	6.2992	761 000	171 100	2 360 000	530 500	560	480	330.00	727.50

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
Consult SKF USA Inc. prior to design change or order placement.

# Deep groove ball bearings

Single row  
 Conrad  
 Open, sealed and shielded  
 Standard  
 Series: 61900 — 61948 MA  
 Size: 10 mm — 240 mm  
 0.3937 in — 9.4488 in



Designation	Principal dimensions						Basic load ratings				Speed rating <sup>1</sup>			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Sealed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf			Limiting speed r/min		
61900	10	0.3937	22	0.8661	6	0.2362	2 080	500	850	200	75 000	45 000	20 000	0.01	0.02
61901	12	0.4724	24	0.9449	6	0.2362	2 250	500	980	200	67 000	40 000	19 000	0.01	0.02
61902	15	0.5906	28	1.1024	7	0.2756	4 360	1 000	2 240	500	56 000	34 000	16 000	0.02	0.04
61903	17	0.6693	30	1.1811	7	0.2756	4 620	1 000	2 550	600	50 000	32 000	14 000	0.02	0.04
61904	20	0.7874	37	1.4567	9	0.3543	6 370	1 400	3 650	800	43 000	26 000	12 000	0.04	0.08
61905	25	0.9843	42	1.6535	9	0.3543	7 020	1 600	4 300	1 000	36 000	22 000	10 000	0.05	0.10
61906	30	1.1811	47	1.8504	9	0.3543	7 280	1 600	4 550	1 000	30 000	19 000	8 500	0.05	0.11
61907	35	1.3780	55	2.1654	10	0.3937	9 560	2 100	6 800	1 500	26 000	16 000	7 500	0.08	0.18
61908	40	1.5748	62	2.4409	12	0.4724	13 800	3 100	10 000	2 200	24 000	14 000	6 700	0.12	0.26
61909	45	1.7717	68	2.6772	12	0.4724	14 000	3 100	10 800	2 400	20 000	13 000	6 000	0.14	0.31
61910	50	1.9685	72	2.8346	12	0.4724	14 600	3 300	11 800	2 700	19 000	12 000	5 600	0.14	0.31
61911	55	2.1654	80	3.1496	13	0.5118	16 500	3 700	14 000	3 100	17 000	11 000	5 000	0.19	0.42
61912	60	2.3622	85	3.3465	13	0.5118	16 500	3 700	14 300	3 200	16 000	10 000	4 500	0.20	0.44
61913	65	2.5591	90	3.5433	13	0.5118	17 400	3 900	16 000	3 600	15 000	9 500	4 300	0.22	0.49
61914	70	2.7559	100	3.9370	16	0.6299	23 800	5 400	21 200	4 800	14 000	8 500	4 000	0.35	0.77
61915	75	2.9528	105	4.1339	16	0.6299	24 200	5 400	19 300	4 300	13 000	8 000	3 600	0.37	0.82
61916	80	3.1496	110	4.3307	16	0.6299	25 100	5 600	20 400	4 600	12 000	7 500	3 400	0.40	0.88
61917	85	3.3465	120	4.7244	18	0.7087	31 900	7 200	30 000	6 700	11 000	7 000	—	0.55	1.20
61918	90	3.5433	125	4.9213	18	0.7087	33 200	7 500	31 500	7 100	11 000	6 700	—	0.59	1.30
61922	110	4.3307	150	5.9055	20	0.7874	43 600	9 800	45 000	10 100	9 000	5 600	—	0.90	2.00
61924	120	4.7244	165	6.4961	22	0.8661	55 300	12 400	57 000	12 800	8 000	5 000	—	1.20	2.65
61926	130	5.1181	180	7.0866	24	0.9449	65 000	14 600	67 000	15 100	7 500	4 500	—	1.85	4.10
61928	140	5.5118	190	7.4803	24	0.9449	66 300	14 900	72 000	16 200	7 000	5 600	—	1.70	3.70
61930 MA	150	5.9055	210	8.2677	28	1.1024	88 400	19 900	93 000	20 900	6 300	5 300	—	3.05	6.70
61932 MA	160	6.2992	220	8.6614	28	1.1024	92 300	20 700	98 000	22 000	6 000	5 000	—	3.25	7.20
61936 MA	180	7.0866	250	9.8425	33	1.2992	119 000	26 800	134 000	30 100	5 300	4 300	—	5.05	11.10
61938 MA	190	7.4803	260	10.2362	33	1.2992	117 000	26 300	134 000	30 100	5 000	4 300	—	5.25	11.60
61940 MA	200	7.8740	280	11.0236	38	1.4961	148 000	33 300	166 000	37 300	4 800	3 800	—	7.40	16.30
61944 MA	220	8.6614	300	11.8110	38	1.4961	151 000	33 900	180 000	40 500	4 300	3 600	—	8.00	17.60
61948 MA	240	9.4488	320	12.5984	38	1.4961	159 000	35 700	200 000	45 000	4 000	3 200	—	8.60	19.00

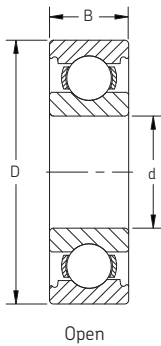
<sup>1</sup> For shielded limiting speed ratings, contact SKF Applications Engineering.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Single row  
Conrad  
Open  
Standard

Series: 61952 MA — 619/900  
Size: 260 mm — 900 mm  
10.2362 in — 35.4331 in



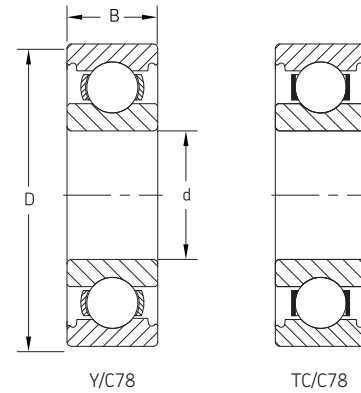
Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
61952 MA	260	10.2362	360	14.1732	46	1.8110	212 000	47 700	270 000	60 700	3 600	3 000	14.50	32.00
61956 MA	280	11.0236	380	14.9606	46	1.8110	216 000	48 600	285 000	64 100	3 200	2 800	15.00	33.10
61960 MA	300	11.8110	420	16.5354	56	2.2047	270 000	60 700	375 000	84 300	3 000	2 400	24.50	54.00
61964 MA	320	12.5984	440	17.3228	56	2.2047	276 000	62 000	400 000	89 900	2 800	2 400	25.50	56.20
61968 MA	340	13.3858	460	18.1102	56	2.2047	281 000	63 200	425 000	95 500	2 600	2 200	26.50	58.40
61972 MA	360	14.1732	480	18.8976	56	2.2047	291 000	65 400	450 000	101 200	2 600	2 200	28.00	61.70
61976 MA	380	14.9606	520	20.4724	65	2.5591	338 000	76 000	540 000	121 400	2 400	1 900	40.00	88.20
61980 MA	400	15.7480	540	21.2598	65	2.5591	345 000	77 600	570 000	128 100	2 200	1 800	41.50	91.50
61984 MA	420	16.5354	560	22.0472	65	2.5591	351 000	78 900	600 000	134 900	2 200	1 800	43.00	95.00
61988 MA	440	17.3228	600	23.6220	74	2.9134	410 000	92 200	720 000	161 900	2 000	1 600	60.50	133.40
61992 MA	460	18.1102	620	24.4094	74	2.9134	423 000	95 100	750 000	168 600	1 900	1 600	62.50	137.80
61996 MA	480	18.8976	650	25.5906	78	3.0709	449 000	100 900	815 000	183 200	1 800	1 500	74.00	163.10
619/500 MA	500	19.6850	670	26.3780	78	3.0709	462 000	103 900	865 000	194 500	1 700	1 400	77.00	169.80
619/530 MA	530	20.8661	710	27.9528	82	3.2283	488 000	109 700	930 000	209 100	1 600	1 300	90.50	199.50
619/560 MA	560	22.0472	750	29.5276	85	3.3465	494 000	111 100	980 000	220 300	1 500	1 200	105.00	231.50
619/600 MA	600	23.6220	800	31.4961	90	3.5433	585 000	131 500	1 220 000	274 300	1 400	1 100	125.00	275.60
619/630 N1MA	630	24.8031	850	33.4646	100	3.9370	624 000	140 300	1 340 000	301 200	1 300	1 100	160.00	352.70
619/670 MA	670	26.3780	900	35.4331	103	4.0551	676 000	152 000	1 500 000	337 200	1 200	1 000	185.00	407.90
619/710 MA	710	27.9528	950	37.4016	106	4.1732	663 000	149 000	1 500 000	337 200	1 100	900	220.00	485.00
619/750 MA	750	29.5276	1 000	39.3701	112	4.4094	761 000	171 100	1 800 000	404 600	1 000	850	255.00	562.20
619/900	900	35.4331	1 090	42.9133	85	3.3464	852 000	191 500	2 280 000	512 500	800	670	350.00	771.60

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
Consult SKF USA Inc. prior to design change or order placement.

# Deep groove ball bearings

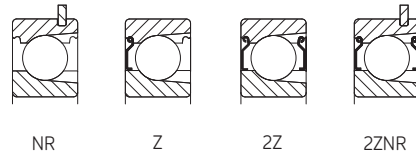
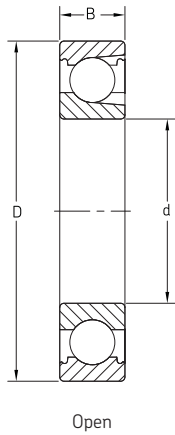
Single row  
 ABEC 5  
 Open  
 Standard  
 Series: 6205/C78 — 6218/C78  
 Size: 25 mm — 90 mm  
 0.9843 in — 3.5433 in

Series: 6303/C78 — 6317/C78  
 Size: 17 mm — 85 mm  
 0.6693 in — 3.3465 in



Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
6205/C78	25	0.9843	52	2.0472	15	0.5906	14 800	3 330	7 800	1 750	28 000	18 000	0.13	0.29
6206/C78	30	1.1811	62	2.4409	16	0.6299	20 300	4 560	11 200	2 520	24 000	15 000	0.20	0.44
6207/C78	35	1.3780	72	2.8346	17	0.6693	27 000	6 070	15 300	3 440	20 000	13 000	0.28	0.62
6208/C78	40	1.5748	80	3.1496	18	0.7087	32 500	7 310	19 000	4 270	18 000	11 000	0.36	0.79
6209/C78	45	1.7717	85	3.3465	19	0.7480	35 100	7 890	21 600	4 860	17 000	11 000	0.41	0.90
6210/C78	50	1.9685	90	3.5433	20	0.7874	37 100	8 340	23 200	5 220	15 000	10 000	0.46	1.01
6211/C78	55	2.1654	100	3.9370	21	0.8268	46 200	10 390	29 000	6 520	14 000	9 000	0.60	1.32
6212/C78	60	2.3622	110	4.3307	22	0.8661	55 300	12 430	36 000	8 090	13 000	8 000	0.78	1.72
6213/C78	65	2.5591	120	4.7244	23	0.9055	58 500	13 150	40 500	9 100	12 000	7 500	0.99	2.18
6214/C78	70	2.7559	125	4.9213	24	0.9449	63 700	14 320	45 000	10 120	11 000	7 000	1.07	2.40
6215/C78	75	2.9528	130	5.1181	25	0.9843	68 900	15 490	49 000	11 020	10 000	6 700	1.20	2.60
6216/C78	80	3.1496	140	5.5118	26	1.0236	72 800	16 370	55 000	12 360	9 500	6 000	1.42	3.10
6217/C78	85	3.3465	150	5.9055	28	1.1024	87 100	19 580	64 000	14 390	9 000	5 600	1.80	4.00
6218/C78	90	3.5433	160	6.2992	30	1.1811	101 000	22 700	73 500	16 520	8 500	5 300	2.15	4.70
6303/C78	17	0.6693	47	1.8504	14	0.5512	14 300	3 210	6 550	1 470	34 000	22 000	0.12	0.26
6304/C78	20	0.7874	52	2.0472	15	0.5906	16 800	3 780	7 800	1 750	30 000	19 000	0.14	0.31
6305/C78	25	0.9843	62	2.4409	17	0.6693	23 400	5 260	11 600	2 610	24 000	16 000	0.23	0.50
6306/C78	30	1.1811	72	2.8346	19	0.7480	29 600	6 650	16 000	3 600	20 000	13 000	0.34	0.70
6307/C78	35	1.3780	80	3.1496	21	0.8268	35 100	7 890	19 000	4 270	19 000	12 000	0.46	1.00
6308/C78	40	1.5748	90	3.5433	23	0.9055	42 300	9 510	24 000	5 400	17 000	11 000	0.63	1.40
6309/C78	45	1.7717	100	3.9370	25	0.9843	55 300	12 430	31 500	7 080	15 000	9 500	0.84	1.90
6310/C78	50	1.9685	110	4.3307	27	1.0630	65 000	14 610	38 000	8 540	13 000	8 500	1.10	2.40
6311/C78	55	2.1654	120	4.7244	29	1.1417	74 100	16 660	45 000	10 120	12 000	8 000	1.39	3.10
6312/C78	60	2.3622	130	5.1181	31	1.2205	85 200	19 150	52 000	11 690	11 000	7 000	1.75	3.90
6313/C78	65	2.5591	140	5.5118	33	1.2992	97 500	21 920	60 000	13 490	10 000	6 700	2.10	4.60
6314/C78	70	2.7559	150	5.9055	35	1.3780	111 000	24 950	68 000	15 290	9 500	6 300	2.55	5.60
6315/C78	75	2.9528	160	6.2992	37	1.4567	119 000	26 750	76 500	17 200	9 000	5 600	3.05	6.70
6316/C78	80	3.1496	170	6.6929	39	1.5354	130 000	29 220	86 500	19 450	8 500	5 300	3.59	7.90
6317/C78	85	3.3465	180	7.0866	41	1.6142	140 000	31 470	96 500	21 690	8 000	5 000	4.30	9.50

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Single row  
Max type  
Open, shielded, snap ring  
Standard  
Series: 206 — 220  
Size: 30 mm — 100 mm  
1.1811 in — 3.9370 in  
  
Series: 308 — 318  
Size: 40 mm — 90 mm  
1.5748 in — 3.5433 in

Designation	Principal dimensions						Basic load ratings				Speed rating <sup>1</sup>		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
206	30	1.1811	62	2.4409	16	0.6299	21 000	4 800	14 510	3 300	20 000	12 000	0.21	0.46
207	35	1.3780	72	2.8346	17	0.6693	27 760	6 300	19 740	4 500	17 000	11 000	0.31	0.68
208	40	1.5748	80	3.1496	18	0.7087	33 370	7 600	24 200	5 500	15 000	9 500	0.39	0.86
209	45	1.7717	85	3.3465	19	0.7480	35 100	7 900	26 070	5 900	14 000	9 000	0.44	0.97
210	50	1.9685	90	3.5433	20	0.7874	38 920	8 800	29 760	6 700	13 000	8 000	0.50	1.10
211	55	2.1654	100	3.9370	21	0.8268	48 110	10 900	37 670	8 500	12 000	7 500	0.66	1.50
212	60	2.3622	110	4.3307	22	0.8661	55 540	12 500	43 400	9 800	11 000	6 700	0.85	1.90
213	65	2.5591	120	4.7244	23	0.9055	60 500	13 700	58 500	13 200	10 000	6 000	1.05	2.30
214	70	2.7559	125	4.9213	24	0.9449	66 000	14 900	65 500	14 800	9 500	6 000	1.15	2.50
215	75	2.9528	130	5.1181	25	0.9843	72 100	16 300	72 000	16 200	9 000	5 600	1.25	2.80
216	80	3.1496	140	5.5118	26	1.0236	88 000	19 800	85 000	19 200	8 500	5 300	1.55	3.40
217	85	3.3465	150	5.9055	28	1.1024	96 800	21 800	100 000	22 500	7 500	4 800	1.95	4.30
218	90	3.5433	160	6.2992	30	1.1811	112 000	25 200	114 000	25 700	7 000	4 500	2.35	5.20
219	95	3.7402	170	6.6929	32	1.2598	121 000	27 300	122 000	27 500	6 700	4 300	2.70	6.00
220	100	3.9370	180	7.0866	34	1.3386	134 000	30 200	140 000	31 500	6 300	4 000	3.45	7.60
305	25	0.9843	62	2.4409	17	0.6693	22 900	5 200	15 600	3 600	20 000	13 000	0.24	0.50
306	30	1.1811	72	2.8346	19	0.7480	29 490	6 700	20 480	4 700	18 000	11 000	0.37	0.80
307	35	1.3780	80	3.1496	21	0.8268	34 860	7 900	24 640	5 600	16 000	10 000	0.48	1.10
308	40	1.5748	90	3.5433	23	0.9055	45 200	10 200	33 570	7 600	14 000	9 000	0.64	1.40
309	45	1.7717	100	3.9370	25	0.9843	55 260	12 500	41 260	9 300	13 000	8 000	0.88	1.90
310	50	1.9685	110	4.3307	27	1.0630	64 730	14 600	49 100	11 100	11 000	7 000	1.15	2.50
311	55	2.1654	120	4.7244	29	1.1417	79 200	17 800	67 000	15 100	10 000	6 700	1.5	3.30
312	60	2.3622	130	5.1181	31	1.2205	91 300	20 500	78 000	17 600	9 500	6 000	1.85	4.10
313	65	2.5591	140	5.5118	33	1.2992	102 000	22 900	90 000	20 300	9 000	5 600	2.3	5.10
314	70	2.7559	150	5.9055	35	1.3780	114 000	25 600	102 000	23 000	8 000	5 000	2.75	6.10
315	75	2.9528	160	6.2992	37	1.4567	125 000	28 100	116 000	26 100	7 500	4 800	3.25	7.20
316	80	3.1496	170	6.6929	39	1.5354	138 000	31 000	129 000	29 000	7 000	4 500	3.95	8.70
317	85	3.3465	180	7.0866	41	1.6142	147 000	33 100	146 000	32 900	6 700	4 300	4.6	10.10
318	90	3.5433	190	7.4803	43	1.6929	157 000	35 300	160 000	36 000	6 300	4 000	5.4	11.90

<sup>1</sup> For shielded limiting speed ratings, contact SKF Applications Engineering.

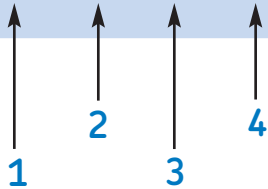
**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
Consult SKF USA Inc. prior to design change or order placement.

## Notes



# Angular contact ball bearings

7200 BE CB Y HC5



## 1. Design:

- B** 40° contact angle
- BE** 40° contact angle, high capacity, all ISO corners
- A** Conrad assembly (3000 series)
- E** Max type (3000 series)
- D** Split inner ring (3300 series)
- NR** Snap ring (3000 series)
- N2** Locating slot (QJ series)
- ZZ** Shield on both sides (3000 series)
- 2RS1** Seals of synthetic rubber (NBR) on both sides (3000 series)

Note: 3000 series are double row angular contact bearings

## 2. Clearance:

- (C0)\*** Normal clearance (3000 series)
- C2** Axial clearance tighter than normal (3000 and QJ series)
- C3** Axial clearance looser than normal (3000 and QJ series)

### 7000 series clearance

- CA** Modified for duplex mounting with axial clearance < normal
- CB** Modified for duplex mounting with normal axial clearance
- CC** Modified for duplex mounting with axial clearance > normal
- GA** Modified for duplex mounting with light preload
- GB** Modified for duplex mounting with medium preload
- GC** Modified for duplex mounting with heavy preload
- G..** Special preload, value in daN

\* Not marked on bearing or package.

## 3. Cage designs:

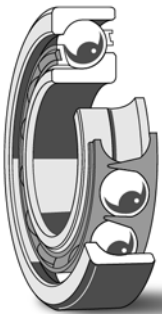
- Y** Pressed brass cage, ball guided
- M** Machined brass cage, rolling element guided
- MA** Machined window-type brass cage, outer ring centered
- P** Injection molded cage of fiberglass reinforced polyamide 6.6, rolling element guided
- PHAS** Injection molded window-type cage of fiberglass reinforced polyetheretherketone (PEEK), with lubrication grooves in the guiding surfaces, outer ring center
- J** Pressed steel cage, rolling element guided
- F** Machined steel cage, rolling element guided

## 4. Special features:

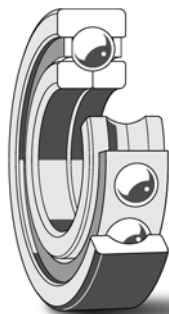
- HC4** Full ceramic bearing
- HC5** Ceramic ball set

## Technical features

	Single row ACBB	Double row ACBB	Four-point contact ACBB
<b>Boundary dimensions</b>	In accordance with ISO 15-1998	In accordance with ISO 15-1998	In accordance with ISO 15-1998
<b>Tolerances</b>	ABEC 3 (P6)	ABEC 3	ABEC 1
<b>Heat stabilization</b>	257° F (125° C)	257° F (125° C)	257° F (125° C)
<b>Misalignment</b>	None – contact SKF	None – contact SKF	None – contact SKF
<b>Cage materials</b>	Polyamide (P) Machined brass (M) Pressed steel (J)	Polyamide (TN9) (limited sizes only) Pressed steel (H)	Machined brass (M, MA)
<b>Axial load – max</b>	1.4 x C <sub>0</sub> for single or tandem mounted bearings  0.7 x C <sub>0</sub> for duplex mounted bearings	0.7 x C <sub>0</sub> – Conrad F <sub>a</sub> / F <sub>r</sub> ≤ 0.3	0.7 x C <sub>0</sub>
<b>Seals</b>	Not available	2RS1 – Synthetic rubber (NBR)	Not available
<b>Shields</b>	Consult SKF for NILOS ring options	2Z – Stamped steel	Consult SKF for NILOS ring options



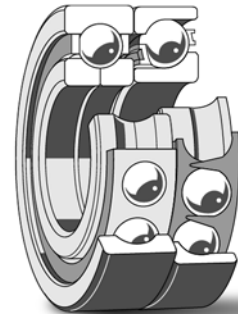
*Single row  
angular contact  
ball bearing  
(data tables on page 62)*



*Four-point  
angular contact  
ball bearing  
(data tables on page 65)*



*Double row  
angular contact  
ball bearing  
(data tables on page 69)*



*Thrust pack  
angular contact  
ball bearing  
(data tables on page 68)*



## Introduction

SKF standard angular contact ball bearings are available with axial clearances, preloads and high precision. Single row angular contact ball bearings are designed to accommodate axial loads acting in one direction. Under radial loads, an induced force acting in the axial direction is produced which must be counteracted. Consequently, the single bearings are normally adjusted against a second bearing.

SKF angular contact ball bearings are produced in a wide variety of designs and sizes. Those commonly used in general engineering are shown in this catalog:

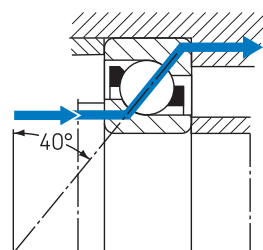
- Single row bearings
- Double row bearings
- Four-point contact ball bearings
- Thrust pack

## Basic design

Angular contact ball bearings have raceways in the inner and outer rings that are displaced with respect to each other in the direction of the bearing axis. This means that they are particularly suitable for the accommodation of combined loads; for example, simultaneously acting radial and axial loads.

The axial load carrying capacity of angular contact ball bearings increases with increasing contact angle  $\alpha$ . This is defined as the angle between the line joining the points of contact between the ball and the raceways in the radial plane, along which the load is transmitted from one raceway to the other, and a line perpendicular to the bearing axis. For single row bearings, the magnitude of the contact angle is indicated by a suffix in the designation (B = 40 degrees) (**Figure 1**). For double row angular contact ball bearings, the contact angle is 30 degrees and for QJ four-point angular contact ball bearings the contact angle is 35 degrees and neither is indicated in the nomenclature.

Figure 1



### Angular contact ball bearings, single row

Single row angular contact ball bearings can accommodate combined loads however the axial loads can only act in one direction (**Figure 1**). Under radial loads, a force acting in the axial direction is produced which must be counteracted. Consequently, the bearings are normally adjusted against a second bearing.

The single row angular contact ball bearings shown in the tables have one high and one low shoulder on each ring, enabling a large number of balls to be incorporated. This gives the bearings relatively high load carrying capacity. The contact angle is 40° (suffix B) and the bearings are therefore suitable for heavy axial loads. They are of non-separable design and permit relatively high-speed operation.

Bearings of the BE design feature an increased load carrying capacity, and either machined brass (M) or glass fiber reinforced polyamide 6-6 (P) cages as standard.

The single row angular contact ball bearings are produced in two standard versions for different design purposes. The standard design (no additional designation suffix such as BEP) is intended for arrangements where only one bearing is used at each bearing position (**Figure 4**, page 58).

The most common version, identified by suffix CB (universal matching) is designed for arrangements where two or more bearings are mounted immediately adjacent to each other in random order (back-to-back, face-to-face or tandem). Because of demand, the larger sized bearings are only produced with universal matching (suffix CB) (**Figure 5**, page 58).

## SKF Explorer class bearings

High performance SKF Explorer angular contact ball bearings are **printed in blue** in the product tables. SKF Explorer bearings retain the designation of the earlier standard bearings, e.g. 7208 BECBP. However, each bearing and its box are marked with the name "SKF Explorer". Additional details on SKF Explorer performance class bearings can be found on page 23.

## Product highlights

### High running accuracy and speed capabilities

Angular contact ball bearings feature high radial and axial load capacity combined with high speed capabilities. SKF ACBB are made as standard to ISO P6 or ABMA ABEC 3 precision as standard.

### Universal matching

Angular contact ball bearings are manufactured for universal mounting in multiple arrangements, including face-to-face, back-to-back and tandem.

### Large product assortment

Available in a wide range (10 to 240 mm inside bore diameter) with cage and clearance / preload combinations. The double row design is available with a choice of shields, seals and snap rings as well as max-type bearings with a filling slot. Special application designs include 4-point contact and thrust pack.

### Machined brass cage for heavy duty applications

The machined brass cage provides better performance and longer service life under harsh conditions and can be used in applications where a standard metal or plastic cage is normally used.

### Meets ANSI pump requirements

Angular contact ball bearings are widely used in centrifugal pump applications and are manufactured in accordance with ANSI pump standards.

## Introduction

### Angular contact ball bearings, double row (Figure 1a)

SKF double row ball bearings are designed with solid or one-piece inner and outer rings with contact angles converging outside the bearing providing overall system rigidity.

The double row angular contact ball bearings are available in two styles, Conrad (suffix A) and Max type (suffix E). The more popular style is the Conrad type. This assembly uses a slight elastic deflection of the outer ring to insert the "last ball". This results in uninterrupted raceways with smooth running, and significant thrust carrying capacity in both directions.

Bearings of the Max type design (suffix E) have a filling slot for inserting the balls. This permits assembly with a greater number of balls than in the previously described Conrad type bearings.

Filling slot bearing features are similar to those of the Conrad type; however, because of the greater number of balls (with the exception of a few sizes) their radial load carrying capacity is often higher than that of the Conrad type. On the other hand, heavy thrust loads can be accommodated in only one direction. These bearings should be mounted so that the predominant axial load acting on the shaft is directed away from the filling slot (Figure 1a). Thrust loads in the direction of the filling slot **should not** exceed a thrust to radial load ratio of  $F_a / F_r = 0.3$ .

Part number markings are normally located on either the side face or the O.D. The side face marking is always on the side opposite the filling slot, and the O.D. marking is offset from the center away from the side with the filling slot. Therefore, even double sealed or shielded bearings with the filling slot covered from view can be oriented correctly.

### Angular contact ball bearings, four-point (Figure 1b)

Four-point contact ball bearings are single row angular contact ball bearings having raceways which are designed to enable axial loads to be accommodated in both directions. They need less axial space than double row bearings. The four-point contact ball bearings shown in the following tables have a contact angle of  $35^\circ$  and a two-part inner ring, allowing a large number of balls to be incorporated, thus providing a high load carrying capacity. The bearings are separable, i.e. the inner ring halves and the outer ring with ball and cage assembly can be mounted individually.

