



**ROLLING
BEARINGS**
for
**INDUSTRIAL
MACHINERY**

1. TYPES AND FEATURES OF ROLLING BEARINGS

1.1 Design and Classification

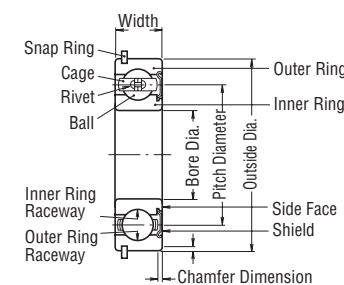
Rolling bearings generally consist of rolling elements, two rings, and a cage. They are classified into radial bearings or thrust bearings depending on the direction of the main load. In addition, depending on the type of rolling elements, they are classified into ball bearings or roller bearings and further divided by differences in their design or specific purpose. The most common bearing types and part names are shown in Fig. 1.1, and a general classification of rolling bearings is shown in Fig. 1.2.

1.2 Characteristics of Rolling Bearings

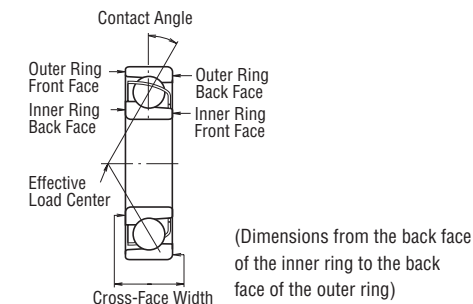
Compared with plain bearings, rolling bearings have the following major advantages:

- (1) Their starting torque or friction is low and the difference between the starting torque and running torque is small.
- (2) With the advancement of worldwide standardization, rolling bearings are internationally available and interchangeable.
- (3) Maintenance, replacement, and inspection are easy because of the simple structure surrounding rolling bearings.
- (4) Many rolling bearings are capable of taking both radial and axial loads simultaneously or independently.
- (5) Rolling bearings can be used under a wide range of temperatures.
- (6) Rolling bearings can be preloaded to produce a negative clearance and achieve greater rigidity.

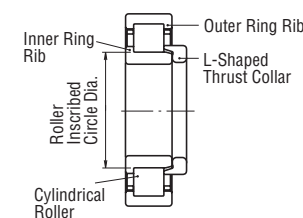
Furthermore, different types of rolling bearings have their own individual advantages. The features of the most common rolling bearings are described on Pages A010 to A013 and in Table 1.1 (Pages A014 and A015).



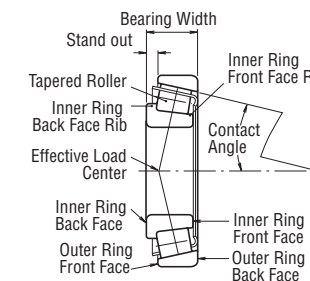
Single-Row Deep Groove Ball Bearing



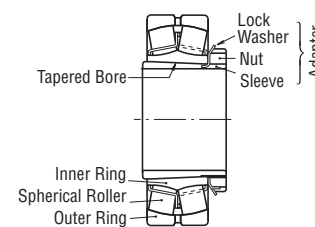
Single-Row Angular Contact Ball Bearing



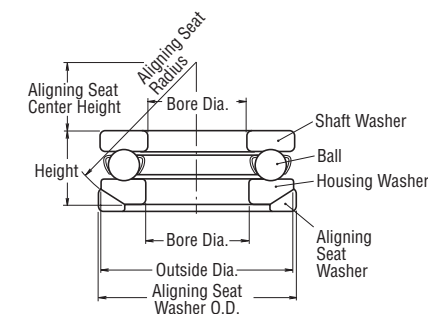
Cylindrical Roller Bearing



Tapered Roller Bearing



Spherical Roller Bearing



Single-Direction Thrust Ball Bearing

Fig. 1.1 Names of Bearing Parts

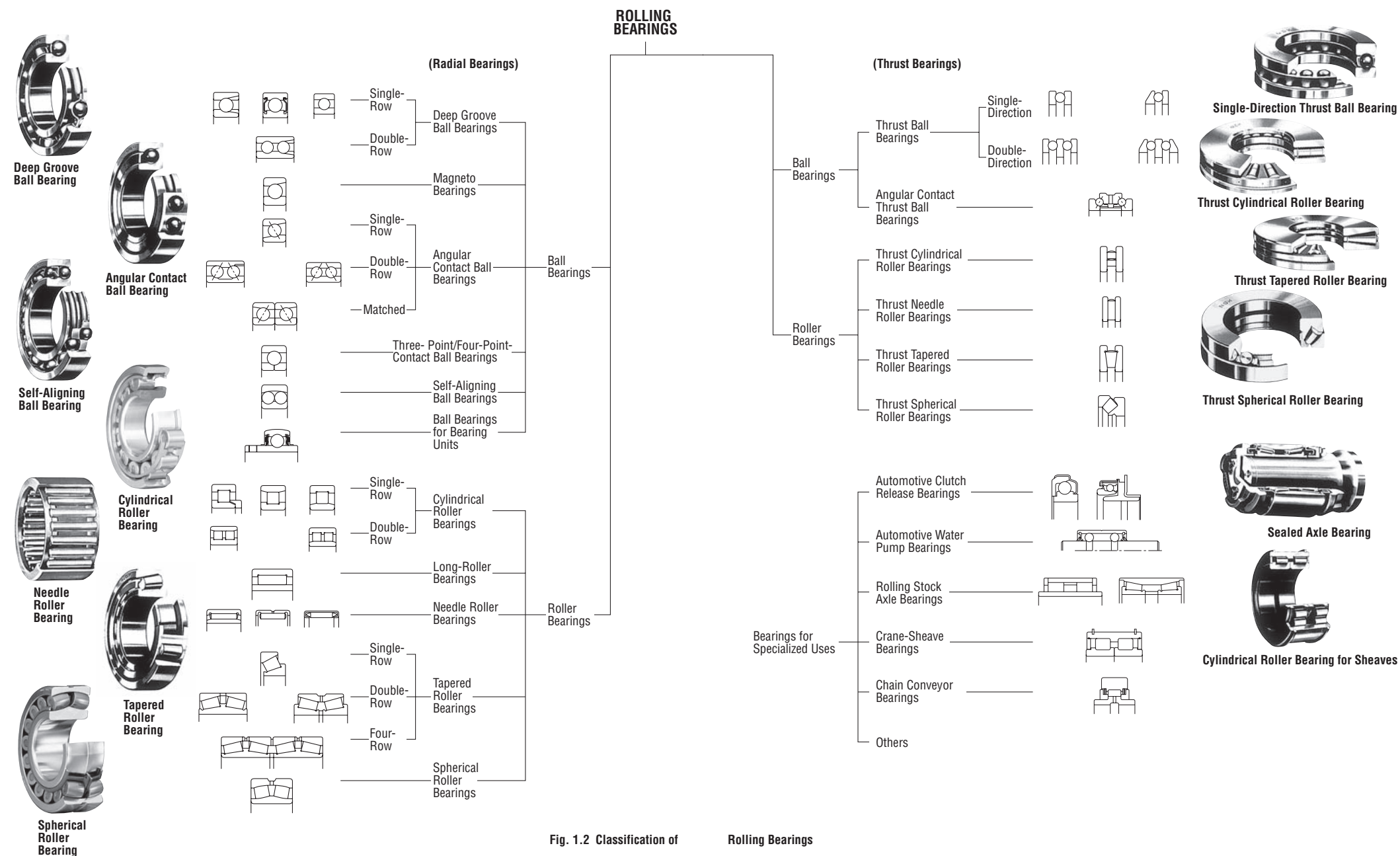
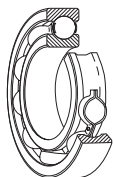


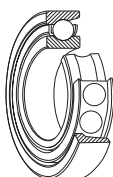
Fig. 1.2 Classification of Rolling Bearings

Single-Row Deep Groove Ball Bearings



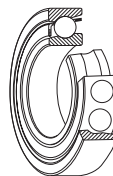
Single-row deep groove ball bearings are the most common type of rolling bearing and are in widespread use. The raceway grooves on both the inner and outer rings have circular arcs of slightly larger radii than those of the balls. They are capable of taking radial loads. In addition, axial loads can be applied in either direction. Because of their low torque, they are highly suitable for applications where high speeds and low power loss are required. While they can be used as open bearings, single-row deep groove bearings often have steel shields or rubber seals installed on one or both sides and are prelubricated with grease. In addition, snap rings are sometimes used on the periphery. Pressed-steel cages are most commonly used.

Magneto Bearings



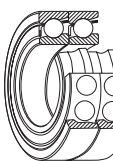
The inner groove of magneto bearings is slightly more shallow than that of deep groove bearings. Since the outer ring has a shoulder on only one side, the outer ring may be removed, which is often advantageous for mounting. In general, two such bearings are used in a paired mounting. Magneto bearings are small bearings with a bore diameter of 4 to 20 mm and are mainly used for small magnetos, gyroscopes, instruments, etc. Pressed-brass cages are generally used.

Single-Row Angular Contact Ball Bearings



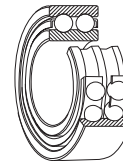
Individual bearings of this type are capable of taking axial loads in one direction and radial loads. Four contact angles of 15°, 25°, 30°, and 40° are available. The larger the contact angle, the higher the axial load capacity. For high-speed operation however, smaller contact angles are preferred. Usually, two bearings are used in a paired mounting, and the clearance between them must be adjusted properly. Pressed-steel and machined-brass cages are commonly used; however, for high precision bearings with a contact angle less than 30°, polyamide resin cages are often used.

Paired Mounting



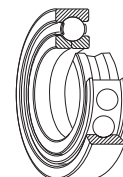
A combination of two radial bearings is called a paired mounting. Usually, they are formed using angular contact ball bearings or tapered roller bearings. Possible arrangements include: face-to-face (type DF), in which the outer ring faces are oriented towards each other; back-to-back (type DB); or same-direction (type DT), in which both front faces are oriented in the same direction. DF and DB arrangements are capable of taking radial loads and axial loads in both directions. Type DT is used when there is a strong axial load in one direction and it is necessary to divide the load equally across each bearing.

Double-Row Angular Contact Ball Bearings



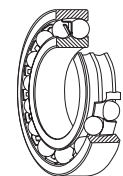
Double-row angular contact ball bearings are like two single-row angular contact ball bearings mounted back-to-back, except that they have only one inner ring and one outer ring. They have a narrower width than two single bearings, and can take thrust loads in both directions.

Four-Point-Contact Ball Bearings



The inner and outer rings of four-point-contact ball bearings are separable because the inner ring is split in a radial plane. They can take axial loads from either direction, and the balls have a contact angle of 35° with each ring. Radial loads are not recommended. Just one bearing of this type can replace a combination of face-to-face or back-to-back angular contact bearings. Machined-brass cages are generally used.

Self-Aligning Ball Bearings



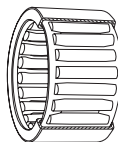
The inner ring of this type of bearing has two raceways, and the outer ring has a single spherical raceway with its center of curvature coincident with the bearing axis. Therefore, the axis of the inner ring, balls, and cage can deflect to some extent around the bearing center. Consequently, minor angular misalignment of the shaft and housing caused by machining or mounting error is automatically corrected. This type of bearing often has a tapered bore for mounting using an adapter sleeve.

Cylindrical Roller Bearings



In bearings of this type, the cylindrical rollers are in linear contact with the raceways. They have a high radial load capacity and are suitable for high speeds. NU, NJ, NUP, N, and NF are single-row bearing types, while NNU and NN are double-row bearing types, with designations depending on the design or absence of side ribs. The outer and inner rings of all types are separable. Some cylindrical roller bearings have no ribs on either the inner or outer ring, so that the rings can move axially relative to each other. These can be used as free-end bearings. Cylindrical roller bearings, in which either the inner or outer ring has two ribs and the other ring has one, are capable of taking some axial load in one direction. Double-row cylindrical roller bearings have high radial rigidity and are used primarily for precision machine tools. Pressed steel or machined brass cages are generally used, but sometimes molded polyamide cages are employed.

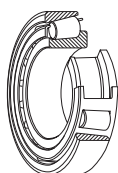
Needle Roller Bearings



Needle roller bearings contain many slender rollers with a length 3 to 10 times their diameter. As a result, the ratio of the bearing outside diameter to the inscribed circle diameter is small, and they have a rather high radial load capacity.

There are numerous types available, and many have no inner ring. The drawn-cup type has a pressed-steel outer ring and the solid type has a machined outer ring. There are also cage and roller assemblies without rings. Most bearings have pressed-steel cages, but some do not use cages.

Tapered Roller Bearings



Bearings of this type use conical rollers guided by a back-face rib on the inner ring. These bearings are capable of taking high radial loads and also axial loads in one direction. The HR Series features a greater quantity of larger rollers, allowing for even higher load capacity.

They are generally mounted in pairs in a manner similar to single-row angular contact ball bearings. In this case, the proper internal clearance can be obtained by adjusting the axial distance between the inner or outer rings of the two opposed bearings. Since they are separable, the inner ring assemblies and outer rings can be mounted independently.

Tapered roller bearings are divided into three types depending on contact angle; these are normal angle, medium angle, and steep angle. Double-row and four-row tapered roller bearings are also available. Pressed-steel cages are generally used.

Spherical Roller Bearings



These bearings have barrel-shaped rollers between the inner ring, which has two raceways, and the outer ring, which has one spherical raceway. Since the center of curvature of the outer ring raceway surface coincides with the bearing axis, they are self-aligning in a manner similar to that of self-aligning ball bearings. Therefore, if there is deflection of the shaft or housing or misalignment of their axes, it is automatically corrected so that excessive force is not applied to the bearings.

Spherical roller bearings can take not only heavy radial loads, but also some axial loads in either direction. They have excellent radial load-carrying capacity and are suitable for use where there are heavy or impact loads.

Some bearings have tapered bores and may be mounted directly on tapered shafts or cylindrical shafts using adapters or withdrawal sleeves.

Pressed-steel and machined-brass cages are used.

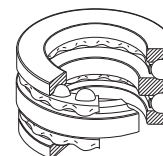
Single-Direction Thrust Ball Bearings



Single-direction thrust ball bearings are composed of washer-like bearing rings with raceway grooves. The ring attached to the shaft is called the shaft washer (or inner ring) while the ring attached to the housing is called the housing washer (or outer ring).

Double-direction thrust ball bearings have three rings with the middle ring (center ring) fixed to the shaft.

Double-Direction Thrust Ball Bearings



As their names imply, single-direction thrust bearings can take axial loads in one direction, while double-direction thrust bearings can take axial loads in both directions.

There are also thrust ball bearings with an aligning seat washer beneath the housing washer in order to compensate for shaft misalignment or mounting error.

