Deep Groove Ball Bearings

B 004

1. DEEP GROOVE BALL BEARINGS

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BEARINGS TABLE

SINGLE-ROW DEEP GROOVE BALL BEARINGS

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	10 - 100 mm	B 046

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	10 - 90 mm	B 048

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	Bore Dia.	Page
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Deep Groove Ball Bearings

DESIGN, TYPES, AND FEATURES

SINGLE-ROW DEEP GROOVE BALL BEARINGS

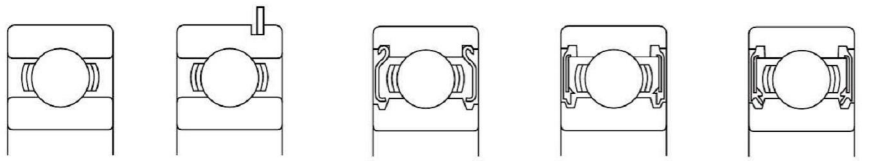
Single-Row Deep Groove Ball Bearings are classified into the types shown below.

The proper amount of good quality grease is packed in shielded and sealed ball bearings. A comparison of the features of each type is shown in Table 1.

Table 1 Features of Sealed Ball Bearings

Type	Shielded Type (ZZ Type)	Non-Contact Rubber Sealed Type (VV Type)	Contact Rubber Sealed Type (DDU Type)
Torque	Low	Low	Higher than ZZ, VV types due to contact seal
Speed capability	Good	Good	Limited by contact seals
Grease sealing effectiveness	Good	Better than ZZ type	A little better than VV type
Dust resistance	Good	Better than ZZ type (usable in moderately dusty environment)	Best (usable even in very dusty environment)
Water resistance	Not suitable	Not suitable	Good (usable even if fluid is splashed on bearing)
Operating temperature (1)	−10 to +110°C	−10 to +110°C	−10 to +100°C

Note (1) The above temperature range applies to standard bearings. By using cold or heat resistant grease and changing the type of rubber, the operating temperature range can be extended. For such applications, please contact NSK.



Open Type | With Snap Ring | Shielded Type (ZZ Type) | Non-Contact Rubber Sealed Type (VV Type) | Contact Rubber Sealed Type (DDU Type)

For deep groove ball bearings, pressed cages are usually used. For big bearings, machined brass cages are used. (Refer to Table 2). Machined cages are also used for high speed applications.

Table 2 Standard Cages for Deep Groove Ball Bearings

Series	Pressed Steel Cages	Machined Brass Cages
68	6800 - 6838	6840 - 68/800
69	6900 - 6936	6938 - 69/800
160	16001 - 16026	16028 - 16064
60	6000 - 6040	6044 - 60/670
62	6200 - 6240	6244 - 6272
63	6300 - 6332	6334 - 6356

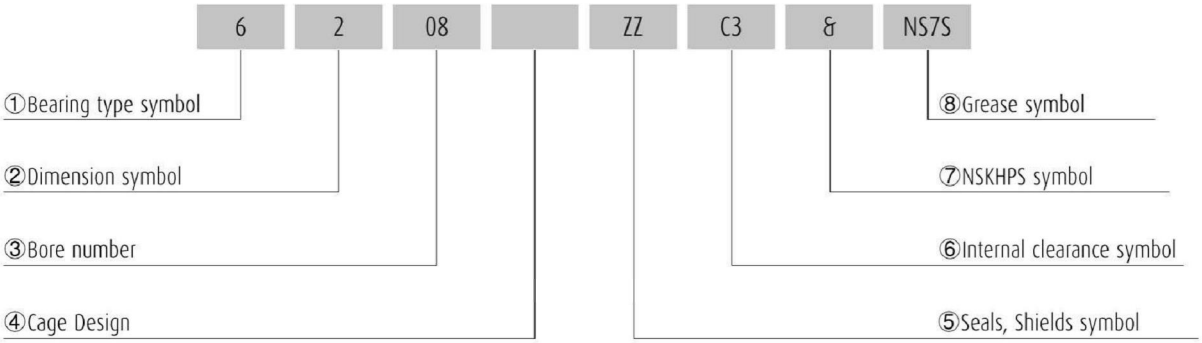
Table 3 Standard Cages for Double Row Deep Grove Ball Bearings

Series	Polyamid Cages
42xxB	4200B - 4218B
43xxB	4302B - 4315B

Formulation of Bearing Numbers

Single-Row Deep Groove Ball Bearings

Bearing number example:



①Bearing type symbol	6 : Single-Row Deep Groove Ball Bearings : 4 Double Row Deep Groove Ball Bearing
②Dimension symbol	2 : 02 Series, 3 : 03 Series, 9 : 19 Series, 0 : 10 Series
③Bore number	Less than 03, Bearing bore 00 : 10mm, 01 : 12mm, 02 : 15mm, 03 : 17mm Over 04, Bearing bore Bore number X 5 (mm)
④Cage Design	BTNG = Polyiamid Cage
⑤Seals, Shields symbol	ZZ : Shield on Both Side , DDU : Contact Rubber Seal on Both Side, VV: Non-Contact Rubber Sealed on Both Side
⑥Internal clearance symbol	Omitted : CN clearance*1, C3 : Clearance greater than CN, C4 : Clearance greater than C3, CM : For Electric Motors*1
⑦NSKHPS symbol	& : NSKHPS Bearings
⑧Grease symbol	NS7 : NS HI-LUBE

*1 The CM clearance can be used in substitute of the CN clearance. (The opposite is not available.)

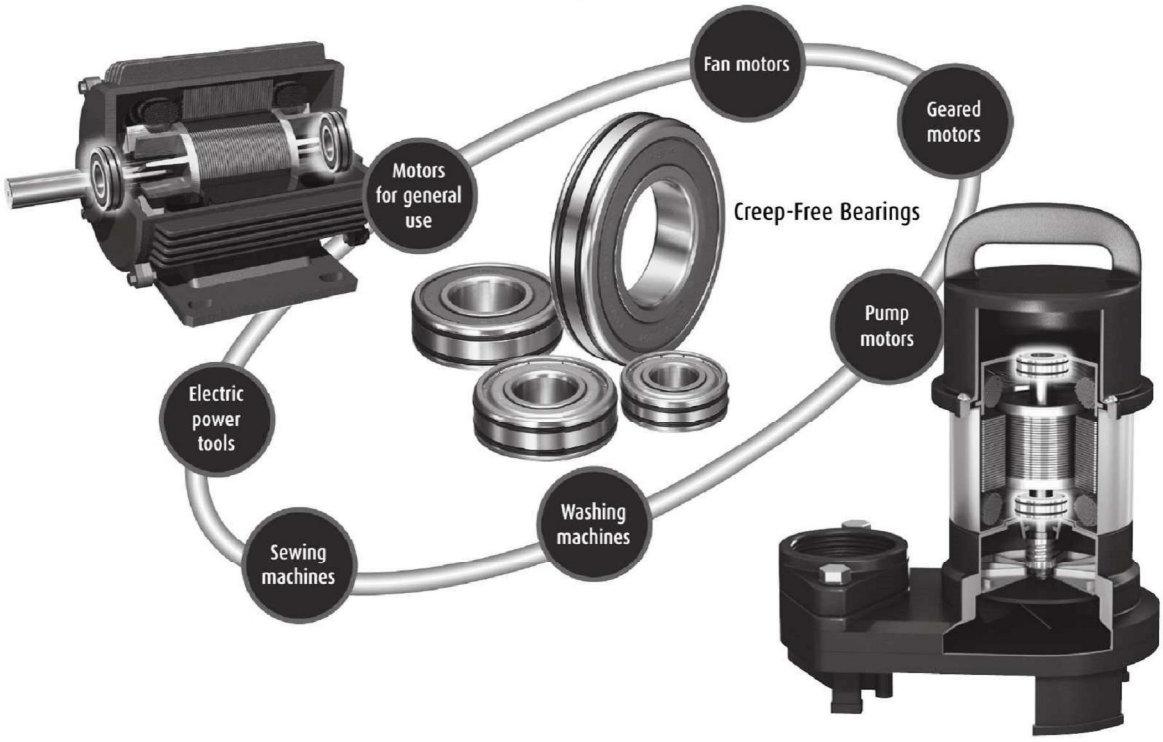
Deep Groove Ball Bearings

Creep-Free Bearings

Creep-Free Bearings, which come with two O-rings mounted in the outer ring, help to prevent the occurrence of creep by restricting the amount of clearance between the outer ring and housing.
No special machining is required; bearings can be used with the same housing as standard bearings.
In creep limit load tests, the more housing clearance is reduced, the greater the improvement in creep prevention, due to the tension of the O-ring mounted in the outer ring.