### Angular contact ball bearings, thrust pack

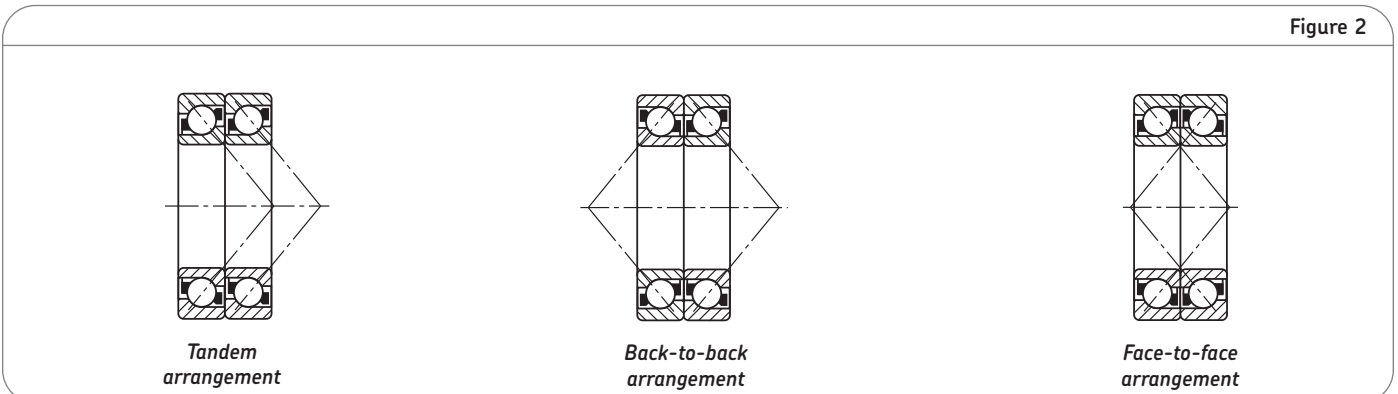
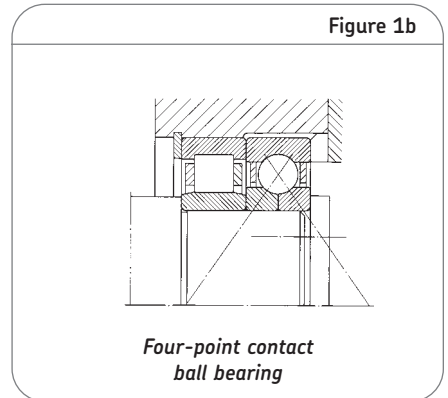
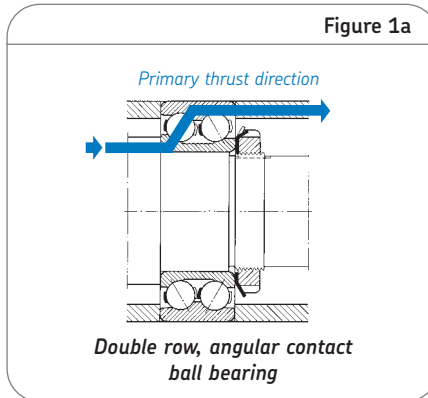
A thrust pack bearing consists of a standard QJ bearing and a single row angular contact bearing (BEGAM version) matched together and are intended for applications having predominate axial load in one direction. The axial load should not reverse direction during operation except for transient conditions such as at machine start up or shut-down, else the BEGAM bearing may become unloaded and have possible skidding problems. These bearings are matched in sets and are serialized and therefore **are not** interchangeable amongst sets.

## Variations

### Angular contact ball bearings, single row for universal matching

These bearings are specially manufactured so that when mounted in random order (back-to-back, face-to-face or tandem) (Figure 2), but immediately adjacent to each other, the predetermined value of axial internal clearance or preload will be attained. An even distribution of load will occur without shims or similar devices.

The standard bearings for universal matching carry the suffix CB where C indicates clearance and B the magnitude of the clearance (Figure 3). Bearings with a smaller or greater clearance are also available (suffixes CA and CC, respectively) as are bearings with light, moderate or heavy preload, (suffixes GA, GB and GC, respectively where G = preload or negative clearance). When ordering bearings for universal matching; for example 7206 BECB, it is necessary to indicate the number of individual bearings required since SKF does not stock these in sets.



Limiting speeds

The limiting speeds listed in the bearing tables are guideline values and are valid for single row bearings. The values under oil lubrication are maximum values and the values under grease lubrication are maximum values that can be attained using a good quality grease of a soft consistency.

If single bearings are to be adjusted against each other in matched sets of two, three or four bearings, the limiting speed values given in the bearing tables **must** be reduced. Reduction factors are given in the table below.

Reduction factors for limiting speeds angular contact ball bearings, single row

Bearing arrangement	Reduction factors
Two bearings	0.80
Three bearings	0.70
Four bearings	0.65

Load carrying capacity of bearing sets

The values given in the bearing tables for the basic dynamic load ratings apply to single bearings. The basic dynamic and static load ratings for sets of bearings arranged back-to-back, face-to-face or in tandem is obtained by multiplying the C value for a single bearings by:

Two bearings	1.62 x C
Three bearings	2.16 x C
Four bearings	2.64 x C

Where the basic static load rating is concerned, the table value  $C_0$  should be multiplied by the number of bearings in the set, 2, 3 or 4.

For example, a pair of 7205 BEGAP angular contact ball bearings will have the following values:

$C$  (single) = 3510 lbs  
 $C$  (pair) = 3510 x 1.62 = 5690 lbs

$C_0$  (single) = 2290 lbs  
 $C_0$  (pair) = 2290 x 2 = 4580 lbs

Grease speed (single) = 10000 rpm  
 Grease speed (pair) = 10000 x 0.8 = 8000 rpm

The C,  $C_0$  and speed limits of the pair of bearings must be used for calculation purposes in this case.

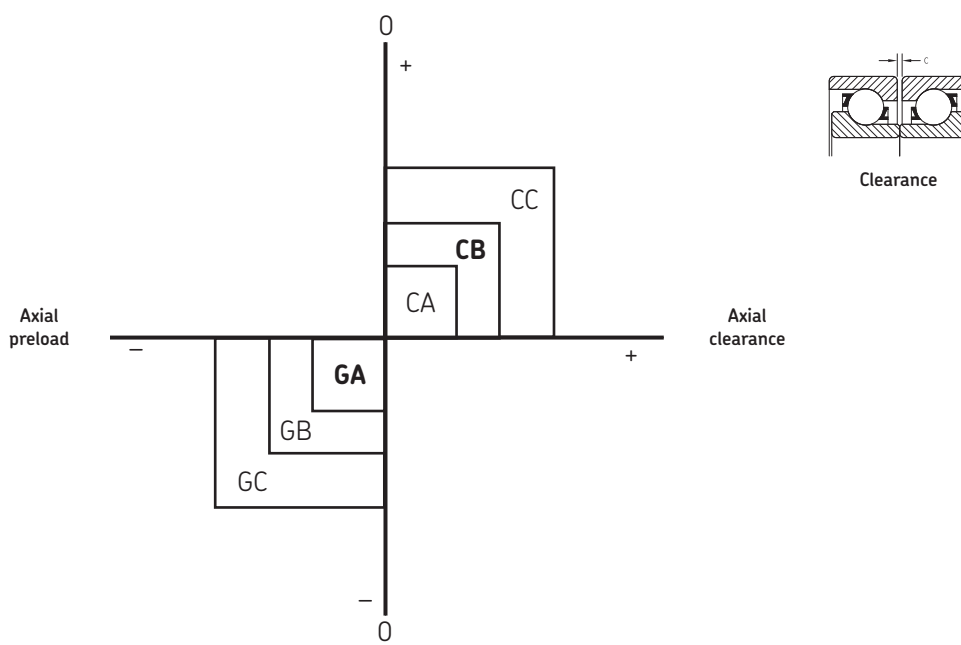
Special solutions using angular contact ball bearings

- Precision angular contact ball bearings for machine tools
- Large-size single and double row bearings for heavy engineering applications
- Hub units produced for the automotive industry

The precision angular contact ball bearings are available with a contact angle of 15° (suffix CD) or 25° (suffix ACD) and can be supplied either individually or in matched sets of two, three or four bearings.

Details on these special solution products are available in other SKF publications, which can be supplied upon request.

Figure 3

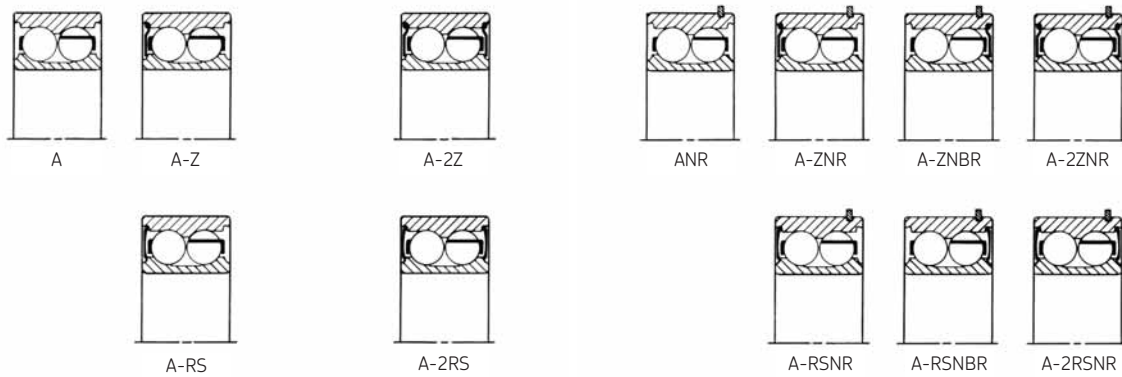


## Introduction

Figure 3a

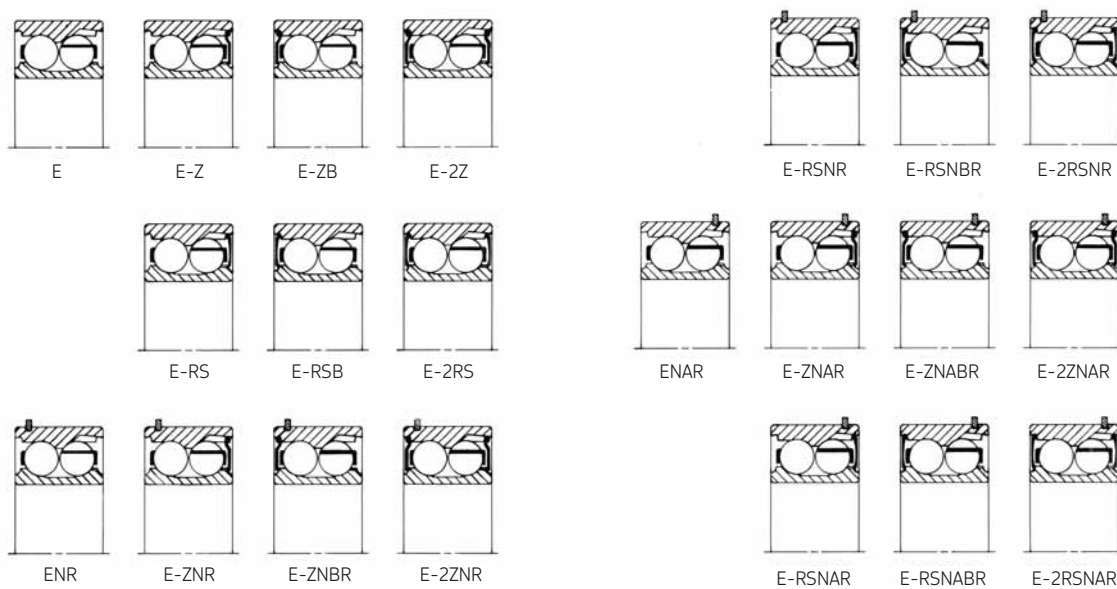
### Conrad type

Designations for Conrad type double-row ball bearings with various combinations of seals, shields and snap rings



### Max type

Designations for Max type (single slot) filling slot double-row ball bearings with various combinations of seals, shields and snap rings



**Angular contact ball bearings, double row**

**Shielded (Z) and sealed (RS) bearings**

In addition to the open designs, most SKF double row ball bearings are offered with shields or seals, on either one or both sides. In most sizes, open bearings also contain seal grooves on the inner and/or outer rings.

Shields (suffix Z and 2Z) are non-contacting. They form a small gap with a chamfer on the inner ring. They are made from pressed steel and are fixed into an outer ring groove. This non-contacting closure is designed to retain lubricant and exclude larger particles of foreign matter. These shielded bearings are primarily intended for applications with inner ring rotation. Single shielded bearings can be used with oil or grease lubrication, while double shielded bearings are packed with a predetermined quantity of grease, providing maintenance-free operation for the life of the bearings.

Most bearings are also available with either one or two contacting seals, (suffix -RS and -2RS). The seals consist of an oil and wear resistant elastomer bonded to a metal plate. The O.D. of either of the seal is firmly fixed into an outer ring groove. The lip at the I.D. of the seal contacts an inner ring seal chamfer for effective closure. This seal effectively excludes solid contaminants and moisture from the inside surfaces of the bearing. The permissible operating temperature range for the seals with a proper lubricant is -40° to +250° F (-40° to +120° C). Single sealed bearings can be

regreased while double sealed bearings are greased for life.

**They should not be heated at temperatures greater than 250° F (120° C) prior to mounting and must on no account be washed.**

**Snap rings**

Snap rings (suffix NR) in the outer ring can provide an easy method of locating the bearing in the application. The snap rings and the snap ring grooves in the outer rings generally conform to ABMA Standard 20 and ISO standard 464. Important snap ring dimensions are shown in the deep groove ball bearings section, **Table 4** page 57.

**Combination of seals, shields and snap rings**

Most bearings are available in various combinations of seals, shields and snap rings. **(Figure 3a)** illustrates the designations for Conrad type bearings in various configurations and shows the same for max-type filling slot bearings.

In a single sealed or shielded Conrad type bearing with snap ring, the snap ring is normally on the opposite side of the seal or shield. An additional suffix B indicates the snap ring is on the same side as the seal or shield, e.g. NBR.

Max type bearings use a suffix A to indicate that the snap ring is on the side of the filling slot (NAR). Suffix B in single seal or shield designation indicates that the seal or shield is on the opposite side of the filling slot (RSB or ZB).

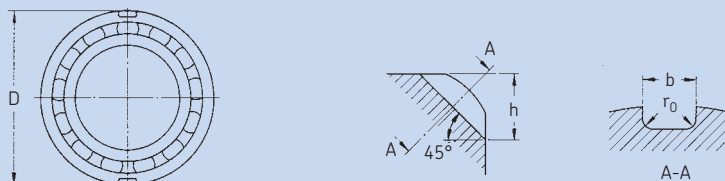
**Angular contact ball bearings, four-point**

**Locating slots**

Four-point contact ball bearings are designed to accommodate predominantly axial loads and are arranged as thrust bearings with radial clearance in the housing in many applications. To permit simple location and prevent rotation of the outer ring, all bearings with an outside diameter of 160 mm and above are provided with two locating slots in the outer ring (N2 design). The dimensions of these locating slots are given in **Table 1**.

**Table 1**

**Locating slots in outer ring of four-point contact ball bearings**



Outside diameter		Dimensions											
		Series QJ 2				Series QJ 3							
D over	incl.	b	h	r <sub>0</sub>	b	h	r <sub>0</sub>						
mm		mm	in	mm	in	mm	in	mm	in				
in		mm	in	mm	in	mm	in	mm	in				
-	170	6.5	0.256	8.1	0.319	1	0.039	8.5	0.335	10.1	0.398	2	0.079
-	6.6929												
170	210	8.5	0.335	10.1	0.398	2	0.787	10.5	0.413	11.7	0.461	2	0.079
6.6929	8.2677												
210	270	10.5	0.413	11.7	0.461	2	0.787	10.5	0.413	11.7	0.461	2	0.079
8.2677	10.6299												
270	400	10.5	0.413	12.7	0.500	2	0.787	10.5	0.413	12.7	0.500	2	0.079
10.6299	15.784												

## Introduction

### Internal clearance

#### Axial internal clearance single row angular contact ball bearings

Internal clearance in a single row angular contact ball bearing is only obtained after mounting and is dependent on adjustment against a second bearing that provides axial location in the opposite direction.

Bearings for universal pairing (suffix CB) are the standard SKF bearings for paired mounting in random order (back-to-back, face-to-face or tandem). Bearings can be supplied with smaller axial internal clearance (suffix CA) or larger (suffix CC) or with preload (suffixes GA, GB and GC) for universal pairing.

Bearings identified by suffix CA, CB or CC can be mounted immediately adjacent to each other in any order and two or more bearings may be used. Bearings with preload of the GA, GB and GC designs can only be arranged in pairs, otherwise the preload will increase.

The values of axial internal clearance for the classes CA, CB and CC can be found in **Table 2**. They are valid for bearings arranged back-to-back or face-to-face before mounting and under zero measuring load. Preload values for classes GA, GB and GC are given in **Table 2a**. **Table 3** shows a conversion from the old preload suffixes to the current suffix.

Table 2

Unmounted axial internal clearance of single row angular contact ball bearings of series 72B (E), 73B (E) and 74B (B) when arranged in random pairs (back-to-back or face-to-face)

Bore diameter		Axial internal clearance											
		CA				CB				CC			
d		min	max	min	max	min	max	min	max	min	max	min	max
over	incl.	μm		in		μm		in		μm		in	
mm													
-	10	4	12	0.0002	0.0005	14	22	0.0006	0.0009	22	30	0.0009	0.0012
10	18	5	13	0.0002	0.0005	15	23	0.0006	0.0009	24	32	0.0009	0.0013
18	30	7	15	0.0003	0.0006	18	26	0.0007	0.0010	32	40	0.0013	0.0016
30	50	9	17	0.0004	0.0007	22	30	0.0009	0.0012	40	48	0.0016	0.0019
50	80	11	23	0.0004	0.0009	26	38	0.0010	0.0015	48	60	0.0019	0.0024
80	120	14	26	0.0006	0.0010	32	44	0.0013	0.0017	55	67	0.0022	0.0026
120	180	17	29	0.0007	0.0011	35	47	0.0014	0.0019	62	74	0.0024	0.0029
180	250	21	37	0.0008	0.0015	45	61	0.0018	0.0024	74	90	0.0029	0.0035
250	315	26	42	0.0010	0.0017	52	68	0.0020	0.0027	90	106	0.0035	0.0042

Radial clearance [≈] 0.85 axial clearance.

Table 2a

Unmounted preload of single row angular contact ball bearings of series 72B (E), 73B (E) and 74 (B) when arranged in random pairs (back-to-back or face-to-face)

Bore diameter		Preload																					
		GA				GB				GC													
d		min	max	min	max	max	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max		
over	incl.	μm		in		N	lbf	μm		in		N	lbf	μm		in		N	max	min	max		
mm																				lbf	lbf		
10	18	4	-4	0.0002	-0.0002	80	18	-2	-10	-0.0001	-0.0004	30	330	7	74	-8	-16	-0.0003	-0.0006	230	660	52	149
18	30	4	-4	0.0002	-0.0002	120	27	-2	-10	-0.0001	-0.0004	40	480	9	108	-8	-16	-0.0003	-0.0006	340	970	76	218
30	50	4	-4	0.0002	-0.0002	160	36	-2	-10	-0.0001	-0.0004	60	630	13	142	-8	-16	-0.0003	-0.0006	450	1 280	101	288
50	80	6	-6	0.0002	-0.0002	380	86	-3	-15	-0.0001	-0.0006	140	1 500	31	338	-12	-24	-0.0005	-0.0009	1 080	3 050	243	686
80	120	6	-6	0.0002	-0.0002	410	92	-3	-15	-0.0001	-0.0006	150	1 600	34	360	-12	-24	-0.0005	-0.0009	1 150	3 250	259	731
120	180	6	-6	0.0002	-0.0002	540	122	-3	-15	-0.0001	-0.0006	200	2 150	45	484	-12	-24	-0.0005	-0.0009	1 500	4 300	337	968
180	250	8	-8	0.0003	-0.0003	940	212	-4	-20	-0.0002	-0.0008	330	3 700	74	833	-16	-32	-0.0006	-0.0013	2 650	7 500	596	1 688
250	315	8	-8	0.0003	-0.0003	1 080	243	-4	-20	-0.0002	-0.0008	380	4 250	85	956	-16	-32	-0.0006	-0.0013	3 000	8 600	674	1 935

### Axial internal clearance double row angular contact ball bearings

Internal clearances for double row angular contact ball bearings differ from deep groove ball bearings in that axial rather than radial clearance is specified. **Table 4** shows the axial clearance of the SKF double row angular contact bearings in four standard clearance ranges; C2 (less than normal clearance), normal clearance, C3 (greater than normal clearance), and C4 (greater than C3 clearance). These are valid for bearings before mounting under zero measuring load.

### Axial internal clearance four-point contact ball bearings

Standard manufacture SKF four-point contact ball bearings have Normal axial internal clearance. Most sizes can also be supplied with greater or smaller internal clearance than Normal. Availability should be checked before ordering.

The values for the axial internal clearance are shown in **Table 5** and are for bearings before mounting under zero measuring load.

### Old versus new designations on SRACBB (Table 3)

Use this table to determine which new preload designations replace old preload designations. Simply find the bearing bore size/diameter on the left, and the old preload across the top. The new designation is at the point where the bore size/diameter row intersects with the old preload column.

**\*Example:** 7308 BEAG1Y = 08 bore size, 40 mm bore diameter G1 (100 lbs) preload  
Replace with: 7308 BEGBY

Table 3

### Old/new preload designation interchange, single row angular contact ball bearings 72xx, 73xx and 74xx series

Bore size	Bore diameter (mm)	Old preload suffix					
		G02	G05	G1*	G2	G3	G5
00	10	GB	GB	GC	–	–	–
01	12	GB	GB	GC	–	–	–
02	15	GB	GB	GC	–	–	–
03	17	GB	GB	GC	–	–	–
04	20	GA	GB	GC	–	–	–
06	30	GA	GB	GC	–	–	–
07	35	GA	GB	GB	GC	–	–
<b>08*</b>	<b>40*</b>	<b>GA</b>	<b>GB</b>	<b>GB*</b>	<b>GC</b>	–	–
09	45	GA	GB	GB	GC	–	–
10	50	GA	GB	GB	GC	–	–
11	55	GA	GA	GB	GB	GB	GC
12	60	GA	GA	GB	GB	GB	GC
13	65	GA	GA	GB	GB	GB	GC
14	70	GA	GA	GB	GB	GB	GC
15	75	GA	GA	GB	GB	GB	GC
16	80	GA	GA	GB	GB	GB	GC
17	85	GA	GA	GB	GB	GB	GC
18	90	GA	GA	GB	GB	GB	GC
19	95	GA	GA	GB	GB	GB	GC
20	100	GA	GA	GB	GB	GB	GC
21	105	GA	GA	GB	GB	GB	GC
22	110	GA	GA	GB	GB	GB	GC
24	120	GA	GA	GB	GB	GB	GC
26	130	GA	GA	GB	GB	GB	GC
28	140	GA	GA	GB	GB	GB	GC
30	150	GA	GA	GB	GB	GB	GC
32	160	GA	GA	GB	GB	GB	GC
34	170	GA	GA	GB	GB	GB	GC
36	180	GA	GA	GB	GB	GB	GC

Table 4

### Axial internal clearance of Conrad type and filling slot double row angular contact ball bearings 32 and 33 series (values in 0.001 mm)

Bore diameter		Axial internal clearance															
		C2				Normal				C3				C4			
d	incl.	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
mm		µm	in	µm	in	µm	in	µm	in	µm	in	µm	in	µm	in	µm	in
–	10	1	11	0.0000	0.0004	5	21	0.0002	0.0008	12	28	0.0005	0.0011	40	60	0.0016	0.0024
10	18	1	12	0.0000	0.0005	6	23	0.0002	0.0009	13	31	0.0005	0.0012	42	64	0.0017	0.0025
18	24	2	14	0.0001	0.0006	7	25	0.0003	0.0010	16	34	0.0006	0.0013	43	69	0.0017	0.0027
24	30	2	15	0.0001	0.0006	8	27	0.0003	0.0011	18	37	0.0007	0.0015	45	75	0.0018	0.0030
30	40	2	16	0.0001	0.0006	9	29	0.0004	0.0011	21	40	0.0008	0.0016	48	84	0.0019	0.0033
40	50	2	18	0.0001	0.0007	11	33	0.0004	0.0013	23	44	0.0009	0.0017	51	90	0.0020	0.0035
50	65	3	22	0.0001	0.0009	13	36	0.0005	0.0014	26	48	0.0010	0.0019	55	96	0.0022	0.0038
65	80	3	24	0.0001	0.0009	15	40	0.0006	0.0016	30	54	0.0012	0.0021	61	106	0.0024	0.0042
80	100	3	26	0.0001	0.0010	18	46	0.0007	0.0018	35	63	0.0014	0.0025	70	123	0.0028	0.0048
100	110	4	30	0.0002	0.0012	22	53	0.0009	0.0021	42	73	0.0017	0.0029	80	148	0.0031	0.0058



## Introduction

Table 5

### Axial internal clearance of four-point contact ball bearings

Bore diameter d		Axial internal clearance																	
		C2				Normal				C3				C4					
over	incl.	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max		
mm	in	μm	in	μm	in	μm	in	μm	in	μm	in	μm	in	μm	in	μm	in		
10	18	0.3937	0.7087	15	55	0.0006	0.0022	45	85	0.0018	0.0033	75	125	0.0030	0.0049	115	165	0.0045	0.0065
18	40	0.7087	1.5748	26	66	0.0010	0.0026	56	106	0.0022	0.0042	96	146	0.0038	0.0057	136	186	0.0054	0.0073
40	60	1.5748	2.3622	36	86	0.0014	0.0034	76	126	0.0030	0.0050	116	166	0.0046	0.0065	156	206	0.0061	0.0081
60	80	2.3622	3.1496	46	96	0.0018	0.0038	86	136	0.0034	0.0054	126	176	0.0050	0.0069	166	226	0.0065	0.0089
80	100	3.1496	3.9370	56	106	0.0022	0.0042	96	156	0.0038	0.0061	136	196	0.0054	0.0077	186	246	0.0073	0.0097
100	140	3.9370	5.5118	66	126	0.0026	0.005	116	176	0.0046	0.0069	156	216	0.0061	0.0085	206	266	0.0081	0.0105
140	180	5.5118	7.0866	76	156	0.0030	0.0061	136	196	0.0054	0.0077	176	246	0.0069	0.0097	226	296	0.0089	0.0116
180	220	7.0866	8.6614	96	176	0.0038	0.0069	156	226	0.0061	0.0089	206	276	0.0081	0.0109	256	326	0.0101	0.0128

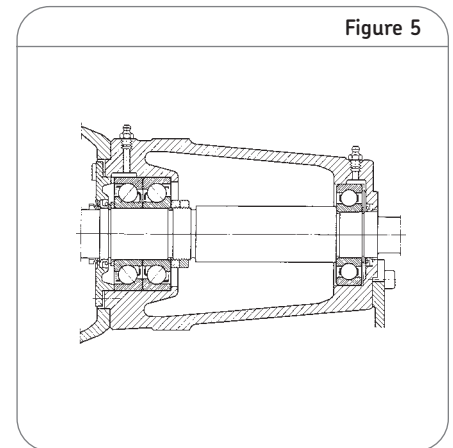
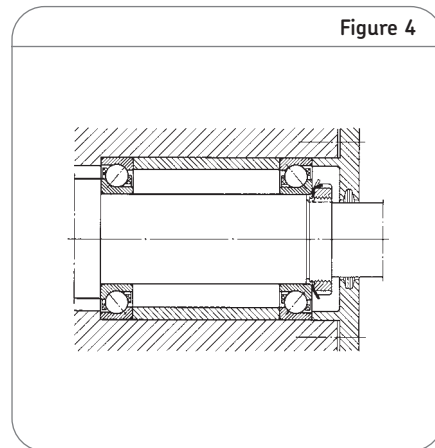
Radial clearance [~] 0.7 axial clearance.

### Design of bearing arrangements

When designing bearing arrangements using single row angular contact ball bearings it is necessary to pay attention to the special characteristics of the bearings. Because of their internal design they cannot be used singly and must be used either with a second bearing (Figure 4) or as bearing sets (Figure 5).

As already mentioned under "Internal clearance", it is necessary to adjust the two single row angular contact ball bearings of an arrangement against each other until the operational clearance or requisite preload is obtained.

Arrangements using bearings for universal mounting, where the bearings are immediately adjacent to each other, do not require adjustment. Here, the required operational preload or clearance is obtained by choosing an appropriate preload or clearance class as well as suitable fits for the bearings in the housing and on the shaft. For more specific mounting instructions visit the SKF website at [www.skf.com/mount](http://www.skf.com/mount) or contact SKF Applications Engineering.





## Loads

### Equivalent dynamic bearing load for single row bearings of the B and BE designs when mounted as single bearings or paired in tandem

$$P = F_r \text{ when } F_a / F_r \leq 1.14$$

$$P = 0.35 F_r + 0.57 F_a \text{ when } F_a / F_r > 1.14$$

where

$P$  = equivalent dynamic bearing load

$F_r$  = radial load acting on the bearing

$F_a$  = axial load acting on the bearing

When determining the axial force  $F_a$  reference should be made to the following section.

### Equivalent dynamic bearing load for bearings mounted in pairs, back-to-back or face-to-face

$$P = F_r + 0.55 F_a$$

when  $F_a / F_r \leq 1.14$

$$P = 0.57 F_r + 0.93 F_a$$

when  $F_a / F_r > 1.14$

$F_a$  and  $F_r$  are the forces acting on the bearing pair.