Pressed-steel cages are usually used in smaller bearings and machined cages in larger bearings.

Spherical Thrust Roller Bearings



These bearings have a spherical raceway in the housing washer and barrel-shaped rollers obliquely arranged around it. Since the raceway in the housing washer is spherical, these bearings are self-aligning. They have a very high axial load capacity and are capable of taking moderate radial loads when an axial load is applied.

Pressed-steel cages or machined-brass cages are usually used.

Table 1. 1 Types and Characteristics

Bearing Type		Deep Groove Ball Bearings	Magneto Bearings	Angular Contact Ball Bearings	Double-Row Angular Contact Ball Bearings	Duplex Angular Contact Ball Bearings	Four-Point-Contact Ball Bearings	Self-Aligning Ball Bearings	Cylindrical Roller Bearings	Double-Row Cylindrical Roller Bearings	Cylindrical Roller Bearings with Single Rib
Features											
Load Capacity	Radial Loads										
	Axial Loads										
	Combined Loads										
High Speeds											
High Accuracy											
Low Noise and Torque											
Rigidity											
Angular Misalignment											
Self-Aligning Capability											
Ring Separability											
Fixed-End Bearing											
Free-End Bearing											
Inner Ring Tapered Bore											
Remarks			Two bearings are usually mounted in opposition.	Contact angles of 15°, 25°, 30° and 40°. Two bearings are usually mounted in opposition. Clearance adjustment is necessary.		Combination of DF and DT pairs is possible, but not for use on free-end.	Contact angle of 35°		Including N type	Including MNU type	Including NF type
Page No.		C005 C053	C005 C050	C072	C072 C106	C072	C072 C108	C114	C124	C124 C158	C124

Excellent
 Good
 Fair
 Poor
 Unsuitable
 One direction only
 Two directions

☆ Applicable
 ★ Applicable, allow for shaft contraction/elongation at bearing fitting surfaces.

of Rolling Bearings

Cylindrical Roller Bearings with Thrust Collars	Needle Roller Bearings	Tapered Roller Bearings	Double- and Multi-Row Tapered Roller Bearings	Spherical Roller Bearings	Thrust Ball Bearings	Thrust Ball Bearings with Aligning Seat	Double-Direction Angular Contact Thrust Ball Bearings	Thrust Cylindrical Roller Bearings	Thrust Tapered Roller Bearings	Thrust Spherical Roller Bearings	Page No.
											—
											—
											—
											A022 A098
											A023 A126 A151
											A023
											A023 A192
											A022 Blue pages of each brg. type
											A022
											A023 A024
											A026 to A029
											A026 to A029
											A150 B008 B012
Including NUP type		Two bearings are usually mounted in opposition. Clearance adjustment is necessary.	KH and KV types are also available but not for use on free-end.					Including needle roller thrust bearings		To be used with oil lubrication	
C124	C341	C182	C182 C246	C258	C296	C296	—	C314	C322	C332	

1.3 Contact Angle and Bearing Types

The contact angle (α) refers to the angle between a vertical plane of the rotation axis of the bearing and a straight line between the points where the rolling element comes in contact with the inner ring raceway and outer ring raceway.

Radial bearings and thrust bearings are classified depending on the size of the contact angle.

Figure 1.3 shows the relation between contact angle and loading direction on the bearing.

Radial bearing α : Less than 45°
(A primarily radial load is applied.)

Thrust bearing α : Over 45°
(A primarily axial load is applied.)

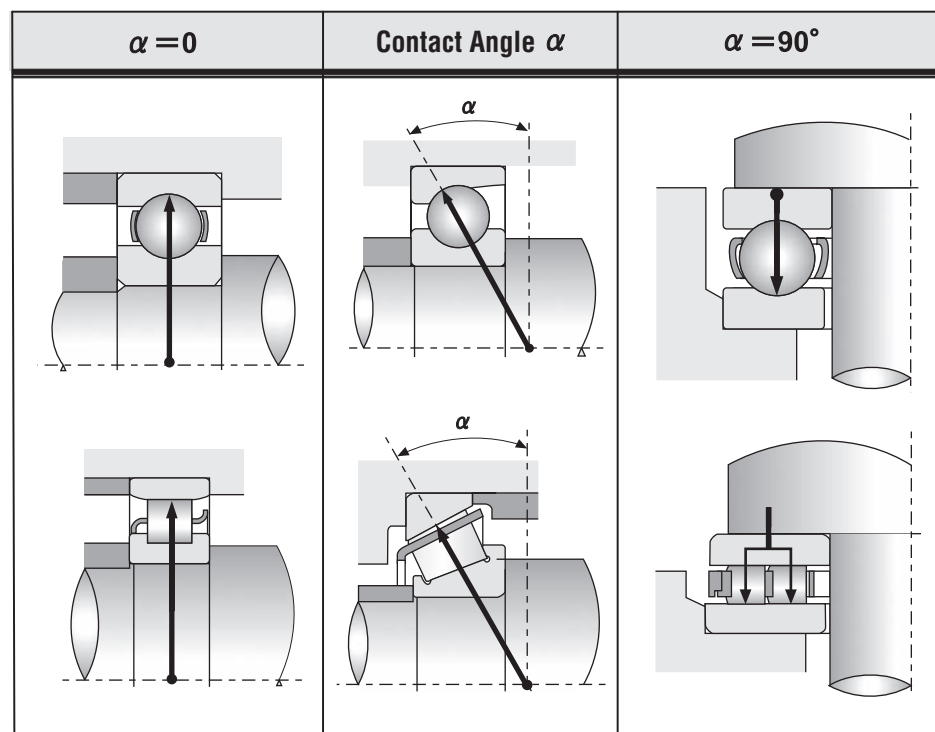


Fig. 1.3 Contact Angle α

1.4 Types of Load on Bearings

An example deep groove ball bearing is shown below in Figure 1.4 along with the types of load applied to a rolling bearing. These are:

- (a) Radial load
- (b) Axial load
- (c) Combined radial and axial load
- (d) Moment load

It is important to select the optimum bearing type according to the type and magnitude of the load.

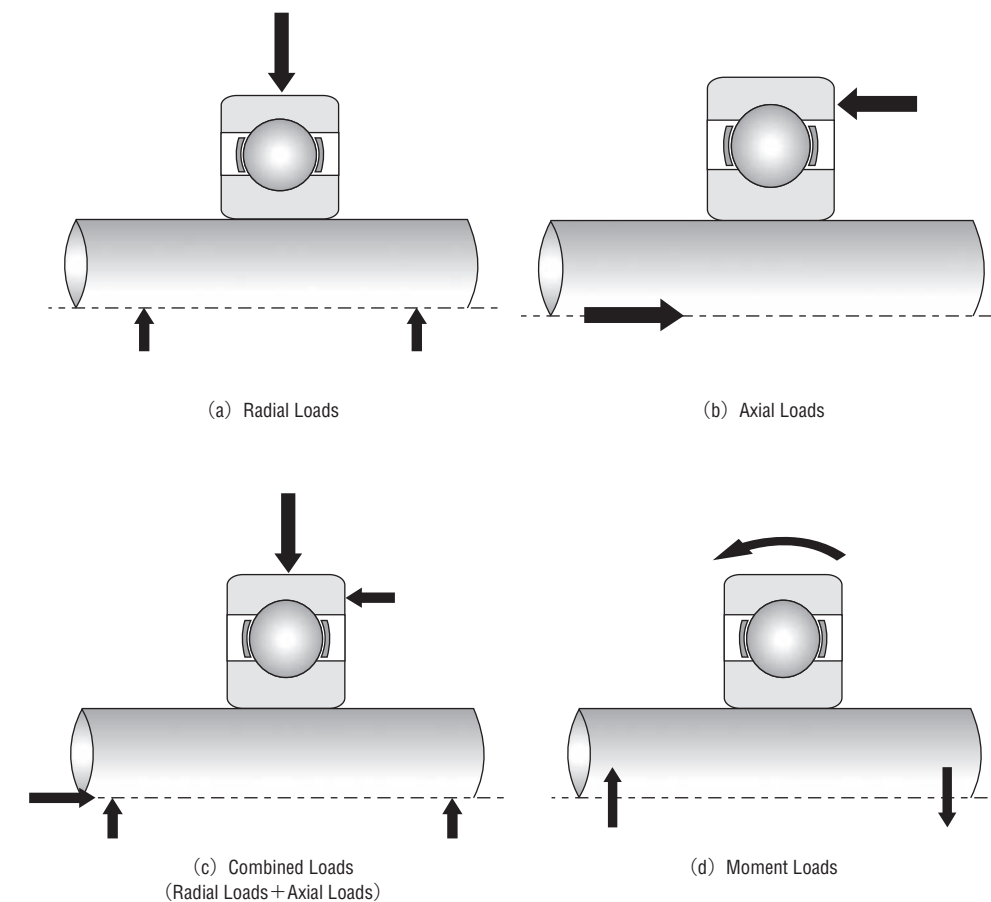
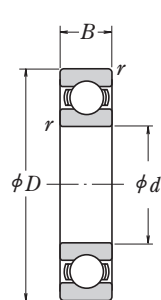


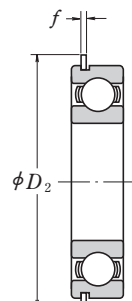
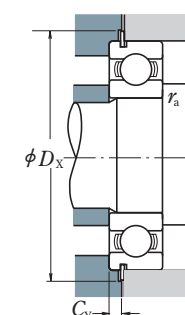
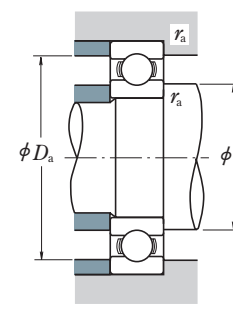
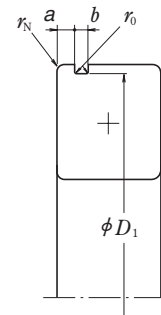
Fig. 1.4 Types of Load

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 10 – 17 mm



Open

Shielded
ZZNon-Contact
Sealed
VVContact
Sealed
DD · DDUWith Snap
Ring Groove
NWith Snap
Ring
NR

Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor f_0	Limiting Speeds (min ⁻¹)			Bearing Designations				With Snap Ring Groove	With Snap Ring	Snap Ring Groove Dimensions ⁽¹⁾ (mm)					Snap Ring ⁽¹⁾ Dimensions (mm)		Abutment and Fillet Dimensions (mm)						Mass (kg) approx.
d	D	B	$r_{min.}$	C_r	C_{0r}		Grease Open Z · ZZ V · VV		Oil DU DDU	Open	Shielded	Sealed	$a_{max.}$			$b_{min.}$	$D_1_{max.}$	$r_0_{max.}$	$r_N_{min.}$	$D_2_{max.}$	$f_{max.}$	$d_a^{(2)}_{min.}$	$d_a^{(2)}_{max.}$	$D_a^{(2)}_{max.}$	$r_a_{max.}$	$D_x_{min.}$	$C_V_{max.}$		
10	19	5	0.3	1 720	840	14.8	34 000	24 000	40 000	6800	ZZ	VV	DD	—	—	—	—	—	—	12	12	17	0.3	—	—	0.005			
	22	6	0.3	2 700	1 270	14.0	32 000	22 000	38 000	6900	ZZ	VV	DD	N ⁽³⁾	NR ⁽³⁾	1.05	0.8	20.8	0.2	0.2	24.8	0.7	12	12.5	20	0.3	25.5	1.5	0.009
	26	8	0.3	4 550	1 970	12.4	30 000	22 000	36 000	6000	ZZ	VV	DDU	N ⁽⁴⁾	NR ⁽⁴⁾	1.35	0.87	24.5	0.2	0.3	28.7	0.84	12	13	24	0.3	29.4	1.9	0.018
	30	9	0.6	5 350	2 390	13.2	28 000	18 000	34 000	* 6200	ZZ	VV	DDU	—	—	—	—	—	—	14	16	26	0.6	—	—	0.032			
	30	9	0.6	5 100	2 390	13.2	24 000	18 000	30 000	6200	ZZ	VV	DDU	N	NR	2.06	1.35	28.17	0.4	0.5	34.7	1.12	14	16	26	0.6	35.5	2.9	0.032
	35	11	0.6	8 500	3 450	11.2	26 000	17 000	30 000	* 6300	ZZ	VV	DDU	—	—	—	—	—	—	14	16.5	31	0.6	—	—	0.052			
35	11	0.6	8 100	3 450	11.2	22 000	17 000	26 000	6300	ZZ	VV	DDU	N	NR	2.06	1.35	33.17	0.4	0.5	39.7	1.12	14	16.5	31	0.6	40.5	2.9	0.052	
12	21	5	0.3	1 920	1 040	15.3	32 000	20 000	38 000	6801	ZZ	VV	DD	—	—	—	—	—	—	14	14	19	0.3	—	—	0.006			
	24	6	0.3	2 890	1 460	14.5	30 000	20 000	36 000	6901	ZZ	VV	DD	N ⁽³⁾	NR ⁽³⁾	1.05	0.8	22.8	0.2	0.2	26.8	0.7	14	14.5	22	0.3	27.5	1.5	0.010
	28	7	0.3	5 100	2 370	13.0	28 000	—	32 000	16001	—	—	—	—	—	—	—	—	—	14	—	26	0.3	—	—	0.019			
	28	8	0.3	5 350	2 370	13.0	32 000	18 000	38 000	* 6001	ZZ	VV	DDU	—	—	—	—	—	—	14	15.5	26	0.3	—	—	0.022			
	28	8	0.3	5 100	2 370	13.0	28 000	18 000	32 000	6001	ZZ	VV	DDU	N ⁽⁴⁾	NR ⁽⁴⁾	1.35	0.87	26.5	0.2	0.3	30.7	0.84	14	15.5	26	0.3	31.4	1.9	0.022
	32	10	0.6	7 150	3 050	12.3	26 000	17 000	32 000	* 6201	ZZ	VV	DDU	—	—	—	—	—	—	16	17	28	0.6	—	—	0.037			
32	10	0.6	6 800	3 050	12.3	22 000	17 000	28 000	6201	ZZ	VV	DDU	N	NR	2.06	1.35	30.15	0.4	0.5	36.7	1.12	16	17	28	0.6	37.5	2.9	0.037	
37	12	1	10 200	4 200	11.1	24 000	16 000	28 000	* 6301	ZZ	VV	DDU	—	—	—	—	—	—	17	18	32	1	—	—	0.060				
37	12	1	9 700	4 200	11.1	20 000	16 000	24 000	6301	ZZ	VV	DDU	N	NR	2.06	1.35	34.77	0.4	0.5	41.3	1.12	17	18	32	1	42	2.9	0.060	
15	24	5	0.3	2 070	1 260	15.8	28 000	17 000	34 000	6802	ZZ	VV	DD	—	—	—	—	—	—	17	17	22	0.3	—	—	0.007			
	28	7	0.3	4 350	2 260	14.3	26 000	17 000	30 000	6902	ZZ	VV	DD	N ⁽³⁾	NR ⁽³⁾	1.30	0.95	26.7	0.25	0.3	30.8	0.85	17	17	26	0.3	31.5	1.8	0.015
	32	8	0.3	5 600	2 830	13.9	24 000	—	28 000	16002	—	—	—	—	—	—	—	—	—	17	—	30	0.3	—	—	0.027			
	32	9	0.3	5 850	2 830	13.9	26 000	15 000	32 000	* 6002	ZZ	VV	DDU	—	—	—	—	—	—	17	19	30	0.3	—	—	0.031			
	32	9	0.3	5 600	2 830	13.9	24 000	15 000	28 000	6002	ZZ	VV	DDU	N	NR	2.06	1.35	30.15	0.4	0.3	36.7	1.12	17	19	30	0.3	37.5	2.9	0.031
	35	11	0.6	8 000	3 750	13.2	22 000	14 000	28 000	* 6202	ZZ	VV	DDU	—	—	—	—	—	—	19	20.5	31	0.6	—	—	0.045			
35	11	0.6	7 650	3 750	13.2	20 000	14 000	24 000	6202	ZZ	VV	DDU	N	NR	2.06	1.35	33.17	0.4	0.5	39.7	1.12	19	20.5	31	0.6	40.5	2.9	0.045	
42	13	1	12 000	5 450	12.3	19 000	13 000	24 000	* 6302	ZZ	VV	DDU	—	—	—	—	—	—	20	22.5	37	1	—	—	0.083				
42	13	1	11 400	5 450	12.3	17 000	13 000	20 000	6302	ZZ	VV	DDU	N	NR	2.06	1.35	39.75	0.4	0.5	46.3	1.12	20	22.5	37	1	47	2.9	0.083	
17	26	5	0.3	2 630	1 570	15.7	26 000	15 000	30 000	6803	ZZ	VV	DD	—	—	—	—	—	—	19	19	24	0.3	—	—	0.007			
	30	7	0.3	4 600	2 550	14.7	24 000	15 000	28 000	6903	ZZ	VV	DDU	N ⁽³⁾	NR ⁽³⁾	1.30	0.95	28.7	0.25	0.3	32.8	0.85	19	19.5	28	0.3	33.5	1.8	0.017
	35	8	0.3	6 000	3 250	14.4	22 000	—	26 000	16003	—	—	—	—	—	—	—	—	—	19	—	33	0.3	—	—	0.033			
	35	10	0.3	6 300	3 250	14.4	24 000	13 000	28 000	* 6003	ZZ	VV	DDU	—	—	—	—	—	—	19	21.5	33	0.3	—	—	0.041			
	35	10	0.3	6 000	3 250	14.4	22 000	13 000	26 000	6003	ZZ	VV	DDU	N	NR	2.06	1.35	33.17	0.4	0.3	39.7	1.12	19	21.5	33	0.3	40.5	2.9	0.041
	40	12	0.6	10 100	4 800	13.2	20 000	12 000	24 000	* 6203	ZZ	VV	DDU	—	—	—	—	—	—	21	23.5	36	0.6	—	—	0.067			
40	12	0.6	9 550	4 800	13.2	17 000	12 000	20 000	6203	ZZ	VV	DDU	N	NR	2.06	1.35	38.1	0.4	0.5	44.6	1.12	21	23.5	36	0.6	45.5	2.9	0.067	
47	14	1	14 300	6 650	12.4	17 000	11 000	20 000	* 6303	ZZ	VV	DDU	—	—	—	—	—	—	22	25.5	42	1	—	—	0.113				
47	14	1	13 600	6 650	12.4	15 000	11 000	18 000	6303	ZZ	VV	DDU	N	NR	2.46	1.35	44.6	0.4	0.5	52.7	1.12	22	25.5	42	1	53.5	3.3	0.113	