Features

- **Prevents creep**
  O-rings help prevent creep.
- **Reusable housing**
  Very little abrasion occurs on the bore surface of the housing, making reuse possible.
- **Easy to assemble**
  Assembly is easy since bearings can be fitted with a loose tolerance.
- **No special machining of the housing is required**
  Bearings can be replaced since boundary dimensions are identical to standard bearings. No reworking of the housing is required.



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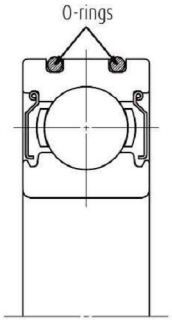


Fig. 1 Structure of Creep-Free Bearings

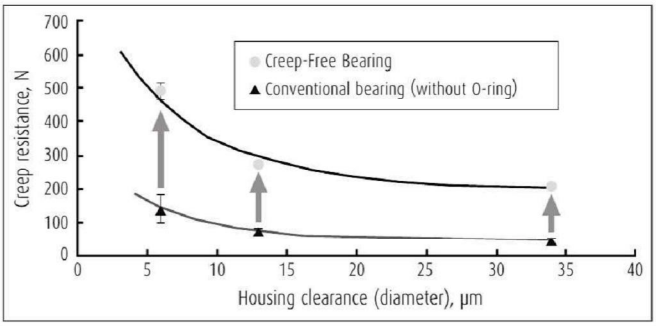


Fig. 2 Creep limit load test (example: 6204)

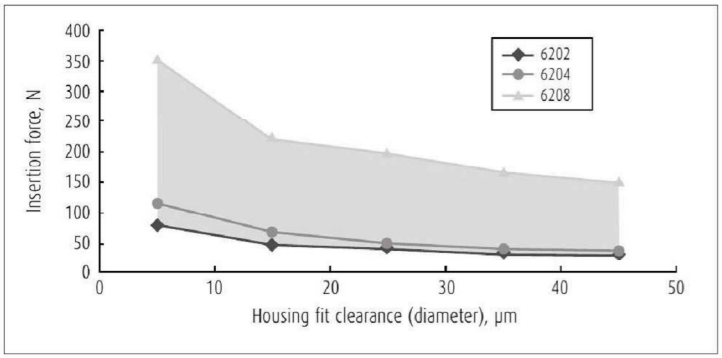


Fig. 3 Fit and insertion force

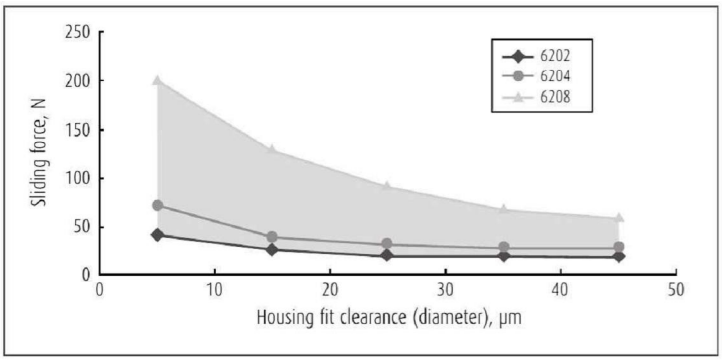


Fig. 4 Fit and sliding force

Note on mounting Creep-Free Bearings

- When oil or grease is applied to the outer diameter of the bearing, use a mineral oil or a synthetic hydrocarbon oil (NSK's EA2, etc.).
- O-ring material is nitrile rubber (operating temperature range: -30 to 120°C) as a standard specification. Please contact NSK for use under special environments such as high temperatures.

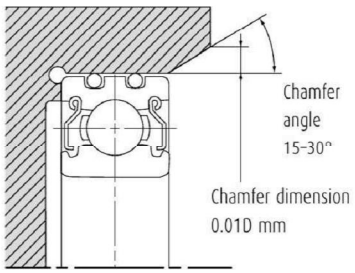
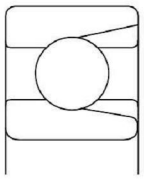


Fig. 5 Housing shape and dimension

Note on the product name "Creep-Free Bearings": The term "free" should not be construed to mean that creep is nonexistent.

Deep Groove Ball Bearings



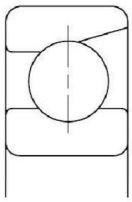
MAXIMUM TYPE BALL BEARINGS

Maximum Type Ball Bearings contain a larger number of balls than normal deep groove ball bearings because of filling slots in the inner and outer rings. Because of their filling slots, they are not suitable for applications with high axial loads.

BL2 and BL3 types of bearings have boundary dimensions equal to those of single-row deep groove ball bearings of Series 62 and 63 respectively. Besides the open type, ZZ type shielded bearings are also available.

When using these bearings, it is important for the filling slot in the outer ring to be outside of the loaded zone as much as possible.

Their cages are pressed steel.



MAGNETO BEARINGS

The groove in the inner ring is a little shallower than that of deep groove ball bearings and one side of the outer ring is relieved. Consequently, the outer ring is separable, which makes it convenient for mounting.

Pressed cages are standard, but for high speed applications, machined synthetic resin cages are used.

PRECAUTIONS FOR USE OF DEEP GROOVE BALL BEARINGS

For deep groove ball bearings, if the bearing load is too small during operation, slippage occurs between the balls and raceways, which may result in smearing. The higher the weight of balls and cage, the higher this tendency becomes, especially for large bearings. If very small bearing loads are expected, please contact NSK for selection of an appropriate bearing.

TOLERANCES AND RUNNING ACCURACY

	Table	Pages
Single-Row Deep Groove Ball Bearings	7.2	A128 to A131
Maximum Type Ball Bearings	7.2	A128 to A131
Magneto Bearings	7.5	A138 and A139

RECOMMENDED FITS

	Table	Page
Single-Row Deep Groove Ball Bearings	8.3	A164
	8.5	A165
Maximum Type Ball Bearings	8.3	A164
	8.5	A165
Magneto Bearings	8.3	A164
	8.5	A165

INTERNAL CLEARANCE

	Table	Page
Single-Row Deep Groove Ball Bearings	8.10	A169
Maximum Type Ball Bearings	8.11	A169
Magneto Bearings	8.12	A169

LIMITING SPEEDS (GREASE/OIL)

The limiting speeds (grease) and limiting speeds (oil) listed in the bearing tables should be adjusted depending on the bearing load condition. Also, higher speeds are attainable by making changes in the lubrication method, cage design, etc. Refer to page A098 for detailed information.

Deep Groove Ball Bearings

TECHNICAL DATA

Radial and Axial Internal Clearances and Contact Angles for Single Row Deep Groove Ball Bearings

(1) Radial and Axial Internal Clearances

The internal clearance in single row bearings has been specified as the radial internal clearance. The bearing internal clearance is the amount of relative displacement possible between the bearing rings when one ring is fixed and the other ring does not bear a load. The amount of movement along the direction of the bearing radius is called the radial clearance, and the amount along the direction of the axis is called the axial clearance.

The geometric relation between the radial and axial clearance is shown in Fig. 1.

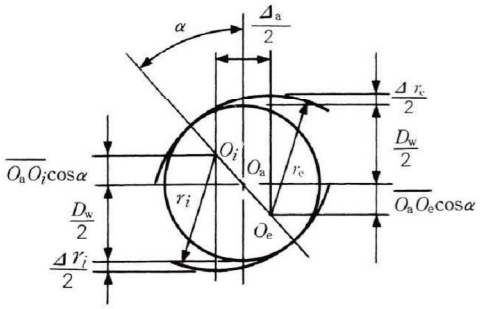


Fig. 1 Relationship Between Δr and Δa

Symbols used in Fig. 1

O_a:	Ball center
O_e:	Center of groove curvature, outer ring
O_i:	Center of groove curvature, inner ring
D_w:	Ball diameter (mm)
r_e:	Radius of outer ring groove (mm)
r_i:	Radius of inner ring groove (mm)
a:	Contact angle (°)
Δ_r:	Radial clearance (mm)
Δ_a:	Axial clearance (mm)

It is apparent from Fig. 1 that $\Delta_r = \Delta r_e + \Delta r_i$.

From geometric relationships, various equations for clearance, contact angle, etc. can be derived.

$$\Delta r = 2(1-\cos a)(r_e + r_i - D_w) \quad (1)$$

$$\Delta a = 2 \sin a (r_e + r_i - D_w) \quad (2)$$

$$\frac{\Delta a}{\Delta r} = \cot\frac{a}{2} \quad (3)$$

$$\Delta \fallingdotseq 2(r_e + r_i - D_w)^{1/2} \Delta r^{1/2} \quad (4)$$

$$a = \cos^{-1}\left(\frac{r_e + r_i - D_w - \frac{\Delta r}{2}}{r_e + r_i - D_w}\right) \quad (5)$$

$$a = \sin^{-1}\left(\frac{\Delta a/2}{r_e + r_i - D_w}\right) \quad (6)$$

Because $(r_e + r_i - D_w)$ is a constant, it is apparent why fixed relationships between Δr, Δa and a exist for all the various bearing types.