### Equivalent dynamic bearing load for double row bearings

For the double row angular contact bearings described in this catalog, the equivalent dynamic bearing load is

$$P = XF_r + YF_a$$

where

$P$  = equivalent dynamic bearing load

$X$  = radial load factor for the bearing

$Y$  = axial load factor for the bearing

$F_r$  = actual radial bearing load

$F_a$  = actual axial bearing load

$X$  and  $Y$  factors are given for each bearing in **Table 6a** for Conrad type and **Table 6b** for Max type they change depending on the load ratio  $F_a / F_r$  in relationship to the reference value  $e$ .

### Equivalent dynamic bearing load for four-point contact bearings

When four-point contact ball bearings with a contact angle of  $35^\circ$  are used as locating bearings to accommodate radial and axial loads, the equivalent dynamic bearing load can be obtained from

$$P = F_r + 0.66 F_a$$

when  $F_a / F_r \leq 0.95$

$$P = 0.6 F_r + 1.07 F_a$$

when  $F_a / F_r > 0.95$

It should be remembered that satisfactory performance of the ball set of four-point contact ball bearings is only obtained when the balls are in contact with the raceways at two points, i.e. when the axial load

$$F_a \geq 1.27 F_r$$

If the four-point contact ball bearing is used as a thrust bearing in combination with other radial bearings, and it is mounted with radial clearance in the housing, the equivalent dynamic bearing load becomes

$$P = 1.07 F_a$$

## Minimum load

**In order to provide satisfactory operation of all ball and roller bearings they must always be subjected to a given minimum load.**

This is also true of angular contact ball bearings, particularly if they run at high speeds where the inertia forces of the balls and cage, and the friction in the lubricant can have a detrimental influence on the rolling conditions in the bearing and may cause damaging sliding movements to occur between the balls and the raceways.

The requisite minimum radial load to be applied in such cases can be determined by using the Interactive Engineering Catalog on the SKF website [www.skf.com](http://www.skf.com) or by contacting SKF Applications Engineering. However, the weight of the components supported by the bearing, together with the external forces, often exceeds the requisite minimum load. If this is not the case, an additional radial load **must** be applied to the bearing; for example, by increasing belt tension, by applying a preload to the inner or outer rings, or by using springs.

## Frequency vibration data

Frequency vibration data is available on the SKF website [www.skf.com](http://www.skf.com) in the Interactive Engineering Catalog or by contacting SKF Applications Engineering.

## Introduction

Table 6a

Calculation factors for double row angular contact ball bearings, Conrad type

Designation	Dynamic						Static $Y_0$
	e	$F_a / F_r \leq e$		$F_a / F_r \geq e$			
		X	Y	X	Y		
3200 A	0.80	1	0.78	0.63	1.24	0.66	
3201 A	0.80	1	0.78	0.63	1.24	0.66	
3202 A	0.80	1	0.78	0.63	1.24	0.66	
3203 A	0.80	1	0.78	0.63	1.24	0.66	
3204 A	0.80	1	0.78	0.63	1.24	0.66	
3205 A	0.80	1	0.78	0.63	1.24	0.66	
3206 A	0.80	1	0.78	0.63	1.24	0.66	
3207 A	0.80	1	0.78	0.63	1.24	0.66	
3208 A	0.80	1	0.78	0.63	1.24	0.66	
3209 A	0.80	1	0.78	0.63	1.24	0.66	
3210 A	0.80	1	0.78	0.63	1.24	0.66	
3211 A	0.80	1	0.78	0.63	1.24	0.66	
3212 A	0.80	1	0.78	0.63	1.24	0.66	
3213 A	0.80	1	0.78	0.63	1.24	0.66	
3214 A	0.80	1	0.78	0.63	1.24	0.66	
3215 A	0.80	1	0.78	0.63	1.24	0.66	
3216 A	0.80	1	0.78	0.63	1.24	0.66	
3217 A	0.80	1	0.78	0.63	1.24	0.66	
3218 A	0.80	1	0.78	0.63	1.24	0.66	
3219 A	0.80	1	0.78	0.63	1.24	0.66	
3220 A	0.80	1	0.78	0.63	1.24	0.66	
3304 A	0.80	1	0.78	0.63	1.24	0.66	
3305 A	0.80	1	0.78	0.63	1.24	0.66	
3306 A	0.80	1	0.78	0.63	1.24	0.66	
3307 A	0.80	1	0.78	0.63	1.24	0.66	
3308 A	0.80	1	0.78	0.63	1.24	0.66	
3309 A	0.80	1	0.78	0.63	1.24	0.66	
3310 A	0.80	1	0.78	0.63	1.24	0.66	
3311 A	0.80	1	0.78	0.63	1.24	0.66	
3312 A	0.80	1	0.78	0.63	1.24	0.66	
3313 A	0.80	1	0.78	0.63	1.24	0.66	
3314 A	0.80	1	0.78	0.63	1.24	0.66	
3315 A	0.80	1	0.78	0.63	1.24	0.66	
3316 A	0.80	1	0.78	0.63	1.24	0.66	
3317 A	0.80	1	0.78	0.63	1.24	0.66	
3318 A	0.80	1	0.78	0.63	1.24	0.66	

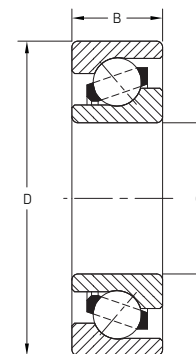
Table 6b

Calculation factors for double row angular contact ball bearings,  
Max type

Designation	Dynamic e	$F_a / F_r \leq e$		$F_a / F_r \geq e$		Static $Y_0$
		X	Y	X	Y	
3204 E	0.68	1	0.92	0.67	1.44	0.76
3205 E	0.68	1	0.92	0.67	1.44	0.76
3206 E	0.68	1	0.92	0.67	1.44	0.76
3207 E	0.80	1	0.78	0.63	1.24	0.66
3208 E	0.80	1	0.78	0.63	1.24	0.66
3209 E	0.80	1	0.78	0.63	1.24	0.66
3210 E	0.80	1	0.78	0.63	1.24	0.66
3211 E	0.80	1	0.78	0.63	1.24	0.66
3212 E	0.80	1	0.78	0.63	1.24	0.66
3213 E	0.80	1	0.78	0.63	1.24	0.66
3214 E	0.80	1	0.78	0.63	1.24	0.66
3215 E	0.80	1	0.78	0.63	1.24	0.66
3216 E	0.80	1	0.78	0.63	1.24	0.66
3217 E	0.80	1	0.78	0.63	1.24	0.66
3218 E	0.80	1	0.78	0.63	1.24	0.66
3304 E	0.80	1	0.78	0.63	1.24	0.66
3305 E	0.80	1	0.78	0.63	1.24	0.66
3306 E	0.80	1	0.78	0.63	1.24	0.66
3307 E	0.80	1	0.78	0.63	1.24	0.66
3308 E	0.80	1	0.78	0.63	1.24	0.66
3309 E	0.80	1	0.78	0.63	1.24	0.66
3310 E	0.80	1	0.78	0.63	1.24	0.66
3311 E	0.80	1	0.78	0.63	1.24	0.66
3312 E	0.80	1	0.78	0.63	1.24	0.66
3313 E	0.80	1	0.78	0.63	1.24	0.66
3314 E	0.80	1	0.78	0.63	1.24	0.66
3315 E	0.80	1	0.78	0.63	1.24	0.66
3316 E	0.80	1	0.78	0.63	1.24	0.66

# Angular contact ball bearings

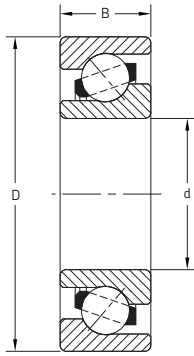
Single row  
Standard and *SKF Explorer*  
Series: 7200 BE — 7248 B  
Size: 10 mm — 240 mm  
0.3937 in — 9.4488 in



These bearings are typically mounted in pairs. Refer to page 52 for details.

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
7200 BE	10	0.3937	30	1.1811	9	0.3543	7 020	1 580	3 350	750	30 000	30 000	0.03	0.07
7201 BE	12	0.4724	32	1.2598	10	0.3937	7 610	1 710	3 800	850	26 000	26 000	0.04	0.08
7202 BE	15	0.5906	35	1.3780	11	0.4331	8 840	1 990	4 800	1 080	24 000	24 000	0.05	0.10
7203 BE	17	0.6693	40	1.5748	12	0.4724	11 000	2 470	6 100	1 370	22 000	22 000	0.07	0.15
7204 BE	20	0.7874	47	1.8504	14	0.5512	13 300	2 990	8 300	1 870	18 000	19 000	0.11	0.24
7205 BE	25	0.9843	52	2.0472	15	0.5906	15 600	3 510	10 200	2 290	17 000	17 000	0.14	0.31
7206 BE	30	1.1811	62	2.4409	16	0.6299	24 000	5 400	15 600	3 510	14 000	14 000	0.21	0.46
7207 BE	35	1.3780	72	2.8346	17	0.6693	31 000	6 970	20 800	4 680	12 000	12 000	0.30	0.66
7208 BE	40	1.5748	80	3.1496	18	0.7087	36 500	8 210	26 000	5 840	11 000	11 000	0.39	0.86
7209 BE	45	1.7717	85	3.3465	19	0.7480	38 000	8 540	28 000	6 290	10 000	10 000	0.44	0.97
7210 BE	50	1.9685	90	3.5433	20	0.7874	40 000	8 990	30 500	6 860	9 000	9 000	0.51	1.12
7211 BE	55	2.1654	100	3.9370	21	0.8268	46 200	10 400	38 000	8 540	7 500	8 000	0.66	1.46
7212 BE	60	2.3622	110	4.3307	22	0.8661	61 000	13 700	45 500	10 200	7 500	7 500	0.85	1.88
7213 BE	65	2.5591	120	4.7244	23	0.9055	66 300	14 900	54 000	12 100	6 300	6 700	1.10	2.43
7214 BE	70	2.7559	125	4.9213	24	0.9449	72 000	16 200	60 000	13 500	6 700	6 700	1.18	2.61
7215 BE	75	2.9528	130	5.1181	25	0.9843	70 200	15 800	64 000	14 400	5 600	6 000	1.29	2.80
7216 BE	80	3.1496	140	5.5118	26	1.0236	85 000	19 100	73 500	16 500	5 600	5 600	1.59	3.50
7217 BE	85	3.3465	150	5.9055	28	1.1024	95 600	21 500	83 000	18 700	5 000	5 300	1.99	4.40
7218 BE	90	3.5433	160	6.2992	30	1.1811	108 000	24 300	96 500	21 700	4 500	4 800	2.41	5.30
7219 BE	95	3.7402	170	6.6929	32	1.2598	129 000	29 000	108 000	24 300	4 800	4 800	2.95	6.50
7220 BE	100	3.9370	180	7.0866	34	1.3386	135 000	30 300	122 000	27 400	4 000	4 300	3.61	8.00
7221 BE	105	4.1339	190	7.4803	36	1.4173	148 000	33 300	137 000	30 800	3 800	4 000	4.18	9.20
7222 BE	110	4.3307	200	7.8740	38	1.4961	153 000	34 400	153 000	34 400	3 600	3 800	4.95	10.90
7224 B	120	4.7244	215	8.4646	40	1.5748	165 000	37 100	163 000	36 600	3 400	3 600	5.89	13.00
7226 B	130	5.1181	230	9.0551	40	1.5748	186 000	41 800	193 000	43 400	3 200	3 400	6.76	14.90
7228 B	140	5.5118	250	9.8425	42	1.6535	199 000	44 700	196 000	44 100	2 800	3 000	8.83	19.50
7230 B	150	5.9055	270	10.6299	45	1.7717	216 000	48 600	224 000	50 400	2 600	2 800	10.80	23.80
7232 B	160	6.2992	290	11.4173	48	1.8898	255 000	57 300	236 000	53 100	2 400	2 600	13.60	30.00
7234 B	170	6.6929	310	12.2047	52	2.0472	281 000	63 200	270 000	60 700	2 400	2 400	16.70	36.80
7236 B	180	7.0866	320	12.5984	52	2.0472	291 000	65 400	320 000	71 900	2 200	2 400	17.60	38.80
7238 B	190	7.4803	340	13.3858	55	2.1654	307 000	69 000	355 000	79 800	2 000	2 200	21.90	48.30
7248 B	240	9.4488	440	17.3228	72	2.8346	364 000	81 800	540 000	121 400	1 600	1 700	49.00	108.00

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Single row  
 Standard and **SKF Explorer**  
 Series: 7301 BE — 7330 B  
 Size: 12 mm — 150 mm  
 0.4724 in — 5.9055 in

These bearings are typically mounted in pairs. Refer to page 52 for details.

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
7301 BE	12	0.4724	37	1.4567	12	0.4724	10 600	2 400	5 000	1 120	24 000	24 000	0.06	0.10
7302 BE	15	0.5906	42	1.6535	13	0.5118	13 000	2 900	6 700	1 510	20 000	20 000	0.08	0.20
7303 BE	17	0.6693	47	1.8504	14	0.5512	15 900	3 600	8 300	1 870	19 000	19 000	0.11	0.20
7304 BE	20	0.7874	52	2.0472	15	0.5906	19 000	4 300	10 400	2 340	18 000	18 000	0.15	0.30
7305 BE	25	0.9843	62	2.4409	17	0.6693	26 500	6 000	15 600	3 510	15 000	15 000	0.24	0.50
7306 BE	30	1.1811	72	2.8346	19	0.7480	35 500	8 000	21 200	4 770	13 000	13 000	0.37	0.80
7307 BE	35	1.3780	80	3.1496	21	0.8268	41 500	9 300	24 500	5 510	11 000	11 000	0.49	1.10
7308 BE	40	1.5748	90	3.5433	23	0.9055	50 000	11 200	33 500	7 530	10 000	10 000	0.68	1.50
7309 BE	45	1.7717	100	3.9370	25	0.9843	61 000	13 700	41 500	9 300	9 000	9 000	0.90	2.00
7310 BE	50	1.9685	110	4.3307	27	1.0630	75 000	16 900	51 000	11 500	8 000	8 000	1.16	2.60
7311 BE	55	2.1654	120	4.7244	29	1.1417	85 000	19 100	60 000	13 500	7 000	7 000	1.49	3.30
7312 BE	60	2.3622	130	5.1181	31	1.2205	104 000	23 400	69 500	15 600	6 700	6 700	1.88	4.10
7313 BE	65	2.5591	140	5.5118	33	1.2992	116 000	26 100	80 000	18 000	6 300	6 300	2.31	5.10
7314 BE	70	2.7559	150	5.9055	35	1.3780	127 000	28 500	90 000	20 200	5 600	5 600	2.83	6.20
7315 BE	75	2.9528	160	6.2992	37	1.4567	132 000	29 700	106 000	23 800	5 300	5 300	3.26	7.20
7316 BE	80	3.1496	170	6.6929	39	1.5354	143 000	32 100	118 000	26 500	5 000	5 000	4.03	8.90
7317 BE	85	3.3465	180	7.0866	41	1.6142	156 000	35 100	132 000	29 700	4 800	4 800	4.74	10.40
7318 BE	90	3.5433	190	7.4803	43	1.6929	166 000	37 300	146 000	32 800	4 500	4 500	5.53	12.20
7319 BE	95	3.7402	200	7.8740	45	1.7717	180 000	40 500	163 000	36 600	4 300	4 300	6.41	14.10
7320 BE	100	3.9370	215	8.4646	47	1.8504	216 000	48 600	190 000	42 700	4 000	4 000	8.00	17.60
7321 BE	105	4.1339	225	8.8583	49	1.9291	203 000	45 600	208 000	46 800	3 400	3 600	9.12	20.10
7322 BE	110	4.3307	240	9.4488	50	1.9685	225 000	50 600	224 000	50 400	3 200	3 400	10.70	23.60
7324 B	120	4.7244	260	10.2362	55	2.1654	238 000	53 500	250 000	56 200	3 000	3 200	13.80	30.40
7326 B	130	5.1181	280	11.0236	58	2.2835	296 000	66 500	270 000	60 700	2 800	2 800	17.10	37.70
7328 B	140	5.5118	300	11.8110	62	2.4409	302 000	67 900	310 000	69 700	2 600	2 600	21.30	47.00
7330 B	150	5.9055	320	12.5984	65	2.5591	332 000	74 600	365 000	82 100	2 400	2 400	25.00	55.10

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.

Consult SKF USA Inc. prior to design change or order placement.

# Angular contact ball bearings

Single row

Standard

Series: 7334 B — 7344 B

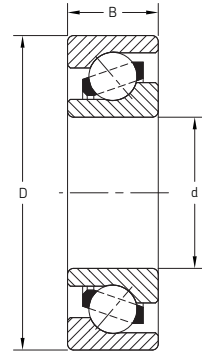
Size: 170 mm — 220 mm

6.6929 in — 8.6614 in

Series: 7405 B — 7432

Size: 25 mm — 160 mm

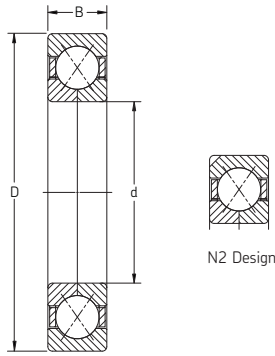
0.9843 in — 6.2992 in



These bearings are typically mounted in pairs. Refer to page 52 for details.

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
7334 B	170	6.6929	360	14.1732	72	2.8346	390 000	87 700	455 000	102 300	2 000	2 200	34.60	76.30
7336 B	180	7.0866	380	14.9606	75	2.9528	410 000	92 200	490 000	110 200	2 000	2 000	40.00	88.20
7338 B	190	7.4803	400	15.7480	78	3.0709	442 000	99 400	560 000	125 900	1 900	1 900	48.30	106.50
7340 B	200	7.8740	420	16.5354	80	3.1496	462 000	103 900	655 000	147 200	1 800	1 800	52.80	116.40
7344 B	220	8.6614	460	18.1102	88	3.4645	494 000	111 100	720 000	161 900	1 600	1 700	70.00	154.30
7405 B	25	0.9843	80	3.1496	21	0.8268	39 700	8 900	23 600	5 300	11 000	11 000	0.61	1.30
7406 B	30	1.1811	90	3.5433	23	0.9055	47 500	10 700	29 000	6 500	10 000	10 000	0.85	1.90
7407 B	35	1.3780	100	3.9370	25	0.9843	60 500	13 600	38 000	8 500	8 500	9 000	1.10	2.40
7408 B	40	1.5748	110	4.3307	27	1.0630	70 200	15 800	45 500	10 200	8 000	8 000	1.40	3.10
7409 B	45	1.7717	120	4.7244	29	1.1417	85 200	19 200	55 000	12 400	7 000	7 500	1.80	4.00
7410 B	50	1.9685	130	5.1181	31	1.2205	95 600	21 500	64 000	14 400	6 300	6 700	2.25	5.00
7411 B	55	2.1654	140	5.5118	33	1.2992	111 000	25 000	76 500	17 200	6 000	6 300	2.75	6.10
7412 B	60	2.3622	150	5.9055	35	1.3780	119 000	26 800	86 500	19 400	5 600	5 600	3.30	7.30
7413 B	65	2.5591	160	6.2992	37	1.4567	130 000	29 200	96 500	21 700	5 000	5 300	3.85	8.50
7414 B	70	2.7559	180	7.0866	42	1.6535	159 000	35 700	127 000	28 500	4 500	4 800	5.00	11.00
7415 B	75	2.9528	190	7.4903	45	1.7717	168 000	37 800	140 000	31 500	4 300	4 500	6.85	15.10
7416 B	80	3.1496	200	7.8740	48	1.8898	178 000	40 000	153 000	34 400	4 000	4 300	8.00	17.60
7417 B	85	3.3465	210	8.2677	52	2.0472	190 000	42 700	166 000	37 300	3 800	4 000	10.30	22.70
7418	90	3.5433	225	8.8583	54	2.1260	216 000	48 600	200 000	45 000	3 600	3 800	11.50	25.40
7419	95	3.7402	250	9.8425	55	2.1654	251 000	56 400	245 000	55 100	3 400	3 400	13.50	29.80
7420	100	3.9370	265	10.4331	60	2.3622	276 000	62 000	275 000	61 800	3 200	3 200	15.50	34.20
7432	160	6.2992	400	15.7480	88	3.4646	468 000	105 200	610 000	137 100	2 200	2 200	59.14	130.40

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Single row  
 Four-point ACBB  
 Standard and SKF Explorer  
 Series: QJ 202 N2MA — QJ 252 N2MA  
 Size: 15 mm — 260 mm  
 0.5906 in — 10.2362 in

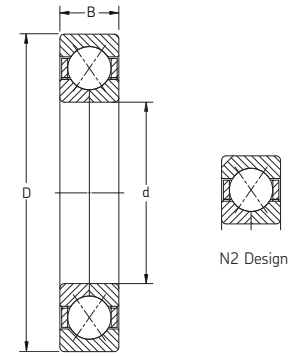
These bearings are typically mounted in pairs. Refer to page 52 for details.

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
QJ 202 N2MA	15	0.5906	35	1.3780	11	0.4331	12 700	2 850	8 300	1 870	22 000	36 000	0.06	0.14
QJ 203 N2MA	17	0.6693	40	1.5748	12	0.4724	15 900	3 570	10 600	2 380	19 000	30 000	0.08	0.18
QJ 205 MA	25	0.9843	52	2.0472	15	0.5906	27 000	6 070	21 200	4 770	16 000	22 000	0.16	0.35
QJ 206 MA	30	1.1811	62	2.4409	16	0.6299	37 500	8 430	30 500	6 860	14 000	19 000	0.24	0.53
QJ 207 N2MA	35	1.3780	72	2.8346	17	0.6693	49 000	11 020	41 500	9 330	12 000	17 000	0.36	0.79
QJ 208 MA	40	1.5748	80	3.1496	18	0.7087	56 000	12 590	49 000	11 020	11 000	15 000	0.45	0.99
QJ 209 MA	45	1.7717	85	3.3465	19	0.7480	63 000	14 160	56 000	12 590	10 000	14 000	0.52	1.15
QJ 210 MA	50	1.9685	90	3.5433	20	0.7874	65 500	14 720	61 000	13 710	9 000	13 000	0.59	1.30
QJ 211 MA	55	2.1654	100	3.9370	21	0.8268	85 000	19 110	83 000	18 660	8 000	11 000	0.77	1.70
QJ 212 MA	60	2.3622	110	4.3307	22	0.8661	96 500	21 690	93 000	20 910	7 500	10 000	0.99	2.18
QJ 212 N2PHAS	60	2.3622	110	4.3307	22	0.8661	96 500	21 690	93 000	20 910	8 500	10 000	0.89	1.96
QJ 213 MA	65	2.5591	120	4.7244	23	0.9055	110 000	24 730	112 000	25 180	6 700	9 500	1.20	2.60
QJ 214 MA	70	2.7559	125	4.9213	24	0.9449	120 000	27 000	122 000	27 430	6 300	9 000	1.32	2.90
QJ 215 MA	75	2.9528	130	5.1181	25	0.9843	125 000	28 100	132 000	29 670	6 300	8 500	1.45	3.20
QJ 216 MA	80	3.1496	140	5.5118	26	1.0236	146 000	32 800	156 000	35 100	5 600	8 000	1.85	4.10
QJ 217 MA	85	3.3465	150	5.9055	28	1.1024	156 000	35 100	173 000	38 900	5 300	7 500	2.25	5.00
QJ 218 N2MA	90	3.5433	160	6.2992	30	1.1811	186 000	41 800	200 000	45 000	5 000	7 000	2.75	6.10
QJ 219 N2MA	95	3.7402	170	6.6929	32	1.2598	212 000	47 700	232 000	52 200	4 800	6 700	3.35	7.40
QJ 220 N2MA	100	3.9370	180	7.0866	34	1.3386	236 000	53 100	265 000	59 600	4 500	6 300	4.05	8.90
QJ 222 N2MA	110	4.3370	200	7.8740	38	1.4961	280 000	62 900	325 000	73 100	4 000	5 600	5.60	12.30
QJ 224 N2MA	120	4.7244	215	8.4646	40	1.5748	300 000	67 400	365 000	82 100	3 600	5 000	6.95	15.30
QJ 226 N2MA	130	5.1181	230	9.0551	40	1.5748	310 000	69 700	400 000	89 900	3 400	4 800	7.75	17.10
QJ 228 N2MA	140	5.5118	250	9.8425	42	1.6535	345 000	77 600	475 000	106 800	3 200	4 300	9.85	21.70
QJ 230 N2MA	150	5.9055	270	10.6299	45	1.7717	400 000	89 900	570 000	128 100	3 000	4 000	12.50	27.60
QJ 232 N2MA	160	6.2992	290	11.4173	48	1.8898	450 000	101 200	670 000	150 600	2 800	3 800	15.50	34.20
QJ 234 N2MA	170	6.6929	310	12.2047	52	2.0472	455 000	102 300	720 000	161 900	2 600	3 400	19.50	43.00
QJ 236 N2MA	180	7.0866	320	12.5984	52	2.0472	475 000	106 800	765 000	172 000	2 400	3 400	20.50	45.20
QJ 240 N2MA	200	7.8740	360	14.1732	58	2.2835	540 000	121 400	915 000	205 700	1 800	3 000	28.50	62.80
QJ 248 N2MA	240	9.4488	440	17.3228	72	2.8346	650 000	146 100	1 200 000	269 800	1 500	2 400	53.00	116.80
QJ 252 N2MA	260	10.2362	480	18.8976	80	3.1496	728 000	163 700	1 430 000	321 500	1 300	2 200	68.00	149.90

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
 Consult SKF USA Inc. prior to design change or order placement.

# Angular contact ball bearings

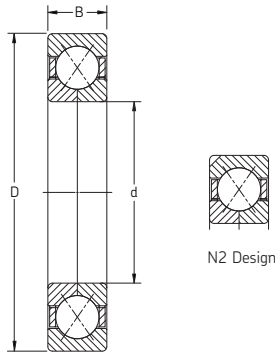
Single row  
Four-point ACBB  
Standard and **SKF Explorer**  
Series: QJ 303 N2MA — QJ 344 N2MA  
Size: 17 mm — 220 mm  
0.6693 in — 8.6614 in



Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
QJ 303 N2MA	17	0.6693	47	1.8504	14	0.5512	23 400	5 260	15 000	3 370	17 000	28 000	0.14	0.30
QJ 304 MA	20	0.7874	52	2.0472	15	0.5906	32 000	7 190	21 600	4 860	18 000	24 000	0.18	0.40
QJ 305 MA	25	0.9843	62	2.4409	17	0.6693	39 000	8 770	28 000	6 290	12 000	20 000	0.29	0.60
QJ 306 MA	30	1.1811	72	2.8346	19	0.7480	53 000	11 910	41 500	9 330	12 000	17 000	0.42	0.90
QJ 307 MA	35	1.3780	80	3.1496	21	0.8268	64 000	14 390	51 000	11 460	11 000	15 000	0.57	1.30
QJ 308 MA	40	1.5748	90	3.5433	23	0.9055	78 000	17 530	64 000	14 390	10 000	14 000	0.78	1.70
QJ 309 MA	45	1.7717	100	3.9370	25	0.9843	100 000	22 480	83 000	18 700	9 000	12 000	1.05	2.30
QJ 310 MA	50	1.9685	110	4.3307	27	1.0630	118 000	26 530	100 000	22 500	8 000	11 000	1.35	3.00
QJ 311 MA	55	2.1654	120	4.7244	29	1.1417	137 000	30 800	118 000	26 500	7 000	10 000	1.75	3.90
QJ 312 MA	60	2.3622	130	5.1181	31	1.2205	156 000	35 100	137 000	30 800	6 700	9 000	2.15	4.70
QJ 313 MA	65	2.5591	140	5.5118	33	1.2992	176 000	39 600	156 000	35 100	6 300	8 500	2.70	6.00
QJ 314 MA	70	2.7559	150	5.9055	35	1.3780	200 000	45 000	180 000	40 500	5 600	8 000	3.15	6.90
QJ 315 N2MA	75	2.9528	160	6.2992	37	1.4567	216 000	48 600	200 000	45 000	5 300	7 500	3.90	8.60
QJ 316 N2MA	80	3.1496	170	6.6929	39	1.5354	232 000	52 200	228 000	51 300	5 000	7 000	4.60	10.10
QJ 317 N2MA	85	3.3465	180	7.0866	41	1.6142	250 000	56 200	255 000	57 300	4 800	6 700	5.45	12.00
QJ 318 N2MA	90	3.5433	190	7.4803	43	1.6929	285 000	64 100	305 000	68 600	4 500	6 300	6.45	14.20
QJ 319 N2MA	95	3.7402	200	7.8740	45	1.7717	305 000	68 600	340 000	76 400	4 300	6 000	7.45	16.40
QJ 320 N2MA	100	3.9370	215	8.4646	47	1.8504	345 000	77 600	400 000	89 900	4 000	5 600	9.30	20.50
QJ 322 N2MA	110	4.3307	240	9.4488	50	1.9685	390 000	87 700	480 000	107 900	3 600	4 800	12.50	27.60
QJ 324 N2MA	120	4.7244	260	10.2362	55	2.1654	415 000	93 300	530 000	119 100	3 200	4 500	16.00	35.30
QJ 326 N2MA	130	5.1181	280	11.0236	58	2.2835	455 000	102 300	610 000	137 100	3 000	4 000	19.50	43.00
QJ 328 N2MA	140	5.5118	300	11.8110	62	2.4409	500 000	112 400	695 000	156 200	2 800	3 800	24.00	52.90
QJ 330 N2MA	150	5.9055	320	12.5984	65	2.5591	530 000	119 100	765 000	172 000	2 600	3 600	29.00	63.90
QJ 332 N2MA	160	6.2992	340	13.3858	68	2.6772	570 000	128 100	880 000	197 800	2 400	3 400	34.50	76.10
QJ 334 N2MA	170	6.6929	360	14.1732	72	2.8346	655 000	147 200	1 040 000	233 800	2 200	3 200	41.50	91.50
QJ 336 N2MA	180	7.0866	380	14.9606	75	2.9528	680 000	152 900	1 020 000	229 300	2 200	3 000	47.50	104.70
QJ 338 N2MA	190	7.4803	400	15.7480	78	3.0709	702 000	157 800	1 116 000	250 900	1 700	2 800	49.00	108.00
QJ 344 N2/309829	220	8.6614	460	18.1102	88	3.4646	904 000	203 200	1 660 000	373 200	1 500	2 400	78.00	172.00
QJ 344 N2MA	220	8.6614	460	18.1102	88	3.4646	780 000	175 300	1 400 000	314 700	1 500	2 400	78.00	172.00

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.