Notes (1) For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.

(2) When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.

(3) Ring types N and NR are applicable only to open bearings. Please consult NSK about the snap ring groove dimensions of sealed or shielded bearings.

(4) Snap ring groove dimensions and snap ring dimensions do not conform to ISO15.

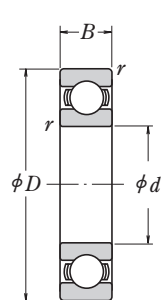
Remarks 1. Diameter Series 7 (extra-thin wall) bearings are also available; please contact NSK for details.

2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.

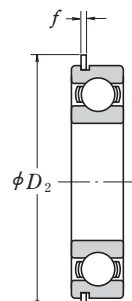
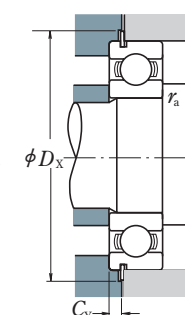
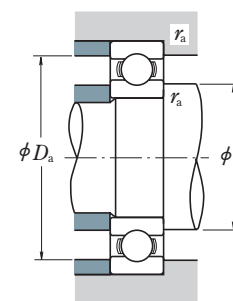
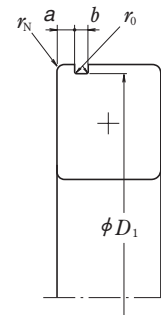
3. Bearings denoted by an asterisk (*) are NSKHPS™ deep groove ball bearings.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 20 – 30 mm



Open

Shielded
ZZNon-Contact
Sealed
VVContact
Sealed
DD · DDUWith Snap
Ring Groove
NWith Snap
Ring
NR

Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min ⁻¹)			Bearing Designations				With Snap Ring Groove	With Snap Ring	Snap Ring Groove Dimensions (1) (mm)					Snap Ring (1) Dimensions (mm)		Abutment and Fillet Dimensions (mm)						Mass (kg)
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C</i> _{0r}	<i>f</i> ₀	Grease		Oil	Open	Shielded	Sealed				<i>a</i> max.	<i>b</i> min.	<i>D</i> ₁ max.	<i>r</i> ₀ max.	<i>r</i> _N min.	<i>D</i> ₂ max.	<i>f</i> max.	<i>d</i> _a (2) min.	<i>D</i> _a (2) max.	<i>r</i> _a max.	<i>D</i> _x min.	<i>C</i> _Y max.	approx.	
20	32	7	0.3	4 000	2 470	15.5	22 000	13 000	26 000	6804 ZZ VV DD			N NR	N NR		1.30	0.95	30.7	0.25	0.3	34.8	0.85	22	22	30	0.3	35.5	1.8	0.017
	37	9	0.3	6 400	3 700	14.7	19 000	12 000	22 000	6904 ZZ VV DDU			N NR	N NR		1.70	0.95	35.7	0.25	0.3	39.8	0.85	22	24	35	0.3	40.5	2.3	0.037
	42	8	0.3	7 900	4 450	14.5	18 000	—	20 000	16004 — — —			—	—		—	—	—	—	—	—	—	22	—	40	0.3	—	—	0.048
	42	12	0.6	9 850	5 000	13.8	20 000	11 000	24 000	* 6004 ZZ VV DDU			—	—		—	—	—	—	—	—	—	24	25.5	38	0.6	—	—	0.068
	42	12	0.6	9 400	5 000	13.8	18 000	11 000	20 000	6004 ZZ VV DDU			N NR	N NR		2.06	1.35	39.75	0.4	0.5	46.3	1.12	24	25.5	38	0.6	47	2.9	0.068
	47	14	1	13 400	6 600	13.1	17 000	11 000	20 000	* 6204 ZZ VV DDU			—	—		—	—	—	—	—	—	—	25	26.5	42	1	—	—	0.107
	47	14	1	12 800	6 600	13.1	15 000	11 000	18 000	6204 ZZ VV DDU			N NR	N NR		2.46	1.35	44.6	0.4	0.5	52.7	1.12	25	26.5	42	1	53.5	3.3	0.107
	52	15	1.1	16 700	7 900	12.4	16 000	10 000	19 000	* 6304 ZZ VV DDU			—	—		—	—	—	—	—	—	—	26.5	28	45.5	1	—	—	0.145
	52	15	1.1	15 900	7 900	12.4	14 000	10 000	17 000	6304 ZZ VV DDU			N NR	N NR		2.46	1.35	49.73	0.4	0.5	57.9	1.12	26.5	28	45.5	1	58.5	3.3	0.145
	52	15	1.1	15 900	7 900	12.4	14 000	10 000	17 000	6304 ZZ VV DDU			N NR	N NR		2.46	1.35	49.73	0.4	0.5	57.9	1.12	26.5	28	45.5	1	58.5	3.3	0.145
22	44	12	0.6	9 400	5 050	14.0	17 000	11 000	20 000	60/22 ZZ VV DDU			N NR	N NR		2.06	1.35	41.75	0.4	0.5	48.3	1.12	26	26.5	40	0.6	49	2.9	0.074
	50	14	1	12 900	6 800	13.5	14 000	9 500	16 000	62/22 ZZ VV DDU			N NR	N NR		2.46	1.35	47.6	0.4	0.5	55.7	1.12	27	29.5	45	1	56.5	3.3	0.119
	56	16	1.1	18 400	9 250	12.4	13 000	9 500	16 000	63/22 ZZ VV DDU			N NR	N NR		2.46	1.35	53.6	0.4	0.5	61.7	1.12	28.5	30.5	49.5	1	62.5	3.3	0.179
	44	12	0.6	9 400	5 050	14.0	17 000	11 000	20 000	60/22 ZZ VV DDU			N NR	N NR		2.06	1.35	41.75	0.4	0.5	48.3	1.12	26	26.5	40	0.6	49	2.9	0.074
	50	14	1	12 900	6 800	13.5	14 000	9 500	16 000	62/22 ZZ VV DDU			N NR	N NR		2.46	1.35	47.6	0.4	0.5	55.7	1.12	27	29.5	45	1	56.5	3.3	0.119
25	37	7	0.3	4 500	3 150	16.1	18 000	10 000	22 000	6805 ZZ VV DD			N NR	N NR		1.30	0.95	35.7	0.25	0.3	39.8	0.85	27	27	35	0.3	40.5	1.8	0.021
	42	9	0.3	7 050	4 550	15.4	16 000	10 000	19 000	6905 ZZ VV DDU			N(3) NR(3)	N(3) NR(3)		1.70	0.95	40.7	0.25	0.3	44.8	0.85	27	28.5	40	0.3	45.5	2.3	0.042
	47	8	0.3	8 850	5 600	15.1	15 000	—	18 000	16005 — — —			—	—		—	—	—	—	—	—	—	27	—	45	0.3	—	—	0.059
	47	12	0.6	10 600	5 850	14.5	18 000	9 500	22 000	* 6005 ZZ VV DDU			—	—		—	—	—	—	—	—	—	29	30	43	0.6	—	—	0.079
	47	12	0.6	10 100	5 850	14.5	15 000	9 500	18 000	6005 ZZ VV DDU			N NR	N NR		2.06	1.35	44.6	0.4	0.5	52.7	1.12	29	30	43	0.6	53.5	2.9	0.079
	52	15	1	14 700	7 850	13.9	15 000	9 000	18 000	* 6205 ZZ VV DDU			—	—		—	—	—	—	—	—	—	30	32	47	1	—	—	0.129
	52	15	1	14 000	7 850	13.9	13 000	9 000	15 000	6205 ZZ VV DDU			N NR	N NR		2.46	1.35	49.73	0.4	0.5	57.9	1.12	30	32	47	1	58.5	3.3	0.129
	62	17	1.1	21 600	11 200	13.2	13 000	8 000	16 000	* 6305 ZZ VV DDU			—	—		—	—	—	—	—	—	—	31.5	36	55.5	1	—	—	0.235
	62	17	1.1	20 600	11 200	13.2	11 000	8 000	13 000	6305 ZZ VV DDU			N NR	N NR		3.28	1.9	59.61	0.6	0.5	67.7	1.7	31.5	36	55.5	1	68.5	4.6	0.235
	52	12	0.6	12 500	7 400	14.5	14 000	8 500	16 000	60/28 ZZ VV DDU			N NR	N NR		2.06	1.35	49.73	0.4	0.5	57.9	1.12	32	34	48	0.6	58.5	2.9	0.096
28	58	16	1	16 600	9 500	13.9	12 000	8 000	14 000	62/28 ZZ VV DDU			N NR	N NR		2.46	1.35	55.6	0.4	0.5	63.7	1.12	33	35.5	53	1	64.5	3.3	0.175
	68	18	1.1	26 700	14 000	12.4	10 000	7 500	13 000	63/28 ZZ VV DDU			N NR	N NR		3.28	1.9	64.82	0.6	0.5	74.6	1.7	34.5	38	61.5	1	76	4.6	0.287
	42	7	0.3	4 700	3 650	16.4	15 000	9 000	18 000	6806 ZZ VV DD			N NR	N NR		1.30	0.95	40.7	0.25	0.3	44.8	0.85	32	32	40	0.3	45.5	1.8	0.024
	47	9	0.3	7 250	5 000	15.8	14 000	8 500	17 000	6906 ZZ VV DDU			N NR	N NR		1.70	0.95	45.7	0.25	0.3	49.8	0.85	32	34	45	0.3	50.5	2.3	0.052
	55	9	0.3	11 200	7 350	15.2	13 000	—	15 000	16006 — — —			—	—		—	—	—	—	—	—	—	32	—	53	0.3	—	—	0.087
	55	13	1	13 900	8 300	14.7	15 000	8 000	18 000	* 6006 ZZ VV DDU			—	—		—	—	—	—	—	—	—	35	36.5	50	1	—	—	0.116
	55	13	1	13 200	8 300	14.7	13 000	8 000	15 000	6006 ZZ VV DDU			N NR	N NR		2.08	1.35	52.6	0.4	0.5	60.7	1.12	35	36.5	50	1	61.5	2.9	0.116
	62	16	1	20 400	11 300	13.8	12 000	7 500	15 000	* 6206 ZZ VV DDU			—	—		—	—	—	—	—	—	—	35	38.5	57	1	—	—	0.199
	62	16	1	19 500	11 300	13.8	11 000	7 500	13 000	6206 ZZ VV DDU			N NR	N NR		3.28	1.9	59.61	0.6	0.5	67.7	1.7	35	38.5	57	1	68.5	4.6	0.199
	72	19	1.1	28 000	15 000	13.3	11 000	6 700	13 000	* 6306 ZZ VV DDU			—	—		—	—	—	—	—	—	—	36.5	42.5	65.5	1	—	—	0.345
72	19	1.1	26 700	15 000	13.3	9 500	6 700	12 000	6306 ZZ VV DDU			N NR	N NR		3.28	1.9	68.81	0.6	0.5	78.6	1.7	36.5	42.5	65.5	1	80	4.6	0.345	

Notes (1) For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.