As was previously mentioned, the clearances for deep groove ball bearings are given as radial clearances, but there are specific applications where it is desirable to have an axial clearance as well. The relationship between deep groove ball bearing radial clearance Δr and axial clearance Δa is given in Equation (4).
To simplify,

$$\Delta a \fallingdotseq K \Delta r^{1/2} \quad (7)$$

where K: Constant depending on bearing design

$$K = 2(r_e + r_i - D_w)^{1/2}$$

Fig. 2 shows one example. The various values for K are presented by bearing size in Table 1 below.

Example

Assume a 6312 bearing, for a sample calculation, which has a radial clearance of 0.017 mm. From Table 1, K=2.09. Therefore, the axial clearance Δa is:

$\Delta = 2.09 \times \sqrt{0.017} = 2.09 \times 0.13 = 0.27$ (mm)

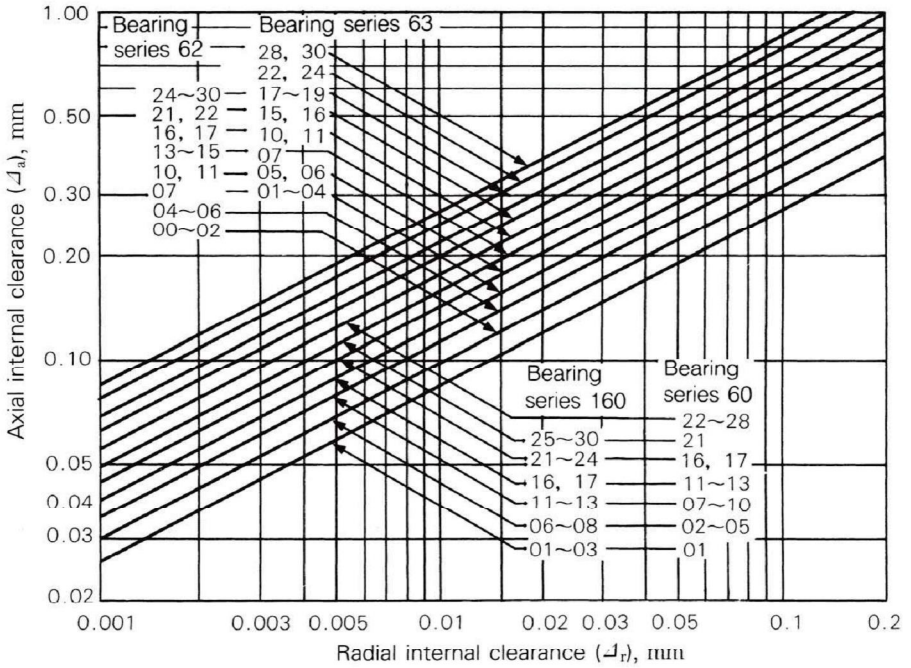


Fig. 2 Radial Clearance, Δ_r and Axial Clearance, Δ_a of Deep Groove Ball Bearings

Table 1 Constant Values of K for Radial and Axial Clearance Conversion

Bearing bore No.	K			
	Series 160	Series 60	Series 62	Series 63
00	-	-	0.93	1.14
01	0.80	0.80	0.93	1.06
02	0.80	0.93	0.93	1.06
03	0.80	0.93	0.99	1.11
04	0.90	0.96	1.06	1.07
05	0.90	0.96	1.06	1.20
06	0.96	1.01	1.07	1.19
07	0.96	1.06	1.25	1.37
08	0.96	1.06	1.29	1.45
09	1.01	1.11	1.29	1.57
10	1.01	1.11	1.33	1.64
11	1.06	1.20	1.40	1.70
12	1.06	1.20	1.50	2.09
13	1.06	1.20	1.54	1.82
14	1.16	1.29	1.57	1.88
15	1.16	1.29	1.57	1.95
16	1.20	1.37	1.64	2.01
17	1.20	1.37	1.70	2.06
18	1.29	1.44	1.76	2.11
19	1.29	1.44	1.82	2.16
20	1.29	1.44	1.88	2.25
21	1.37	1.54	1.95	2.32
22	1.40	1.64	2.01	2.40
24	1.40	1.64	2.06	2.40
26	1.54	1.70	2.11	2.49
28	1.54	1.70	2.11	2.59
30	1.54	1.76	2.11	2.59

Deep Groove Ball Bearings

(2) Relation between Radial Clearance and Contact Angle

Single-row deep groove ball bearings are sometimes used as thrust bearings. In such applications, it is recommended to make the contact angle as large as possible.

The contact angle for ball bearings is determined by the geometric relationship between the radial clearance and the radii of the inner and outer grooves. Using Equations (1) to (6), Fig. 3 shows the particular relationship between the radial clearance and contact angle of 62 and 63 series bearings. The initial contact angle, a_0, is the initial contact angle when the axial load is zero. Application of any load to the bearing will change this contact angle.

If the initial contact angle a_0 exceeds 20°, it is necessary to check whether or not the contact area of the ball and raceway touch the edge of raceway shoulder. (Refer to Section 8.1.2)

For applications when an axial load alone is applied, the radial clearance for deep groove ball bearings is normally greater than the normal clearance in order to ensure that the contact anlgle is relatively large. The initial contact angles for C3 and C4 clearances are given for selected bearing sizes in Table 2 below.

Table 2 Initial Contact Angle, a_0, with C3 and C4 Clearances

Bearing No.	a_0 with C3	a_0 with C4
6205	12.5° to 18°	16.5° to 22°
6210	11.5° to 16.5°	13.5° to 19.5°
6215	11.5° to 16°	15.5° to 19.5°
6220	10.5° to 14.5°	14° to 17.5°
6305	11° to 16°	14.5° to 19.5°
6310	9.5° to 13.5°	12° to 16°
6315	9.5° to 13.5°	12.5° to 15.5°
6320	9° to 12.5°	12° to 15°

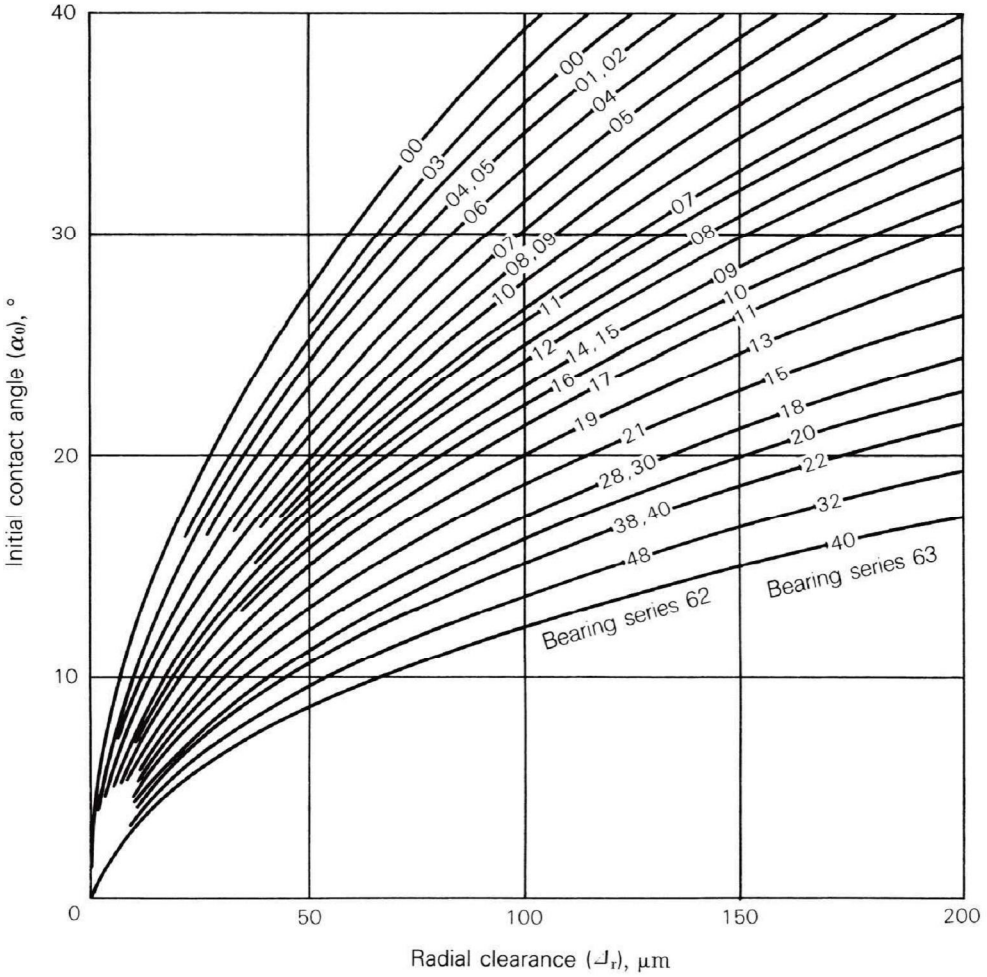


Fig. 3 Radial Clearance and Contact Angle

Deep Groove Ball Bearings

Features and Operating Temperature Range of Ball Bearing Seal Material

The sealed ball bearing is a ball bearing with seals as shown in Figs. 1 and 2. There are two seal types: non-contact seal type and contact seal type. For rubber seal material, nitrile rubber is used for general purpose and poly-acrylic rubber, silicon rubber, and fluoric rubber are used depending on temperature conditions.