Single row  
 Four-point ACBB  
 Standard  
 Series: QJ 1017 N2MA — QJ 1988 N2MA  
 Size: 85 mm — 440 mm  
 3.3465 in — 17.3228 in

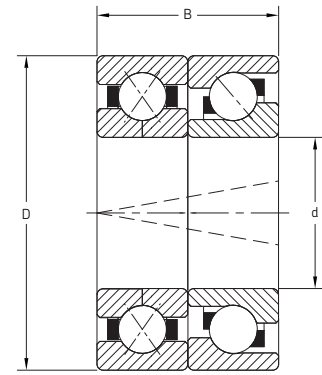
Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed		
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min	kg	lb
QJ 1017 N2MA	85	3.3465	130	5.1181	22	0.8661	85 200	19 200	102 000	22 900	5 000	8 000	1.10	2.40
QJ 1021 N2MA	105	4.1339	160	6.2992	26	1.0236	124 000	27 900	156 000	35 100	4 000	6 700	2.00	4.40
QJ 1022 N2MA	110	4.3307	170	6.6929	28	1.1024	146 000	32 800	186 000	41 800	3 800	6 300	2.50	5.50
QJ 1030 N2MA	150	5.9055	225	8.8583	35	1.3780	216 000	48 600	305 000	68 600	2 800	4 500	5.25	11.57
QJ 1032 N2MA	160	6.2992	240	9.4488	38	1.4961	247 000	55 500	355 000	79 800	2 600	4 300	6.45	14.20
QJ 1038 N2MA	190	7.4803	290	11.4173	46	1.8110	338 000	76 000	510 000	114 600	2 200	3 400	11.50	25.40
QJ 1040 N2MA	200	7.8740	310	12.2047	51	2.0079	390 000	87 700	620 000	139 400	2 000	3 200	15.00	33.10
QJ 1056 N2MA	280	11.0236	420	16.5354	65	2.5591	553 000	124 300	1 060 000	238 300	1 400	2 400	33.50	73.90
QJ 1060 MA	300	11.8110	460	18.1102	74	2.9134	650 000	146 100	1 340 000	301 200	1 300	2 200	47.50	104.70
QJ 1064 MA	320	12.5984	480	18.8976	74	2.9134	715 000	160 700	1 530 000	343 900	1 200	2 000	50.00	110.20
QJ 1068 N2MA	340	13.3858	520	20.4724	82	3.2283	780 000	175 300	1 700 000	382 200	1 100	1 800	67.50	148.80
QJ 1072 N2MA	360	14.1732	540	21.2598	82	3.2283	793 000	178 300	1 800 000	404 600	1 100	1 700	70.50	155.40
QJ 1076 N2MA	380	14.9606	560	22.0472	82	3.2283	819 000	184 100	1 900 000	427 100	1 000	1 700	73.50	162.00
QJ 1080 N2MA	400	15.7480	600	23.6220	90	3.5433	904 000	203 200	2 160 000	485 600	950	1 500	95.50	210.50
QJ 1084 N2MA	420	16.5354	620	24.4094	90	3.5433	923 000	207 500	2 280 000	512 500	900	1 500	99.50	219.40
QJ 1088 N2MA	440	17.3228	650	25.5906	94	3.7008	995 000	223 700	2 500 000	562 000	850	1 400	115.00	253.50
QJ 1092 N2MA	460	18.1102	680	26.7717	100	3.9370	1 040 000	233 800	2 650 000	595 700	800	1 300	130.00	286.60
QJ 1096 N2MA	480	18.8976	700	27.5591	100	3.9370	1 060 000	238 300	2 800 000	629 400	750	1 300	135.00	297.60
QJ 1240 N2MA	200	7.8740	360	14.1732	70	2.7559	520 000	116 900	865 000	194 500	1 800	3 000	32.50	71.70
QJ 1244 N2MA	220	8.6614	400	15.7480	78	3.0709	592 000	133 100	1 020 000	229 300	1 600	2 600	45.50	100.30
QJ 1248 MA/344524	240	9.4488	440	17.3228	85	3.3465	663 000	149 000	1 220 000	274 300	1 500	2 400	61.00	134.50
QJ 1252 MA	260	10.2362	480	18.8976	90	3.5433	741 000	166 600	1 460 000	328 200	1 300	2 200	78.00	172.00
QJ 1256 N2MA	280	11.0236	500	19.6850	90	3.5433	728 000	163 700	1 460 000	328 200	1 300	2 000	82.00	180.80
QJ 1260 N2MA	300	11.8110	540	21.2598	98	3.8583	832 000	187 000	1 760 000	395 600	1 200	1 900	105.00	231.50
QJ 1264 N2MA	320	12.5984	580	22.8346	105	4.1339	923 000	207 500	2 040 000	458 600	1 100	1 700	130.00	286.60
QJ 1268 MA/344524	340	13.3858	620	24.4094	118	4.6457	1 060 000	238 300	2 450 000	550 800	1 000	1 600	165.00	363.80
QJ 1272 N2MA	360	14.1732	650	25.5906	122	4.8031	1 110 000	249 500	2 600 000	584 500	950	1 500	190.00	418.90
QJ 1276 N2MA	380	14.9606	680	26.7717	132	5.1969	1 170 000	263 000	2 850 000	640 700	900	1 400	220.00	485.00
QJ 1280 N2MA	400	15.7480	720	28.3465	140	5.5118	1 300 000	292 200	3 250 000	730 600	800	1 300	265.00	584.20
QJ 1284 N2MA	420	16.5354	760	29.9213	150	5.9055	1 430 000	321 500	3 750 000	843 000	750	1 300	315.00	694.50
QJ 1288 N2MA	440	17.3228	790	31.1024	155	6.1024	1 400 000	314 700	3 750 000	843 000	750	1 200	350.00	771.60
QJ 1292 N2MA	460	18.1102	830	32.6772	165	6.4961	1 530 000	343 900	4 250 000	955 400	700	1 100	415.00	914.90
QJ 1296 N2MA	480	18.8976	870	34.2520	170	6.6929	1 680 000	377 700	4 750 000	1 068 000	670	1 100	470.00	1 036.20
QJ 1984 MA	420	16.5354	560	22.0472	65	2.5591	637 000	143 200	1 600 000	359 700	950	1 600	51.00	112.40
QJ 1988 N2MA	440	17.3228	600	23.6220	74	2.9134	761 000	171 100	1 900 000	427 100	900	1 500	65.00	143.30

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
 Consult SKF USA Inc. prior to design change or order placement.

# Angular contact ball bearings

Thrust pack  
 Double row  
 Four-point ACBB and Single row ACBB  
 Standard  
 Series: BA2B 459304 — BA2B 459328  
 Size: 20 mm — 140 mm  
 0.7874 in — 5.5118 in

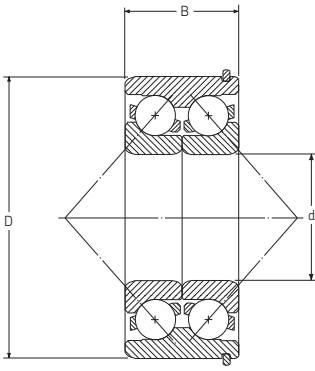
Series: BA2B 459418 — BA2B 459430  
 Size: 90 mm — 150 mm  
 3.5433 in — 5.9055 in



BA2B 4593XX

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min		
BA2B 459304	20	0.7874	52	2.0472	30	1.1811	30 700	6 900	20 800	4 680	9 000	13 000	0.28	0.62
BA2B 459306	30	1.1811	72	2.8346	38	1.4961	55 900	12 600	42 500	9 550	6 700	9 000	0.68	1.50
BA2B 459307	35	1.3780	80	3.1496	42	1.6535	62 400	14 000	49 000	11 000	6 000	8 000	0.90	2.00
BA2B 459308	40	1.5748	90	3.5433	46	1.8110	79 300	17 800	65 500	14 700	5 300	7 000	1.25	2.75
BA2B 459309	45	1.7717	100	3.9370	50	1.9685	97 500	21 900	81 500	18 300	4 800	6 300	1.70	3.75
BA2B 459310	50	1.9685	110	4.3307	54	2.1260	119 000	26 800	102 000	22 900	4 300	5 600	2.20	4.85
BA2B 459311	55	2.1654	120	4.7244	58	2.2835	138 000	31 000	120 000	27 000	3 800	5 000	2.80	6.15
BA2B 459312	60	2.3622	130	5.1181	62	2.4409	156 000	35 100	140 000	31 500	3 600	4 800	3.50	7.70
BA2B 459313	65	2.5591	140	5.5118	65	2.5984	174 000	39 100	160 000	36 000	3 200	4 300	4.30	9.50
BA2B 459314	70	2.7559	150	5.9055	70	2.7559	195 000	43 800	180 000	40 500	3 000	4 000	5.30	11.50
BA2B 459317	85	3.3465	180	7.0866	82	3.2283	251 000	56 400	265 000	59 600	2 400	3 400	8.90	19.50
BA2B 459318	90	3.5433	190	7.4803	86	3.3858	270 000	60 700	290 000	65 200	2 200	3 200	10.50	23.00
BA2B 459320	100	3.9370	215	8.4646	94	3.7008	325 000	73 100	380 000	85 400	1 900	2 800	15.00	33.00
BA2B 459322	110	4.3307	240	9.4488	100	3.9370	364 000	81 800	450 000	101 000	1 700	2 400	20.00	44.00
BA2B 459326	130	5.1181	280	11.0236	116	4.5669	403 000	90 600	540 000	121 000	1 500	2 000	35.00	77.00
BA2B 459328	140	5.5118	300	11.8110	124	4.8819	449 000	101 000	620 000	139 000	1 400	1 900	43.00	95.00
BA2B 459418	90	3.5433	160	6.2992	60	2.3622	178 000	40 000	193 000	43 400	2 600	3 600	4.60	10.00
BA2B 459420	100	3.9370	180	7.0866	68	2.6772	221 000	49 700	245 000	55 100	2 200	3 200	6.60	14.50
BA2B 459422	110	4.3307	200	7.8740	76	2.9921	260 000	58 500	310 000	69 700	1 900	2 800	9.20	20.50
BA2B 459424	120	4.7244	215	8.4646	80	3.1496	270 000	60 700	325 000	73 100	1 700	2 400	12.20	27.00
BA2B 459428	140	5.5118	250	9.8425	84	3.3071	296 000	66 500	390 000	87 700	1 600	2 200	17.70	39.00
BA2B 459430	150	5.9055	270	10.6299	90	3.5433	319 000	71 700	44 0000	98 900	1 500	2 000	23.00	50.50

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



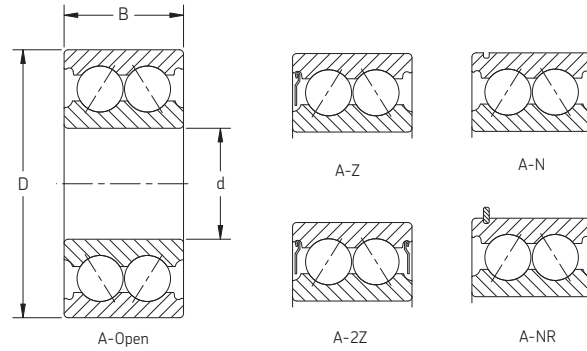
Double row, 40° contact angle  
 Standard  
 Series: 3308 DNRCBM — 3313 DNRCBM  
 Size: 40 mm — 65 mm  
 1.5748 in — 2.5591 in

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed	Limiting speed		
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min	kg	lb
3308 DNRCBM	40	1.5748	90	3.5433	36.5	1.437	49 400	11 100	41 500	9 300	6 700	7 000	1.20	2.60
3309 DNRCBM	45	1.7717	100	3.9370	39.7	1.563	61 800	13 900	52 000	11 700	6 000	6 300	1.50	3.30
3310 DNRCBM	50	1.9685	110	4.3307	44.4	1.748	81 900	18 400	69 500	15 600	5 300	5 600	1.95	4.30
3311 DNRCBM	55	2.1654	120	4.7244	49.2	1.937	95 600	21 500	83 000	18 700	4 800	5 000	2.55	5.60
3313 DNRCBM	65	2.5591	140	5.5118	58.7	2.311	138 000	31 000	122 000	27 400	4 300	4 500	4.00	8.80

**Warning:** The new reference and limiting speeds **are not to be used** as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
 Consult SKF USA Inc. prior to design change or order placement.

# Angular contact ball bearings

Double row, 30° contact angle  
 Conrad  
 Open, sealed, shielded and snap ring  
 Standard and **SKF Explorer**  
 Series: 3200 A — 3220 A  
 Size: 10 mm — 100 mm  
 0.3937 in — 3.9370 in

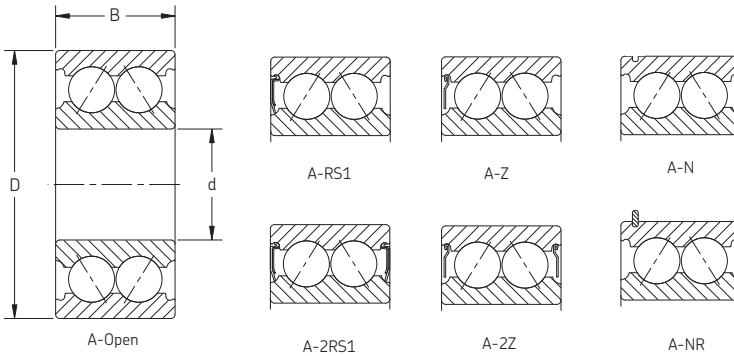


Designation	Principal dimensions						Basic load ratings				Speed rating			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Sealed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf			Limiting speed r/min		
3200 A	10	0.3937	30	1.1811	14.0	.5625	7 610	1 700	4 300	1 000	22 000	24 000	17 000	0.05	0.11
3201 A	12	0.4724	32	1.2598	15.9	.6250	10 100	2 300	5 600	1 300	20 000	22 000	15 000	0.06	0.13
3202 A	15	0.5906	35	1.3780	15.9	.6250	11 200	2 500	6 800	1 500	17 000	18 000	14 000	0.07	0.15
3203 A	17	0.6693	40	1.5748	17.5	.6875	14 300	3 200	8 800	2 000	15 000	16 000	12 000	0.10	0.21
3204 A	20	0.7874	47	1.8504	20.6	.8125	20 000	4 500	12 000	2 700	14 000	14 000	10 000	0.16	0.35
3205 A	25	0.9843	52	2.0472	20.6	.8125	21 600	4 900	14 300	3 200	12 000	12 000	8 500	0.19	0.42
3206 A	30	1.1811	62	2.4409	23.8	.9375	30 000	6 700	20 400	4 600	10 000	10 000	7 500	0.29	0.64
3207 A	35	1.3780	72	2.8346	27.0	1.0625	40 000	9 000	28 000	6 300	9 000	9 000	6 300	0.40	0.88
3208 A	40	1.5748	80	3.1496	30.2	1.1875	47 500	10 700	34 000	7 600	8 000	8 000	5 600	0.58	1.28
3209 A	45	1.7717	85	3.3465	30.2	1.1875	51 000	11 500	39 000	8 800	7 500	7 500	5 300	0.64	1.41
3210 A	50	1.9685	90	3.5433	30.2	1.1875	51 000	11 500	39 000	8 800	7 000	7 000	4 800	0.66	1.46
3211 A	55	2.1654	100	3.9370	33.3	1.3125	60 000	13 500	47 500	10 700	6 300	6 300	4 500	1.05	2.31
3212 A	60	2.3622	110	4.3307	36.5	1.4375	73 500	16 500	58 500	13 200	5 600	5 600	4 000	1.40	3.09
3213 A	65	2.5591	120	4.7244	38.1	1.5000	80 600	18 100	73 500	16 500	4 500	4 800	3 600	1.75	3.86
3214 A	70	2.7559	125	4.9213	39.7	1.5625	88 400	19 900	80 000	18 000	4 300	4 500	—	1.90	4.19
3215 A	75	2.9528	130	5.1181	41.3	1.6250	95 600	21 500	88 000	19 800	4 300	4 500	3 200	2.10	4.63
3216 A	80	3.1496	140	5.5118	44.4	1.7500	106 000	23 800	95 000	21 400	4 000	4 300	3 000	2.65	5.84
3217 A	85	3.3465	150	5.9055	49.2	1.9375	124 000	27 900	110 000	24 700	3 600	3 800	—	3.40	7.50
3218 A	90	3.5433	160	6.2992	52.4	2.0625	130 000	29 200	120 000	27 000	3 400	3 600	—	4.15	9.15
3219 A	95	3.7402	170	6.6929	55.6	2.1875	159 000	35 700	146 000	32 800	3 200	3 400	—	5.00	11.02
3220 A	100	3.9370	180	7.0866	60.3	2.3750	178 000	40 000	166 000	37 300	3 000	3 200	—	6.10	13.45

Note: The 5200/5300 series DRACBB have been replaced with the 3200/3300 series designation. The product design has not changed; therefore, the fit, form and function remain the same.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

Double row, 30° contact angle  
 Conrad  
 Open, sealed, shielded and snap ring  
 Standard and SKF Explorer  
 Series: 3304 A — 3318 A  
 Size: 20 mm — 90 mm  
 0.7874 in — 3.5433 in



Designation	Principal dimensions						Basic load ratings				Speed rating			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Sealed Limiting speed r/min	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf					
3304 A	20	0.7874	52	2.0472	22.2	.8750	23 600	5 300	14 600	3 300	13 000	13 000	9 000	0.20	0.44
3305 A	25	0.9843	62	2.4409	25.4	1.0000	32 000	7 200	20 400	4 600	11 000	11 000	7 500	0.31	0.68
3306 A	30	1.1811	72	2.8346	30.2	1.1875	41 500	9 300	27 500	6 200	9 000	9 000	6 300	0.59	1.30
3307 A	35	1.3780	80	3.1496	34.9	1.3750	52 000	11 700	35 500	8 000	8 500	8 500	6 000	0.71	1.57
3308 A	40	1.5748	90	3.5433	36.5	1.4375	64 000	14 400	44 000	9 900	7 500	7 500	5 000	1.05	2.31
3308 AH	40	1.5748	90	3.5433	36.5	1.4375	64 000	14 400	44 000	9 900	7 500	7 500	—	1.05	2.31
3309 A	45	1.7717	100	3.9370	39.7	1.5625	75 000	16 900	53 000	11 900	6 700	6 700	4 800	1.40	3.09
3309 AH	45	1.7717	100	3.9370	39.7	1.5625	75 000	16 900	53 000	11 900	6 700	6 700	—	1.40	3.09
3310 A	50	1.9685	110	4.3307	44.4	1.7500	90 000	20 200	64 000	14 400	6 000	6 000	4 300	1.95	4.30
3310 AH	50	1.9685	110	4.3307	44.4	1.7500	90 000	20 200	64 000	14 400	6 000	6 000	—	1.95	4.30
3311 A	55	2.1654	120	4.7244	49.2	1.9375	112 000	25 200	81 500	18 300	5 300	5 300	—	2.55	5.62
3311 AH	55	2.1654	120	4.7244	49.2	1.9375	112 000	25 200	81 500	18 300	5 300	5 300	—	2.55	5.62
3312 A	60	2.3622	130	5.1181	54.0	2.1250	127 000	28 500	95 000	21 400	5 000	5 000	—	3.25	7.16
3313 A	65	2.5591	140	5.5118	58.7	2.3125	146 000	32 800	110 000	24 700	4 500	4 500	—	4.10	9.04
3314 A	70	2.7559	150	5.9055	63.5	2.5000	153 000	34 400	125 000	28 100	4 000	4 000	—	5.05	11.13
3315 A	75	2.9528	160	6.2992	68.3	2.6875	176 000	39 600	140 000	31 500	4 000	4 000	—	5.60	12.35
3315 AH	75	2.9528	160	6.2992	68.3	2.6875	176 000	39 600	140 000	31 500	4 000	4 000	—	5.60	12.35
3316 A	80	3.1496	170	6.6929	68.3	2.8675	182 000	40 900	156 000	35 100	3 400	3 600	—	6.80	14.99
3317 A	85	3.3465	180	7.0866	73.0	2.8750	195 000	43 800	176 000	39 600	3 200	3 400	—	8.30	18.30
3318 A	90	3.5433	190	7.4803	73.0	2.8750	195 000	43 800	180 000	40 500	3 000	3 200	—	9.25	20.39

Note: The 5200/5300 series DRACBB have been replaced with the 3200/3300 series designation. The product design has not changed; therefore, the fit, form and function remain the same.

**Warning:** The new reference and limiting speeds **are not to be used** as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
 Consult SKF USA Inc. prior to design change or order placement.

# Angular contact ball bearings

Double row, 30° contact angle

Max type

Open, sealed, shielded and snap ring

Standard

Series: 3205 E — 3218 E

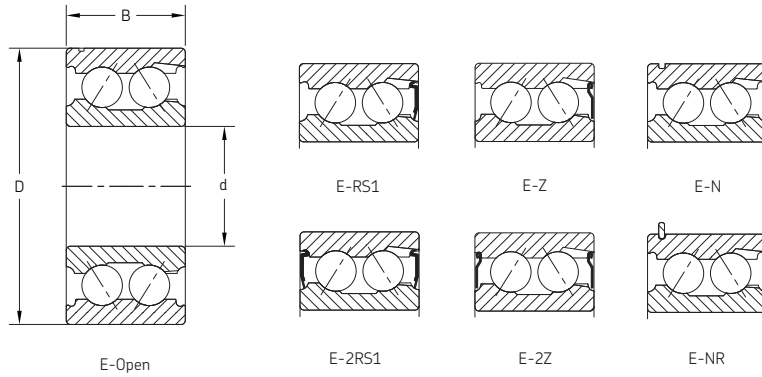
Size: 25 mm — 90 mm

0.9843 in — 3.5433 in

Series: 3305 E — 3316 E

Size: 25 mm — 80 mm

0.9843 in — 3.1496 in



Designation	Principal dimensions						Basic load ratings				Speed rating			Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C <sub>0</sub>		Reference speed r/min	Limiting speed r/min	Sealed Limiting speed r/min	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf					
3205 E	25	0.9843	52	2.0472	20.6	.8125	22 900	5 150	21 200	4 770	11 000	12 000	8 500	0.25	0.55
3206 E	30	1.1811	62	2.4409	23.8	.9375	30 300	6 810	28 000	6 290	9 500	10 000	7 500	0.35	0.80
3207 E	35	1.3780	72	2.8346	27.0	1.0625	39 100	8 790	36 500	8 210	8 000	8 500	6 300	0.54	1.20
3208 E	40	1.5748	80	3.1496	30.2	1.1875	49 500	11 130	49 000	11 020	7 500	8 000	5 600	0.73	1.60
3209 E	45	1.7717	85	3.3465	30.2	1.1875	51 200	11 510	54 000	12 140	6 700	7 000	5 300	0.77	1.70
3210 E	50	1.9685	90	3.5433	30.2	1.1875	53 900	12 120	58 500	13 150	6 300	6 700	4 800	0.82	1.80
3211 E	55	2.1654	100	3.9370	33.3	1.3125	66 000	14 840	76 500	17 200	5 600	6 000	4 500	1.15	2.50
3212 E	60	2.3622	110	4.3307	36.5	1.4375	78 100	17 560	88 000	19 780	5 000	5 300	4 000	1.50	3.30
3213 E	65	2.5591	120	4.7244	38.1	1.5000	88 000	19 780	106 000	23 800	4 800	5 000	3 600	1.95	4.30
3214 E	70	2.7559	125	4.9213	39.7	1.5625	101 000	22 700	125 000	28 100	4 500	4 800		2.15	4.70
3215 E	75	2.9528	130	5.1181	41.3	1.6250	108 000	24 300	137 000	30 800	4 300	4 500	3 200	2.50	5.50
3216 E	80	3.1496	140	5.5118	44.4	1.7500	128 000	28 800	160 000	36 000	4 000	4 000	3 000	3.00	6.60
3217 E	85	3.3465	150	5.9055	49.2	1.9375	142 000	31 900	176 000	39 600	3 600	3 800		3.70	8.16
3218 E	90	3.5433	160	6.2992	52.4	2.0625	151 000	33 900	193 000	43 400	3 400	3 600		4.55	10.00
3305 E	25	0.9843	62	2.4409	25.4	1.0000	34 100	7 670	30 500	6 860	10 000	10 000	7 500	0.39	0.90
3306 E	30	1.1811	72	2.8346	30.2	1.1875	46 800	10 520	43 000	9 670	8 500	9 000	6 300	0.59	1.30
3307 E	35	1.3780	80	3.1496	34.9	1.3750	52 300	11 760	48 000	10 790	7 500	8 000	6 000	0.86	1.90
3308 E	40	1.5748	90	3.5433	36.5	1.4375	67 100	15 080	65 500	14 720	6 700	7 000	5 000	1.15	2.50
3309 E	45	1.7717	100	3.9370	39.7	1.5625	80 900	18 190	80 000	17 980	6 000	6 300	4 800	1.50	3.30
3310 E	50	1.9685	110	4.3307	44.4	1.7500	95 200	21 400	95 000	21 360	5 300	5 600		2.00	4.40
3311 E	55	2.1654	120	4.7244	49.2	1.9375	119 000	26 800	122 000	27 400	5 000	5 300		2.65	5.80
3312 E	60	2.3622	130	5.1181	54.0	2.1250	134 000	30 100	143 000	32 100	4 500	4 800		3.30	7.30
3313 E	65	2.5591	140	5.5118	58.7	2.3125	182 000	40 900	163 000	36 600	4 300	4 500		4.20	9.30
3314 E	70	2.7559	150	5.9055	63.5	2.5000	172 000	38 700	186 000	41 800	4 000	4 300		5.00	11.00
3315 E	75	2.9528	160	6.2992	68.3	2.6875	187 000	42 000	208 000	46 800	3 600	3 800		6.35	14.00
3316 E	80	3.1496	170	6.6929	68.3	2.6875	201 000	45 200	236 000	53 100	3 400	3 600		7.25	16.00

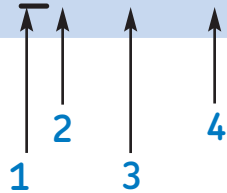
Note: The 5200/5300 series DRACBB have been replaced with the 3200/3300 series designation. The product design has not changed; therefore, the fit, form and function remain the same.