(2) When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.

(3) Ring types N and NR are applicable only to open bearings. Please consult NSK about the snap ring groove dimensions of sealed or shielded bearings.

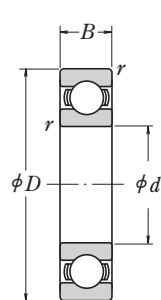
Remarks 1. Diameter Series 7 (extra-thin wall) bearings are also available; please contact NSK for details.

2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.

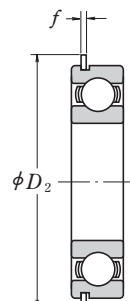
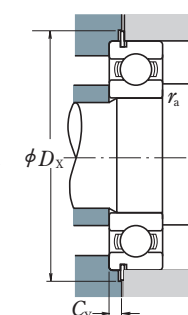
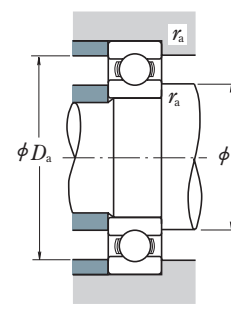
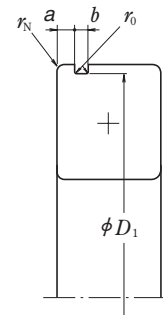
3. Bearings denoted by an asterisk (*) are NSKHPST™ deep groove ball bearings.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 32 – 45 mm



Open

Shielded
ZZNon-Contact
Sealed
VVContact
Sealed
DD·DDUWith Snap
Ring Groove
NWith Snap
Ring
NR

Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min ⁻¹)			Bearing Designations				With Snap Ring Groove	With Snap Ring	Snap Ring Groove Dimensions (1) (mm)					Snap Ring (1) Dimensions (mm)		Abutment and Fillet Dimensions (mm)						Mass (kg) approx.
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C</i> _{0r}		Grease		Oil	Open	Shielded	Sealed	<i>a</i> max.			<i>b</i> min.	<i>D</i> ₁ max.	<i>r</i> ₀ max.	<i>r</i> _N min.	<i>D</i> ₂ max.	<i>f</i> max.	<i>d</i> _a (2) min.	<i>D</i> _a (2) max.	<i>r</i> _a max.	<i>D</i> _x min.	<i>C</i> _Y max.			
						Open Z · ZZ V · VV	DU DDU	Open Z																					
32	58	13	1	15 100	9 150	14.5	12 000	7 500	14 000	60/32	ZZ	VV	DDU	N	NR	2.08	1.35	55.6	0.4	0.5	63.7	1.12	37	38.5	53	1	64.5	2.9	0.122
	65	17	1	20 700	11 600	13.6	10 000	7 100	12 000	62/32	ZZ	VV	DDU	N	NR	3.28	1.9	62.6	0.6	0.5	70.7	1.7	37	40	60	1	71.5	4.6	0.223
	75	20	1.1	29 900	17 000	13.2	9 000	6 300	11 000	63/32	ZZ	VV	DDU	N	NR	3.28	1.9	71.83	0.6	0.5	81.6	1.7	38.5	44.5	68.5	1	83	4.6	0.389
35	47	7	0.3	4 900	4 100	16.7	14 000	7 500	16 000	6807	ZZ	VV	DD	N	NR	1.30	0.95	45.7	0.25	0.3	49.8	0.85	37	37	45	0.3	50.5	1.8	0.027
	55	10	0.6	10 600	7 250	15.5	12 000	7 500	15 000	6907	ZZ	VV	DDU	N	NR	1.70	0.95	53.7	0.25	0.5	57.8	0.85	39	39	51	0.6	58.5	2.3	0.079
	62	9	0.3	11 700	8 200	15.6	11 000	—	13 000	16007	—	—	—	—	—	—	—	—	—	—	—	—	37	—	60	0.3	—	—	0.107
35	62	14	1	16 800	10 300	14.8	13 000	6 700	15 000	* 6007	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	40	41.5	57	1	—	—	0.151
	62	14	1	16 000	10 300	14.8	11 000	6 700	13 000	* 6007	ZZ	VV	DDU	N	NR	2.08	1.9	59.61	0.6	0.5	67.7	1.7	40	41.5	57	1	68.5	3.4	0.151
	72	17	1.1	27 000	15 300	13.8	11 000	6 300	13 000	* 6207	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	41.5	44.5	65.5	1	—	—	0.284
35	72	17	1.1	25 700	15 300	13.8	9 500	6 300	11 000	* 6207	ZZ	VV	DDU	N	NR	3.28	1.9	68.81	0.6	0.5	78.6	1.7	41.5	44.5	65.5	1	80	4.6	0.284
	80	21	1.5	35 000	19 200	13.2	10 000	6 000	12 000	* 6307	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	43	47	72	1.5	—	—	0.464
	80	21	1.5	33 500	19 200	13.2	8 500	6 000	10 000	* 6307	ZZ	VV	DDU	N	NR	3.28	1.9	76.81	0.6	0.5	86.6	1.7	43	47	72	1.5	88	4.6	0.464
40	52	7	0.3	6 350	5 550	17.0	12 000	6 700	14 000	6808	ZZ	VV	DD	N	NR	1.30	0.95	50.7	0.25	0.3	54.8	0.85	42	42	50	0.3	55.5	1.8	0.031
	62	12	0.6	13 700	10 000	15.7	11 000	6 300	13 000	6908	ZZ	VV	DDU	N	NR	1.70	0.95	60.7	0.25	0.5	64.8	0.85	44	46	58	0.6	65.5	2.3	0.112
	68	9	0.3	12 600	9 650	16.0	10 000	—	12 000	16008	—	—	—	—	—	—	—	—	—	—	—	—	42	—	66	0.3	—	—	0.13
40	68	15	1	17 600	11 500	15.3	12 000	6 000	14 000	* 6008	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	45	47.5	63	1	—	—	0.19
	68	15	1	16 800	11 500	15.3	10 000	6 000	12 000	* 6008	ZZ	VV	DDU	N	NR	2.49	1.9	64.82	0.6	0.5	74.6	1.7	45	47.5	63	1	76	3.8	0.19
	80	18	1.1	30 500	17 900	14.0	9 500	5 600	12 000	* 6208	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	46.5	50.5	73.5	1	—	—	0.366
40	80	18	1.1	29 100	17 900	14.0	8 500	5 600	10 000	* 6208	ZZ	VV	DDU	N	NR	3.28	1.9	76.81	0.6	0.5	86.6	1.7	46.5	50.5	73.5	1	88	4.6	0.366
	90	23	1.5	43 000	24 000	13.2	9 000	5 300	11 000	* 6308	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	48	53	82	1.5	—	—	0.630
	90	23	1.5	40 500	24 000	13.2	7 500	5 300	9 000	* 6308	ZZ	VV	DDU	N	NR	3.28	2.7	86.79	0.6	0.5	96.5	2.46	48	53	82	1.5	98	5.4	0.630
45	58	7	0.3	6 600	6 150	17.2	11 000	6 000	13 000	6809	ZZ	VV	DD	N	NR	1.30	0.95	56.7	0.25	0.3	60.8	0.85	47	47.5	56	0.3	61.5	1.8	0.038
	68	12	0.6	14 100	10 900	15.9	9 500	5 600	12 000	6909	ZZ	VV	DDU	N	NR	1.70	0.95	66.7	0.25	0.3(9)	70.8	0.85	49	50	64	0.6	72	2.3	0.126
	75	10	0.6	14 900	11 400	15.9	9 000	—	11 000	16009	—	—	—	—	—	—	—	—	—	—	—	—	49	—	71	0.6	—	—	0.167
45	75	16	1	22 000	15 200	15.3	10 000	5 300	12 000	* 6009	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	50	53.5	70	1	—	—	0.241
	75	16	1	20 900	15 200	15.3	9 000	5 300	11 000	* 6009	ZZ	VV	DDU	N	NR	2.49	1.9	71.83	0.6	0.5	81.6	1.7	50	53.5	70	1	83	3.8	0.241
	85	19	1.1	33 000	20 400	14.4	9 000	5 300	11 000	* 6209	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	51.5	55.5	78.5	1	—	—	0.42
45	85	19	1.1	31 500	20 400	14.4	7 500	5 300	9 000	* 6209	ZZ	VV	DDU	N	NR	3.28	1.9	81.81	0.6	0.5	91.6	1.7	51.5	55.5	78.5	1	93	4.6	0.42
	100	25	1.5	55 500	32 000	13.1	7 500	4 800	9 500	* 6309	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	53	61.5	92	1.5	—	—	0.829
	100	25	1.5	53 000	32 000	13.1	6 700	4 800	8 000	* 6309	ZZ	VV	DDU	N	NR	3.28	2.7	96.8	0.6	0.5	106.5	2.46	53	61.5	92	1.5	108	5.4	0.829

Notes ⁽¹⁾ For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.⁽²⁾ When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.⁽³⁾ Does not conform to ISO15.

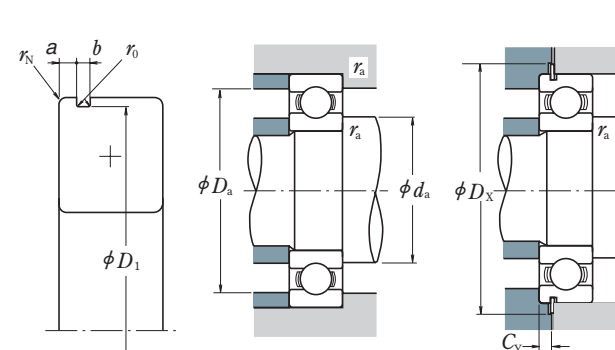
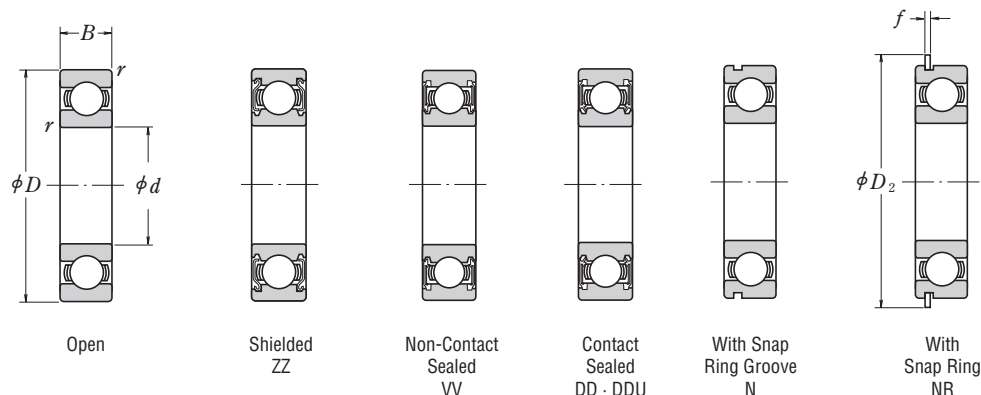
Remarks 1. Diameter Series 7 (extra-thin wall) bearings are also available; please contact NSK for details.

2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.

3. Bearings denoted by an asterisk (*) are NSKHPST™ deep groove ball bearings.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 50 – 60 mm



Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min ⁻¹)			Bearing Designations				With Snap Ring Groove	With Snap Ring	Snap Ring Groove Dimensions (1) (mm)					Snap Ring (1) Dimensions (mm)		Abutment and Fillet Dimensions (mm)						Mass (kg)
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C_{0r}</i>	<i>f</i> ₀	Grease		Oil	Open	Shielded	Sealed				<i>a</i> max.	<i>b</i> min.	<i>D</i> ₁ max.	<i>r</i> ₀ max.	<i>r</i> _N min.	<i>D</i> ₂ max.	<i>f</i> max.	<i>d</i> _a (2) min.	<i>D</i> _a (2) max.	<i>r</i> _a max.	<i>D</i> _x min.	<i>C</i> _V max.	approx.	
						Open Z · ZZ V · VV	DU DDU	Open Z																					
50	65	7	0.3	6 400	6 200	17.2	9 500	5 300	11 000	6810	ZZ	VV	DDU	N	NR	1.30	0.95	63.7	0.25	0.3	67.8	0.85	52	52.5	63	0.3	68.5	1.8	0.050
	72	12	0.6	14 500	11 700	16.1	9 000	5 300	11 000	6910	ZZ	VV	DDU	N	NR	1.70	0.95	70.7	0.25	0.5	74.8	0.85	54	55	68	0.6	76	2.3	0.135
	80	10	0.6	15 400	12 400	16.1	8 500	—	10 000	16010	—	—	—	—	—	—	—	—	—	—	—	—	54	—	76	0.6	—	—	0.175
	80	16	1	22 900	16 600	15.6	9 500	4 800	11 000	* 6010	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	55	58.5	75	1	—	—	0.261
	80	16	1	21 800	16 600	15.6	8 500	4 800	10 000	6010	ZZ	VV	DDU	N	NR	2.49	1.9	76.81	0.6	0.5	86.6	1.7	55	58.5	75	1	88	3.8	0.261
	90	20	1.1	37 000	23 200	14.4	8 000	4 800	10 000	* 6210	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	56.5	60	83.5	1	—	—	0.459
	90	20	1.1	35 000	23 200	14.4	7 100	4 800	8 500	* 6210	ZZ	VV	DDU	N	NR	3.28	2.7	86.79	0.6	0.5	96.5	2.46	56.5	60	83.5	1	98	5.4	0.459
	110	27	2	65 000	38 500	13.2	7 100	4 300	8 500	* 6310	ZZ	VV	DDU	N	NR	—	—	—	—	—	—	—	59	68	101	2	—	—	1.06
	110	27	2	62 000	38 500	13.2	6 000	4 300	7 500	6310	ZZ	VV	DDU	N	NR	3.28	2.7	106.81	0.6	0.5	116.6	2.46	59	68	101	2	118	5.4	1.06
	72	9	0.3	8 800	8 500	17.0	8 500	4 800	10 000	6811	ZZ	VV	DDU	N	NR	1.70	0.95	70.7	0.25	0.3	74.8	0.85	57	59	70	0.3	76	2.3	0.081
	80	13	1	16 000	13 300	16.2	8 000	4 500	9 500	6911	ZZ	VV	DDU	N	NR	2.10	1.3	77.9	0.4	0.5	84.4	1.12	60	61.5	75	1	86	2.9	0.189
	90	11	0.6	19 400	16 300	16.2	7 500	—	9 000	16011	—	—	—	—	—	—	—	—	—	—	—	—	59	—	86	0.6	—	—	0.257
55	90	18	1.1	29 700	21 200	15.3	8 500	4 500	10 000	* 6011	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	61.5	64	83.5	1	—	—	0.381
	90	18	1.1	28 300	21 200	15.3	7 500	4 500	9 000	6011	ZZ	VV	DDU	N	NR	2.87	2.7	86.79	0.6	0.5	96.5	2.46	61.5	64	83.5	1	98	5	0.381
	100	21	1.5	45 500	29 300	14.3	7 500	4 300	9 000	* 6211	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	63	66.5	92	1.5	—	—	0.619
	100	21	1.5	43 500	29 300	14.3	6 300	4 300	7 500	* 6211	ZZ	VV	DDU	N	NR	3.28	2.7	96.8	0.6	0.5	106.5	2.46	63	66.5	92	1.5	108	5.4	0.619
	120	29	2	75 000	44 500	13.1	6 700	4 000	8 000	* 6311	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	64	72.5	111	2	—	—	1.37
	120	29	2	71 500	44 500	13.1	5 600	4 000	6 700	6311	ZZ	VV	DDU	N	NR	4.06	3.1	115.21	0.6	0.5	129.7	2.82	64	72.5	111	2	131.5	6.5	1.37
	78	10	0.3	11 500	10 900	16.9	8 000	4 500	9 500	6812	ZZ	VV	DD	N	NR	1.70	1.3	76.2	0.4	0.3	82.7	1.12	62	64	76	0.3	84	2.5	0.103
	85	13	1	19 400	16 300	16.2	7 500	4 300	9 000	6912	ZZ	VV	DDU	N	NR	2.10	1.3	82.9	0.4	0.5	89.4	1.12	65	66	80	1	91	2.9	0.192
	95	11	0.6	20 000	17 500	16.3	7 100	—	8 500	16012	—	—	—	—	—	—	—	—	—	—	—	—	64	—	91	0.6	—	—	0.281
	95	18	1.1	31 000	23 200	15.6	8 000	4 000	9 500	* 6012	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	66.5	69	88.5	1	—	—	0.412
	95	18	1.1	29 500	23 200	15.6	7 100	4 000	8 500	6012	ZZ	VV	DDU	N	NR	2.87	2.7	91.82	0.6	0.5	101.6	2.46	66.5	69	88.5	1	103	5	0.412
	110	22	1.5	55 000	36 000	14.3	6 700	3 800	8 000	* 6212	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	68	74.5	102	1.5	—	—	0.783
60	110	22	1.5	52 500	36 000	14.3	5 600	3 800	7 100	* 6212	ZZ	VV	DDU	N	NR	3.28	2.7	106.81	0.6	0.5	116.6	2.46	68	74.5	102	1.5	118	5.4	0.783
	130	31	2.1	86 000	52 000	13.1	6 000	3 600	7 100	* 6312	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	71	79	119	2	—	—	1.72
	130	31	2.1	82 000	52 000	13.1	5 300	3 600	6 300	6312	ZZ	VV	DDU	N	NR	4.06	3.1	125.22	0.6	0.5	139.7	2.82	71	79	119	2	141.5	6.5	1.72