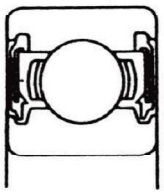
These rubbers have their own unique nature and appropriate rubber must be selected by considering the particular application environment and running conditions.

Table 1 shows principal features of each rubber material and the operating temperature range of the bearing seal. The operating temperature range of Table 1 is a guideline for continuous operation. Thermal aging of rubber is related to the temperature and time. Rubber may be used in a much wider range of operating temperatures depending on the operating time and frequency.

In the non-contact seal, heat generation due to friction on the lip can be ignored. And thermal factors, which cause aging of the rubber, are physical changes due to atmospheric and bearing temperatures. Accordingly, increased hardness or loss of elasticity due to thermal aging exerts only a negligible effect on the seal performance. A rubber non-contact seal can thus be used in an expanded range of operating temperatures greater than that for a contact seal.

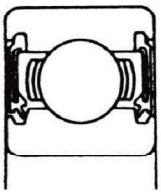
But there are some disadvantages. The contact seal has a problem with wear occurring at the seal lip due to friction, thermal plastic deformation, and hardening. When friction or plastic deformation occurs, the contact pressure between the lip and slide surface decreases, resulting in a clearance. This clearance is minimum and does not cause excessive degradation of sealing performance (for instance, it does not allow dust entry or grease leakage). In most cases, this minor plastic deformation or slightly increased hardness presents no practical problems.

However, in external environments with dust and water in large quantity, the bearing seal is used as an auxiliary seal and a principal seal should be provided separately. As so far described, the operating temperature range of rubber material is only a guideline for selection. Since heat resistant rubber is expensive, it is important to understand the temperature conditions so that an economical selection can be made. Due attention should also be paid not only to heat resistance, but also to the distinctive features of each rubber.



Non-contact rubber seal (VV)

Fig. 1



Contact rubber seal (DDU)

Fig. 2

Table 1 Features and Operating Temperature Range of Rubber Materials

Material		Nitrile rubber	Polyacrylic rubber	Silicon rubber	Fluorine rubber
Key features		○Most popular seal material ○Superior in oil and wear resistances and mechanical properties ○Readily ages under direct sunrays ○Less expensive than other rubbers	○Superior in heat and oil resistances ○Large compression causes permanent deformation ○Inferior in cold resistance ○One of the less expensive materials among the high temperature materials ○Attention is necessary because it swells the ester oil based grease	○High heat and cold resistances ○Inferior in mechanical properties other than permanent deformation by compression. Pay attention to tear strength ○Pay attention so as to avoid swell caused by low aniline point mineral oil, silicone grease, and silicone oil	○High heat resistance ○Superior in oil and chemical resistances ○Cold resistance similar to nitrile rubber ○Attention is necessary because it deteriorates the urea grease
Operating temperature range (1) (°C)	Non-contact seal	−50 to +130	−30 to +170	−100 to +250	−50 to +220
	Contact seal	−30 to +110	−15 to +150	−70 to +200	−30 to +200

Note (1) This operating temperature is the temperature of seal rubber materials.

Deep Groove Ball Bearings

Free Space and Grease Filling Amount for Deep Groove Ball Bearings

Grease lubrication can simplify the bearing's peripheral construction. In place of oil lubrication, grease lubrication is now employed along with enhancement of the grease quality for applications in many fields. It is important to select a grease appropriate to the operating conditions. Due care is also necessary as to the filling amount, since too much or too little grease greatly affects the temperature rise and torque. The amount of grease needed depends on such factors as housing construction, free space, grease brand, and environment. A general guideline is described next.

First, the bearing is filled with an appropriate amount of grease. In this case, it is essential to push grease onto the cage guide surface. Then, the free space, whic excludes the spindle and bearing inside the housing, is filled with an amount of grease as shown next:

1/2 to 2/3..... when the bearing speed is 50% or less of the allowable speed specified in the catalog.

1/3 to 1/2..... when the bearing speed is 50% or more.

Roughly, low speeds require more grease while high speeds require less grease. Depending on the particular application, the filling amount may have to be reduced further to reduce the torque and to prevent heat generation. When the bearing speed is extremely low, on the other hand, grease may be packed almost full to prevent dust and water entry. Accordingly, it is necessary to know the extent of the housing's free space for the specific bearing to determine the correct filling amount. As a reference, the volume of free space is shown in Table 1 for an open type deep groove ball bearing.

Note that the free space of the open type deep groove ball bearing is the volume obtained by subtracting the volume of the balls and cage from the space formed between inner and outer rings.

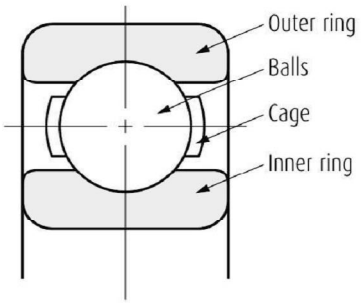


Table 1 Free Space of Open Type Deep Groove Ball Bearing

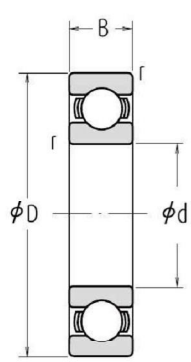
Units : cm^3

Bearing bore No.	Bearing free space			Bearing bore No.	Bearing free space		
	Bearing series				Bearing series		
	60	62	63		60	62	63
00	1.2	1.5	2.9	14	34	61	148
01	1.2	2.1	3.5	15	35	67	180
02	1.6	2.7	4.8	16	47	84	213
03	2.0	3.7	6.4	17	48	104	253
04	4.0	6.0	7.9	18	63	127	297
05	4.6	7.7	12	19	66	155	345
06	6.5	11	19	20	68	184	425
07	9.2	15	25	21	88	216	475
08	11	20	35	22	114	224	555
09	14	23	49	24	122	310	675
10	15	28	64	26	172	355	830
11	22	34	79	28	180	415	1 030
12	23	45	98	30	220	485	1 140
13	24	54	122	32	285	545	1 410

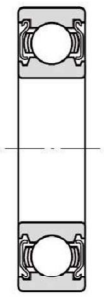
Remark The table above shows the free space of a bearing using a pressed steel cage. The free space of a bearing using a high-tension brass machined cage is about 50 to 60% of the value in the table.