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



# Self-aligning ball bearings

1220 — K M C3



## 1. Internal design:

- Standard internal design
- E Improved internal design

## 3. Cage designs:

- TN9 Injection molded polyamide 6.6 cage with glass fiber reinforcement
- M Machined brass cage
- TN Injection molded polyamide 6.6 cage

## 2. Variations:

- K Bearing with 1 to 12 tapered bore
- 2RS1 Contact seal acrylonitrile butadiene rubber (NBR) with sheet steel on both sides of bearing
- KAM Bearing kit, includes bearing and adapter sleeve

## 4. Clearance:

- C2 Radial internal clearance < Normal
- (C0)\* Normal radial internal clearance
- C3 Radial internal clearance > Normal
- C4 Radial internal clearance > C3

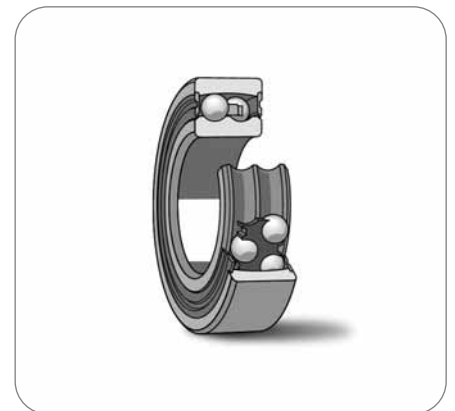
\*Not marked on bearing or package

## Technical features

<b>Boundary dimensions</b>	In accordance with ISO 15-1998																		
<b>Tolerances</b>	ABEC 1, ISO 492-2002																		
<b>Max. temperature</b>	248° F (120° C) for open bearings only																		
<b>Misalignment</b>	<table border="0"> <tr> <td>Series 108, 126, 127, 129, 135</td> <td>3.0 degrees</td> </tr> <tr> <td>Series 12 (E)</td> <td>2.5 degrees</td> </tr> <tr> <td>Series 13 (E)</td> <td>3.0 degrees</td> </tr> <tr> <td>Series 22 (E)</td> <td>2.5 degrees</td> </tr> <tr> <td>Series 22 E-2RS1</td> <td>1.5 degrees</td> </tr> <tr> <td>Series 23 (E)</td> <td>3.0 degrees</td> </tr> <tr> <td>Series 23 E-2RS1</td> <td>1.5 degrees</td> </tr> <tr> <td>Series 112 (E)</td> <td>2.5 degrees</td> </tr> <tr> <td>Series 130, 139</td> <td>3.0 degrees</td> </tr> </table>	Series 108, 126, 127, 129, 135	3.0 degrees	Series 12 (E)	2.5 degrees	Series 13 (E)	3.0 degrees	Series 22 (E)	2.5 degrees	Series 22 E-2RS1	1.5 degrees	Series 23 (E)	3.0 degrees	Series 23 E-2RS1	1.5 degrees	Series 112 (E)	2.5 degrees	Series 130, 139	3.0 degrees
Series 108, 126, 127, 129, 135	3.0 degrees																		
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Series 22 (E)	2.5 degrees																		
Series 22 E-2RS1	1.5 degrees																		
Series 23 (E)	3.0 degrees																		
Series 23 E-2RS1	1.5 degrees																		
Series 112 (E)	2.5 degrees																		
Series 130, 139	3.0 degrees																		
<b>Cage material</b>																			
<b>Standard</b>	Polyamide (TN) Glass fiber reinforced polyamide (TN9)																		
<b>Optional</b>	Machined brass (M) large bearings																		
<b>Axial load – max</b> for adapter sleeve mounting	$F_{ap} = 3 \times B \times d$ where B = bearing width in mm d = bearing bore in mm F <sub>ap</sub> = axial load in Newtons																		
<b>Seals</b>	2RS1 synthetic rubber (NBR) seals																		
<b>Grease</b>	Lithium soap with mineral oil																		



*Self-aligning ball bearing (open design)  
(data tables on page 80)*



*Self-aligning ball bearing (sealed design)  
(data tables on page 82)*



## Introduction

Self-aligning ball bearings have two rows of balls with a common sphered raceway in the outer ring. This feature gives the bearings their self-aligning property, permitting angular misalignment of the shaft relative to the housing. Therefore, they are particularly suitable for applications where misalignment can arise from errors in mounting or from shaft deflection.

For applications where the load carrying capacity of self-aligning ball bearings is insufficient, spherical roller bearings, which have the same self-aligning property, should be used instead.

SKF self-aligning ball bearings of the E design have higher load carrying capacity than bearings of the original standard design because of improvements to the internal design. This makes them suitable for a wider range of applications than their predecessors; the same size of bearing can be used to carry heavier loads, or if the loads remain the same, operational reliability is enhanced and bearing life is longer. Self-aligning ball bearings of the E design are fitted with a glass fiber reinforced polyamide 6.6 cage (TN9) as standard.

SKF self-aligning ball bearings are available in several designs of which the most common are shown in this catalog:

- Basic open (unsealed) design bearings
- Bearings with seals on both sides

## Basic design

Self-aligning ball bearings of the basic design are available with a cylindrical bore as well as with a tapered bore (taper 1:12).

For self-aligning ball bearings with a tapered bore, SKF supplies appropriate adapter sleeves with which the bearings can be secured simply and rapidly to smooth or stepped shafts. The adapter sleeves are supplied complete with nut and locking device. Additional information can be found in the Split Pillow Block sections (inch and metric) under "Mounted Accessories".

## Variations

### Sealed bearings

SKF self-aligning ball bearings are also available in a sealed (2RS1) version with rubbing seals on both sides. The seals are made of oil and acrylonitrile butadiene rubber (NBR) and have a sheet steel reinforcement. The operating temperature range for the seal material is  $-40^{\circ}$  to  $+248^{\circ}$  F ( $-40^{\circ}$  to  $+120^{\circ}$  C). The outside diameter of the seal is retained in a recess in the outer ring giving a tight seal without deformation, while the lip of the seal exerts a slight pressure against a recess in the inner ring shoulder.

The sealed bearings are supplied as standard filled with a lithium base grease which is suitable for the operating temperature range  $-22^{\circ}$  to  $+230^{\circ}$  F ( $-30^{\circ}$  to  $+110^{\circ}$  C). The bearings are lubricated for life and are maintenance free. **They should not be heated at temperatures greater than 250° F (120° C) prior to mounting and must on no account be washed.**

SKF self-aligning ball bearings with seals are available with a cylindrical bore or with a tapered bore, the taper being 1:12 as for the basic bearings.

### Special solutions for bearings with extended inner ring

Self-aligning ball bearings with extended inner ring (series 11200) are used for applications employing commercial ground shafting. The special bore tolerance of these bearings allows easy mounting and dismounting.

Self-aligning ball bearings with extended inner ring are located axially by pins or shouldered screws which engage in a slot at one side of the inner ring. The pins or screws also prevent the inner ring from turning on the shaft. When these bearings are used in pairs, the slots of the inner rings **must** either be adjacent or at the outboard positions. Otherwise, the shaft will be located in one direction only.

**Details on these special solution products are available in other SKF publications, which can be supplied upon request.**

## Product highlights

### Optimum performance

SKF self-aligning ball bearings have been designed to provide optimum performance in a wide range of machinery and equipment applications and are particularly suitable for applications where misalignment can arise from errors in shaft and housing alignment or shaft deflection and high speed is a requirement.

### Capacity for resistance-free, self-alignment

In the event of minor angular misalignment, the problems which beset many other bearing types do not occur—allowing for increased operational life, lower friction and temperature, less wear and noise during operation, and reduced stress on both the cages and lubricants.

### Sealed bearings—greased for life

SKF self-aligning ball bearings are available with contact seals on both sides which protect the bearing from contaminants during handling and operation. This allows for longer bearing service life, is environmentally friendly, and requires no relubrication—making the bearing maintenance free.

### Large product assortment

Available in a wide range (5 to 130 mm inside bore diameter), the basic SKF design is available with a choice of seals, cage materials, and extended inner rings.

### Application flexibility

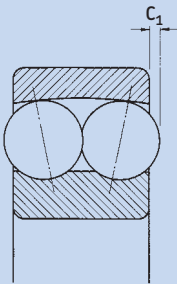
Self-aligning bearings are used in high speed applications where alignments may be a problem and running accuracy is required. Examples include fans and blowers, textile equipment and general conveyor equipment.

## Introduction

### Special feature

Self-aligning ball bearings of series 14 as well as some sizes of series 12 (K) and 13 (K) have balls which protrude somewhat from the bearing; the actual values are given in the adjacent table. This should be remembered when designing adjacent components.

#### Protrusion of balls from bearing side faces



Bearing	Protrusion C1	
	mm	in
1224(K)	1.3	0.0512
1226	1.4	0.0551
1318(K)	1.0	0.0394
1319(K)	1.5	0.0591
1320(K)	2.5	0.0984
1322(K)	2.6	0.1024

## Clearance

### Radial internal clearance

SKF self-aligning ball bearings are produced with Normal radial internal clearance (CN or CO not marked on bearing) as standard. Radial clearance selection is based on factors such as high speed, operating temperature, shaft fits and axial movement limitations. Bearings with a tapered bore are normally supplied with a C3 radial internal clearance (marked on the bearing). Bearings having clearances that are greater than (C3 or C4) or less than (C2) Normal are available on request.

The clearance values are given in **Table 1**. They are valid for unmounted bearings without measuring load, and conform to ISO 5753-1981 (ABMA standard 20).

## Loads

### Equivalent dynamic bearing loads

$$P = F_r + Y_1 F_a \text{ where } F_a / F_r \leq e$$

$$P = 0.65 F_r + Y_2 F_a \text{ when } F_a / F_r > e$$

Values of factors  $e$ ,  $Y_1$  and  $Y_2$  for each individual bearing are given in the bearing **Table 2**, page 78.

## Minimum load

**In order to provide satisfactory operation of all ball and roller bearings they must always be subjected to a given minimum load.**

This is also true of self-aligning ball bearings, particularly if they run at high speeds where the inertia forces of the balls and cage, and the friction in the lubricant can have a detrimental influence on the rolling conditions in the bearing and may cause damaging sliding movements to occur between the balls and the raceways.

The requisite minimum radial load to be applied in such cases can be determined by using the Interactive Engineering catalog on the SKF website [www.skf.com](http://www.skf.com) or by contacting SKF Applications Engineering. However, the weight of the components supported by the bearing, together with the external forces, often exceeds the requisite minimum load. If this is not the case, an additional radial load **must** be applied to the bearing; for example, by increasing belt tension or similar means.

## Mounting bearings with tapered bore

Bearings with a tapered bore are always mounted with an interference fit on the shaft, adapter sleeve or withdrawal sleeve. As a measure of the degree of interference of the fit, either the reduction in radial internal clearance of the bearing or the axial displacement of the inner ring on the tapered bearing seating can be used.

The mounting of self-aligning ball bearings with tapered bore calls for experience and skill as they have a relatively small internal clearance, and a reliable measurement of the clearance reduction is not always possible. There are specific mounting instructions for these bearings in the SKF Bearing Installation and Maintenance Guide (140-710) or by visiting the SKF website [www.skf.com/mount](http://www.skf.com/mount) for exact mounting instructions.

## Frequency vibration data

Frequency vibration data is available on the SKF website [www.skf.com](http://www.skf.com), in the Interactive Engineering Catalog or by contacting SKF Applications Engineering.

Table 1

## Radial internal clearance of self-aligning ball bearings

Bore diameter d		Radial internal clearance															
		C2				Normal				C3				C4			
over	incl.	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
mm		μm		in		μm		in		μm		in		μm		in	
<b>Bearings with cylindrical bore</b>																	
<b>2.5</b>	<b>6</b>	1	8	0.0000	0.0003	5	15	0.0002	0.0006	10	20	0.0004	0.0008	15	25	0.0006	0.0010
<b>6</b>	<b>10</b>	2	9	0.0001	0.0004	6	17	0.0002	0.0007	12	25	0.0005	0.0010	19	33	0.0007	0.0013
<b>10</b>	<b>14</b>	2	10	0.0001	0.0004	6	19	0.0002	0.0007	13	26	0.0005	0.0010	21	35	0.0008	0.0014
<b>14</b>	<b>18</b>	3	12	0.0001	0.0005	8	21	0.0003	0.0008	15	28	0.0006	0.0011	23	37	0.0009	0.0015
<b>18</b>	<b>24</b>	4	14	0.0002	0.0006	10	23	0.0004	0.0009	17	30	0.0007	0.0012	25	39	0.0010	0.0015
<b>24</b>	<b>30</b>	5	16	0.0002	0.0006	11	24	0.0004	0.0009	19	35	0.0007	0.0014	29	46	0.0011	0.0018
<b>30</b>	<b>40</b>	6	18	0.0002	0.0007	13	29	0.0005	0.0011	23	40	0.0009	0.0016	34	53	0.0013	0.0021
<b>40</b>	<b>50</b>	6	19	0.0002	0.0007	14	31	0.0006	0.0012	25	44	0.0010	0.0017	37	57	0.0015	0.0022
<b>50</b>	<b>65</b>	7	21	0.0003	0.0008	16	36	0.0006	0.0014	30	50	0.0012	0.0020	45	69	0.0018	0.0027
<b>65</b>	<b>80</b>	8	24	0.0003	0.0009	18	40	0.0007	0.0016	35	60	0.0014	0.0024	54	83	0.0021	0.0033
<b>80</b>	<b>100</b>	9	27	0.0004	0.0011	22	48	0.0009	0.0019	42	70	0.0017	0.0028	64	96	0.0025	0.0038
<b>100</b>	<b>120</b>	10	31	0.0004	0.0012	25	56	0.0010	0.0022	50	83	0.0020	0.0033	75	114	0.0030	0.0045
<b>120</b>	<b>140</b>	10	38	0.0004	0.0015	30	68	0.0012	0.0027	60	100	0.0024	0.0039	90	135	0.0035	0.0053
<b>Bearings with tapered bore</b>																	
<b>18</b>	<b>24</b>	7	17	0.0003	0.0007	13	26	0.0005	0.0010	20	33	0.0008	0.0013	28	42	0.0011	0.0017
<b>24</b>	<b>30</b>	9	20	0.0004	0.0008	15	28	0.0006	0.0011	23	39	0.0009	0.0015	33	50	0.0013	0.0020
<b>30</b>	<b>40</b>	12	24	0.0005	0.0009	19	35	0.0007	0.0014	29	46	0.0011	0.0018	40	59	0.0016	0.0023
<b>40</b>	<b>50</b>	14	27	0.0006	0.0011	22	39	0.0009	0.0015	33	52	0.0013	0.0020	45	65	0.0018	0.0026
<b>50</b>	<b>65</b>	18	32	0.0007	0.0013	27	47	0.0011	0.0019	41	61	0.0016	0.0024	56	80	0.0022	0.0031
<b>65</b>	<b>80</b>	23	39	0.0009	0.0015	35	57	0.0014	0.0022	50	75	0.0020	0.0030	69	98	0.0027	0.0039
<b>80</b>	<b>100</b>	29	47	0.0011	0.0019	42	68	0.0017	0.0027	62	90	0.0024	0.0035	84	116	0.0033	0.0046
<b>100</b>	<b>120</b>	35	56	0.0014	0.0022	50	81	0.0020	0.0032	75	108	0.0030	0.0043	100	139	0.0039	0.0055

Table 2

Calculation factors for self-aligning ball bearings

Designation	Calculation factors		
	e	Y1	Y2
Bearings with cylindrical bore			
126	0.33	1.9	3.0
127	0.33	1.9	3.0
129	0.33	1.9	3.0
1200 E	0.33	1.9	3.0
1201 E	0.33	1.9	3.0
1202 E	0.33	1.9	3.0
1203 E	0.31	2.0	3.1
1204 E	0.30	2.1	3.3
1205 E	0.28	2.2	3.5
1206 E	0.25	2.5	3.9
1207 E	0.23	2.7	4.2
1208 E	0.22	2.9	4.5
1209 E	0.21	3.0	4.6
1210 E	0.21	3.0	4.6
1211 E	0.19	3.3	5.1
1212 E	0.19	3.3	5.1
1213 E	0.18	3.5	5.4
1214	0.18	3.5	5.4
1215	0.17	3.7	5.7
1216	0.16	3.9	6.1
1217	0.17	3.7	5.7
1218	0.17	3.7	5.7
1219	0.17	3.7	5.7
1220	0.17	3.7	5.7
1221	0.17	3.7	5.7
1222	0.17	3.7	5.7
1224	0.19	3.3	5.1
1226	0.19	3.3	5.1
135	0.33	1.9	3.0
1301 E	0.35	1.8	2.8
1302 E	0.31	2.0	3.1
1303 E	0.30	2.1	3.3
1304 E	0.28	2.2	3.5
1305 E	0.28	2.2	3.5
1306 E	0.25	2.5	3.9
1307 E	0.25	2.5	3.9
1308 E	0.28	2.2	3.5
1309 E	0.23	2.7	4.2
1310 E	0.24	2.6	4.1
1311 E	0.23	2.7	4.2
1312 E	0.23	2.7	4.2
1313 E	0.22	2.9	4.5
1314	0.22	2.9	4.5
1315 K	0.22	2.9	4.5
1316 K	0.22	2.9	4.5
1317 K	0.22	2.9	4.5
1318 K	0.22	2.9	4.5
1319 K	0.23	2.7	4.2
1320	0.23	2.7	4.2
1322	0.22	2.9	4.5

Table 2

## Calculation factors for self-aligning ball bearings

Designation	Calculation factors		
	e	Y1	Y2
Bearings with cylindrical bore			
1412	0.33	1.90	3.0
2200 E	0.54	1.15	1.8
2201 E	0.50	1.25	2.0
2202 E	0.43	1.50	2.3
2203 E	0.43	1.50	2.3
2204 E	0.40	1.60	2.4
2205 E	0.35	1.80	2.8
2206 E	0.33	1.90	3.0
2207 E	0.31	2.00	3.1
2208 E	0.22	2.90	4.5
2209 E	0.26	2.40	3.7
2210 E	0.23	2.70	4.2
2211 E	0.23	2.70	4.2
2212 E	0.24	2.60	4.1
2213 E	0.24	2.60	4.1
2214	0.27	2.30	3.6
2215	0.25	2.50	3.9
2216 E	0.22	2.90	4.5
2217	0.25	2.50	3.9
2218	0.27	2.30	3.6
2219	0.27	2.30	3.6
2220	0.27	2.30	3.6
2221	0.28	2.20	3.5
2222	0.28	2.20	3.5
2301	0.60	1.05	1.6
2302	0.52	1.20	1.9
2303	0.52	1.20	1.9
2304	0.52	1.20	1.9
2305	0.48	1.30	2.0
2306	0.44	1.40	2.2
2307 E	0.46	1.35	2.1
2308 E	0.23	2.70	4.2
2309 E	0.33	1.90	3.0
2310	0.43	1.50	2.3
2311	0.40	1.60	2.4
2312	0.33	1.90	3.0
2313	0.37	1.70	2.6
2314	0.37	1.70	2.6
2315	0.37	1.70	2.6
2316	0.37	1.70	2.6
2317	0.37	1.70	2.6
2318	0.37	1.70	2.6
2319	0.37	1.70	2.6
2320	0.37	1.70	2.6
2322	0.37	1.70	2.6

# Self-aligning ball bearings

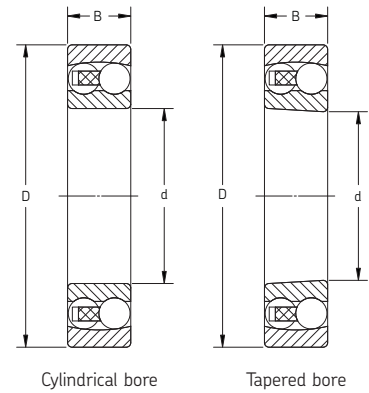
Double row

Open, cylindrical and tapered bore

Series: 126 — 1226 M

Size: 6 mm — 130 mm

0.2362 in — 5.1181 in

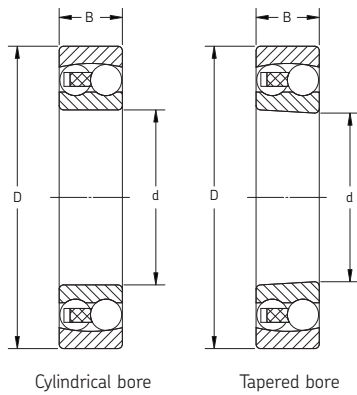


Cylindrical bore

Tapered bore

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass		Designation		Mass	
	Bore		Outside diameter		Width		Dynamic		Static		Reference speed r/min	Limiting speed r/min	kg	lb	Tapered bore	Adapter sleeve	kg	lb
	d	D	D	D	B	B	C	C <sub>0</sub>	C	C <sub>0</sub>								
mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min	kg	lb			kg	lb	
126	6	0.2362	19	0.7480	6	0.2362	2 510	560	480	110	70 000	45 000	0.01	0.10	—	—	—	—
127	7	0.2756	22	0.8661	7	0.2756	2 650	600	560	130	63 000	40 000	0.01	0.10	—	—	—	—
129	9	0.3543	26	1.0236	8	0.3150	3 900	880	820	180	60 000	38 000	0.02	0.10	—	—	—	—
1200 E	10	0.3937	30	1.1811	9	0.3543	5 530	1 240	1 180	270	56 000	36 000	0.03	0.10	—	—	—	—
1201 E	12	0.4724	32	1.2598	10	0.3937	6 240	1 400	1 430	320	50 000	32 000	0.04	0.10	—	—	—	—
1202 E	15	0.5906	35	1.3780	11	0.4331	7 410	1 670	1 760	400	45 000	28 000	0.05	0.20	—	—	—	—
1203 E	17	0.6693	40	1.5748	12	0.4724	8 840	1 990	2 200	490	38 000	24 000	0.07	0.20	—	—	—	—
1204 E	20	0.7874	47	1.8504	14	0.5512	12 700	2 850	3 400	760	32 000	20 000	0.12	0.30	1204 EK	H 204	0.04	0.08
1205 E	25	0.9843	52	2.0472	15	0.5906	14 300	3 210	4 000	900	28 000	18 000	0.14	0.40	1205 EK	H 205	0.07	0.14
1206 E	30	1.1811	62	2.4409	16	0.6299	15 600	3 510	4 650	1 050	24 000	15 000	0.22	0.50	1206 EK	H 206	0.09	0.19
1207 E	35	1.3780	72	2.8346	17	0.6693	19 000	4 270	6 000	1 350	20 000	13 000	0.32	0.80	1207 EK	H 207	0.12	0.26
1208 E	40	1.5748	80	3.1496	18	0.7087	19 900	4 470	6 950	1 560	18 000	11 000	0.42	1.00	1208 EK	H 208	0.16	0.35
1209 E	45	1.7717	85	3.3465	19	0.7480	22 900	5 150	7 800	1 750	17 000	11 000	0.47	1.10	1209 EK	H 209	0.21	0.46
1210 E	50	1.9685	90	3.5433	20	0.7874	26 500	5 960	9 150	2 060	16 000	10 000	0.53	1.20	1210 EK	H 210	0.24	0.53
1211 E	55	2.1654	100	3.9370	21	0.8268	27 600	6 200	10 600	2 380	14 000	9 000	0.71	1.60	1211 EK	H 211	0.28	0.62
1212 E	60	2.3622	110	4.3307	22	0.8661	31 200	7 010	12 200	2 740	12 000	8 500	0.90	2.00	1212 EK	H 212	0.31	0.68
1213 E	65	2.5591	120	4.7244	23	0.9055	35 100	7 890	14 000	3 150	11 000	7 000	1.15	2.60	1213 EK	H 213	0.36	0.79
1214	70	2.7559	125	4.9213	24	0.9449	35 800	8 050	14 600	3 280	11 000	7 000	1.25	2.80	—	—	—	—
1215	75	2.9528	130	5.1181	25	0.9843	39 000	8 770	15 600	3 510	10 000	6 700	1.35	3.00	1215 K	H 215	0.66	1.45
1216	80	3.1496	140	5.5118	26	1.0236	39 700	8 920	17 000	3 820	9 500	6 000	1.65	3.70	1216 K	H 216	0.81	1.80
1217	85	3.3465	150	5.9055	28	1.1024	48 800	10 970	20 800	4 680	9 000	5 600	2.05	4.60	1217 K	H 217	0.94	2.05
1218	90	3.5433	160	6.2992	30	1.1811	57 200	12 860	23 600	5 310	8 500	5 300	2.50	5.60	1218 K	H 218	1.10	2.45
1219	95	3.7402	170	6.6929	32	1.2598	63 700	14 320	27 000	6 070	8 000	5 000	3.10	6.90	1219 K	H 219	1.25	2.75
1220	100	3.9370	180	7.0866	34	1.3386	68 900	15 490	30 000	6 740	7 500	4 800	3.70	8.20	1220 K	H 220	1.40	3.10
1221	105	4.1339	190	7.4803	36	1.4173	74 100	16 660	32 500	7 310	7 000	4 500	4.35	9.60	1221 K	H 221	1.60	3.55
1222	110	4.3307	200	7.8740	38	1.4961	88 400	19 870	39 000	8 770	6 700	4 300	5.15	11.40	1222 K	H 222	1.80	3.95
1224 M	120	4.7244	215	8.4646	42	1.6535	119 000	26 750	53 000	11 910	6 300	4 000	6.75	14.90	1224 KM	H 3024	1.80	3.95
1226 M	130	5.1181	230	9.0551	46	1.8110	127 000	28 550	58 500	13 150	5 600	3 600	8.30	18.30	—	—	—	—

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Double row  
Open, cylindrical and tapered bore  
Series: 135 — 1322 M  
Size: 5 mm — 110 mm  
0.1969 in — 4.3307 in

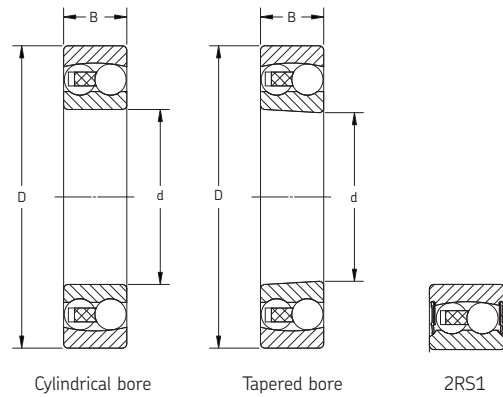
Series: 1412 M  
Size: 60 mm (2.3622 in)

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass		Designation		Mass	
	Bore		Outside diameter		Width		Dynamic		Static		Reference speed r/min	Limiting speed r/min	kg	lb	Tapered bore	Adapter sleeve	kg	lb
	d	D	B	C	C <sub>0</sub>													
	mm	in	mm	in	mm	in	N	lbf	N	lbf								
135	5	0.1969	19	0.7480	6	0.2362	2 510	560	480	110	63 000	45 000	0.01	0.10	—	—	—	—
1301 E	12	0.4724	37	1.4567	12	0.4724	9 360	2 100	2 160	490	40 000	28 000	0.07	0.20	—	—	—	—
1302 E	15	0.5906	42	1.6535	13	0.5118	10 800	2 430	2 600	580	34 000	24 000	0.09	0.20	—	—	—	—
1303 E	17	0.6693	47	1.8504	14	0.5512	12 700	2 850	3 400	760	28 000	20 000	0.13	0.30	—	—	—	—
1304 E	20	0.7874	52	2.0472	15	0.5906	14 300	3 210	4 000	900	26 000	18 000	0.16	0.40	1304 EK	H 304	0.04	0.09
1305 E	25	0.9843	62	2.4409	17	0.6693	19 000	4 270	5 400	1 210	22 000	15 000	0.26	0.60	1305 EK	H 305	0.07	0.16
1306 E	30	1.1811	72	2.8346	19	0.7480	22 500	5 060	6 800	1 530	19 000	13 000	0.39	0.90	1306 EK	H 306	0.10	0.21
1307 E	35	1.3780	80	3.1496	21	0.8268	26 500	5 960	8 500	1 910	16 000	11 000	0.51	1.20	1307 EK	H 307	0.14	0.31
1308 E	40	1.5748	90	3.5433	23	0.9055	33 800	7 600	11 200	2 520	14 000	9 500	0.72	1.60	1308 EK	H 308	0.17	0.37
1309 E	45	1.7717	100	3.9370	25	0.9843	39 000	8 770	13 400	3 010	12 000	8 500	0.96	2.20	1309 EK	H 309	0.23	0.51
1310 E	50	1.9685	110	4.3307	27	1.0630	43 600	9 800	14 000	3 150	12 000	8 000	1.20	2.70	1310 EK	H 310	0.27	0.60
1311 E	55	2.1654	120	4.7244	29	1.1417	50 700	11 400	18 000	4 050	11 000	7 500	1.60	3.60	1311 EK	H 311	0.32	0.71
1312 E	60	2.3622	130	5.1181	31	1.2205	58 500	13 150	22 000	4 950	9 000	6 300	1.95	4.30	1312 EK	H 312	0.36	0.79
1313 E	65	2.5591	140	5.5118	33	1.2992	65 000	14 610	25 500	5 730	8 500	6 000	2.45	5.50	1313 EK	H 313	0.42	0.93
1314	70	2.7559	150	5.9055	35	1.3780	74 100	16 660	27 500	6 180	8 500	6 000	3.00	6.60	-	-	-	-
1315	75	2.9528	160	6.2992	37	1.4567	79 300	17 830	30 000	6 740	8 000	5 600	3.55	7.80	1315 K	H 315	0.78	1.70
1316	80	3.1496	170	6.6929	39	1.5354	88 400	19 870	33 500	7 530	7 500	5 300	4.20	9.30	1316 K	H 316	0.95	2.10
1317	85	3.3465	180	7.0866	41	1.6142	97 500	21 920	38 000	8 540	7 000	4 800	5.00	11.00	1317 K	H 317	1.10	2.45
1318	90	3.5433	190	7.4803	43	1.6929	117 000	26 300	44 000	9 890	6 700	4 500	5.80	12.80	1318 K	H 318	1.30	2.85
1319	95	3.7402	200	7.8740	45	1.7717	133 000	29 900	51 000	11 460	6 300	4 300	6.70	14.80	1319 K	H 319	1.40	3.10
1320	100	3.9370	215	8.4646	47	1.8504	143 000	32 150	57 000	12 810	6 000	4 000	8.30	18.30	1320 K	H 320	1.60	3.55
1322 M	110	4.3307	240	9.4488	50	1.9685	163 000	36 640	72 000	16 190	5 300	3 600	12.00	26.50	1322 K	H 322	2.05	4.50
1412 M	60	2.3622	150	5.9055	42	1.6535	125 000	28 100	41 500	9 330	9 000	6 300	3.95	8.70	—	—	—	—

Warning: The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
Consult SKF USA Inc. prior to design change or order placement.