Notes (1) For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.

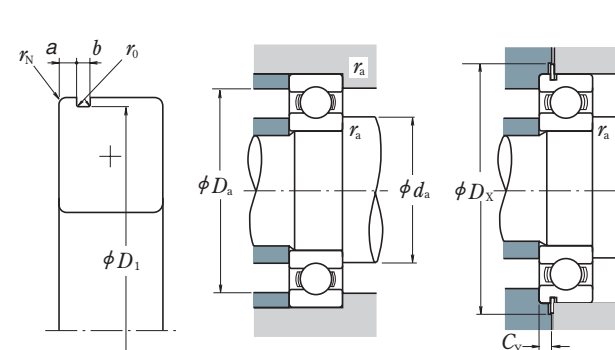
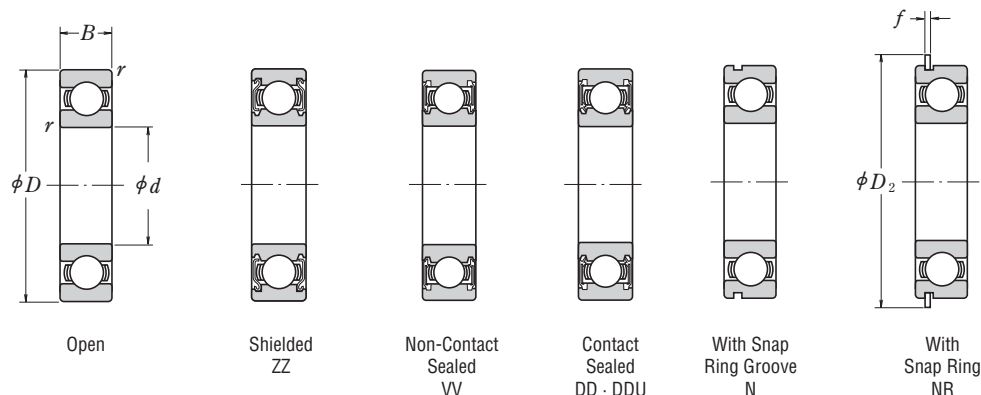
(2) When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.

Remarks

- Diameter Series 7 (extra-thin wall) bearings are also available; please contact NSK for details.
- When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
- Please consult NSK about the snap ring groove dimensions of Dimension Series 18 and 19 sealed and shielded bearings when the diameter is 50 mm or more.
- Bearings denoted by an asterisk (*) are NSKHPSTTM deep groove ball bearings.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 65 – 75 mm



Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min ⁻¹)			Bearing Designations				With Snap Ring Groove	With Snap Ring	Snap Ring Groove Dimensions ⁽¹⁾ (mm)					Snap Ring ⁽¹⁾ Dimensions (mm)		Abutment and Fillet Dimensions (mm)					Mass (kg)	
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C_{0r}</i>	<i>f</i> ₀	Grease		Oil	Open	Shielded	Sealed				<i>a</i> max.	<i>b</i> min.	<i>D</i> ₁ max.	<i>r</i> ₀ max.	<i>r</i> _N min.	<i>D</i> ₂ max.	<i>f</i> max.	<i>d</i> _a ⁽²⁾ min.	<i>d</i> _a ⁽²⁾ max.	<i>D</i> _a ⁽²⁾ max.	<i>r</i> _a max.	<i>D</i> _x min.	<i>C</i> _Y max.	approx.
65	85	10	0.6	11 900	12 100	17.0	7 500	4 000	8 500	6813	ZZ	VV	DD	N	NR	1.70	1.3	82.9	0.4	0.5	89.4	1.12	69	69	81	0.6	91	2.5	0.128
	90	13	1	17 400	16 100	16.6	7 100	4 000	8 500	6913	ZZ	VV	DDU	N	NR	2.10	1.3	87.9	0.4	0.5	94.4	1.12	70	71.5	85	1	96	2.9	0.218
	100	11	0.6	20 500	18 700	16.5	6 700	—	8 000	16013	—	—	—	—	—	—	—	—	—	—	—	—	69	—	96	0.6	—	—	0.30
	100	18	1.1	32 000	25 200	15.8	7 500	4 000	9 000	* 6013	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	71.5	73	93.5	1	—	—	0.439
	100	18	1.1	30 500	25 200	15.8	6 700	4 000	8 000	6013	ZZ	VV	DDU	N	NR	2.87	2.7	96.8	0.6	0.5	106.5	2.46	71.5	73	93.5	1	108	5	0.439
	120	23	1.5	60 000	40 000	14.4	6 300	3 600	7 500	* 6213	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	73	80	112	1.5	—	—	1.0
	120	23	1.5	57 500	40 000	14.4	5 300	3 600	6 300	* 6213	ZZ	VV	DDU	N	NR	4.06	3.1	115.21	0.6	0.5	129.7	2.82	73	80	112	1.5	131.5	6.5	2.11
	140	33	2.1	97 500	60 000	13.2	5 600	3 400	6 700	* 6313	ZZ	VV	DDU	N	NR	4.90	3.1	135.23	0.6	0.5	149.7	2.82	76	85.5	129	2	—	—	2.11
	140	33	2.1	92 500	60 000	13.2	4 800	3 400	6 000	6313	ZZ	VV	DDU	N	NR	4.90	3.1	135.23	0.6	0.5	149.7	2.82	76	85.5	129	2	152	7.3	2.11
	90	10	0.6	12 100	12 700	17.2	6 700	3 800	8 000	6814	ZZ	VV	DD	N	NR	1.70	1.3	87.9	0.4	0.5	94.4	1.12	74	74.5	86	0.6	96	2.5	0.134
	100	16	1	23 700	21 200	16.3	6 300	3 600	7 500	6914	ZZ	VV	DDU	N	NR	2.50	1.3	97.9	0.4	0.5	104.4	1.12	75	77.5	95	1	106	3.3	0.349
	110	13	0.6	26 800	23 600	16.3	6 000	—	7 100	16014	—	—	—	—	—	—	—	—	—	—	—	—	74	—	106	0.6	—	—	0.441
70	110	20	1.1	40 000	31 000	15.6	7 100	3 600	8 500	* 6014	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	76.5	80.5	103.5	1	—	—	0.608
	110	20	1.1	38 000	31 000	15.6	6 000	3 600	7 100	6014	ZZ	VV	DDU	N	NR	2.87	2.7	106.81	0.6	0.5	116.6	2.46	76.5	80.5	103.5	1	118	5	0.608
	125	24	1.5	65 500	44 000	14.5	6 000	3 400	7 100	* 6214	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	78	84	117	1.5	—	—	1.09
	125	24	1.5	62 000	44 000	14.5	5 000	3 400	6 300	* 6214	ZZ	VV	DDU	N	NR	4.06	3.1	120.22	0.6	0.5	134.7	2.82	78	84	117	1.5	136.5	6.5	1.09
	150	35	2.1	109 000	68 000	13.2	5 300	3 200	6 300	* 6314	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	81	92	139	2	—	—	2.57
	150	35	2.1	104 000	68 000	13.2	4 500	3 200	5 300	6314	ZZ	VV	DDU	N	NR	4.90	3.1	145.24	0.6	0.5	159.7	2.82	81	92	139	2	162	7.3	2.57
	95	10	0.6	12 500	13 900	17.3	6 300	3 600	7 500	6815	ZZ	VV	DDU	N	NR	1.70	1.3	92.9	0.4	0.5	99.4	1.12	79	79.5	91	0.6	101	2.5	0.149
	105	16	1	24 400	22 600	16.5	6 000	3 400	7 100	6915	ZZ	VV	DDU	N	NR	2.50	1.3	102.6	0.4	0.5	110.7	1.12	80	82	100	1	112	3.3	0.364
	115	13	0.6	27 600	25 300	16.4	5 600	—	6 700	16015	—	—	—	—	—	—	—	—	—	—	—	—	79	—	111	0.6	—	—	0.463
	115	20	1.1	41 500	33 500	15.8	6 700	3 400	8 000	* 6015	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	81.5	85.5	108.5	1	—	—	0.649
	115	20	1.1	39 500	33 500	15.8	5 600	3 400	6 700	6015	ZZ	VV	DDU	N	NR	2.87	2.7	111.81	0.6	0.5	121.6	2.46	81.5	85.5	108.5	1	123	5	0.649
	130	25	1.5	69 500	49 500	14.7	5 600	3 200	6 700	* 6215	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	83	90	122	1.5	—	—	1.19
75	130	25	1.5	66 000	49 500	14.7	4 800	3 200	5 600	* 6215	ZZ	VV	DDU	N	NR	4.06	3.1	125.22	0.6	0.5	139.7	2.82	83	90	122	1.5	141.5	6.5	1.19
	160	37	2.1	119 000	77 000	13.2	4 800	2 800	6 000	* 6315	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	86	98.5	149	2	—	—	3.08
	160	37	2.1	113 000	77 000	13.2	4 300	2 800	5 000	6315	ZZ	VV	DDU	N	NR	4.90	3.1	155.22	0.6	0.5	169.7	2.82	86	98.5	149	2	172	7.3	3.08

Notes (1) For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.

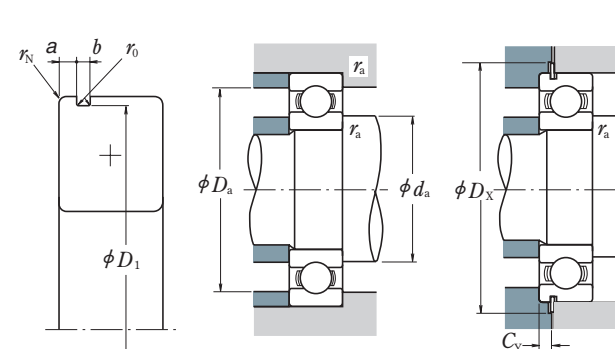
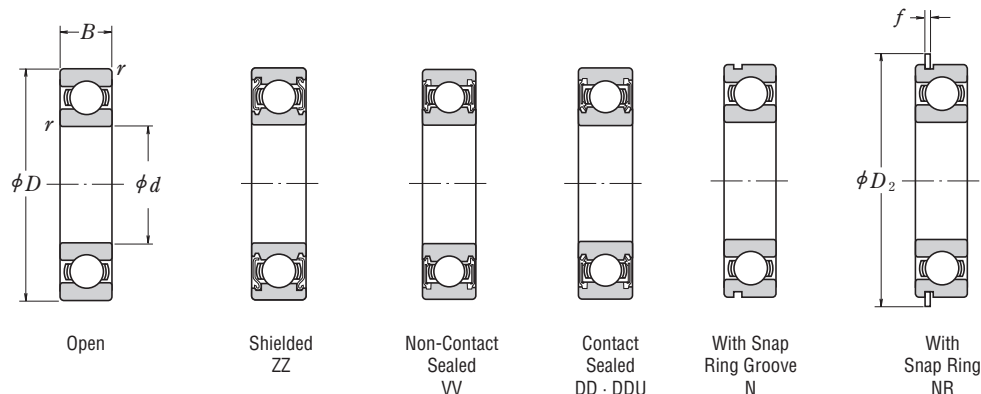
(2) When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.