Single-Row Deep Groove Ball Bearings

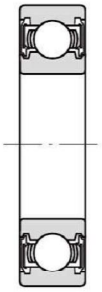
Bore Diameter 10 – 17 mm



Open Type

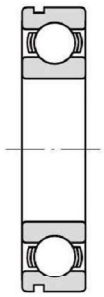


Shielded Type
ZZ

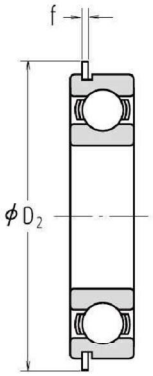


Non-Contact
Sealed Type
VV

Contact
Sealed Type
DD · DDU



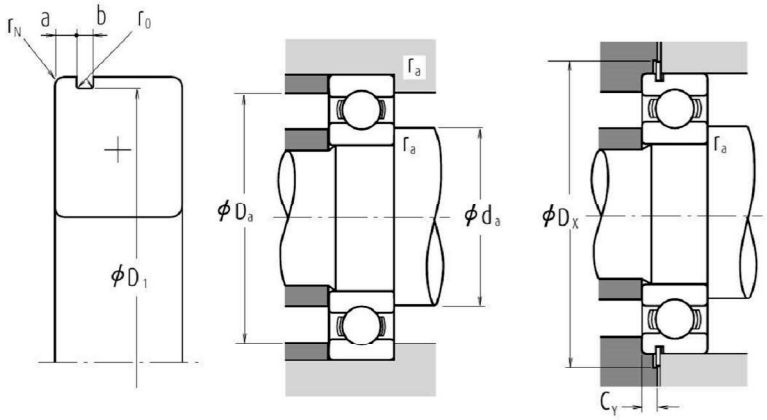
With Snap
Ring Groove
N



With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min⁻¹)			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
10	19	5	0.3	1 720	840	14.8	34 000	24 000	40 000	**6800**	**ZZ**	**VV**	**DD**
	22	6	0.3	2 700	1 270	14.0	32 000	22 000	38 000	**6900**	**ZZ**	**VV**	**DD**
	26	8	0.3	4 550	1 970	12.4	30 000	22 000	36 000	**6000**	**ZZ**	**VV**	**DDU**
	30	9	0.6	5 100	2 390	13.2	24 000	18 000	30 000	**6200**	**ZZ**	**VV**	**DDU**
	30	9	0.6	5 350	2 390	13.2	28 000	18 000	34 000	**6200***	**ZZ**	**VV**	**DDU**
	35	11	0.6	8 100	3 450	11.2	22 000	17 000	26 000	**6300**	**ZZ**	**VV**	**DDU**
	35	11	0.6	8 500	3 450	11.2	26 000	17 000	30 000	**6300***	**ZZ**	**VV**	**DDU**
12	21	5	0.3	1 920	1 040	15.3	32 000	20 000	38 000	**6801**	**ZZ**	**VV**	**DD**
	24	6	0.3	2 890	1 460	14.5	30 000	20 000	36 000	**6901**	**ZZ**	**VV**	**DD**
	28	7	0.3	5 100	2 370	13.0	28 000	—	32 000	**16001**	—	—	—
	28	8	0.3	5 100	2 370	13.0	28 000	18 000	32 000	**6001**	**ZZ**	**VV**	**DDU**
	28	8	0.3	5 350	2 370	13.0	32 000	18 000	38 000	**6001***	**ZZ**	**VV**	**DDU**
	32	10	0.6	6 800	3 050	12.3	22 000	17 000	28 000	**6201**	**ZZ**	**VV**	**DDU**
	32	10	0.6	7 150	3 050	12.3	26 000	17 000	32 000	**6201***	**ZZ**	**VV**	**DDU**
	37	12	1	9 700	4 200	11.1	20 000	16 000	24 000	**6301**	**ZZ**	**VV**	**DDU**
	37	12	1.0	10 200	4 200	11.1	24 000	16 000	28 000	**6301***	**ZZ**	**VV**	**DDU**
15	24	5	0.3	2 070	1 260	15.8	28 000	17 000	34 000	**6802**	**ZZ**	**VV**	**DD**
	28	7	0.3	4 350	2 260	14.3	26 000	17 000	30 000	**6902**	**ZZ**	**VV**	**DD**
	32	8	0.3	5 600	2 830	13.9	24 000	—	28 000	**16002**	—	—	—
	32	9	0.3	5 600	2 830	13.9	24 000	15 000	28 000	**6002**	**ZZ**	**VV**	**DDU**
	32	9	0.3	5 850	2 830	13.9	26 000	15 000	32 000	**6002***	**ZZ**	**VV**	**DDU**
	35	11	0.6	7 650	3 750	13.2	20 000	14 000	24 000	**6202**	**ZZ**	**VV**	**DDU**
	35	11	0.6	8 000	3 750	13.2	22 000	14 000	28 000	**6202***	**ZZ**	**VV**	**DDU**
	42	13	1	11 400	5 450	12.3	17 000	13 000	20 000	**6302**	**ZZ**	**VV**	**DDU**
	42	13	1.0	12 000	5 450	12.3	19 000	13 000	24 000	**6302***	**ZZ**	**VV**	**DDU**
17	26	5	0.3	2 630	1 570	15.7	26 000	15 000	30 000	**6803**	**ZZ**	**VV**	**DD**
	30	7	0.3	4 600	2 550	14.7	24 000	15 000	28 000	**6903**	**ZZ**	**VV**	**DDU**
	35	8	0.3	6 000	3 250	14.4	22 000	—	26 000	**16003**	—	—	—
	35	10	0.3	6 000	3 250	14.4	22 000	13 000	26 000	**6003**	**ZZ**	**VV**	**DDU**
	35	10	0.3	6 300	3 250	14.4	24 000	13 000	28 000	**6003***	**ZZ**	**VV**	**DDU**
	40	12	0.6	9 550	4 800	13.2	17 000	12 000	20 000	**6203**	**ZZ**	**VV**	**DDU**
	40	12	0.6	10 100	4 800	13.2	20 000	12 000	24 000	**6203***	**ZZ**	**VV**	**DDU**
	47	14	1	13 600	6 650	12.4	15 000	11 000	18 000	**6303**	**ZZ**	**VV**	**DDU**
	47	14	1.0	14 300	6 650	12.4	17 000	11 000	20 000	**6303***	**ZZ**	**VV**	**DDU**

Notes (1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119**.
(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.
(3) Ring types N and NR applicable only to open-type bearings. Please consult NSK about the snap ring groove dimensions of sealed or shielded bearings. (4) Snap ring groove dimensions and snap ring dimensions are not conformed to ISO15.



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

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

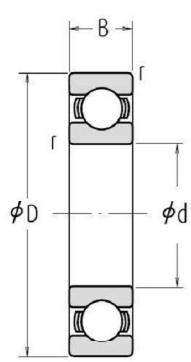
$\frac{F_a}{F_r} \leq 0.8$, $P_0=F_r$

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)
		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_y max.	approx.
—	—	—	—	—	—	—	—	—	12	12	17	0.3	—	—	0.005
N(3)	NR(3)	1.05	0.80	20.80	0.20	0.2	24.8	0.70	12	12.5	20	0.3	25.5	1.5	0.009
N(4)	NR(4)	1.35	0.87	24.50	0.20	0.3	28.7	0.84	12	13	24	0.3	29.4	1.9	0.018
N	NR	2.06	1.35	28.17	0.40	0.5	34.7	1.12	14	16	26	0.6	35.5	2.9	0.032
N	NR	2.06	1.35	28.17	0.40	0.5	34.7	1.12	14	16	26	0.6	35.5	2.9	0.032
N	NR	2.06	1.35	33.17	0.40	0.5	39.7	1.12	14	16.5	31	0.6	40.5	2.9	0.052
N	NR	2.06	1.35	33.17	0.40	0.5	39.7	1.12	14	16.5	31	0.6	40.5	2.9	0.052
—	—	—	—	—	—	—	—	—	14	14	19	0.3	—	—	0.006
N	NR	1.05	0.80	22.80	0.20	0.2	26.8	0.70	14	14.5	22	0.3	27.5	1.5	0.010
—	—	—	—	—	—	—	—	—	14	—	26	0.3	—	—	0.019
N(4)	NR(4)	1.35	0.87	26.50	0.20	0.3	30.7	0.84	14	15.5	26	0.3	31.4	1.9	0.022
N(4)	NR(4)	1.35	0.87	26.50	0.20	0.3	30.7	0.84	14	15.5	26	0.3	31.4	1.9	0.022
N	NR	2.06	1.35	30.15	0.40	0.5	36.7	1.12	16	17	28	0.6	37.5	2.9	0.037
N	NR	2.06	1.35	30.15	0.40	0.5	36.7	1.12	16	17	28	0.6	37.5	2.9	0.037
N	NR	2.06	1.35	34.77	0.40	0.5	41.3	1.12	17	18	32	1	42	2.9	0.060
N	NR	2.06	1.35	34.77	0.40	0.5	41.3	1.12	17	18	32	1	42	2.9	0.060
—	—	—	—	—	—	—	—	—	17	17	22	0.3	—	—	0.007
N	NR	1.30	0.95	26.70	0.25	0.3	30.8	0.85	17	17	26	0.3	31.5	1.8	0.015
—	—	—	—	—	—	—	—	—	17	—	30	0.3	—	—	0.027
N	NR	2.06	1.35	30.15	0.40	0.3	36.7	1.12	17	19	30	0.3	37.5	2.9	0.031
N	NR	2.06	1.35	30.15	0.40	0.3	36.7	1.12	17	19	30	0.3	37.5	2.9	0.031
N	NR	2.06	1.35	33.17	0.40	0.5	39.7	1.12	19	20.5	31	0.6	40.5	2.9	0.045
N	NR	2.06	1.35	33.17	0.40	0.5	39.7	1.12	19	20.5	31	0.6	40.5	2.9	0.045
N	NR	2.06	1.35	39.75	0.40	0.5	46.3	1.12	20	22.5	37	1	47	2.9	0.083
N	NR	2.06	1.35	39.75	0.40	0.5	46.3	1.12	20	22.5	37	1	47	2.9	0.083
—	—	—	—	—	—	—	—	—	19	19	24	0.3	—	—	0.007
N	NR	1.30	0.95	28.70	0.25	0.3	32.8	0.85	19	19.5	28	0.3	33.5	1.8	0.017
—	—	—	—	—	—	—	—	—	19	—	33	0.3	—	—	0.033
N	NR	2.06	1.35	33.17	0.40	0.3	39.7	1.12	19	21.5	33	0.3	40.5	2.9	0.041
N	NR	2.06	1.35	33.17	0.40	0.3	39.7	1.12	19	21.5	33	0.3	40.5	2.9	0.041
N	NR	2.06	1.35	38.10	0.40	0.5	44.6	1.12	21	23.5	36	0.6	45.5	2.9	0.067
N	NR	2.06	1.35	38.10	0.40	0.5	44.6	1.12	21	23.5	36	0.6	45.5	2.9	0.067
N	NR	2.46	1.35	44.60	0.40	0.5	52.7	1.12	22	25.5	42	1	53.5	3.3	0.113
N	NR	2.46	1.35	44.60	0.40	0.5	52.7	1.12	22	25.5	42	1	53.5	3.3	0.113

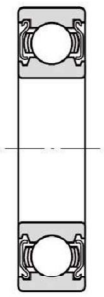
Remarks
1. Diameter Series 7 (extra thin section bearings) are also available, please contact NSK.
2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
3. The bearings denoted by an asterisk(*) are NSKHPS Deep groove ball bearings.