# Self-aligning ball bearings

Double row  
Cylindrical and tapered bore  
Open and sealed  
Series: 2200 E — 2222  
Size: 10 mm — 110 mm  
0.3937 in — 4.3307 in

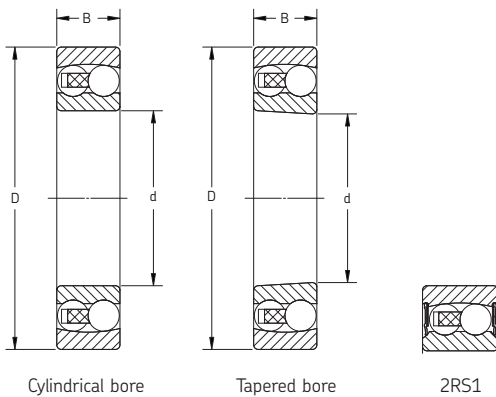


Designation	Principal dimensions						Basic load ratings				Speed rating		Mass		Designation		Mass	
	Bore		Outside diameter		Width		Dynamic		Static		Reference speed r/min	Limiting speed r/min	kg	lb	Tapered bore	Adapter sleeve	kg	lb
	d	D	B	C	C <sub>0</sub>													
mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min	kg	lb			kg	lb	
2200 E	10	0.3937	30	1.1811	14	0.5512	8 060	1 810	1 730	390	50 000	34 000	0.05	0.10	—	—	—	—
2201 E	12	0.4724	32	1.2598	14	0.5512	8 520	1 920	1 900	430	45 000	30 000	0.05	0.10	—	—	—	—
2202 E	15	0.5906	35	1.3780	14	0.5512	8 710	1 960	2 040	460	38 000	26 000	0.06	0.10	—	—	—	—
2203 E	17	0.6693	40	1.5748	16	0.6299	10 600	2 380	2 550	570	34 000	24 000	0.09	0.20	—	—	—	—
2204 E	20	0.7874	47	1.8504	18	0.7087	16 800	3 780	4 150	930	28 000	20 000	0.14	0.30	—	—	—	—
2205 E	25	0.9843	52	2.0472	18	0.7087	16 800	3 780	4 400	990	26 000	18 000	0.16	0.40	2205 EK	H 305	0.07	0.16
2206 E	30	1.1811	62	2.4409	20	0.7874	23 800	5 350	6 700	1 510	22 000	15 000	0.26	0.60	2206 EK	H 306	0.10	0.21
2207 E	35	1.3780	72	2.8346	23	0.9055	30 700	6 900	8 800	1 980	18 000	12 000	0.40	0.90	2207 EK	H 307	0.14	0.31
2208 E	40	1.5748	80	3.1496	23	0.9055	31 900	7 170	10 000	2 250	16 000	11 000	0.51	1.10	2208 EK	H 308	0.17	0.37
2209 E	45	1.7717	85	3.3465	23	0.9055	32 500	7 310	10 600	2 380	15 000	10 000	0.55	1.20	2209 EK	H 309	0.23	0.51
2210 E	50	1.9685	90	3.5433	23	0.9055	33 800	7 600	11 200	2 520	14 000	9 500	0.60	1.30	2210 EK	H 310	0.27	0.6
2211 E	55	2.1654	100	3.9370	25	0.9843	39 000	8 770	13 400	3 010	12 000	8 500	0.81	1.80	2211 EK	H 311	0.32	0.71
2212 E	60	2.3622	110	4.3307	28	1.1024	48 800	10 970	17 000	3 820	11 000	8 000	1.10	2.45	2212 EK	H 312	0.36	0.79
2213 E	65	2.5591	120	4.7244	31	1.2205	57 200	12 860	20 000	4 500	10 000	7 000	1.45	3.20	2213 EK	H 313	0.42	0.93
2214	70	2.7559	125	4.9213	31	1.2205	44 200	9 940	17 000	3 820	10 000	6 700	1.50	3.30	—	—	—	—
2215 E	75	2.9528	130	5.1181	31	1.2205	58 500	13 150	22 000	4 950	9 000	6 300	1.60	3.55	2215 K	H 315	0.78	1.7
2216 E	80	3.1496	140	5.5118	33	1.2992	65 000	14 610	25 500	5 730	8 500	6 000	2.00	4.40	2216 EK	H 316	0.95	2.1
2217	85	3.3465	150	5.9055	36	1.4173	58 500	13 150	23 600	5 310	8 000	5 600	2.50	5.50	2217 K	H 317	1.10	2.45
2218	90	3.5433	160	6.2992	40	1.5748	70 200	15 780	28 500	6 410	7 500	5 300	3.40	7.50	2218 K	H 318	1.30	2.85
2219 M	95	3.7402	170	6.6929	43	1.6929	83 200	18 700	34 500	7 760	7 000	5 000	4.10	9.05	2219 KM	H 319	1.40	3.1
2220	100	3.9370	180	7.0866	46	1.8110	97 500	21 920	40 500	9 100	6 700	4 800	5.00	11.00	2220 K	H 320	1.60	3.55
2221 M	105	4.1339	190	7.4803	50	1.9685	108 000	24 280	45 000	10 120	6 300	4 500	6.10	13.50	2221 K	H 321	1.85	4.1
2222	110	4.3307	200	7.8740	53	2.0866	124 000	27 880	52 000	11 690	6 000	4 300	7.10	15.50	2222 K	H 322	2.05	4.5

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Double row  
Cylindrical and tapered bore  
Open and sealed  
Series: 2302 — 2320 M  
Size: 15 mm — 100 mm  
0.5906 in — 3.9370 in



Cylindrical bore

Tapered bore

2RS1

Designation	Principal Dimensions						Basic load ratings				Speed rating		Mass		Designation		Mass	
	Bore		Outside diameter		Width		Dynamic		Static		Reference speed r/min	Limiting speed r/min	kg	lb	Tapered bore	Adapter sleeve	kg	lb
	d	D	B	C	C <sub>0</sub>													
	mm	in	mm	in	mm	in	N	lbf	N	lbf								
2302	15	0.5906	42	1.6535	17	0.6693	11 900	2 680	2 900	650	32 000	24 000	0.11	0.20	—	—	—	—
2303	17	0.6693	47	1.8504	19	0.7480	14 600	3 280	3 550	800	30 000	22 000	0.16	0.40	—	—	—	—
2304	20	0.7874	52	2.0472	21	0.8268	18 200	4 090	4 750	1 070	26 000	19 000	0.21	0.50	—	—	—	—
2305	25	0.9843	62	2.4409	24	0.9449	24 200	5 440	6 550	1 470	22 000	16 000	0.34	0.70	2305 K	H 2305	0.09	0.19
2306	30	1.1811	72	2.8346	27	1.0630	31 200	7 010	8 800	1 980	18 000	13 000	0.50	1.10	2306 K	H 2306	0.11	0.24
2307 E	35	1.3780	80	3.1496	31	1.2205	39 700	8 920	11 200	2 520	16 000	12 000	0.68	1.50	2307 EK	H 2307	0.16	0.35
2308 E	40	1.5748	90	3.5433	33	1.2992	54 000	12 140	16 000	3 600	14 000	10 000	0.93	2.10	2308 EK	H 2308	0.22	0.49
2309 E	45	1.7717	100	3.9370	36	1.4173	63 700	14 320	19 300	4 340	13 000	9 000	1.25	2.80	2309 EK	H 2309	0.27	0.6
2310	50	1.9685	110	4.3307	40	1.5748	63 700	14 320	20 000	4 500	14 000	9 500	1.65	3.60	2310 K	H 2310	0.34	0.75
2311	55	2.1654	120	4.7244	43	1.6929	76 100	17 110	24 000	5 400	11 000	7 500	2.10	4.60	2311 K	H 2311	0.39	0.86
2312	60	2.3622	130	5.1181	46	1.8110	87 100	19 580	28 500	6 410	9 500	7 000	2.60	5.70	2312 K	H 2312	0.45	0.99
2313	65	2.5591	140	5.5118	48	1.8898	95 600	21 490	32 500	7 310	9 000	6 300	3.25	7.20	2313 K	H 2313	0.52	1.15
2314	70	2.7559	150	5.9055	51	2.0079	111 000	24 950	37 500	8 430	8 000	6 000	3.90	8.60	—	—	—	—
2315	75	2.9528	160	6.2992	55	2.1654	124 000	27 880	43 000	9 670	7 500	5 600	4.70	10.40	2315 K	H 2315	1.10	2.45
2316	80	3.1496	170	6.6929	58	2.2835	135 000	30 350	49 000	11 020	7 000	5 300	6.10	13.40	2316 K	H 2316	1.20	2.65
2317	85	3.3465	180	7.0866	60	2.3622	140 000	31 470	51 000	11 460	6 700	4 800	7.05	15.50	2317 K	H 2317	1.35	3
2318 M	90	3.5433	190	7.4803	64	2.5197	153 000	34 390	57 000	12 810	6 300	4 500	8.45	18.60	2318 K	H 2318	1.60	3.55
2319 M	95	3.7402	200	7.8740	67	2.6378	165 000	37 090	64 000	14 390	6 000	4 500	9.80	21.60	2319 K	H 2319	1.80	3.95
2320 M	100	3.9370	215	8.4646	73	2.8740	190 000	42 710	80 000	17 980	5 600	4 000	12.50	27.60	2320 K	H 2320	2.00	4.4

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
Consult SKF USA Inc. prior to design change or order placement.

# Self-aligning ball bearings

Double row

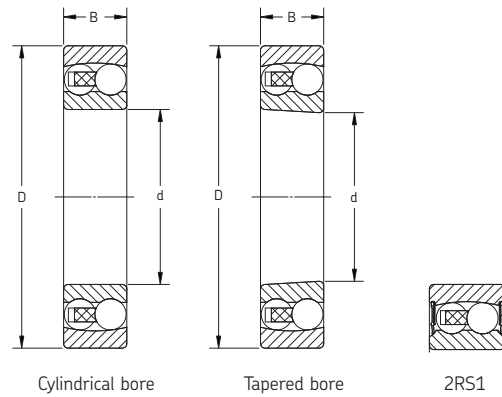
Cylindrical and tapered bore

Open and sealed

Series: 2200 E 2RS1KTN9 — 2208 E 2RS1KTN9

Size: 10 mm — 40 mm

0.3937 in — 1.5748 in



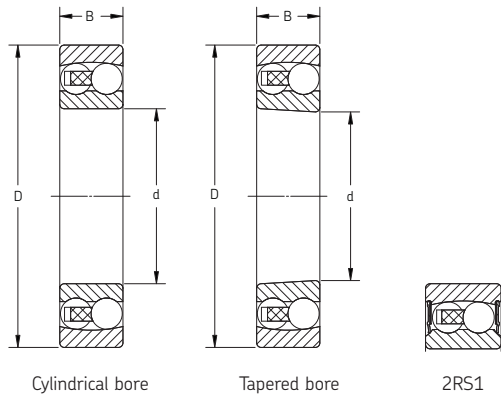
Cylindrical bore

Tapered bore

2RS1

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass		Designation		Mass	
	Bore		Outside diameter		Width		Dynamic		Static		Sealed		kg	lb	Tapered bore	Adapter sleeve	kg	lb
	d	D	B	C	C <sub>0</sub>	Reference speed	Limiting speed	r/min	r/min									
	mm	in	mm	in	mm	in	N			lbf	N	lbf						
2200 E-2RS1TN9	10	0.3937	30	1.1811	14	0.5512	5 530	1 240	1 180	270	—	17 000	0.05	0.10	—	—	—	—
2201 E-2RS1TN9	12	0.4724	32	1.2598	14	0.5512	6 240	1 400	1 430	320	—	16 000	0.05	0.10	—	—	—	—
2202 E-2RS1TN9	15	0.5906	35	1.3780	14	0.5512	7 410	1 670	1 760	400	—	14 000	0.05	0.10	—	—	—	—
2203 E-2RS1TN9	17	0.6693	40	1.5748	16	0.6299	8 840	1 990	2 200	490	—	12 000	0.10	0.20	—	—	—	—
2204 E-2RS1TN9	20	0.7874	47	1.8504	18	0.7087	12 700	2 850	3 400	760	—	10 000	0.14	0.30	—	—	—	—
2205 E-2RS1KTN9	25	0.9843	52	2.0472	18	0.7087	14 300	3 210	4 000	900	—	9 000	0.16	0.40	2205 E-2RS1K	H 305 C	0.07	0.20
2205 E-2RS1TN9	25	0.9843	52	2.0472	18	0.7087	14 300	3 210	4 000	900	—	9 000	0.16	0.40	—	—	—	—
2206 E-2RS1KTN9	30	1.1811	62	2.4409	20	0.7874	15 600	3 510	4 650	1 050	—	7 500	0.26	0.60	2206 E-2RS1K	H 306 C	0.10	0.30
2206 E-2RS1TN9	30	1.1811	62	2.4409	20	0.7874	15 600	3 510	4 650	1 050	—	7 500	0.26	0.60	—	—	—	—
2207 E-2RS1KTN9	35	1.3780	72	2.8346	23	0.9055	19 000	4 270	6 000	1 350	—	6 300	0.41	0.90	2207 E-2RS1K	H 307 C	0.14	0.40
2207 E-2RS1TN9	35	1.3780	72	2.8346	23	0.9055	19 000	4 270	6 000	1 350	—	6 300	0.41	0.90	—	—	—	—
2208 E-2RS1KTN9	40	1.5748	80	3.1496	23	0.9055	19 900	4 470	6 950	1 560	—	5 600	0.50	1.10	2208 E-2RS1K	H 308 C	0.17	0.40

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



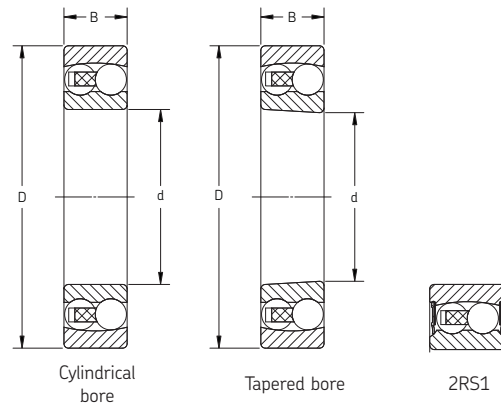
Double row  
Cylindrical and tapered bore  
Open and sealed  
Series: 2308 E 2RS1TN9 — 2308 E 2RS1TN9  
Size: 15 mm — 70 mm  
0.5906 in — 2.7559 in

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass		Designation		Mass	
	Bore		Outside diameter		Width		Dynamic		Static		Sealed				Tapered bore	Adapter sleeve		
	d	D	B	C	C <sub>0</sub>	Reference speed	Limiting speed	kg	lb									
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min	kg	lb	kg	lb		
2208 E-2RS1TN9	40	1.5748	80	3.1496	23	0.9055	19 900	4 470	6 950	1 560	—	5 600	0.50	1.10	—	—	—	—
2209 E-2RS1KTN9	45	1.7717	85	3.3465	23	0.9055	22 900	5 150	7 800	1 750	—	5 300	0.53	1.20	2209 E-2RS1K	H 309 C	0.23	0.60
2209 E-2RS1TN9	45	1.7717	85	3.3465	23	0.9055	22 900	5 150	7 800	1 750	—	5 300	0.53	1.20	—	—	—	—
2210 E-2RS1KTN9	50	1.9685	90	3.5433	23	0.9055	22 900	5 150	8 150	1 830	—	4 800	0.57	1.30	2210 E-2RS1K	H 310 C	0.27	0.60
2210 E-2RS1TN9	50	1.9685	90	3.5433	23	0.9055	22 900	5 150	8 150	1 830	—	4 800	0.57	1.30	—	—	—	—
2211 E-2RS1KTN9	55	2.1654	100	3.9370	25	0.9843	27 600	6 200	10 600	2 380	—	4 300	0.79	1.70	2211 E-2RS1K	H 311 C	0.32	0.80
2211 E-2RS1TN9	55	2.1654	100	3.9370	25	0.9843	27 600	6 200	10 600	2 380	—	4 300	0.79	1.70	—	—	—	—
2212 E-2RS1TN9	60	2.3622	110	4.3307	28	1.1024	31 200	7 010	12 200	2 740	—	3 800	1.05	2.30	—	—	—	—
2213 E-2RS1KTN9	65	2.5591	120	4.7244	31	1.2205	35 100	7 890	14 000	3 150	—	3 600	1.40	3.10	2213 E-2RS1K	H 313 C	0.42	1.00
2213 E-2RS1TN9	65	2.5591	120	4.7244	31	1.2205	35 100	7 890	14 000	3 150	—	3 600	1.40	3.10	—	—	—	—
2214 E-2RS1TN9	70	2.7559	125	4.9213	31	1.2205	35 800	8 050	14 600	3 280	—	3 400	1.45	3.20	—	—	—	—
2302 E-2RS1TN9	15	0.5906	42	1.6535	17	0.6693	10 800	2 430	2 600	580	—	12 000	0.11	0.20	—	—	—	—

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

# Self-aligning ball bearings

Double row  
Cylindrical and tapered bore  
Open and sealed  
Series: 2200 E — 2200 E 2RS1KTN9  
Size: 17 mm — 50 mm  
0.6693 in — 1.9685 in



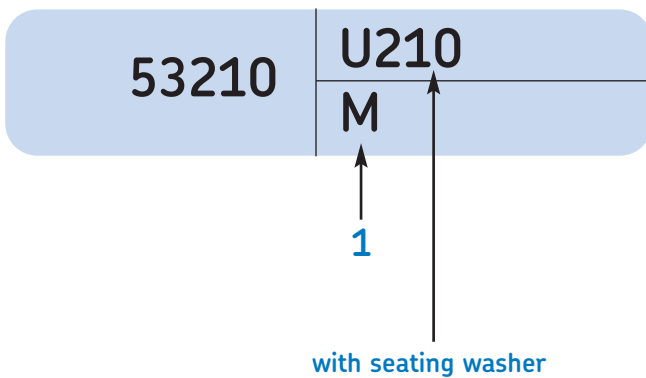
Designation	Principal dimensions						Basic load ratings				Speed rating		Mass		Designation		Mass	
	Bore		Outside diameter		Width		Dynamic		Static		Sealed		kg	lb	Tapered bore	Adapter sleeve	kg	lb
	d	D	B	C	C <sub>0</sub>	Reference speed	Limiting speed											
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min						
2303 E-2RS1TN9	17	0.6693	47	1.8504	19	0.7480	12 700	2 850	3 400	760	—	11 000	0.16	0.40	—	—	—	—
2304 E-2RS1TN9	20	0.7874	52	2.0472	21	0.8268	14 300	3 210	4 000	900	—	9 000	0.21	0.50	—	—	—	—
2305 E-2RS1TN9	25	0.9843	62	2.4409	24	0.9449	19 000	4 270	5 400	1 210	—	7 500	0.34	0.70	—	—	—	—
2306 E-2RS1TN9	30	1.1811	72	2.8346	27	1.0630	22 500	5 060	6 800	1 530	—	6 700	0.51	1.10	—	—	—	—
2307 E-2RS1TN9	35	1.3780	80	3.1496	31	1.2205	26 500	5 960	8 500	1 910	—	5 600	0.70	1.50	—	—	—	—
2308 E-2RS1TN9	40	1.5748	90	3.5433	33	1.2992	33 800	7 600	11 200	2 520	—	5 600	0.96	2.10	—	—	—	—
2309 E-2RS1TN9	45	1.7717	100	3.9370	36	1.4173	39 000	8 770	13 400	3 010	—	4 500	1.30	2.90	—	—	—	—
2310 E-2RS1TN9	50	1.9685	110	4.3307	40	1.4173	43 600	9 800	14 000	3 150	—	4 000	1.65	3.60	—	—	—	—

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

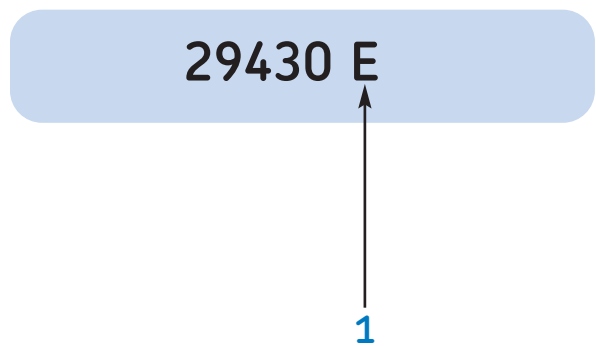


# Thrust bearings

## Thrust ball bearing



## Spherical roller thrust bearing



### 1. Features

- M** Machined brass cage, roller guided
- J9** Internal design change to J cage
- F** Machined steel or special cast iron cage, roller guided
- P5** Dimensional and running accuracy to ISO tolerance class 5 (approximately ABEC 5)

### 1. Features

- E** Optimized internal design, window-type steel cage
- Machined brass cage (no symbol)
- EF** Optimized internal design, machined steel cage
- EM** Optimized internal design, machined brass cage
- RD** Spacer sleeve

## Technical features

### Thrust ball bearing

### Spherical roller thrust bearing

#### Boundary dimensions

Bearings with flat housing washers are in accordance with ISO 104-2002. The bearings with sphered housing washers have dimensions in accordance with DIN 711:1988 and DIN 715:1987.

In accordance with ISO 104-2002

#### Tolerances

ABEC 1

RBEC 1

#### Heat stabilization

250° F (125° C)

392° F (200° C)

#### Misalignment

None – contact SKF

#### normal load conditions

$F_a + 2.7 \times F_r \leq 0.05 C_0$   
 series 29200 - 2 degrees  
 series 29300 - 2.5 degrees  
 series 29400 - 3 degrees

#### heavy load conditions

$F_a + 2.7 \times F_r > 0.05 C_0$   
 1.5 degrees for all series

#### Cage materials

##### Standard

Pressed steel

Steel

##### Optional

Machined brass (M)

Machined brass (larger bearings only)

#### Axial load – max

Thrust bearing  
 (see tables in General Catalog - 6000 EN)

Thrust bearing  
 (see tables in General Catalog - 6000 EN)

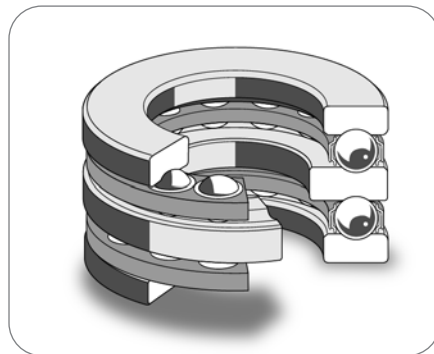
#### Seals

Not available

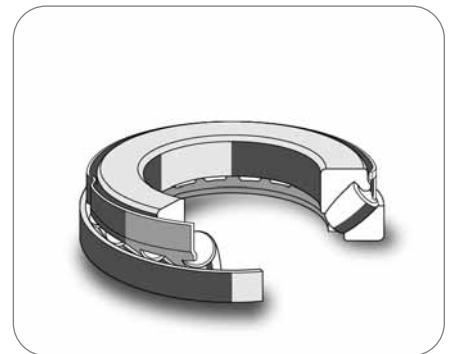
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*Single direction thrust ball bearing (data tables on page 96)*



*Double direction thrust ball bearing (data tables on page 102)*



*Spherical roller thrust bearing (data tables on page 107)*

## Introduction

SKF produces two types of thrust bearings—ball and roller—both of the separable design. The thrust ball bearings are manufactured in single direction and double direction designs and are specifically designed into applications in which there is no radial load.

The spherical roller thrust bearings are capable of handling shaft misalignment, very heavy axial loads, small radial loads and relatively high speeds.

## Basic design

### Single direction thrust ball bearings

Thrust ball bearings of this type are suitable for the accommodation of axial loads in one direction only and can locate a shaft in one direction; **they may not, however, be subjected to any radial load.**

Single direction thrust ball bearings comprise a shaft washer with raceway groove, a ball and cage thrust assembly and a housing washer with raceway groove. The housing washer can have a flat or sphered seating surface as required. Bearings with a sphered housing washer can compensate for initial misalignment if they are used together with a seating washer which has a correspondingly sphered surface.

**The sphered seating washer must be ordered separately.** See **Table 1** for designations and dimensions.

The bearings are separable and mounting is simple as the components can be mounted individually.

### Double direction thrust ball bearings

Thrust ball bearings of this type can accommodate axial loads acting in both directions and consequently can be used to locate a shaft in both directions. **They should not be subjected to any radial load.**

Double direction thrust ball bearings comprise one shaft washer with a raceway groove in each face, two ball and cage thrust assemblies and two housing washers with raceway groove. The housing washers can have a flat or sphered seating surface as required. Bearings with sphered housing washers can compensate for initial misalignments if they are used together with seating washers which have a correspondingly sphered surface. **The sphered seating washers must be ordered separately.** See bearing tables for designations.

The bearings are separable. The housing washers and ball and cage thrust assemblies are the same as those of the corresponding single direction bearings.

### Spherical roller thrust bearings

In spherical roller thrust bearings the load is transmitted from one raceway to the other at an angle to the bearing axis (**Figure 1**). They are therefore suitable, in contrast to the other thrust bearings shown in this catalog, for the accommodation of radial loads in addition to simultaneously acting axial loads. Another important characteristic of spherical roller thrust bearings is their self-aligning capability. This makes the bearings insensitive to shaft deflection and to errors of alignment of the shaft relative to the housing.

Spherical roller thrust bearings are of separable design; the shaft washer with roller and cage assembly, and the housing washer, can be mounted individually.

## Product highlights

### Thrust ball

#### Purely for thrust loads

SKF thrust ball bearings are designed for purely thrust loads and are used in applications in which there is no radial load. These bearings are separable to facilitate easy mounting.

#### High speed capabilities

SKF thrust ball bearings offer higher speed capabilities than the spherical roller thrust bearings.

#### Large product assortment

Single and double direction designs are available also with sphered seating washers to compensate for alignment errors. Size range includes 10 to 800 mm inside diameter.

### Spherical roller thrust

#### Accommodates heavy combined load at high speeds

Spherical roller thrust bearings are used extensively in applications where heavy axial and simultaneous radial loads need to be supported. These heavy loads are often accompanied by relatively high speeds.

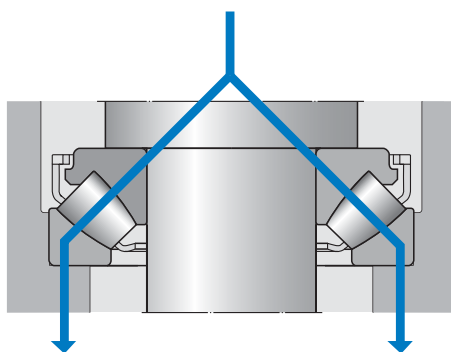
#### Unaffected by misalignment

Spherical roller thrust bearings are also insensitive to misalignments allowing for equipment machining error without reduced service life.

#### Application flexibility

Used in a wide range of machinery including gearboxes, water turbines, steering propellers and propeller thrust blocks, wind power stations, electric motors, pumps, fans, crushers, machine tools, rolling mills, extrusion machines refiners, injection molding machines, hydraulic motors, cranes and tunneling.

Figure 1



## Introduction

SKF spherical roller thrust bearings incorporate a large number of asymmetrical rollers and have specially designed raceways with an optimum conformity. They are therefore suitable for very heavy axial loads and also permit relatively high speed operation.

SKF spherical roller thrust bearings are manufactured in two designs depending on size and series. Bearings identified by the designation suffix E up to and including size 68 — except bearing 29238 E — have a pressed steel window-type cage which forms a non-separable assembly with the rollers and the shaft washer. All other bearings have a machined cage of brass which is guided by a sleeve fixed in the shaft washer bore. Here again, the shaft washer, cage and rollers form a non-separable unit.

The E design bearings represent a new generation of SKF spherical roller thrust bearings. They have the same boundary dimensions, but because of improvements to the internal design, their load carrying capacity is much higher and their friction much lower than that of the earlier bearings.

If bearings of earlier design with a machined cage, where axial forces were transmitted via the cage-guiding sleeve, are to be replaced by E design bearings with a pressed steel cage, it is necessary to insert a spacer sleeve between the shaft washer and the existing abutment (**Figure 2**). If bearings of the earlier B design are to be replaced, the spacer sleeve used with the B design generally needs machining (**Figure 3**). The sleeves must be hardened and should have ground faces. These sleeves may be purchased through SKF using the designation RD + the basic part number, i.e. RD 29434 B. Appropriate outside diameters for the sleeves and detailed drawings can be obtained from SKF Applications Engineering.

## Loads

### Minimum load – thrust ball

In order to provide satisfactory operation, thrust ball bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly if they are to operate at high speeds or are subjected to high accelerations or rapid changes in the direction of load. Under such conditions the inertia forces of the balls and cage(s), and the friction in the lubricant, can have a detrimental influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the balls and raceways.