Remarks

- Diameter Series 7 (extra-thin wall) bearings are also available; please contact NSK for details.
- When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
- Please consult NSK about the snap ring groove dimensions of Dimension Series 18 and 19 sealed and shielded bearings when the diameter is 50 mm or more.
- Bearings denoted by an asterisk (*) are NSKHPS™ deep groove ball bearings.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 80 – 90 mm



Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min ⁻¹)			Bearing Designations				With Snap Ring Groove	With Snap Ring	Snap Ring Groove Dimensions ⁽¹⁾ (mm)					Snap Ring ⁽¹⁾ Dimensions (mm)		Abutment and Fillet Dimensions (mm)					Mass (kg)		
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C_{0r}</i>		Grease		Oil	Open	Shielded	Sealed	<i>a</i> max.			<i>b</i> min.	<i>D</i> ₁ max.	<i>r</i> ₀ max.	<i>r</i> _N min.	<i>D</i> ₂ max.	<i>f</i> max.	<i>d</i> _a ⁽²⁾ min.	<i>D</i> _a ⁽²⁾ max.	<i>r</i> _a max.	<i>D</i> _x min.	<i>C</i> _Y max.	approx.			
						Open Z · ZZ V · VV	DU DDU	Open Z																						
80	100	10	0.6	12 700	14 500	17.4	6 000	3 400	7 100	6816	ZZ	VV	DDU	N	NR	1.7	1.3	97.9	0.4	0.5	104.4	1.12	84	84.5	96	0.6	106	2.5	0.151	
	110	16	1	25 000	24 000	16.6	5 600	3 200	6 700	6916	ZZ	VV	DDU	N	NR	2.5	1.3	107.6	0.4	0.5	115.7	1.12	85	87.5	105	1	117	3.3	0.391	
	125	14	0.6	32 000	29 600	16.4	5 300	—	6 300	16016	—	—	—	—	—	—	—	—	—	—	—	84	—	121	0.6	—	—	0.621		
	125	22	1.1	50 000	40 000	15.6	6 300	3 200	7 100	* 6016	ZZ	VV	DDU	N	NR	—	—	—	—	—	—	—	—	—	—	—	—	0.872		
	125	22	1.1	47 500	40 000	15.6	5 300	3 200	6 300	6016	ZZ	VV	DDU	N	NR	2.87	3.1	120.22	0.6	0.5	134.7	2.82	86.5	91	118.5	1	136.5	5.3	0.872	
	140	26	2	76 500	53 000	14.6	5 300	3 000	6 300	* 6216	ZZ	VV	DDU	—	—	—	—	—	—	—	—	89	95.5	131	2	—	—	1.42		
	140	26	2	72 500	53 000	14.6	4 500	3 000	5 300	* 6216	ZZ	VV	DDU	N	NR	4.90	3.1	135.23	0.6	0.5	149.7	2.82	89	95.5	131	2	152	7.3	1.42	
	170	39	2.1	129 000	86 500	13.3	4 500	2 800	5 600	* 6316	ZZ	VV	DDU	N	NR	—	—	—	—	—	—	91	104.5	159	2	—	—	3.67		
	170	39	2.1	123 000	86 500	13.3	4 000	2 800	4 800	6316	ZZ	VV	DDU	N	NR	5.69	3.5	163.65	0.6	0.5	182.9	3.1	91	104.5	159	2	185	8.4	3.67	
	85	110	13	1	18 700	20 000	17.1	5 600	3 200	6 700	6817	ZZ	VV	DDU	N	NR	2.10	1.3	107.6	0.4	0.5	115.7	1.12	90	90.5	105	1	117	2.9	0.263
		120	18	1.1	32 000	29 600	16.4	5 300	3 000	6 300	6917	ZZ	VV	DDU	N	NR	3.30	1.3	117.6	0.4	0.5	125.7	1.12	91.5	94.5	113.5	1	127	4.1	0.55
		130	14	0.6	33 000	31 500	16.5	5 000	—	6 000	16017	—	—	—	—	—	—	—	—	—	—	—	89	—	126	0.6	—	—	0.652	
130		22	1.1	52 000	43 000	15.8	6 000	3 000	7 100	* 6017	ZZ	VV	DDU	—	—	—	—	—	—	—	—	91.5	96	123.5	1	—	—	0.918		
130		22	1.1	49 500	43 000	15.8	5 000	3 000	6 000	6017	ZZ	VV	DDU	N	NR	2.87	3.1	125.22	0.6	0.5	139.7	2.82	91.5	96	123.5	1	141.5	5.3	0.918	
150		28	2	88 000	62 000	14.5	4 800	2 800	6 000	* 6217	ZZ	VV	DDU	—	—	—	—	—	—	—	—	94	102	141	2	—	—	1.76		
150		28	2	84 000	62 000	14.5	4 300	2 800	5 000	* 6217	ZZ	VV	DDU	N	NR	4.90	3.1	145.24	0.6	0.5	159.7	2.82	94	102	141	2	162	7.3	1.76	
180		41	3	139 000	97 000	13.3	4 300	2 600	5 000	* 6317	ZZ	VV	DDU	—	—	—	—	—	—	—	—	98	110.5	167	2.5	—	—	4.28		
180		41	3	133 000	97 000	13.3	3 800	2 600	4 500	6317	ZZ	VV	DDU	N	NR	5.69	3.5	173.66	0.6	0.5	192.9	3.1	98	110.5	167	2.5	195	8.4	4.28	
90		115	13	1	19 000	21 000	17.2	5 300	3 000	6 300	6818	ZZ	VV	DDU	N	NR	2.10	1.3	112.6	0.4	0.5	120.7	1.12	95	95.5	110	1	122	2.9	0.276
		125	18	1.1	33 000	31 500	16.5	5 000	2 800	6 000	6918	ZZ	VV	DDU	N	NR	3.30	1.3	122.6	0.4	0.5	130.7	1.12	96.5	98.5	118.5	1	132	4.1	0.585
		140	16	1	41 500	39 500	16.3	4 800	—	5 600	16018	—	—	—	—	—	—	—	—	—	—	—	95	—	135	1	—	—	0.873	
	140	24	1.5	61 000	50 000	15.6	5 600	2 800	6 300	* 6018	ZZ	VV	DDU	—	—	—	—	—	—	—	—	98	103	132	1.5	—	—	1.19		
	140	24	1.5	58 000	50 000	15.6	4 800	2 800	5 600	6018	ZZ	VV	DDU	N	NR	3.71	3.1	135.23	0.6	0.5	149.7	2.82	98	103	132	1.5	152	6.1	1.19	
	160	30	2	101 000	71 500	14.5	4 500	2 600	5 600	* 6218	ZZ	VV	DDU	—	—	—	—	—	—	—	—	99	107.5	151	2	—	—	2.18		
	160	30	2	96 000	71 500	14.5	4 000	2 600	4 800	* 6218	ZZ	VV	DDU	N	NR	4.90	3.1	155.22	0.6	0.5	169.7	2.82	99	107.5	151	2	172	7.3	2.18	
	190	43	3	150 000	107 000	13.3	4 000	2 400	4 800	* 6318	ZZ	VV	DDU	—	—	—	—	—	—	—	—	103	117	177	2.5	—	—	4.98		
	190	43	3	143 000	107 000	13.3	3 600	2 400	4 300	6318	ZZ	VV	DDU	N	NR	5.69	3.5	183.64	0.6	0.5	202.9	3.1	103	117	177	2.5	205	8.4	4.98	

Notes (1) For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.

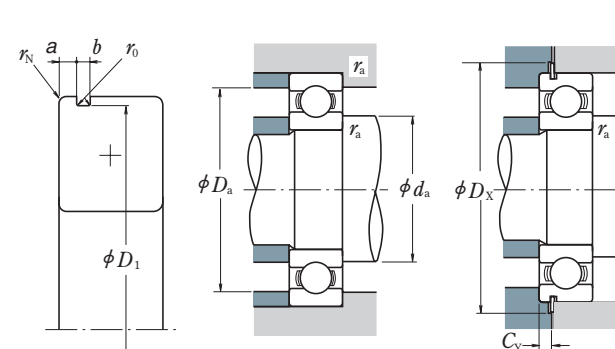
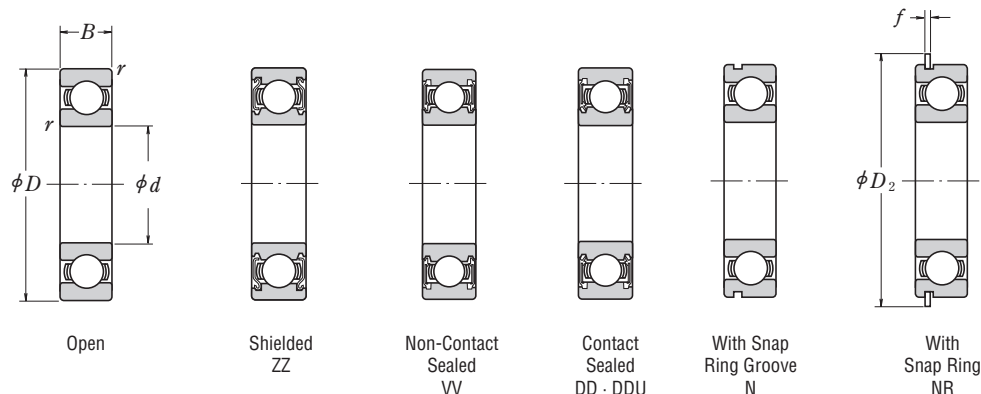
(2) When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.

Remarks

- Diameter Series 7 (extra-thin wall) bearings are also available; please contact NSK for details.
- When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
- Please consult NSK about the snap ring groove dimensions of Dimension Series 18 and 19 sealed and shielded bearings when the diameter is 50 mm or more.
- Bearings denoted by an asterisk (*) are NSKHPSTTM deep groove ball bearings.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 95 – 105 mm



Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min ⁻¹)			Bearing Designations				With Snap Ring Groove	With Snap Ring	Snap Ring Groove Dimensions (1) (mm)					Snap Ring (1) Dimensions (mm)		Abutment and Fillet Dimensions (mm)					Mass (kg)	
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C_{0r}</i>	<i>f</i> ₀	Grease		Oil	Open	Shielded	Sealed				<i>a</i> max.	<i>b</i> min.	<i>D</i> ₁ max.	<i>r</i> ₀ max.	<i>r</i> _N min.	<i>D</i> ₂ max.	<i>f</i> max.	<i>d</i> _a (2) min.	<i>D</i> _a (2) max.	<i>r</i> _a max.	<i>D</i> _x min.	<i>C</i> _Y max.	approx.	
							Open Z · ZZ V · VV	DU DDU	Open Z																				
95	120	13	1	19 300	22 000	17.2	5 000	2 800	6 000	6819	ZZ	VV	DD	N	NR	2.10	1.3	117.6	0.4	0.5	125.7	1.12	100	101.5	115	1	127	2.9	0.297
	130	18	1.1	33 500	33 500	16.6	4 800	2 800	5 600	6919	ZZ	VV	DDU	N	NR	3.30	1.3	127.6	0.4	0.5	135.7	1.12	101.5	103.5	123.5	1	137	4.1	0.601
	145	16	1	43 000	42 000	16.4	4 500	—	5 300	16019	—	—	—	—	—	—	—	—	—	—	—	—	100	—	140	1	—	—	0.904
	145	24	1.5	63 500	54 000	15.8	5 300	2 600	6 000	* 6019	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	103	108.5	137	1.5	—	—	1.23
	145	24	1.5	60 500	54 000	15.8	4 500	2 600	5 300	6019	ZZ	VV	DDU	N	NR	3.71	3.1	140.23	0.6	0.5	154.7	2.82	103	108.5	137	1.5	157	6.1	1.23
	170	32	2.1	114 000	82 000	14.4	4 300	2 600	5 000	* 6219	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	106	114	159	2	—	—	2.64
	170	32	2.1	109 000	82 000	14.4	3 800	2 600	4 500	* 6219	ZZ	VV	DDU	N	NR	5.69	3.5	163.65	0.6	0.5	182.9	3.1	106	114	159	2	185	8.4	2.64
	200	45	3	160 000	119 000	13.3	3 400	2 400	4 300	* 6319	ZZ	VV	DDU	N	NR	5.69	3.5	193.65	0.6	0.5	212.9	3.1	108	123.5	187	2.5	—	—	5.76
	200	45	3	153 000	119 000	13.3	3 000	2 400	3 600	6319	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	108	123.5	187	2.5	215	8.4	5.76
	125	13	1	19 600	23 000	17.3	4 800	2 800	5 600	6820	ZZ	VV	DD	N	NR	2.10	1.3	122.6	0.4	0.5	130.7	1.12	105	105.5	120	1	132	2.9	0.31
	140	20	1.1	43 000	42 000	16.4	4 500	2 600	5 300	6920	ZZ	VV	DDU	N	NR	3.30	1.9	137.6	0.6	0.5	145.7	1.7	106.5	111	133.5	1	147	4.7	0.828
	150	16	1	42 500	42 000	16.5	4 300	—	5 300	16020	—	—	—	—	—	—	—	—	—	—	—	—	105	—	145	1	—	—	0.945
150	24	1.5	63 000	54 000	15.9	5 000	2 600	6 000	* 6020	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	108	112.5	142	1.5	—	—	1.29	
150	24	1.5	60 000	54 000	15.9	4 300	2 600	5 300	6020	ZZ	VV	DDU	N	NR	3.71	3.1	145.24	0.6	0.5	159.7	2.82	108	112.5	142	1.5	162	6.1	1.29	
180	34	2.1	128 000	93 000	14.4	4 000	2 400	4 800	* 6220	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	111	121.5	169	2	—	—	3.17	
180	34	2.1	122 000	93 000	14.4	3 600	2 400	4 300	6220	ZZ	VV	DDU	N	NR	5.69	3.5	173.66	0.6	0.5	192.9	3.1	111	121.5	169	2	195	8.4	3.17	
215	47	3	173 000	141 000	13.2	2 800	2 200	3 400	6320	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	—	113	133	202	2.5	—	—	7.04
130	13	1	19 800	23 900	17.4	4 800	2 600	5 600	6821	ZZ	VV	DDU	N	NR	2.10	1.3	127.6	0.4	0.5	135.7	1.12	110	110.5	125	1	137	2.9	0.324	
145	20	1.1	42 500	42 000	16.5	4 300	—	5 300	6921	ZZ	VV	—	N	NR	3.30	1.9	142.6	0.6	0.5	150.7	1.7	111.5	116	138.5	1	152	4.7	0.856	
160	18	1	52 000	50 500	16.3	4 000	—	4 800	16021	—	—	—	—	—	—	—	—	—	—	—	—	—	110	—	155	1	—	—	1.24
160	26	2	76 000	66 000	15.8	4 500	2 400	5 600	* 6021	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	—	114	120	151	2	—	—	1.58
160	26	2	72 500	66 000	15.8	4 000	2 400	4 800	6021	ZZ	VV	DDU	N	NR	3.71	3.1	155.22	0.6	0.5	169.7	2.82	114	120	151	2	172	6.1	1.58	
190	36	2.1	140 000	105 000	14.4	3 800	2 200	4 500	* 6221	ZZ	VV	DDU	—	—	—	—	—	—	—	—	—	—	116	127.5	179	2	—	—	3.79
190	36	2.1	133 000	105 000	14.4	3 400	2 200	4 000	6221	ZZ	VV	DDU	N	NR	5.69	3.5	183.64	0.6	0.5	202.9	3.1	116	127.5	179	2	205	8.4	3.79	
225	49	3	184 000	154 000	13.2	2 600	2 000	3 200	6321	ZZ	—	DDU	—	—	—	—	—	—	—	—	—	—	118	138	212	2.5	—	—	8.09

Notes (1) For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.