Single-Row Deep Groove Ball Bearings

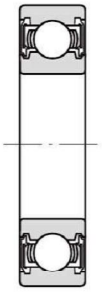
Bore Diameter 20 – 30 mm



Open Type

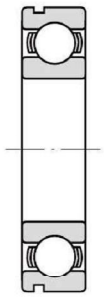


Shielded Type
ZZ

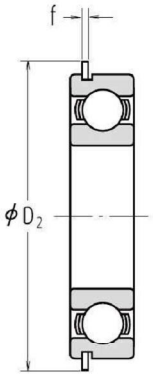


Non-Contact
Sealed Type
VV

Contact
Sealed Type
DD · DDU



With Snap
Ring Groove
N

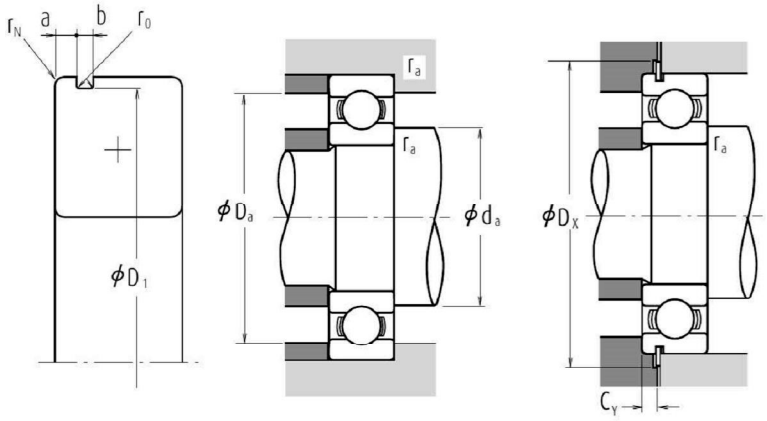


With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min⁻¹)			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
20	32	7	0.3	4 000	2 470	15.5	22 000	13 000	26 000	**6804**	**ZZ**	**VV**	**DD**
	37	9	0.3	6 400	3 700	14.7	19 000	12 000	22 000	**6904**	**ZZ**	**VV**	**DDU**
	42	8	0.3	7 900	4 450	14.5	18 000	—	20 000	**16004**	—	—	—
	42	12	0.6	9 400	5 000	13.8	18 000	11 000	20 000	**6004**	**ZZ**	**VV**	**DDU**
	42	12	0.6	9 850	5 000	13.8	20 000	11 000	24 000	**6004***	**ZZ**	**VV**	**DDU**
	47	14	1	12 800	6 600	13.1	15 000	11 000	18 000	**6204**	**ZZ**	**VV**	**DDU**
	47	14	1.0	13 400	6 600	13.1	17 000	11 000	20 000	**6204***	**ZZ**	**VV**	**DDU**
	52	15	1.1	15 900	7 900	12.4	14 000	10 000	17 000	**6304**	**ZZ**	**VV**	**DDU**
	52	15	1.1	16 700	7 900	12.4	16 000	10 000	19 000	**6304***	**ZZ**	**VV**	**DDU**
22	44	12	0.6	9 400	5 050	14.0	17 000	11 000	20 000	**60/22**	**ZZ**	**VV**	**DDU**
	50	14	1	12 900	6 800	13.5	14 000	9 500	16 000	**62/22**	**ZZ**	**VV**	**DDU**
	56	16	1.1	18 400	9 250	12.4	13 000	9 500	16 000	**63/22**	**ZZ**	**VV**	**DDU**
25	37	7	0.3	4 500	3 150	16.1	18 000	10 000	22 000	**6805**	**ZZ**	**VV**	**DD**
	42	9	0.3	7 050	4 550	15.4	16 000	10 000	19 000	**6905**	**ZZ**	**VV**	**DDU**
	47	8	0.3	8 850	5 600	15.1	15 000	—	18 000	**16005**	—	—	—
	47	12	0.6	10 100	5 850	14.5	15 000	9 500	18 000	**6005**	**ZZ**	**VV**	**DDU**
	47	12	0.6	10 600	5 850	14.5	18 000	9 500	22 000	**6005***	**ZZ**	**VV**	**DDU**
	52	15	1	14 000	7 850	13.9	13 000	9 000	15 000	**6205**	**ZZ**	**VV**	**DDU**
	52	15	1.0	14 700	7 850	13.9	15 000	9 000	18 000	**6205***	**ZZ**	**VV**	**DDU**
	62	17	1.1	20 600	11 200	13.2	11 000	8 000	13 000	**6305**	**ZZ**	**VV**	**DDU**
	62	17	1.1	21 600	11 200	13.2	13 000	8 000	16 000	**6305***	**ZZ**	**VV**	**DDU**
28	52	12	0.6	12 500	7 400	14.5	14 000	8 500	16 000	**60/28**	**ZZ**	**VV**	**DDU**
	58	16	1	16 600	9 500	13.9	12 000	8 000	14 000	**62/28**	**ZZ**	**VV**	**DDU**
	68	18	1.1	26 700	14 000	12.4	10 000	7 500	13 000	**63/28**	**ZZ**	**VV**	**DDU**
30	42	7	0.3	4 700	3 650	16.4	15 000	9 000	18 000	**6806**	**ZZ**	**VV**	**DD**
	47	9	0.3	7 250	5 000	15.8	14 000	8 500	17 000	**6906**	**ZZ**	**VV**	**DDU**
	55	9	0.3	11 200	7 350	15.2	13 000	—	15 000	**16006**	—	—	—
	55	13	1	13 200	8 300	14.7	13 000	8 000	15 000	**6006**	**ZZ**	**VV**	**DDU**
	55	13	1.0	13 900	8 300	14.7	15 000	8 000	18 000	**6006***	**ZZ**	**VV**	**DDU**
	62	16	1	19 500	11 300	13.8	11 000	7 500	13 000	**6206**	**ZZ**	**VV**	**DDU**
	62	16	1.0	20 400	11 300	13.8	12 000	7 500	15 000	**6206***	**ZZ**	**VV**	**DDU**
	72	19	1.1	26 700	15 000	13.3	9 500	6 700	12 000	**6306**	**ZZ**	**VV**	**DDU**
	72	19	1.1	28 000	15 000	13.3	11 000	6 700	13 000	**6306***	**ZZ**	**VV**	**DDU**

Notes
(1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119.**
(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.
(3) Ring types N and NR applicable only to open-type bearings. Please consult NSK about the snap ring groove dimensions of sealed or shielded bearings.
(4) Snap ring groove dimensions and snap ring dimensions are not conformed to ISO15.