The requisite minimum axial load to be applied to thrust ball bearings can be estimated using

$$F_{am} = A \left( \frac{n}{1\,000} \right)^2$$

where

$F_{am}$  = minimum axial load, N

$A$  = minimum load factor,  
(see product tables)

$n$  = rotational speed, r/min

When starting up at low temperatures or when the lubricant is highly viscous, even greater minimum loads may be required. The weight of the components supported by the bearing, particularly when the shaft is vertical, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the thrust ball bearing must be preloaded, e.g. by springs.

### Minimum load – spherical roller thrust

In order to provide satisfactory operation, spherical roller thrust bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly if they are to operate at high speeds or are subjected to high accelerations or rapid changes in the direction of the load. Under such conditions, the inertia forces of the rollers and cage, and the friction in the lubricant, can have a detrimental influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the rollers and raceways.

The requisite minimum axial load to be applied to spherical roller thrust bearings can be estimated using

$$F_{am} = 1.8 F_r + A \left( \frac{n}{1\,000} \right)^2$$

where

$F_{am}$  = minimum axial load, N

$F_r$  = radial component of load for bearings  
subjected to combined load, N

$C_0$  = basic static load rating, N  
(see product tables)

$A$  = minimum load factor,  
(see product tables)

$n$  = rotational speed, r/min

If  $1.8 F_r < 0.0005 C_0$  then  $0.0005 C_0$  should be used in the above equation instead of  $1.8 F_r$ .

At speeds higher than the reference speed or when starting up at low temperatures, or when the lubricant is highly viscous, even greater minimum loads may be required. The weight of the components supported by the bearing, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the spherical roller thrust bearing must be preloaded, e.g. by springs. For additional information, contact the SKF Application Engineering service.

Figure 2

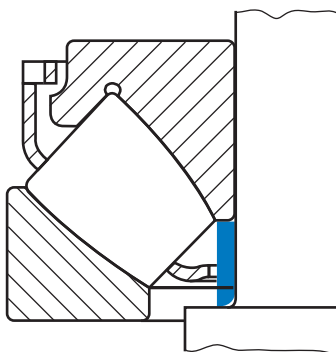
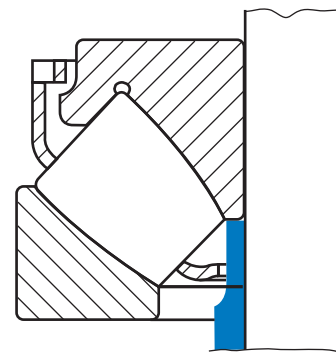


Figure 3





**Equivalent dynamic bearing load – thrust ball**

For single and double direction thrust ball bearings

$$P = F_a$$

**Equivalent dynamic bearing load – spherical roller thrust**

For spherical roller thrust bearings, provided  $F_r \leq 0.55 F_a$

$$P = F_a + 1.2 F_r$$

If, however, the bearing is arranged so that it can compensate for axial and radial runouts by relative movements between the washers and provided

$$F_r \leq 0.55 F_a \text{ then}$$

$$P = 0.88 (F_a + 1.2 F_r)$$

can be used.

If  $F_r > 0.55 F_a$  please contact SKF Applications Engineering.

**Design of associated components for roller thrust bearings**

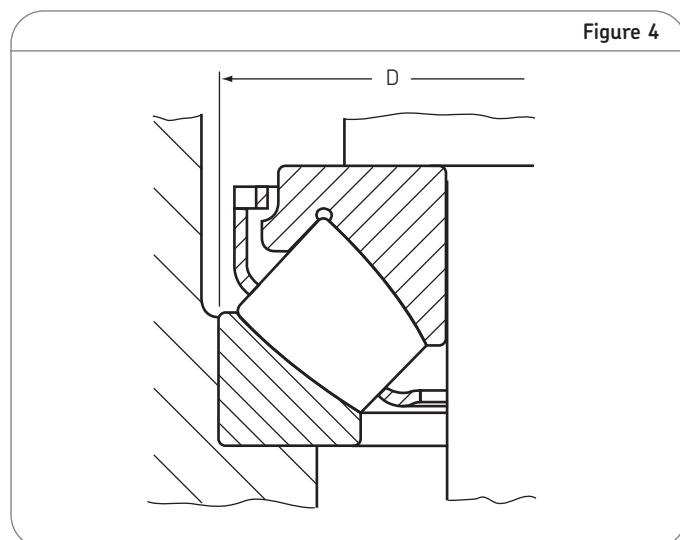
For E design bearings with pressed steel cage it is recommended that the housing bore be relieved to prevent the cage from rubbing against the housing if the shaft should be misaligned (**Figure 4**). Recommended guideline values for the diameter of this relief are  $D + 15$  mm for bearings with outside diameters up to and including 380 mm and  $D + 20$  mm for larger bearings. Contact SKF Applications Engineering for additional information.

**SKF Explorer class bearings**

High performance SKF Explorer spherical roller thrust bearings are shown in blue in the product tables. SKF Explorer bearings retain the designation of the earlier standard bearings, e.g. 29330 E. However, each bearing and its box are marked with the name “SKF Explorer”. Additional details on the Explorer performance class bearings can be found on page 23.

**Frequency vibration data**

Frequency vibration data is available on the SKF website [www.skf.com](http://www.skf.com) in the Interactive Engineering Catalog or by contacting SKF Applications Engineering.



# Thrust bearings

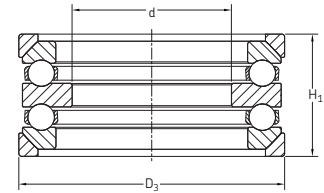
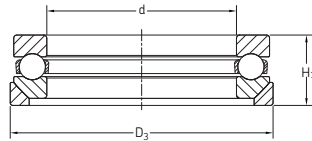
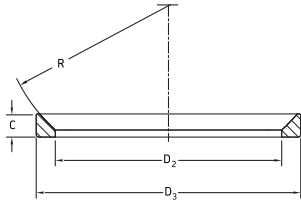


Table 1

## Ball thrust bearing seating washer dimensions

Designation		Dimensions - seating washer										Mass	
Seating washer	Bearing	D2		D3		C		R		H1		Seating washer	
		mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
U 201	53201	20	0.7874	30	1.1811	3.5	0.1378	25	0.9843	13	0.5118	0.01	0.03
U 202	53202	24	0.9449	35	1.3780	4	0.1575	28	1.1024	15	0.5906	0.01	0.03
U 203	53203	26	1.0236	38	1.4961	4	0.1575	32	1.2598	15	0.5906	0.02	0.03
U 204	53204	30	1.1811	42	1.6535	5	0.1969	36	1.4173	17	0.6693	0.02	0.04
U 205	53205	36	1.4173	50	1.9685	5.5	0.2165	40	1.5748	19	0.7480	0.03	0.07
U 206	53206	42	1.6535	55	2.1654	5.5	0.2165	45	1.7717	20	0.7874	0.04	0.08
U 207	53207	48	1.8898	65	2.5591	7	0.2756	50	1.9685	22	0.8661	0.06	0.13
U 207	54207	48	1.8898	65	2.5591	7	0.2756	50	1.9685	42	1.6535	0.06	0.13
U 208	53208	55	2.1654	72	2.8346	7	0.2756	56	2.2047	23	0.9055	0.07	0.15
U 208	54208	55	2.1654	72	2.8346	7	0.2756	56	2.2047	44	1.7323	0.07	0.15
U 209	53209	60	2.3622	78	3.0709	7.5	0.2953	56	2.2047	24	0.9449	0.09	0.19
U 210	53210	62	2.4409	82	3.2283	7.5	0.2953	64	2.5197	26	1.0236	0.10	0.22
U 211	53211	72	2.8346	95	3.7402	9	0.3543	72	2.8346	30	1.1811	0.15	0.33
U 211	54211	72	2.8346	95	3.7402	9	0.3543	72	2.8346	55	2.1654	0.15	0.33
U 212	53212	78	3.0709	100	3.9370	9	0.3543	72	2.8346	31	1.2205	0.16	0.35
U 213	53213	82	3.2283	105	4.1339	9	0.3543	80	3.1496	32	1.2598	0.18	0.40
U 214	53214	88	3.4646	110	4.3307	9	0.3543	80	3.1496	32	1.2598	0.19	0.42
U 215	53215	92	3.6220	115	4.5276	9.5	0.3740	90	3.5433	32	1.2598	0.21	0.46
U 216	53216	98	3.8583	120	4.7244	10	0.3937	90	3.5433	33	1.2992	0.22	0.48
U 217	53217	105	4.1339	130	5.1181	11	0.4331	100	3.9370	37	1.4567	0.29	0.64
U 218	53218	110	4.3307	140	5.5118	13.5	0.5315	100	3.9370	42	1.6535	0.42	0.92
U 220	53220	125	4.9213	155	6.1024	14	0.5512	112	4.4094	45	1.7717	0.50	1.10
U 222	53222	135	5.3150	165	6.4961	14	0.5512	125	4.9213	45	1.7717	0.56	1.23
U 224	53224	145	5.7087	175	6.8898	15	0.5906	125	4.9213	46	1.8110	0.65	1.43
U 226	53226	160	6.2992	195	7.6772	17	0.6693	140	5.5118	53	2.0866	0.90	1.98
U 228	53228	170	6.6929	210	8.2677	17	0.6693	160	6.2992	55	2.1654	1.20	2.64
U 306	53306	45	1.7717	62	2.4409	7	0.2756	50	1.9685	25	0.9843	0.06	0.12
U 306	54306	45	1.7717	62	2.4409	7	0.2756	50	1.9685	46	1.8110	0.06	0.12
U 307	53307	52	2.0472	72	2.8346	7.5	0.2953	56	2.2047	28	1.1024	0.08	0.18
U 307	54307	52	2.0472	72	2.8346	7.5	0.2953	56	2.2047	52	2.0472	0.08	0.18
U 308	53308	60	2.3622	82	3.2283	8.5	0.3346	64	2.5197	31	1.2205	0.12	0.26
U 308	54308	60	2.3622	82	3.2283	8.5	0.3346	64	2.5197	59	2.3228	0.12	0.26

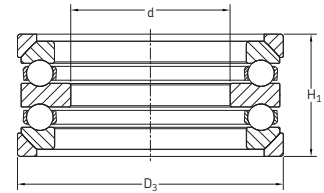
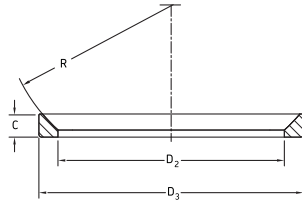


Table 1

**Ball thrust bearing seating washer dimensions**

Designation		Dimensions - seating washer										Mass	
Seating washer	Bearing	D2		D3		C		R		H1		Seating washer	
		mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
U 309	53309	65	2.5591	90	3.5433	10	0.3937	64	2.5197	33	1.2992	0.17	0.37
U 309	54309	65	2.5591	90	3.5433	10	0.3937	64	2.5197	62	2.4409	0.17	0.37
U 310	53310	72	2.8346	100	3.9370	11	0.4331	72	2.8346	37	1.4567	0.23	0.51
U 310	54310	72	2.8346	100	3.9370	11	0.4331	72	2.8346	70	2.7559	0.23	0.51
U 311	53311	80	3.1496	110	4.3307	11.5	0.4528	80	3.1496	42	1.6535	0.28	0.62
U 312	53312	85	3.3465	115	4.5276	11.5	0.4528	90	3.5433	42	1.6535	0.31	0.68
U 312	54312	85	3.3465	115	4.5276	11.5	0.4528	90	3.5433	78	3.0709	0.31	0.68
U 313	53313	90	3.5433	120	4.7244	12.5	0.4921	90	3.5433	43	1.6929	0.34	0.75
U 314	53314	98	3.8583	130	5.1181	13	0.5118	100	3.9370	48	1.8898	0.41	0.90
U 315	53315	105	4.1339	140	5.5118	15	0.5906	100	3.9370	52	2.0472	0.55	1.21
U 316	53316	110	4.3307	145	5.7087	15	0.5906	112	4.4094	52	2.0472	0.57	1.25
U 316	54316	110	4.3307	145	5.7087	15	0.5906	112	4.4094	95	3.7402	0.57	1.25
U 317	53317	115	4.5276	155	6.1024	17.5	0.6890	112	4.4094	58	2.2835	0.81	1.78
U 317	54317	115	4.5276	155	6.1024	17.5	0.6890	112	4.4094	105	4.1339	0.81	1.78
U 318	53318	120	4.7244	160	6.2992	18	0.7087	112	4.4094	59	2.3228	0.84	1.85
U 320	53320	135	5.3150	175	6.8898	18	0.7087	125	4.9213	64	2.5197	0.95	2.09
U 322	53322	150	5.9055	195	7.6772	20.5	0.8071	140	5.5118	72	2.8346	1.30	2.86
U 324	53324	165	6.4961	220	8.6614	22	0.8661	160	6.2992	80	3.1496	2.00	4.40
U 408	53408	65	2.5591	95	3.7402	12	0.4724	72	2.8346	42	1.6535	0.25	0.55
U 409	53409	72	2.8346	105	4.1339	12.5	0.4921	80	3.1496	46	1.8110	0.32	0.70
U 409	54409	72	2.8346	105	4.1339	12.5	0.4921	80	3.1496	86	3.3858	0.32	0.70
U 410	53410	80	3.1496	115	4.5276	14	0.5512	90	3.5433	50	1.9685	0.41	0.90
U 410	54410	80	3.1496	115	4.5276	14	0.5512	90	3.5433	92	3.6220	0.41	0.90
U 412	53412	95	3.7402	135	5.3150	16	0.6299	100	3.9370	58	2.2835	0.71	1.56
U 414	53414	110	4.3307	155	6.1024	19.5	0.7677	112	4.4094	69	2.7165	1.00	2.20
U 415	53415	115	4.5276	165	6.4961	21	0.8268	125	4.9213	75	2.9528	1.25	2.75
U 416	53416	125	4.9213	175	6.8898	22	0.8661	125	4.9213	78	3.0709	1.40	3.08
U 416	54416	125	4.9213	175	6.8898	22	0.8661	125	4.9213	140	5.5118	1.40	3.08
U 418	53418	140	5.5118	195	7.6772	25.5	1.0039	140	5.5118	88	3.4646	1.90	4.18
U 420	53420	155	6.1024	220	8.6614	27	1.0630	160	6.2992	98	3.8583	2.90	6.38
U 420	54420	155	6.1024	220	8.6614	27	1.0630	160	6.2992	176	6.9291	2.90	6.38

# Thrust bearings

Thrust ball bearings

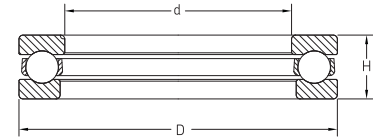
Single direction

Standard

Series: 51100 — 51140 M

Size: 10 mm — 200 mm

0.3937 in — 7.8740 in



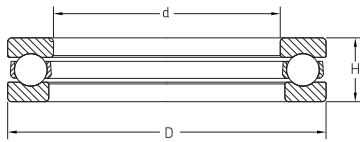
Single direction

Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass	
	Bore d		Outside diameter D		Height H		Dynamic C		Static C <sub>0</sub>			Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf		r/min	r/min		
51100	10	0.3937	24	0.9449	9	0.3543	9 950	2 240	15 300	3 440	1.2	9 500	13 000	0.02	0.10
51101	12	0.4724	26	1.0236	9	0.3543	10 400	2 340	16 600	3 740	1.4	9 000	13 000	0.02	0.10
51102	15	0.5906	28	1.1024	9	0.3543	9 360	2 110	15 300	3 440	1.2	8 500	12 000	0.02	0.10
51103	17	0.6693	30	1.1811	9	0.3543	9 750	2 200	16 600	3 740	1.4	8 500	12 000	0.03	0.10
51104	20	0.7874	35	1.3780	10	0.3937	13 500	3 040	25 000	5 620	3.3	7 500	10 000	0.04	0.10
51105	25	0.9843	42	1.6535	11	0.4331	15 900	3 580	31 500	7 090	3.3	6 300	9 000	0.06	0.20
51106	30	1.1811	47	1.8504	11	0.4331	16 800	3 780	36 000	8 100	6.7	6 000	8 500	0.06	0.20
51107	35	1.3780	52	2.0472	12	0.4724	17 400	3 920	40 500	9 110	8.6	5 600	7 500	0.08	0.20
51108	40	1.5748	60	2.3622	13	0.5118	23 400	5 270	55 000	12 370	15	5 000	7 000	0.12	0.30
51109	45	1.7717	65	2.5591	14	0.5512	24 200	5 450	61 000	13 720	19	4 500	6 300	0.14	0.40
51110	50	1.9685	70	2.7559	14	0.5512	25 500	5 740	68 000	15 290	24	4 300	6 300	0.16	0.40
51111	55	2.1654	78	3.0709	16	0.6299	30 700	6 910	85 000	19 110	39	3 800	5 300	0.23	0.60
51112	60	2.3622	85	3.3465	17	0.6693	36 400	8 190	102 000	22 930	54	3 600	5 000	0.20	0.50
51113	65	2.5591	90	3.5433	18	0.7087	37 100	8 350	108 000	24 280	60	3 400	4 800	0.33	0.80
51114	70	2.7559	95	3.7402	18	0.7087	37 700	8 480	112 000	25 180	68	3 400	4 500	0.35	0.80
51115	75	2.9528	100	3.9370	19	0.7480	44 200	9 940	146 000	32 830	110	3 200	4 300	0.40	0.90
51116	80	3.1496	105	4.1339	19	0.7480	44 900	10 100	153 000	34 400	120	3 000	4 300	0.42	1.00
51117	85	3.3465	110	4.3307	19	0.7480	46 200	10 390	163 000	36 650	140	3 000	4 300	0.44	1.00
51118	90	3.5433	120	4.7244	22	0.8661	59 200	13 310	208 000	46 760	220	2 600	3 800	0.67	1.50
51120	100	3.9370	135	5.3150	25	0.9843	85 200	19 160	290 000	65 200	440	2 400	3 200	0.97	2.20
51122	110	4.3307	145	5.7087	25	0.9843	87 100	19 590	315 000	70 820	520	2 200	3 200	1.05	2.40
51124	120	4.7244	155	6.1024	25	0.9843	88 400	19 880	335 000	75 310	580	2 200	3 000	1.15	2.60
51126	130	5.1181	170	6.6929	30	1.1811	111 000	24 960	425 000	95 540	940	1 900	2 600	1.85	4.10
51128	140	5.5118	180	7.0866	31	1.2205	111 000	24 960	440 000	98 920	1 000	1 800	2 600	2.05	4.60
51130 M	150	5.9055	190	7.4803	31	1.2205	111 000	24 960	440 000	98 920	1 000	1 700	2 400	2.20	4.90
51132 M	160	6.2992	200	7.8740	31	1.2205	112 000	25 180	465 000	104 540	1 100	1 700	2 400	2.35	5.20
51134 M	170	6.6929	215	8.4646	34	1.3386	133 000	29 900	540 000	121 400	1 500	1 600	2 200	3.30	7.30
51136 M	180	7.0866	225	8.8583	34	1.3386	135 000	30 350	570 000	128 140	1 700	1 500	2 200	3.50	7.80
51138 M	190	7.4803	240	9.4488	37	1.4567	172 000	38 670	710 000	159 610	2 600	1 400	2 000	4.05	9.00
51140 M	200	7.8740	250	9.8425	37	1.4567	168 000	37 770	710 000	159 610	2 600	1 400	1 900	4.25	9.40

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

**Warning:** The new reference and limiting speeds **are not to be used** as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

**Thrust ball bearings**  
**Single direction**  
**Standard**  
**Series: 51144 M — 511/670 F**  
**Size: 220 mm — 670 mm**  
**8.6614 in — 26.3780 in**



Single direction

Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass	
	Bore d		Outside diameter D		Height H		Dynamic C		Static C <sub>0</sub>			Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf		r/min	r/min		
51144 M	220	8.6614	270	10.6299	37	1.4567	178 000	40 020	800 000	179 840	3 300	1 300	1 900	4.60	10.20
51148 M	240	9.4488	300	11.8110	45	1.7717	234 000	52 610	1 040 000	233 800	5 600	1 100	1 600	7.55	16.70
51152 M	260	10.2362	320	12.5984	45	1.7717	238 000	53 510	1 100 000	247 280	6 300	1 100	1 500	8.10	17.90
51156 M	280	11.0236	350	13.7795	53	2.0866	319 000	71 720	1 460 000	328 210	11 000	950	1 300	12.00	26.50
51160 M	300	11.8110	380	14.9606	62	2.4409	364 000	81 830	1 760 000	395 650	16 000	800	1 100	17.50	38.60
51164 M	320	12.5984	400	15.7480	63	2.4803	371 000	83 410	1 860 000	418 130	18 000	800	1 100	19.00	41.90
51168 F	340	13.3858	420	16.5354	64	2.5197	377 000	84 750	1 960 000	440 610	20 000	750	1 100	20.50	45.20
51172 F	360	14.1732	440	17.3228	65	2.5591	390 000	87 680	2 080 000	467 590	22 000	750	1 000	22.00	48.60
51176 F	380	14.9606	460	18.1102	65	2.5591	397 000	89 250	2 200 000	494 560	25 000	750	1 000	23.00	50.80
51180 F	400	15.7480	480	18.8976	65	2.5591	403 000	90 600	2 280 000	512 550	27 000	700	1 000	24.00	53.00
51184 F	420	16.5354	500	19.6850	65	2.5591	410 000	92 170	2 400 000	539 520	30 000	700	1 000	25.50	56.30
51188 F	440	17.3228	540	21.2598	80	3.1496	527 000	118 470	3 250 000	730 600	55 000	600	850	42.00	92.60
51192 F	460	18.1102	560	22.0472	80	3.1496	527 000	118 470	3 250 000	730 600	55 000	600	800	43.50	96.00
51196 F	480	18.8976	580	22.8346	80	3.1496	540 000	121 400	3 550 000	798 040	66 000	560	800	45.50	100.40
511/500 F	500	19.6850	600	23.6220	80	3.1496	553 000	124 320	3 600 000	809 280	67 000	560	800	47.00	103.70
511/530 F	530	20.8661	640	25.1969	85	3.3465	650 000	146 120	4 400 000	989 120	100 000	530	750	58.50	129.00
511/560 F	560	22.0472	670	26.3780	85	3.3465	650 000	146 120	4 650 000	1 045 320	110 000	500	700	61.00	134.50
511/600 F	600	23.6220	710	27.9528	85	3.3465	663 000	149 050	4 800 000	1 079 040	120 000	500	700	65.00	143.30
511/630 F	630	24.8031	750	29.5276	95	3.7402	728 000	163 660	5 400 000	1 213 920	150 000	450	630	84.00	185.20
511/670 F	670	26.3780	800	31.4961	105	4.1339	852 000	191 530	6 700 000	1 506 160	230 000	400	560	105.00	231.50

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

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Consult SKF USA Inc. prior to design change or order placement.

# Thrust bearings

## Thrust ball bearings

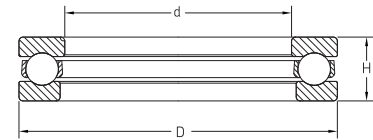
Single direction

Standard

Series: 51200 — 51240 M

Size: 10 mm — 200 mm

0.3937 in — 7.8740 in



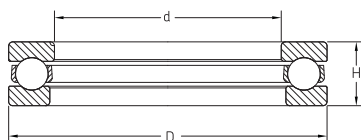
Single direction

Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass	
	Bore d		Outside diameter D		Height H		Dynamic C		Static C <sub>0</sub>			Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf		r/min	r/min		
51200	10	0.3937	26	1.0236	11	0.4331	12 700	2 860	18 600	4 190	2	8 000	11 000	0.03	0.10
51201	12	0.4724	28	1.1024	11	0.4331	13 300	2 990	20 800	4 680	2	8 000	11 000	0.03	0.10
51202	15	0.5906	32	1.2598	12	0.4724	16 500	3 710	27 000	6 070	4	7 000	10 000	0.05	0.20
51203	17	0.6693	35	1.3780	12	0.4724	17 200	3 870	30 000	6 750	5	6 700	9 500	0.05	0.20
51204	20	0.7874	40	1.5748	14	0.5512	22 500	5 060	40 500	9 110	9	6 000	8 000	0.08	0.20
51205	25	0.9843	47	1.8504	15	0.5906	27 600	6 210	55 000	12 370	15	5 300	7 500	0.11	0.30
51206	30	1.1811	52	2.0472	16	0.6299	25 500	5 740	51 000	11 470	13	4 800	6 700	0.13	0.30
51207	35	1.3780	62	2.4409	18	0.7087	35 100	7 900	73 500	16 530	28	4 000	5 600	0.22	0.50
51208	40	1.5748	68	2.6772	19	0.7480	46 800	10 530	106 000	23 830	58	3 800	5 300	0.28	0.70
51209	45	1.7717	73	2.8740	20	0.7874	39 000	8 770	86 500	19 450	38	3 600	5 000	0.30	0.70
51210	50	1.9685	78	3.0709	22	0.8661	49 400	11 110	116 000	26 080	69	3 400	4 500	0.37	0.90
51211	55	2.1654	90	3.5433	25	0.9843	61 800	13 900	146 000	32 830	110	2 800	4 000	0.59	1.40
51212	60	2.3622	95	3.7402	26	1.0236	62 400	14 030	150 000	33 720	120	2 800	3 800	0.65	1.50
51213	65	2.5591	100	3.9370	27	1.0630	63 700	14 320	163 000	36 650	140	2 600	3 600	0.78	1.80
51214	70	2.7559	105	4.1339	27	1.0630	65 000	14 620	173 000	38 900	160	2 600	3 600	0.79	1.80
51215	75	2.9528	110	4.3307	27	1.0630	67 600	15 200	183 000	41 140	170	2 400	3 400	0.83	1.90
51216	80	3.1496	115	4.5276	28	1.1024	76 100	17 110	208 000	46 760	220	2 400	3 400	0.91	2.10
51217	85	3.3465	125	4.9213	31	1.2205	97 500	21 920	275 000	61 820	390	2 200	3 000	1.20	2.70
51218	90	3.5433	135	5.3150	35	1.3780	119 000	26 760	325 000	73 060	550	2 000	2 800	1.70	3.80
51220	100	3.9370	150	5.9055	38	1.4961	124 000	27 880	345 000	77 560	620	1 800	2 400	2.20	4.90
51222	110	4.3307	160	6.2992	38	1.4961	130 000	29 230	390 000	87 680	790	1 700	2 400	2.40	5.30
51224	120	4.7244	170	6.6929	39	1.5354	140 000	31 480	440 000	98 920	1 000	1 600	2 200	2.65	5.90
51226	130	5.1181	190	7.4803	45	1.7717	186 000	41 820	585 000	131 510	1 800	1 400	2 000	4.00	8.90
51228	140	5.5118	200	7.8740	46	1.8110	190 000	42 720	620 000	139 380	2 000	1 400	1 900	4.35	9.60
51230 M	150	5.9055	215	8.4646	50	1.9685	238 000	53 510	800 000	179 840	3 300	1 300	1 800	6.10	13.50
51232 M	160	6.2992	225	8.8583	51	2.0079	242 000	54 410	850 000	191 080	3 800	1 200	1 700	6.55	14.50
51234 M	170	6.6929	240	9.4488	55	2.1654	286 000	64 300	1 020 000	229 300	5 400	1 100	1 800	8.15	18.00
51236 M	180	7.0866	250	9.8425	56	2.2047	296 000	66 550	1 080 000	242 790	6 100	1 100	1 500	8.60	19.00
51238 M	190	7.4803	270	10.6299	62	2.4409	332 000	74 640	1 270 000	285 500	8 400	1 000	1 400	12.00	26.50
51240 M	200	7.8740	280	11.0236	62	2.4409	338 000	75 990	1 320 000	296 740	9 100	1 000	1 400	12.00	26.50

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

**Warning:** The new reference and limiting speeds **are not to be used** as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

Thrust ball bearings  
 Single direction  
 Standard  
 Series: 51244 M — 51276 F  
 Size: 220 mm — 380 mm  
 8.6614 in — 14.9606 in



Single direction

Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass	
	Bore d		Outside diameter D		Height H		Dynamic C		Static C <sub>0</sub>			Reference speed r/min	Limiting speed r/min	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf					
51244 M	220	8.6614	300	11.8110	63	2.4803	351 000	78 910	1 460 000	328 210	11 000	950	1 300	13.00	28.70
51248 M	240	9.4488	340	13.3858	78	3.0709	462 000	103 860	2 000 000	449 600	21 000	800	1 100	23.00	50.80
51252 M	260	10.2362	360	14.1732	79	3.1102	475 000	106 780	2 160 000	485 570	24 000	750	1 100	25.00	55.20
51256 M	280	11.0236	380	14.9606	80	3.1496	494 000	111 060	2 320 000	521 540	28 000	750	1 000	26.50	58.50
51260 M	300	11.8110	420	16.5354	95	3.7402	605 000	136 010	3 000 000	674 400	47 000	600	850	42.00	92.60
51264 F	320	12.5984	440	17.3228	95	3.7402	572 000	128 590	3 000 000	674 400	47 000	600	800	45.50	100.40
51268 F	340	13.3858	460	18.1102	96	3.7795	605 000	136 010	3 200 000	719 360	53 000	530	750	48.50	107.00
51272 F	360	14.1732	500	19.6850	110	4.3307	741 000	166 580	4 150 000	932 920	90 000	500	700	70.00	154.40
51276 F	380	14.9606	520	20.4724	112	4.4094	728 000	163 660	4 150 000	932 920	90 000	500	700	73.00	161.00

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

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 Consult SKF USA Inc. prior to design change or order placement.