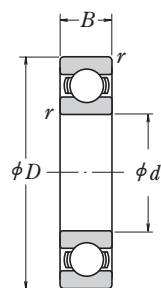
(2) When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.

Remarks

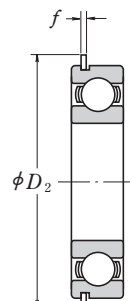
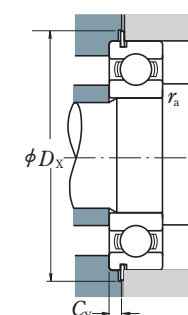
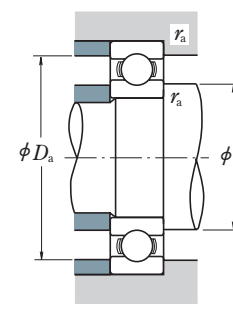
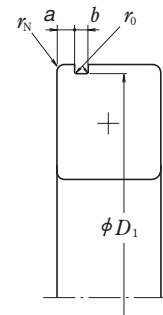
1. Diameter Series 7 (extra-thin wall) bearings are also available; please contact NSK for details.
2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
3. Please consult NSK about the snap ring groove dimensions of Dimension Series 18 and 19 sealed and shielded bearings when the diameter is 50 mm or more.
4. Bearings denoted by an asterisk (*) are NSKHPSTTM deep groove ball bearings.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 110 – 150 mm



Open

Shielded
ZZ · ZTSNon-Contact
Sealed
VVContact
Sealed
DD · DDUWith Snap
Ring Groove
NWith Snap
Ring
NR

Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

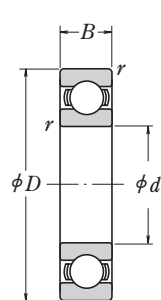
$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min ⁻¹)			Bearing Designations				With Snap Ring Groove	With Snap Ring	Snap Ring Groove Dimensions ⁽¹⁾ (mm)					Snap Ring ⁽¹⁾ Dimensions (mm)		Abutment and Fillet Dimensions (mm)					Mass (kg)	
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C_{0r}</i>		Grease		Oil	Open	Shielded	Sealed	Open			Shielded	Sealed	<i>a</i> max.	<i>b</i> min.	<i>D</i> ₁ max.	<i>r</i> ₀ max.	<i>r</i> _N min.	<i>D</i> ₂ max.	<i>f</i> max.	<i>d</i> _a ⁽²⁾ min.	<i>d</i> _a ⁽²⁾ max.	<i>D</i> _a ⁽²⁾ max.	<i>r</i> _a max.	<i>D</i> _x min.
110	140	16	1	28 100	32 500	17.1	4 300	2 400	5 300	6822	ZZ	VV	DDU	N	NR	2.50	1.9	137.6	0.6	0.5	145.7	1.7	115	117	135	1	147	3.9	0.497
	150	20	1.1	43 500	44 500	16.6	4 300	2 400	5 000	6922	ZZ	VV	DDU	N	NR	3.30	1.9	147.6	0.6	0.5	155.7	1.7	116.5	121	143.5	1	157	4.7	0.893
	170	19	1	57 500	56 500	16.3	3 800	—	4 500	16022	—	—	—	—	—	—	—	—	—	—	—	115	—	165	1	—	—	—	1.51
	170	28	2	89 000	73 000	15.5	4 500	2 200	5 300	* 6022	ZZ	VV	DDU	—	—	—	—	—	—	—	—	119	124.5	161	2	—	—	—	1.94
	170	28	2	85 000	73 000	15.5	3 800	2 200	4 500	6022	ZZ	VV	DDU	N	NR	3.71	3.5	163.65	0.6	0.5	182.9	3.1	119	124.5	161	2	185	6.4	1.94
	200	38	2.1	144 000	117 000	14.3	2 800	2 200	3 400	6222	ZZ	VV	DDU	N	NR	5.69	3.5	193.65	0.6	0.5	212.9	3.1	121	134	189	2	215	8.4	4.45
	240	50	3	205 000	179 000	13.2	2 400	—	3 000	6322	ZZ	—	—	—	—	—	—	—	—	—	—	—	123	147	227	2.5	—	—	9.51
120	150	16	1	28 900	35 500	17.3	4 000	2 200	4 800	6824	ZZ	VV	DD	N	NR	2.50	1.9	147.6	0.6	0.5	155.7	1.7	125	127	145	1	157	3.9	0.537
	165	22	1.1	53 000	54 000	16.5	3 800	—	4 500	6924	ZZ	—	—	N	NR	3.70	1.9	161.8	0.6	0.5	171.5	1.7	126.5	132	158.5	1	173	5.1	1.21
	180	19	1	56 500	57 500	16.5	3 600	—	4 300	16024	—	—	—	—	—	—	—	—	—	—	—	125	—	175	1	—	—	—	1.6
	180	28	2	92 500	80 000	15.7	4 000	2 200	4 800	* 6024	ZZ	VV	DDU	—	—	—	—	—	—	—	—	129	134.5	171	2	—	—	—	2.08
	180	28	2	88 000	80 000	15.7	3 600	2 200	4 300	6024	ZZ	VV	DDU	N	NR	3.71	3.5	173.66	0.6	0.5	192.9	3.1	129	134.5	171	2	195	6.4	2.08
	215	40	2.1	155 000	131 000	14.4	2 600	2 000	3 200	6224	ZZ	VV	DDU	—	—	—	—	—	—	—	—	131	146	204	2	—	—	—	5.29
	260	55	3	207 000	185 000	13.5	2 200	1 800	2 800	6324	ZZS	—	DDU	—	—	—	—	—	—	—	—	133	161	247	2.5	—	—	—	12.5
130	165	18	1.1	37 000	44 000	17.1	3 600	2 000	4 300	6826	ZZS	VV	DD	N	NR	3.30	1.9	161.8	0.6	0.5	171.5	1.7	136.5	138	158.5	1	173	4.7	0.758
	180	24	1.5	65 000	67 500	16.5	3 400	—	4 000	6926	ZZ	—	—	N	NR	3.70	1.9	176.8	0.6	0.5	186.5	1.7	138	144	172	1.5	188	5.1	1.57
	200	22	1.1	75 500	77 500	16.4	3 000	—	3 600	16026	—	—	—	—	—	—	—	—	—	—	—	136.5	—	193.5	1	—	—	—	2.4
	200	33	2	106 000	101 000	15.8	3 000	1 900	3 600	6026	ZZ	—	DDU	N	NR	5.69	3.5	193.65	0.6	0.5	212.9	3.1	139	148.5	191	2	215	8.4	3.26
	230	40	3	167 000	146 000	14.5	2 400	—	3 000	6226	ZZ	—	—	—	—	—	—	—	—	—	—	143	157	217	2.5	—	—	—	5.96
	280	58	4	229 000	214 000	13.6	2 200	—	2 600	6326	ZZS	—	—	—	—	—	—	—	—	—	—	146	175	264	3	—	—	—	15.2
	280	58	4	229 000	214 000	13.6	2 200	—	2 600	6326	ZZS	—	—	—	—	—	—	—	—	—	—	146	175	264	3	—	—	—	15.2
140	175	18	1.1	38 500	48 000	17.3	3 400	1 900	4 000	6828	ZZ	VV	DDU	N	NR	3.30	1.9	171.8	0.6	0.5	181.5	1.7	146.5	148.5	168.5	1	183	4.7	0.832
	190	24	1.5	66 500	72 000	16.6	3 200	—	3 800	6928	ZZS	VV	—	N	NR	3.70	1.9	186.8	0.6	0.5	196.5	1.7	148	153.5	182	1.5	198	5.1	1.67
	210	22	1.1	77 500	82 500	16.5	2 800	—	3 400	16028	—	—	—	—	—	—	—	—	—	—	—	146.5	—	203.5	1	—	—	—	2.84
	210	33	2	110 000	109 000	16.0	2 800	1 800	3 400	6028	ZZ	—	DDU	—	—	—	—	—	—	—	—	149	158.5	201	2	—	—	—	3.48
	250	42	3	166 000	150 000	14.9	2 200	1 700	2 800	6228	ZZS	—	DDU	—	—	—	—	—	—	—	—	153	171.5	237	2.5	—	—	—	7.68
	300	62	4	253 000	246 000	13.6	2 000	—	2 400	6328	ZZS	—	—	—	—	—	—	—	—	—	—	156	187	284	3	—	—	—	18.5
	300	62	4	253 000	246 000	13.6	2 000	—	2 400	6328	ZZS	—	—	—	—	—	—	—	—	—	—	156	187	284	3	—	—	—	18.5
150	190	20	1.1	47 500	58 500	17.1	3 200	1 800	3 800	6830	ZZ	VV	DDU	N	NR	3.30	1.9	186.8	0.6	0.5	196.5	1.7	156.5	160	183.5	1	198	4.7	1.15
	210	28	2	85 000	90 500	16.5	2 600	1 700	3 200	6930	ZZS	—	DDU	—	—	—	—	—	—	—	—	159	166	201	2	—	—	—	3.01
	225	24	1.1	84 000	91 000	16.6	2 600	—	3 000	16030	—	—	—	—	—	—	—	—	—	—	—	156.5	—	218.5	1	—	—	—	3.62
	225	35	2.1	126 000	126 000	15.9	2 600	1 700	3 000	6030	ZZ	VV	DDU	—	—	—	—	—	—	—	—	161	170	214	2	—	—	—	4.24
	270	45	3	176 000	168 000	15.1	2 000	—	2 600	6230	ZZS	—	—	—	—	—	—	—	—	—	—	163	186	257	2.5	—	—	—	10
	320	65	4	274 000	284 000	13.9	1 800	—	2 200	6330	ZZS	—	—	—	—	—	—	—	—	—	—	166	203	304	3	—	—	—	22.7
	320	65	4	274 000	284 000	13.9	1 800	—	2 200	6330	ZZS	—	—	—	—	—	—	—	—	—	—	166	203	304	3	—	—	—	22.7

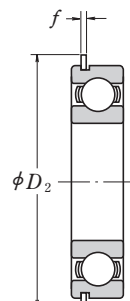
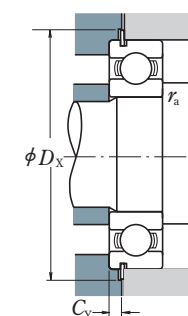
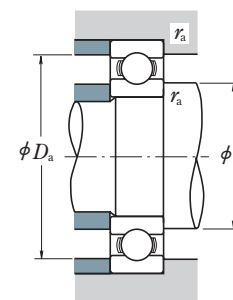
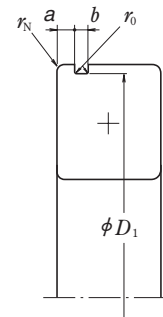
Notes ⁽¹⁾ For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.⁽²⁾ When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.Remarks 1. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
2. Please consult NSK about the snap ring groove dimensions of Dimension Series 18 and 19 sealed and shielded bearings when the diameter is 50 mm or more.
3. Bearings denoted by an asterisk (*) are NSKHPST™ deep groove ball bearings.

SINGLE-ROW DEEP GROOVE BALL BEARINGS

Bore Diameter 160 mm



Open

Shielded
ZZ · ZTSNon-Contact
Sealed
VVContact
Sealed
DD · DDUWith Snap
Ring Groove
NWith Snap
Ring
NR

Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$\frac{f_0 F_a}{C_{0r}}$	e	$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
		X	Y	X	Y
0.172	0.19	1	0	0.56	2.30
0.345	0.22	1	0	0.56	1.99
0.689	0.26	1	0	0.56	1.71
1.03	0.28	1	0	0.56	1.55
1.38	0.30	1	0	0.56	1.45
2.07	0.34	1	0	0.56	1.31
3.45	0.38	1	0	0.56	1.15
5.17	0.42	1	0	0.56	1.04
6.89	0.44	1	0	0.56	1.00

Static Equivalent Load

$$\frac{F_a}{F_r} > 0.8, P_0 = 0.6F_r + 0.5F_a$$

$$\frac{F_a}{F_r} \leq 0.8, P_0 = F_r$$

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min ⁻¹)			Bearing Designations				Snap Ring Groove Dimensions (1) (mm)					Snap Ring (1) Dimensions		Abutment and Fillet Dimensions (mm)					Mass (kg)			
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C</i> _r	<i>C</i> _{0r}	<i>f</i> ₀	Grease		Oil	Open	Shielded	Sealed	With Snap Ring Groove	With Snap Ring	<i>a</i>	<i>b</i>	<i>D</i> ₁	<i>r</i> ₀	<i>r</i> _N	<i>D</i> ₂ (mm)	<i>f</i>	<i>d</i> _a ⁽²⁾ min.	<i>D</i> _a ⁽²⁾ max.	<i>r</i> _a max.	<i>D</i> _x min.	<i>C</i> _Y max.	approx.		
						Open Z · ZZ V · VV	DU DDU	Open Z	max.						min.	max.	max.	min.	max.									max.	max.
160	200	20	1.1	48 500	61 000	17.2	2 600	1 700	3 200	6832	ZZS	VV	DDU	N	NR	3.30	1.9	196.8	0.6	0.5	206.5	1.7	166.5	170.5	193.5	1	208	4.7	1.23
	220	28	2	87 000	96 000	16.6	2 600	1 600	3 000	6932	ZZS	—	DDU	—	—	—	—	—	—	—	—	169	176	211	2	—	—	2.71	
	240	25	1.5	99 000	108 000	16.5	2 400	—	2 800	16032	—	—	—	—	—	—	—	—	—	—	—	168	—	232	1.5	—	—	4.2	
	240	38	2.1	137 000	135 000	15.9	2 400	1 600	2 800	6032	ZZ	—	DDU	—	—	—	—	—	—	—	—	171	181.5	229	2	—	—	5.15	
	290	48	3	185 000	186 000	15.4	1 900	—	2 400	6232	ZZS	—	—	—	—	—	—	—	—	—	—	173	202	277	2.5	—	—	12.8	
	340	68	4	278 000	287 000	13.9	1 700	—	2 000	6332	ZZS	—	—	—	—	—	—	—	—	—	—	—	176	215.5	324	3	—	—	26.2

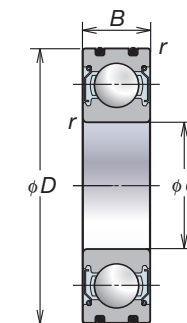
Notes (1) For tolerances of snap ring grooves and snap ring dimensions, refer to Pages A116 to A119.