B 022



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

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

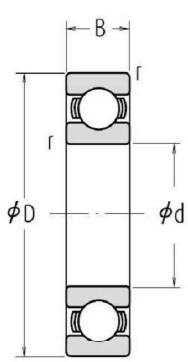
$\frac{F_a}{F_r}\leq 0.8$, $P_0=F_r$

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)
		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_y max.	approx.
N	NR	1.30	0.95	30.70	0.25	0.3	34.8	0.85	22	22	30	0.3	35.5	1.8	0.017
N	NR	1.70	0.95	35.70	0.25	0.3	39.8	0.85	22	24	35	0.3	40.5	2.3	0.037
—	—	—	—	—	—	—	—	—	22	—	40	0.3	—	—	0.048
N	NR	2.06	1.35	39.75	0.40	0.5	46.3	1.12	24	25.5	38	0.6	47	2.9	0.068
N	NR	2.06	1.35	39.75	0.40	0.5	46.3	1.12	24	25.5	38	0.6	47	2.9	0.068
N	NR	2.46	1.35	44.60	0.40	0.5	52.7	1.12	25	26.5	42	1	53.5	3.3	0.107
N	NR	2.46	1.35	44.60	0.40	0.5	52.7	1.12	25	26.5	42	1	53.5	3.3	0.107
N	NR	2.46	1.35	49.73	0.40	0.5	57.9	1.12	26.5	28	45.5	1	58.5	3.3	0.145
N	NR	2.46	1.35	49.73	0.40	0.5	57.9	1.12	26.5	28	45.5	1	58.5	3.3	0.145
N	NR	2.06	1.35	41.75	0.40	0.5	48.3	1.12	26	26.5	40	0.6	49	2.9	0.074
N	NR	2.46	1.35	47.60	0.40	0.5	55.7	1.12	27	29.5	45	1	56.5	3.3	0.119
N	NR	2.46	1.35	53.60	0.40	0.5	61.7	1.12	28.5	30.5	49.5	1	62.5	3.3	0.179
N	NR	1.30	0.95	35.70	0.25	0.3	39.8	0.85	27	27	35	0.3	40.5	1.8	0.021
N	NR	1.70	0.95	40.70	0.25	0.3	44.8	0.85	27	28.5	40	0.3	45.5	2.3	0.042
—	—	—	—	—	—	—	—	—	27	—	45	0.3	—	—	0.059
N	NR	2.06	1.35	44.60	0.40	0.5	52.7	1.12	29	30	43	0.6	53.5	2.9	0.079
N	NR	2.06	1.35	44.60	0.40	0.5	52.7	1.12	29	30	43	0.6	53.5	2.9	0.079
N	NR	2.46	1.35	49.73	0.40	0.5	57.9	1.12	30	32	47	1	58.5	3.3	0.129
N	NR	2.46	1.35	49.73	0.40	0.5	57.9	1.12	30	32	47	1	58.5	3.3	0.129
N	NR	3.28	1.90	59.61	0.60	0.5	67.7	1.70	31.5	36	55.5	1	68.5	4.6	0.235
N	NR	3.28	1.90	59.61	0.60	0.5	67.7	1.70	31.5	36	55.5	1	68.5	4.6	0.235
N	NR	2.06	1.35	49.73	0.40	0.5	57.9	1.12	32	34	48	0.6	58.5	2.9	0.096
N	NR	2.46	1.35	55.60	0.40	0.5	63.7	1.12	33	35.5	53	1	64.5	3.3	0.175
N	NR	3.28	1.90	64.82	0.60	0.5	74.6	1.70	34.5	38	61.5	1	76	4.6	0.287
N	NR	1.30	0.95	40.70	0.25	0.3	44.8	0.85	32	32	40	0.3	45.5	1.8	0.024
N	NR	1.70	0.95	45.70	0.25	0.3	49.8	0.85	32	34	45	0.3	50.5	2.3	0.052
—	—	—	—	—	—	—	—	—	32	—	53	0.3	—	—	0.087
N	NR	2.08	1.35	52.60	0.40	0.5	60.7	1.12	35	36.5	50	1	61.5	2.9	0.116
N	NR	2.08	1.35	52.60	0.40	0.5	60.7	1.12	35	36.5	50	1	61.5	2.9	0.116
N	NR	3.28	1.90	59.61	0.60	0.5	67.7	1.70	35	38.5	57	1	68.5	4.6	0.199
N	NR	3.28	1.90	59.61	0.60	0.5	67.7	1.70	35	38.5	57	1	68.5	4.6	0.199
N	NR	3.28	1.90	68.81	0.60	0.5	78.6	1.70	36.5	42.5	65.5	1	80	4.6	0.345
N	NR	3.28	1.90	68.81	0.60	0.5	78.6	1.70	36.5	42.5	65.5	1	80	4.6	0.345

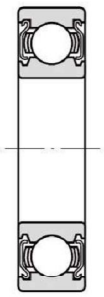
Remarks
1. Diameter Series 7 (extra thin section bearings) are also available, please contact NSK.
2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
3. The bearings denoted by an asterisk(*) are NSKHPS Deep groove ball bearings.

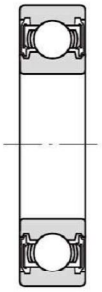
Single-Row Deep Groove Ball Bearings

Bore Diameter 32 – 45 mm

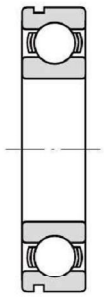


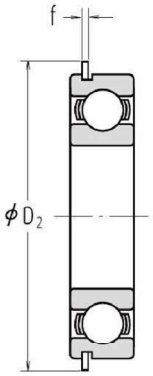
Open Type


Shielded Type
ZZ


Non-Contact
Sealed Type
VV


Contact
Sealed Type
DD · DDU

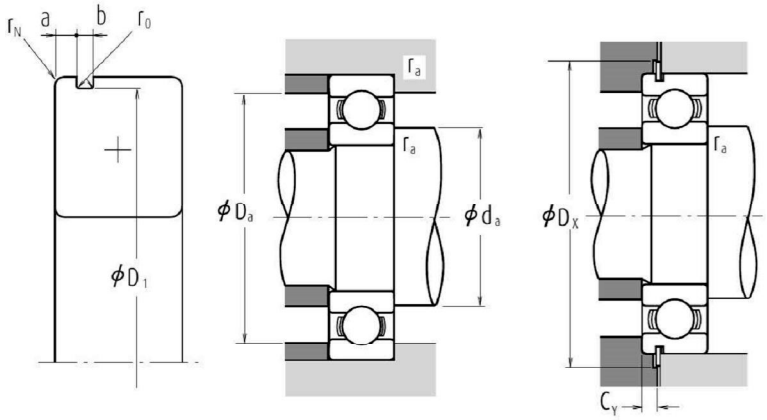

With Snap
Ring Groove
N



With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min⁻¹)			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
32	58	13	1	15 100	9 150	14.5	12 000	7 500	14 000	**60/32**	**ZZ**	**VV**	**DDU**
	65	17	1	20 700	11 600	13.6	10 000	7 100	12 000	**62/32**	**ZZ**	**VV**	**DDU**
	75	20	1.1	29 900	17 000	13.2	9 000	6 300	11 000	**63/32**	**ZZ**	**VV**	**DDU**
35	47	7	0.3	4 900	4 100	16.7	14 000	7 500	16 000	**6807**	**ZZ**	**VV**	**DD**
	55	10	0.6	10 600	7 250	15.5	12 000	7 500	15 000	**6907**	**ZZ**	**VV**	**DDU**
	62	9	0.3	11 700	8 200	15.6	11 000	—	13 000	**16007**	—	—	—
	62	14	1	16 000	10 300	14.8	11 000	6 700	13 000	**6007**	**ZZ**	**VV**	**DDU**
	62	14	1.0	16 800	10 300	14.8	13 000	6 700	15 000	**6007***	**ZZ**	**VV**	**DDU**
	72	17	1.1	25 700	15 300	13.8	9 500	6 300	11 000	**6207**	**ZZ**	**VV**	**DDU**
	72	17	1.1	27 000	15 300	13.8	11 000	6 300	13 000	**6207***	**ZZ**	**VV**	**DDU**
	80	21	1.5	33 500	19 200	13.2	8 500	6 000	10 000	**6307**	**ZZ**	**VV**	**DDU**
	80	21	1.5	35 000	19 200	13.2	10 000	6 000	12 000	**6307***	**ZZ**	**VV**	**DDU**
40	52	7	0.3	6 350	5 550	17.0	12 000	6 700	14 000	**6808**	**ZZ**	**VV**	**DD**
	62	12	0.6	13 700	10 000	15.7	11 000	6 300	13 000	**6908**	**ZZ**	**VV**	**DDU**
	68	9	0.3	12 600	9 650	16.0	10 000	—	12 000	**16008**	—	—	—
	68	15	1	16 800	11 500	15.3	10 000	6 000	12 000	**6008**	**ZZ**	**VV**	**DDU**
	68	15	1.0	17 600	11 500	15.3	12 000	6 000	14 000	**6008***	**ZZ**	**VV**	**DDU**
	80	18	1.1	29 100	17 900	14.0	8 500	5 600	10 000	**6208**	**ZZ**	**VV**	**DDU**
	80	18	1.1	30 500	17 900	14.0	9 500	5 600	12 000	**6208***	**ZZ**	**VV**	**DDU**
	90	23	1.5	40 500	24 000	13.2	7 500	5 300	9 000	**6308**	**ZZ**	**VV**	**DDU**
	90	23	1.5	43 000	24 000	13.2	9 000	5 300	11 000	**6308***	**ZZ**	**VV**	**DDU**
45	58	7	0.3	6 600	6 150	17.2	11 000	6 000	13 000	**6809**	**ZZ**	**VV**	**DD**
	68	12	0.6	14 100	10 900	15.9	9 500	5 600	12 000	**6909**	**ZZ**	**VV**	**DDU**
	75	10	0.6	14 900	11 400	15.9	9 000	—	11 000	**16009**	—	—	—
	75	16	1	20 900	15 200	15.3	9 000	5 300	11 000	**6009**	**ZZ**	**VV**	**DDU**
	75	16	1.0	22 000	15 200	15.3	10 000	5 300	12 000	**6009***	**ZZ**	**VV**	**DDU**
	85	19	1.1	31 500	20 400	14.4	7 500	5 300	9 000	**6209**	**ZZ**	**VV**	**DDU**
	85	19	1.1	33 000	20 400	14.4	9 000	5 300	11 000	**6209***	**ZZ**	**VV**	**DDU**
	100	25	1.5	53 000	32 000	13.1	6 700	4 800	8 000	**6309**	**ZZ**	**VV**	**DDU**
	100	25	1.5	55 500	32 000	13.1	7 500	4 800	9 500	**6309***	**ZZ**	**VV**	**DDU**

Notes
(1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119.**
(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.
(3) Ring types N and NR applicable only to open-type bearings. Please consult NSK about the snap ring groove dimensions of sealed or shielded bearings.
(4) Snap ring groove dimensions and snap ring dimensions are not conformed to ISO15.