# Thrust bearings

## Thrust ball bearings

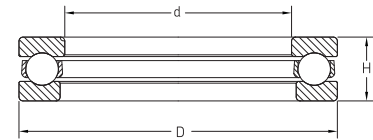
Single direction

Standard

Series: 51305 — 51340 M

Size: 25 mm — 200 mm

0.9843 in — 7.8740 in



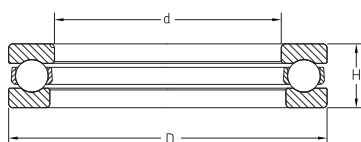
Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass	
	Bore d		Outside diameter D		Height H		Dynamic C		Static C <sub>0</sub>			Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf		r/min	r/min		
51305	25	0.9843	52	2.0472	18	0.7087	34 500	7 760	60 000	13 490	18	4 500	6 300	0.17	0.40
51306	30	1.1811	60	2.3622	21	0.8268	37 700	8 480	71 000	15 970	26	3 800	5 300	0.26	0.60
51307	35	1.3780	68	2.6772	24	0.9449	49 400	11 110	96 500	21 700	48	3 400	4 800	0.39	0.90
51308	40	1.5748	78	3.0709	26	1.0236	61 800	13 900	122 000	27 430	77	3 000	4 300	0.53	1.20
51309	45	1.7717	85	3.3465	28	1.1024	76 100	17 110	153 000	34 400	120	2 800	4 000	0.66	1.50
51310	50	1.9685	95	3.7402	31	1.2205	88 400	19 880	190 000	42 720	190	2 600	3 600	0.94	2.10
51311	55	2.1654	105	4.1339	35	1.3780	104 000	23 380	224 000	50 360	260	2 200	3 200	1.30	2.90
51312	60	2.3622	110	4.3307	35	1.3780	101 000	22 710	224 000	50 360	260	2 200	3 000	1.35	3.00
51313	65	2.5591	115	4.5276	36	1.4173	106 000	23 830	240 000	53 960	300	2 000	3 000	1.50	3.40
51314	70	2.7559	125	4.9213	40	1.5748	135 000	30 350	320 000	71 940	530	1 900	2 600	2.00	4.50
51315	75	2.9528	135	5.3150	44	1.7323	163 000	36 650	390 000	87 680	790	1 700	2 400	2.60	5.80
51316	80	3.1496	140	5.5118	44	1.7323	159 000	35 750	390 000	87 680	790	1 700	2 400	2.70	6.00
51317	85	3.3465	150	5.9055	49	1.9291	190 000	42 720	465 000	104 540	1 100	1 600	2 200	3.55	7.90
51318	90	3.5433	155	6.1024	50	1.9685	195 000	43 840	500 000	112 400	1 300	1 500	2 200	3.80	8.40
51320	100	3.9370	170	6.6929	55	2.1654	229 000	51 480	610 000	137 130	1 900	1 400	1 900	4.95	11.00
51322 M	110	4.3307	190	7.4803	63	2.4803	276 000	62 050	780 000	175 350	3 200	1 200	1 700	7.85	17.40
51324 M	120	4.7244	210	8.2677	70	2.7559	325 000	73 060	980 000	220 310	5 000	1 100	1 500	11.00	24.30
51324 M	130	5.1181	225	8.8583	75	2.9528	325 000	73 060	980 000	220 310	6 800	1 100	1 500	11.00	24.30
51328 M	140	5.5118	240	9.4488	80	3.1496	397 000	89 250	1 320 000	296 740	9 100	950	1 300	15.50	34.20
51330 M	150	5.9055	250	9.8425	80	3.1496	410 000	92 170	1 400 000	314 720	10 000	900	1 300	16.50	36.40
51332 M	160	6.2992	270	10.6299	87	3.4252	449 000	100 940	1 660 000	373 170	14 000	850	1 200	21.00	46.30
51334 M	170	6.6929	280	11.0236	87	3.4252	468 000	105 210	1 760 000	395 650	16 000	800	1 100	22.00	48.60
51336 M	180	7.0866	300	11.8110	95	3.7402	520 000	116 900	2 000 000	449 600	21 000	750	1 100	28.50	62.90
51340 M	200	7.8740	340	13.3858	110	4.3307	624 000	140 280	2 600 000	584 480	35 000	630	900	44.50	98.20

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.



Thrust ball bearings  
 Single direction  
 Standard  
 Series: 51405 — 51424 M  
 Size: 25 mm — 120 mm  
 0.9843 in — 4.7244 in



Single direction

Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass	
	Bore d		Outside diameter D		Height H		Dynamic C		Static C <sub>0</sub>			Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf		r/min	r/min		
51405	25	0.9843	60	2.3622	24	0.9449	55 300	12 440	96 500	21 700	48	3 600	5 000	0.34	0.80
51406	30	1.1811	70	2.7559	28	1.1024	72 800	16 370	137 000	30 800	97	3 000	4 300	0.52	1.20
51407	35	1.3780	80	3.1496	32	1.2598	87 100	19 590	170 000	38 220	150	2 600	3 800	0.79	1.80
51408	40	1.5748	90	3.5433	36	1.4173	112 000	25 180	224 000	50 360	260	2 400	3 400	1.10	2.50
51409	45	1.7717	100	3.9370	39	1.5354	130 000	29 230	265 000	59 580	370	2 200	3 000	1.40	3.10
51410	50	1.9685	110	4.3307	43	1.6929	159 000	35 750	340 000	76 440	600	2 000	2 800	2.00	4.50
51411	55	2.1654	120	4.7244	48	1.8898	178 000	40 020	390 000	87 680	790	1 800	2 400	2.55	5.70
51412 M	60	2.3622	130	5.1181	51	2.0079	199 000	44 740	430 000	96 670	960	1 600	2 200	3.10	6.90
51413 M	65	2.5591	140	5.5118	56	2.2047	216 000	48 560	490 000	110 160	1 200	1 500	2 200	4.00	8.90
51414 M	70	2.7559	150	5.9055	60	2.3622	234 000	52 610	550 000	123 640	1 600	1 400	2 000	5.00	11.10
51415 M	75	2.9528	160	6.2992	65	2.5591	251 000	56 430	610 000	137 130	1 900	1 300	1 800	6.75	14.90
51416 M	80	3.1496	170	6.6929	68	2.6772	270 000	60 700	670 000	150 620	2 300	1 200	1 700	7.95	17.60
51417 M	85	3.3465	180	7.0866	72	2.8346	286 000	64 300	750 000	168 600	2 900	1 200	1 600	9.45	20.90
51418 M	90	3.5433	190	7.4803	77	3.0315	307 000	69 020	815 000	183 220	3 500	1 100	1 500	11.00	24.30
51420 M	100	3.9370	210	8.2677	85	3.3465	371 000	83 410	1 060 000	238 290	5 800	950	1 400	15.00	33.10
51422 M	110	4.3307	230	9.0551	95	3.7402	410 000	92 170	1 220 000	274 260	7 700	900	1 300	20.00	44.10
51424 M	120	4.7244	250	9.8425	102	4.0157	520 000	116 900	1 730 000	388 910	16 000	800	1 100	29.50	65.10

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

# Thrust bearings

Thrust ball bearings

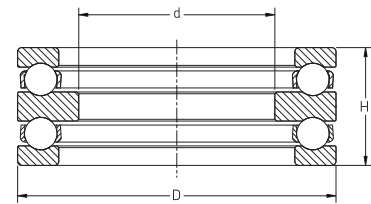
Double direction

Standard

Series: 52202 — 52234 M

Size: 10 mm — 150 mm

0.3937 in — 5.9055 in



Double direction

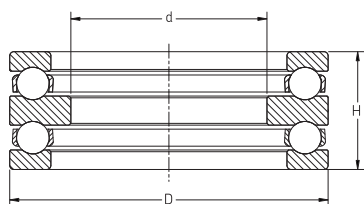
Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass	
	Bore d		Outside diameter D		Height H		Dynamic C		Static C <sub>0</sub>			Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf		r/min	r/min		
52202	10	0.3937	32	1.2598	22	0.8661	16 500	3 710	27 000	6 100	3.8	7 000	10 000	0.08	0.20
52204	15	0.5906	40	1.5748	26	1.0236	22 500	5 060	40 500	9 200	8.5	6 000	8 000	0.15	0.30
52205	20	0.7874	47	1.8504	28	1.1024	27 600	6 210	55 000	12 400	15	5 300	7 500	0.22	0.50
52206	25	0.9843	52	2.0472	29	1.1417	25 500	5 740	51 000	11 500	13	4 800	6 700	0.25	0.60
52207	30	1.1811	62	2.4409	34	1.3386	35 100	7 900	73 500	16 600	28	4 000	5 600	0.41	0.90
52208	30	1.1811	68	2.6772	36	1.4173	46 800	10 600	106 000	23 900	58	3 800	5 300	0.55	1.20
52209	35	1.3780	73	2.8740	37	1.4567	39 000	8 770	86 500	19 500	38	3 600	5 000	0.60	1.30
52210	40	1.5748	78	3.0709	39	1.5354	49 400	11 200	116 000	26 100	69	3 400	4 500	0.71	1.60
52211	45	1.7717	90	3.5433	45	1.7717	61 800	13 900	146 000	32 900	110	2 800	4 000	1.10	2.40
52212	50	1.9685	95	3.7402	46	1.8110	62 400	14 030	150 000	33 800	120	2 800	3 800	1.20	2.60
52213	55	2.1654	100	3.9370	47	1.8504	63 700	14 400	163 000	36 700	140	2 600	3 600	1.35	3.00
52215	60	2.3622	110	4.3307	47	1.8504	67 600	15 200	183 000	41 200	170	2 400	3 400	1.55	3.40
52216	65	2.5591	115	4.5276	48	1.8898	76 100	17 200	208 000	46 800	220	2 400	3 400	1.70	3.70
52217	70	2.7559	125	4.9213	55	2.1654	97 500	22 000	275 000	61 900	390	2 200	3 000	2.40	5.30
52218	75	2.9528	135	5.3150	62	2.4409	119 000	26 800	325 000	73 100	550	2 000	2 800	3.20	7.10
52220	85	3.3465	150	5.9055	67	2.6378	124 000	27 900	345 000	77 600	620	1 800	2 400	4.20	9.30
52222	95	3.7402	160	6.2992	67	2.6378	130 000	29 300	390 000	87 700	790	1 700	2 400	4.65	10.30
52224	100	3.9370	170	6.6929	68	2.6772	140 000	31 500	440 000	99 000	1 000	1 600	2 200	5.25	11.60
52226	110	4.3307	190	7.4803	80	3.1496	186 000	41 900	585 000	131 600	1 800	1 400	2 000	8.00	17.60
52228	120	4.7244	200	7.8740	81	3.1890	190 000	42 800	620 000	139 400	2 000	1 400	1 900	8.65	19.10
52230 M	130	5.1181	215	8.4646	89	3.5039	238 000	53 600	800 000	179 900	3 300	1 300	1 800	11.50	25.40
52232 M	140	5.5118	225	8.8583	90	3.5433	242 000	54 500	850 000	191 100	3 800	1 200	1 700	12.00	26.50
52234 M	150	5.9055	240	9.4488	97	3.8189	286 000	64 300	1 020 000	229 300	5 400	1 100	1 800	15.00	33.10

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

Thrust ball bearings  
 Double direction  
 Standard  
 Series: 52305 — 52320  
 Size: 20 mm — 85 mm  
 0.7874 in — 3.3465 in

Series: 52406 — 52414 M  
 Size: 20 mm — 55 mm  
 0.7874 in — 2.7559 in



Double direction

Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass	
	Bore d		Outside diameter D		Height H		Dynamic C		Static C <sub>0</sub>			Reference speed	Limiting speed	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf		r/min	r/min		
52305	20	0.7874	52	2.0472	34	1.3386	34 500	7 800	60 000	13 500	18	4 500	6 300	0.33	0.70
52306	25	0.9843	60	2.3622	38	1.4961	37 700	8 500	71 000	16 000	26	3 800	5 300	0.47	1.00
52307	30	1.1811	68	2.6772	44	1.7323	49 400	11 110	96 500	21 700	48	3 400	4 800	0.68	1.50
52308	30	1.1811	78	3.0709	49	1.9291	61 800	13 900	122 000	27 500	77	3 000	4 300	1.05	2.30
52309	35	1.3780	85	3.3465	52	2.0472	76 100	17 200	153 000	34 400	120	2 800	4 000	1.25	2.80
52310	40	1.5748	95	3.7402	58	2.2835	88 400	19 900	190 000	42 800	190	2 600	3 600	1.75	3.90
52311	45	1.7717	105	4.1339	64	2.5197	104 000	23 380	224 000	50 400	260	2 200	3 200	2.40	5.30
52312	50	1.9685	110	4.3307	64	2.5197	101 000	22 800	224 000	50 400	260	2 200	3 000	2.55	5.60
52313	55	2.1654	115	4.5276	65	2.5591	106 000	23 900	240 000	54 000	300	2 000	3 000	2.75	6.10
52314	55	2.1654	125	4.9213	72	2.8346	135 000	30 350	320 000	72 000	530	1 900	2 600	3.65	8.00
52315	60	2.3622	135	5.3150	79	3.1102	163 000	36 650	390 000	87 700	790	1 700	2 400	4.80	10.60
52316	65	2.5591	140	5.5118	79	3.1102	159 000	35 750	390 000	87 700	790	1 700	2 400	4.94	10.90
52320	85	3.3465	170	6.6929	97	3.8189	229 000	51 480	610 000	137 200	1 900	1 400	1 900	8.95	19.70
52406	20	0.7874	70	2.7559	52	2.0472	72 800	16 370	137 000	30 800	97	3 000	4 300	1.00	2.20
52407	25	0.9843	80	3.1496	59	2.3228	87 100	19 590	170 000	38 300	150	2 600	3 800	1.45	3.20
52408	30	1.1811	90	3.5433	65	2.5591	112 000	25 180	224 000	50 400	260	2 400	3 400	2.05	4.50
52409	35	1.3780	100	3.9370	72	2.8346	130 000	29 300	265 000	59 600	370	2 200	3 000	2.70	6.00
52411	45	1.7717	120	4.7244	87	3.4252	170 800	38 400	390 000	87 700	790	1 800	2 400	4.70	10.40
52412 M	50	1.9685	130	5.1181	93	3.6614	199 000	44 800	430 000	96 700	960	1 600	2 200	6.35	14.00
52413 M	50	1.9685	140	5.5118	101	3.9764	216 000	48 600	490 000	110 200	1 200	1 500	2 100	8.03	17.70
52414 M	55	2.7559	150	5.9055	107	4.2126	234 000	52 700	550 000	123 700	1 600	1 400	2 000	9.71	21.40

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
 Consult SKF USA Inc. prior to design change or order placement.

# Thrust bearings

## Thrust ball bearings

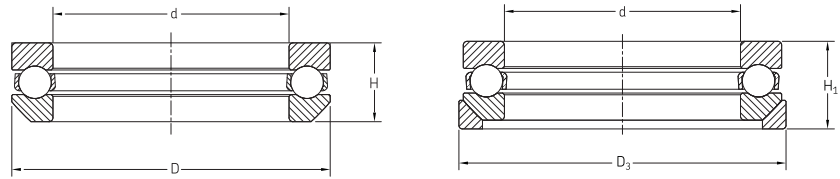
Single direction, sphered housing washer

Standard

Series: 53201 — 53228

Size: 12 mm — 140 mm

0.4724 in — 5.5118 in



Single direction with sphered housing washer

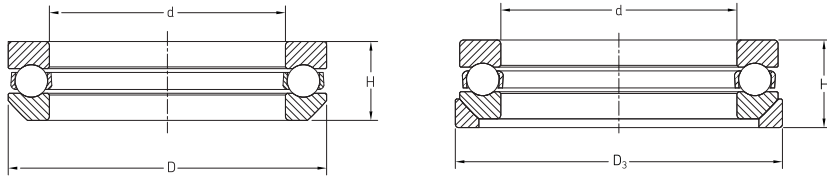
For  $D_3$  and  $H_1$  dimension refer to table 1 on pages 94 and 95.

Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass		Seating washer	Mass		
	Bore d		Outside diameter D		Height H		Dynamic C		Static $C_0$			Reference speed r/min	Limiting speed r/min	kg	lb		—	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf									
53201	12	0.4724	28	1.1024	11	0.4488	13 300	3 000	20 800	4 700	2.2	8 000	11 000	0.05	0.1	U 201	0.01	0.03	
53202	15	0.5906	32	1.2598	13	0.5236	16 500	3 700	27 000	6 100	3.8	7 000	10 000	0.06	0.1	U 202	0.01	0.03	
53203	17	0.6693	35	1.3780	13	0.5197	17 200	3 900	30 000	6 700	4.7	6 700	9 500	0.07	0.2	U 203	0.02	0.03	
53204	20	0.7874	40	1.5748	15	0.5787	22 500	5 100	40 500	9 100	8.5	6 000	8 000	0.10	0.2	U 204	0.02	0.04	
53205	25	0.9843	47	1.8504	17	0.6575	27 600	6 200	55 000	12 400	15	5 300	7 500	0.15	0.3	U 205	0.03	0.07	
53206	30	1.1811	52	2.0472	18	0.7008	25 500	5 700	51 000	11 500	13	4 800	6 700	0.18	0.4	U 206	0.04	0.08	
53207	35	1.3780	62	2.4409	20	0.7835	35 100	7 900	73 500	16 500	28	4 000	5 600	0.28	0.6	U 207	0.06	0.13	
53208	40	1.5748	68	2.6772	20	0.7992	46 800	10 500	106 000	23 800	58	3 800	5 300	0.35	0.8	U 208	0.07	0.15	
53209	45	1.7717	73	2.8740	21	0.8386	39 000	8 800	86 500	19 400	38	3 600	5 000	0.39	0.9	U 209	0.09	0.19	
53210	50	1.9685	78	3.0709	24	0.9252	49 400	11 100	116 000	26 100	69	3 400	4 500	0.47	1.0	U 210	0.10	0.22	
53211	55	2.1654	90	3.5433	27	1.0748	61 800	13 900	146 000	32 800	110	2 800	4 000	0.75	1.7	U 211	0.15	0.33	
53212	60	2.3622	95	3.7402	28	1.1024	62 400	14 000	150 000	33 700	120	2 800	3 800	0.82	1.8	U 212	0.16	0.35	
53213	65	2.5591	100	3.9370	29	1.1299	63 700	14 300	163 000	36 600	140	2 600	3 600	0.91	2.0	U 213	0.18	0.40	
53214	70	2.7559	105	4.1339	29	1.1339	65 000	14 600	173 000	38 900	160	2 600	3 600	0.97	2.1	U 214	0.19	0.42	
53215	75	2.9528	110	4.3307	28	1.1142	67 600	15 200	183 000	41 100	170	2 400	3 400	1.00	2.2	U 215	0.21	0.46	
53216	80	3.1496	115	4.5276	30	1.1614	76 100	17 100	208 000	46 800	220	2 400	3 400	1.10	2.4	U 216	0.22	0.49	
53217	85	3.3465	125	4.9213	33	1.3031	97 500	21 900	275 000	61 800	390	2 200	3 000	1.50	3.3	U 217	0.29	0.64	
53218	90	3.5433	135	5.3150	39	1.5157	119 000	26 800	325 000	73 100	550	2 000	2 800	2.10	4.6	U 218	0.42	0.93	
53220	100	3.9370	150	5.9055	41	1.6102	124 000	27 900	345 000	77 600	620	1 800	2 400	2.70	6.0	U 220	0.50	1.10	
53222	110	4.3307	160	6.2992	40	1.5827	130 000	29 200	390 000	87 700	790	1 700	2 400	2.91	6.4	U 222	0.56	1.25	
53226	130	5.1181	190	7.4803	48	1.8858	186 000	41 800	585 000	131 500	1 800	1 400	2 000	4.85	10.7	U 226	0.90	2.00	
53228	140	5.5118	200	7.8740	49	1.9134	190 000	42 700	620 000	139 400	2 000	1 400	1 900	5.45	12.0	U 228	1.20	2.65	

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details. Consult SKF USA Inc. prior to design change or order placement.

Thrust ball bearings  
 Single direction, sphered housing washer  
 Standard  
 Series: 53306 — 53326  
 Size: 30 mm — 130 mm  
 1.1811 in — 5.1181 in



Single direction with sphered housing washer

Series: 53408 — 53420 M  
 Size: 40 mm — 100 mm  
 1.5748 in — 3.9370 in

For  $D_3$  and  $H_1$  dimension refer to table 1 on pages 94 and 95.

Designation	Principal dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass		Seating washer	Mass		
	Bore d		Outside diameter D		Height H		Dynamic C		Static $C_0$			Reference speed r/min	Limiting speed r/min	kg	lb		—	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf									
53306	30	1.1811	60	2.3622	23	0.8898	37 700	8 500	71 000	16 000	26	3 800	5 300	0.33	0.7	U 306	0.06	0.12	
53307	35	1.3780	68	2.6772	26	1.0079	49 400	11 100	96 500	21 700	48	3 400	4 800	0.46	1.0	U 307	0.08	0.19	
53308	40	1.5748	78	3.0709	29	1.1220	61 800	13 900	122 000	27 400	77	3 000	4 300	0.67	1.5	U 308	0.12	0.26	
53309	45	1.7717	85	3.3465	30	1.1850	76 100	17 100	153 000	34 400	120	2 800	4 000	0.83	1.8	U 309	0.17	0.37	
53310	50	1.9685	95	3.7402	34	1.3543	88 400	19 900	190 000	42 700	190	2 600	3 600	1.20	2.6	U 310	0.23	0.51	
53311	55	2.1654	105	4.1339	39	1.5472	104 000	23 400	224 000	50 400	260	2 200	3 200	1.68	3.7	U 311	0.28	0.62	
53312	60	2.3622	110	4.3307	38	1.5079	101 000	22 700	224 000	50 400	260	2 200	3 000	1.71	3.8	U 312	0.31	0.68	
53313	65	2.5591	115	4.5276	39	1.5512	106 000	23 800	240 000	54 000	300	2 000	3 000	1.89	4.2	U 313	0.34	0.75	
53314	70	2.7559	125	4.9213	44	1.7402	135 000	30 300	320 000	71 900	530	1 900	2 600	2.50	5.5	U 314	0.41	0.90	
53315	75	2.9528	135	5.3150	48	1.8937	163 000	36 600	390 000	87 700	790	1 700	2 400	3.20	7.1	U 315	0.55	1.20	
53316	80	3.1496	140	5.5118	48	1.8740	159 000	35 700	390 000	87 700	790	1 700	2 400	3.30	7.3	U 316	0.57	1.25	
53317	85	3.3465	150	5.9055	53	2.0906	190 000	42 700	465 000	104 500	1 100	1 600	2 200	4.35	9.6	U 317	0.81	1.80	
53318	90	3.5433	155	6.1024	55	2.1496	195 000	43 800	500 000	112 400	1 300	1 500	2 200	4.70	10.4	U 318	0.84	1.85	
53320	100	3.9370	170	6.6929	59	2.3307	229 000	51 500	610 000	137 100	1 900	1 400	1 900	5.95	13.1	U 320	0.95	2.10	
53322 M	110	4.3307	190	7.4803	67	2.6457	276 000	62 000	780 000	175 300	3 200	1 200	1 700	9.10	20.1	U 322	1.30	2.85	
53324 M	120	4.7244	210	8.2677	74	2.9173	325 000	73 100	980 000	220 300	5 000	1 100	1 500	12.50	27.6	U 324	2.00	4.40	
53326	130	5.1181	190	7.4803	53	2.0866	186 000	41 800	585 000	131 500	1 800	1 400	2 000	4.85	10.7	U 226	0.90	2.00	
53408	40	1.5748	90	3.5433	38	1.5039	112 000	25 200	224 000	50 400	2 600	2 400	3 400	1.35	3.0	U 408	0.25	0.55	
53409	45	1.7717	100	3.9370	42	1.6693	130 000	29 200	265 000	59 600	3 700	1 900	2 800	1.45	3.2	U 409	0.32	0.71	
53410	50	1.9685	110	4.3307	46	1.7953	159 000	35 700	340 000	76 400	600	2 000	2 800	2.31	5.1	U 410	0.41	0.90	
53411	55	2.1654	120	4.7244	55	2.1654	178 000	40 000	390 000	87 700	790	1 800	2 400	3.08	6.8	U 411	0.53	1.17	
53412 M	60	2.3622	130	5.1181	54	2.1260	199 000	44 700	430 000	96 700	960	1 600	2 200	3.80	8.4	U 412	0.71	1.55	
53414 M	70	2.7559	150	5.9055	69	2.7165	234 000	52 600	550 000	123 600	1 600	1 400	2 000	6.50	14.3	U 414	0.99	2.18	
53420 M	100	3.9370	210	8.2677	90	3.5433	371 000	83 400	1 060 000	238 300	5 800	950	1 400	18.00	39.7	U 420	2.90	6.40	

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

**Warning:** The new reference and limiting speeds are not to be used as a direct substitution for the previous oil and grease speed ratings. See page 7 for details.  
 Consult SKF USA Inc. prior to design change or order placement.

# Thrust bearings

## Thrust ball bearings

Double direction, sphered housing washer

Standard

Series: 54207 — 54211

Size: 30 mm — 45 mm

1.1811 in — 1.7717 in

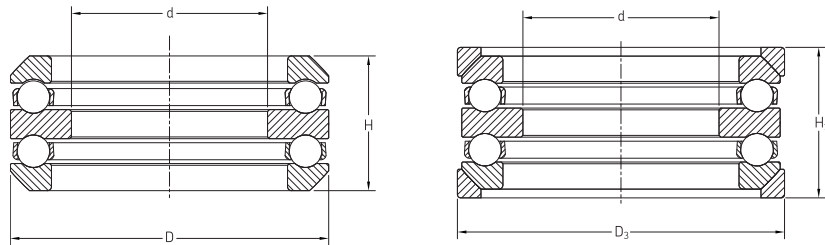
Series: 54306 — 54317

Size: 25 mm — 70 mm

0.9843 in — 2.7559 in

Series: 54410

Size: 40 mm (1.5748 in)



Double direction with sphered housing washer

For  $D_3$  and  $H_1$  dimension refer to table 1 on pages 94 and 95.

Designation	Principal Dimensions						Basic load ratings				Minimum load factor A	Speed rating		Mass		Seating washer	Mass		
	Bore d		Outside Diameter D		Height H		Dynamic C		Static $C_0$			Reference speed r/min	Limiting speed r/min	kg	lb		—	kg	lb
	mm	in	mm	in	mm	in	N	lbf	N	lbf									
<b>54207</b>	30	1.1811	62	2.4409	38	1.4882	35 100	7 900	73 500	16 500	28	4 000	5 600	0.53	1.20	U 207	0.06	0.13	
<b>54211</b>	45	1.7717	90	3.5433	50	1.9528	61 800	13 900	146 000	32 800	110	2 800	4 000	1.3	2.90	U 211	0.15	0.33	
<b>54306</b>	25	0.9843	60	2.3622	41	1.6260	37 700	8 500	71 000	16 000	26	3 800	5 300	0.58	1.30	U 306	0.06	0.12	
<b>54307</b>	30	1.1811	68	2.6772	47	1.8583	49 400	11 100	96 500	21 700	48	3 400	4 800	0.85	1.90	U 307	0.08	0.19	
<b>54309</b>	35	1.3780	85	3.3465	56	2.2165	76 100	17 100	153 000	34 400	120	2 800	4 000	1.6	3.50	U 309	0.17	0.37	
<b>54310</b>	40	1.5748	95	3.7402	65	2.5472	88 400	19 900	190 000	42 700	190	2 600	3 600	2.3	5.10	U 310	0.23	0.51	
<b>54312</b>	50	1.9685	110	4.3307	71	2.7835	101 000	22 700	224 000	50 400	260	2 200	3 000	2.9	6.40	U 312	0.31	0.68	
<b>54317</b>	70	2.7559	150	5.9055	93	3.6417	190 000	42 700	465 000	104 500	1 100	1 600	2 200	7.95	17.50	U 317	0.81	1.80	
<b>54410</b>	40	1.5748	110	4.3307	83	3.2756	159 000	35 700	340 000	76 400	600	2 000	2 800	4.45	9.80	U 410	0.46	1.00	

Note: For complete dimensional information, refer to the SKF Interactive Engineering Catalog on [www.skfusa.com](http://www.skfusa.com).

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