(2) When heavy axial loads are applied, d_a and D_a can be adjusted up to the shoulder diameter of the races. Please consult NSK for details.

Remarks 1. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
2. Please consult NSK about the snap ring groove dimensions of Dimension Series 18 and 19 sealed and shielded bearings when the diameter is 50 mm or more.

Bore Diameter 10 – 100 mm

Boundary Dimensions (mm)			Basic Load Ratings (N)		Recommended Fits ⁽¹⁾	Bearing Designations			
<i>d</i>	<i>D</i>	<i>B</i>	<i>C_r</i>	<i>C_{0r}</i>		Basic Designation (Open)	Shields	Contact Seal ⁽²⁾	Non-Contact Seal
10	26	8	4 550	1 970	H7 or G6	6000	ZZ	DDU	VV
	30	9	5 100	2 390		6200	ZZ	DDU	VV
	35	11	8 100	3 450		6300	ZZ	DDU	VV
12	28	8	5 100	2 370		6001	ZZ	DDU	VV
	32	10	6 800	3 050		6201	ZZ	DDU	VV
	37	12	9 700	4 200		6301	ZZ	DDU	VV
15	32	9	5 600	2 830		6002	ZZ	DDU	VV
	35	11	7 650	3 750		6202	ZZ	DDU	VV
	42	13	11 400	5 450		6302	ZZ	DDU	VV
17	35	10	6 000	3 250		6003	ZZ	DDU	VV
	40	12	9 550	4 800		6203	ZZ	DDU	VV
	47	14	13 600	6 650		6303	ZZ	DDU	VV
20	42	12	9 400	5 000		6004	ZZ	DDU	VV
	47	14	12 800	6 600		6204	ZZ	DDU	VV
	52	15	15 900	7 900		6304	ZZ	DDU	VV
25	47	12	10 100	5 850		6005	ZZ	DDU	VV
	52	15	14 000	7 850		6205	ZZ	DDU	VV
	62	17	20 600	11 200		6305	ZZ	DDU	VV
30	55	13	13 200	8 300		6006	ZZ	DDU	VV
	62	16	19 500	11 300		6206	ZZ	DDU	VV
	72	19	26 700	15 000		6306	ZZ	DDU	VV
35	62	14	16 000	10 300		6007	ZZ	DDU	VV
	72	17	25 700	15 300		6207	ZZ	DDU	VV
	80	21	33 500	19 200		6307	ZZ	DDU	VV
40	68	15	16 800	11 500		6008	ZZ	DDU	VV
	80	18	29 100	17 900		6208	ZZ	DDU	VV
	90	23	40 500	24 000		6308	ZZ	DDU	VV
45	75	16	20 900	15 200		6009	ZZ	DDU	VV
	85	19	31 500	20 400		6209	ZZ	DDU	VV
	100	25	53 000	32 000		6309	ZZ	DDU	VV
50	80	16	21 800	16 600		6010	ZZ	DDU	VV
	90	20	35 000	23 200		6210	ZZ	DDU	VV
	110	27	62 000	38 500		6310	ZZ	DDU	VV
55	90	18	28 300	21 200		6011	ZZ	DDU	VV
	100	21	43 500	29 300		6211	ZZ	DDU	VV
	120	29	71 500	44 500		6311	ZZ	DDU	VV
60	95	18	29 500	23 200		6012	ZZ	DDU	VV
	110	22	52 500	36 000		6212	ZZ	DDU	VV
	130	31	82 000	52 000		6312	ZZ	DDU	VV
65	100	18	30 500	25 200		6013	ZZ	DDU	VV
	120	23	57 500	40 000		6213	ZZ	DDU	VV
	140	33	92 500	60 000		6313	ZZ	DDU	VV
70	110	20	38 000	31 000		6014	ZZ	DDU	VV
	125	24	62 000	44 000		6214	ZZ	DDU	VV
	150	35	104 000	68 000		6314	ZZ	DDU	VV
75	115	20	39 500	33 500		6015	ZZ	DDU	VV
	130	25	66 000	49 500		6215	ZZ	DDU	VV
80	125	22	47 500	40 000		6016	ZZ	DDU	VV
	140	26	72 500	53 000		6216	ZZ	DDU	VV
85	130	22	49 500	43 000		6017	ZZ	DDU	VV
	150	28	84 000	62 000		6217	ZZ	DDU	VV
90	140	24	58 000	50 000		6018	ZZ	DDU	VV
95	145	24	60 500	54 000		6019	ZZ	DDU	VV
100	150	24	60 000	54 000		6020	ZZ	DDU	VV



Notes ⁽¹⁾ Although recommended fits are H7 or G6, G6 is recommended when used under conditions that prioritize insertion under light preload.

C 046 ⁽²⁾ Low-contact seals are available for sealed bearings; contact NSK for details.

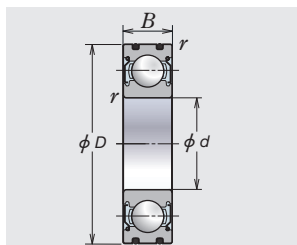
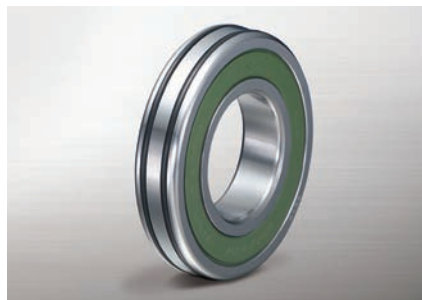
■ Features of Bearings for Pumps

Creep-Free Bearings™

Applications • Water/Sewage and Irrigation, etc.

Outer ring creep prevention is significantly improved by O-ring tension in the housing. Standard principal dimensions are maintained to eliminate the need for re-machining housings, thereby reducing costs.

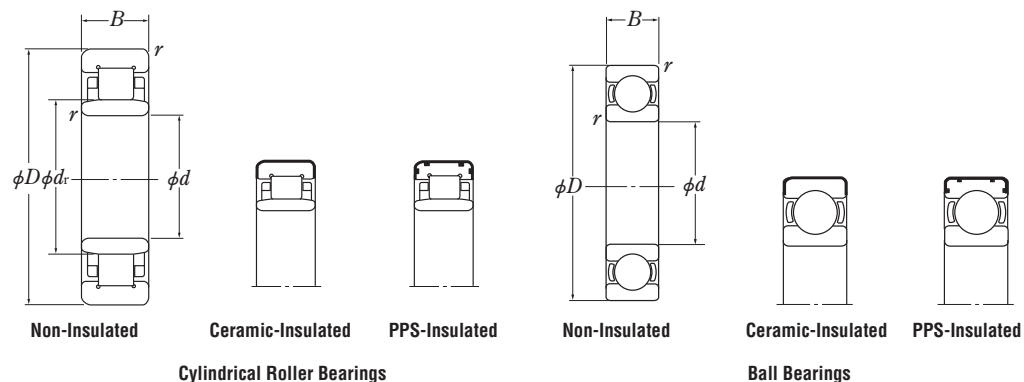
(Recommended fits: G6 or H7)



Bearing Designation	Boundary Dimensions (mm)				Basic Load Ratings (N)	
	<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> (min.)	<i>C</i> _r (dynamic)	<i>C</i> _{0r} (static)
6000	10	26	8	0.3	4 550	1 970
6200	10	30	9	0.6	5 100	2 390
6300	10	35	11	0.6	8 100	3 450
6001	12	28	8	0.3	5 100	2 370
6201	12	32	10	0.6	6 800	3 050
6301	12	37	12	1.0	9 700	4 200
6002	15	32	9	0.3	5 600	2 830
6202	15	35	11	0.6	7 650	3 750
6302	15	42	13	1.0	11 400	5 450
6003	17	35	10	0.3	6 000	3 250
6203	17	40	12	0.6	9 550	4 800
6303	17	47	14	1.0	13 600	6 650
6004	20	42	12	0.6	9 400	5 000
6204	20	47	14	1.0	12 800	6 600
6304	20	52	15	1.1	15 900	7 900
6005	25	47	12	0.6	10 100	5 850
6205	25	52	15	1.0	14 000	7 850
6305	25	62	17	1.1	20 600	11 200
6006	30	55	13	1.0	13 200	8 300
6206	30	62	16	1.0	19 500	11 300
6306	30	72	19	1.1	26 700	15 000
6007	35	62	14	1.0	16 000	10 300
6207	35	72	17	1.1	25 700	15 300
6307	35	80	21	1.5	33 500	19 200
6008	40	68	15	1.0	16 800	11 500
6208	40	80	18	1.1	29 100	17 900
6308	40	90	23	1.5	40 500	24 000
6009	45	75	16	1.0	20 900	15 200
6209	45	85	19	1.1	31 500	20 400
6309	45	100	25	1.5	53 000	32 000

■ Traction Motor Bearings

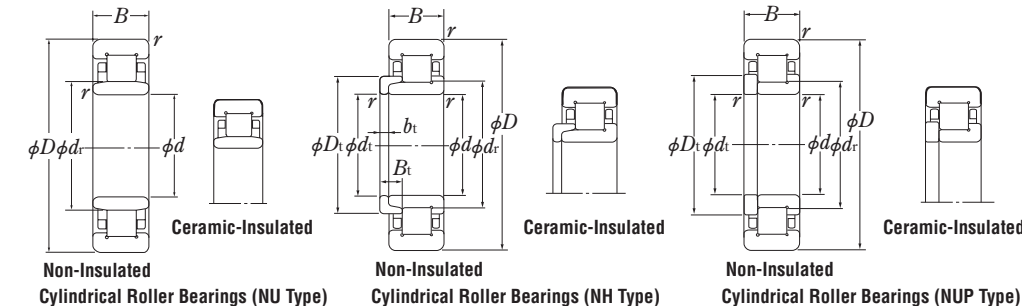
Bearings for Electric Car Traction Motors



Loaded Side, Cylindrical Roller Bearing	Dimensions (mm)					Non-Loaded Side, Ball Bearing	Dimensions (mm)		
	<i>d</i>	<i>D</i>	<i>B</i>	<i>d_r</i>	<i>r</i> (min.)		<i>d</i>	<i>D</i>	<i>B</i>
NU210E⁽¹⁾	50	90	20	59.5	1.1	6016	80	125	22
NU212	60	110	22	73.5	1.5	6310	50	110	27
NU312	60	130	31	77.0	2.1	6310	50	110	27
NU213	65	120	23	79.6	1.5	6310	50	110	27
NU313	65	140	33	83.5	2.1	6311	55	120	29
NU214	70	125	24	84.5	1.5	6310	50	110	27
						6311	55	120	29
NU314	70	150	35	90.0	2.1	6311	55	120	29
NU215	75	130	25	88.5	1.5	6311	55	120	29
						6312	60	130	31
NU315	75	160	37	95.5	2.1	6311	55	120	29
						6312	60	130	31
						6314	70	150	35
NU415	75	190	45	104.5	3.0	6313	65	140	33
NU216	80	140	26	95.3	2.0	6312	60	130	31
NU316	80	170	39	103.0	2.1	6312	60	130	31
NU416	80	200	48	110.0	3.0	6313	65	140	33
NU217	85	150	28	101.8	2.0	6217	85	150	28
NU218	90	160	30	107.0	2.0	6218	90	160	30
NU219	95	170	32	113.5	2.1	6219	95	170	32

Note ⁽¹⁾ E: High-Capacity

Bearings for Electric Locomotive Traction Motors



2xx Series (Free End-Bearings)

Boundary Dimensions (mm)					Basic Designation	Internal Design ⁽¹⁾	Basic Dynamic Load Rating (N)	Basic Static Load Rating (N)
<i>d</i>	<i>D</i>	<i>B</i>	<i>d_r</i>	<i>r</i> (min.)				
120	215	40	143.5	2.1	NU224	E	320 000	395 000
130	230	40	153.5	3.0	NU226	E	345 000	425 000

Note ⁽¹⁾ E: High-capacity type

3xx Series (Free End-Bearings)

Boundary Dimensions (mm)					Basic Designation	Internal Design ⁽¹⁾	Basic Dynamic Load Rating (N)	Basic Static Load Rating (N)
<i>d</i>	<i>D</i>	<i>B</i>	<i>d_r</i>	<i>r</i> (min.)				
90	190	43	113.5	3	NU318	E	315 000	355 000
100	215	47	127.5	3	NU320	E	380 000	425 000
110	240	50	143.0	3	NU322	E	425 000	485 000
120	260	55	154.0	3	NU324	E	530 000	610 000
130	280	58	165.0	4	NU326	B	655 000	795 000
			167.0			E	615 000	735 000
140	300	62	180.0	4	NU328	E	665 000	795 000
			178.0			F	705 000	860 000
150	320	65	193.0	4	NU330	E	760 000	920 000
			193.0			EA	715 000	855 000
			190.5			J	800 000	985 000
			190.0			L	790 000	970 000
160	340	68	204.0	4	NU332	E	860 000	1 050 000
180	380	75	231.0	4	NU336	E	985 000	1 230 000

Note ⁽¹⁾ E, EA: High-capacity type B, F, J, L: Special specification

3xx Series (NH Type, NUP Type)

Dimensions (mm)								Basic Designation	Internal Design ⁽¹⁾	Basic Dynamic Load Rating (N)	Basic Static Load Rating (N)
<i>d, d_t</i>	<i>D</i>	<i>B</i>	<i>d_r</i>	<i>D_t</i>	<i>B_t</i>	<i>b_t</i>	<i>r</i> (min.)				
80	170	39	101.0	111.8	17.0	11.0	2.1	NH316	—	256 000	282 000
90	190	43	115.0	125.0	21.0	12.0	3.0	NH318	E	240 000	265 000
			113.5	124.2	18.5				E	315 000	355 000
90	190	43	115.0	125.0	—	—	3.0	NUP318	E	240 000	265 000
			113.5	124.2					B	315 000	355 000
100	215	47	129.5	140.5	22.5	13.0	3.0	NH320	A	310 000	355 000
			129.5	140.5	22.5				B	310 000	355 000
			127.5	139.0	20.5				E	380 000	425 000
110	240	50	143.0	155.0	22.0	14.0	3.0	NH322	E	425 000	485 000
120	260	55	154.0	168.5	23.5	14.0	3.0	NH324	—	475 000	550 000
130	280	58	167.0	182.0	24.0	14.0	4.0	NH326	—	560 000	665 000
			181.0						E	615 000	735 000
140	300	62	180.0	196.0	26.0	15.0	4.0	NH328	—	615 000	745 000

Note ⁽¹⁾ E: High-capacity type A, B: Special specification