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

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

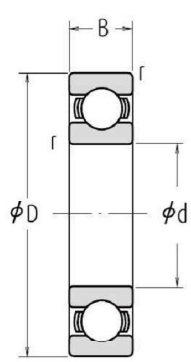
$\frac{F_a}{F_r} \leq 0.8$, $P_0=F_r$

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)
		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_y max.	approx.
N	NR	2.08	1.35	55.60	0.40	0.5	63.7	1.12	37	38.5	53	1	64.5	2.9	0.122
N	NR	3.28	1.90	62.60	0.60	0.5	70.7	1.70	37	40	60	1	71.5	4.6	0.225
N	NR	3.28	1.90	71.83	0.60	0.5	81.6	1.70	38.5	44.5	68.5	1	83	4.6	0.389
N	NR	1.30	0.95	45.70	0.25	0.3	49.8	0.85	37	37	45	0.3	50.5	1.8	0.027
N	NR	1.70	0.95	53.70	0.25	0.5	57.8	0.85	39	39	51	0.6	58.5	2.3	0.075
—	—	—	—	—	—	—	—	—	37	—	60	0.3	—	—	0.107
N	NR	2.08	1.90	59.61	0.60	0.5	67.7	1.70	40	41.5	57	1	68.5	3.4	0.151
N	NR	2.08	1.90	59.61	0.60	0.5	67.7	1.70	40	41.5	57	1	68.5	3.4	0.151
N	NR	3.28	1.90	68.81	0.60	0.5	78.6	1.70	41.5	44.5	65.5	1	80	4.6	0.284
N	NR	3.28	1.90	68.81	0.60	0.5	78.6	1.70	41.5	44.5	65.5	1	80	4.6	0.284
N	NR	3.28	1.90	76.81	0.60	0.5	86.6	1.70	43	47	72	1.5	88	4.6	0.464
N	NR	3.28	1.90	76.81	0.60	0.5	86.6	1.70	43	47	72	1.5	88	4.6	0.464
N	NR	1.30	0.95	50.70	0.25	0.3	54.8	0.85	42	42	50	0.3	55.5	1.8	0.031
N	NR	1.70	0.95	60.70	0.25	0.5	64.8	0.85	44	46	58	0.6	65.5	2.3	0.112
—	—	—	—	—	—	—	—	—	42	—	66	0.3	—	—	0.13
N	NR	2.49	1.90	64.82	0.60	0.5	74.6	1.70	45	47.5	63	1	76	3.8	0.19
N	NR	2.49	1.90	64.82	0.60	0.5	74.6	1.70	45	47.5	63	1	76	3.8	0.19
N	NR	3.28	1.90	76.81	0.60	0.5	86.6	1.70	46.5	50.5	73.5	1	88	4.6	0.366
N	NR	3.28	1.90	76.81	0.60	0.5	86.6	1.70	46.5	50.5	73.5	1	88	4.6	0.366
N	NR	3.28	2.70	86.79	0.60	0.5	96.5	2.46	48	53	82	1.5	98	5.4	0.636
N	NR	3.28	2.70	86.79	0.60	0.5	96.5	2.46	48	53	82	1.5	98	5.4	0.636
N	NR	1.30	0.95	56.70	0.25	0.3	60.8	0.85	47	47.5	56	0.3	61.5	1.8	0.038
N	NR	1.70	0.95	66.70	0.25	0.5	70.8	0.85	49	50	64	0.6	72	2.3	0.126
—	—	—	—	—	—	—	—	—	49	—	71	0.6	—	—	0.167
N	NR	2.49	1.90	71.83	0.60	0.5	81.6	1.70	50	53.5	70	1	83	3.8	0.241
N	NR	2.49	1.90	71.83	0.60	0.5	81.6	1.70	50	53.5	70	1	83	3.8	0.241
N	NR	3.28	1.90	81.81	0.60	0.5	91.6	1.70	51.5	55.5	78.5	1	93	4.6	0.42
N	NR	3.28	1.90	81.81	0.60	0.5	91.6	1.70	51.5	55.5	78.5	1	93	4.6	0.42
N	NR	3.28	2.70	96.80	0.60	0.5	106.50	2.46	53	61.5	92	1.5	108	5.4	0.829
N	NR	3.28	2.70	96.80	0.60	0.5	106.50	2.46	53	61.5	92	1.5	108	5.4	0.829

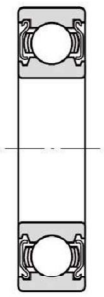
Remarks
1. Diameter Series 7 (extra thin section bearings) are also available, please contact NSK.
2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
3. The bearings denoted by an asterisk(*) are NSKHPS Deep groove ball bearings.

Single-Row Deep Groove Ball Bearings

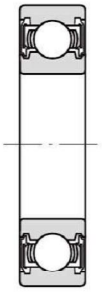
Bore Diameter 50 – 60 mm



Open Type

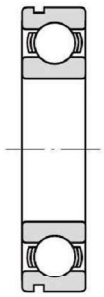


Shielded Type
ZZ

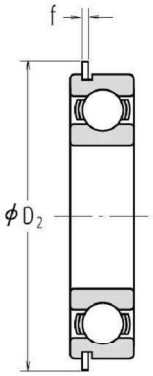


Non-Contact
Sealed Type
VV

Contact
Sealed Type
DD · DDU



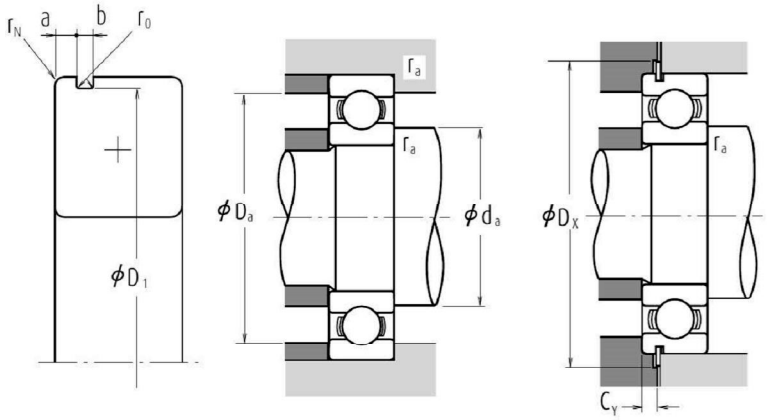
With Snap
Ring Groove
N



With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min^{-1})			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
50	65	7	0.3	6 400	6 200	17.2	9 500	5 300	11 000	**6810**	**ZZ**	**VV**	**DDU**
	72	12	0.6	14 500	11 700	16.1	9 000	5 300	11 000	**6910**	**ZZ**	**VV**	**DDU**
	80	10	0.6	15 400	12 400	16.1	8 500	—	10 000	**16010**	—	—	—
	80	16	1	21 800	16 600	15.6	8 500	4 800	10 000	**6010**	**ZZ**	**VV**	**DDU**
	80	16	1.0	22 900	16 600	15.6	9 500	4 800	11 000	**6010***	**ZZ**	**VV**	**DDU**
	90	20	1.1	35 000	23 200	14.4	7 100	4 800	8 500	**6210**	**ZZ**	**VV**	**DDU**
	90	20	1.1	37 000	23 200	14.4	8 500	4 800	10 000	**6210***	**ZZ**	**VV**	**DDU**
	110	27	2	62 000	38 500	13.2	6 000	4 300	7 500	**6310**	**ZZ**	**VV**	**DDU**
	110	27	2.0	65 000	38 500	13.2	7 100	4 300	8 500	**6310***	**ZZ**	**VV**	**DDU**
55	72	9	0.3	8 800	8 500	17.0	8 500	4 800	10 000	**6811**	**ZZ**	**VV**	**DDU**
	80	13	1	16 000	13 300	16.2	8 000	4 500	9 500	**6911**	**ZZ**	**VV**	**DDU**
	90	11	0.6	19 400	16 300	16.2	7 500	—	9 000	**16011**	—	—	—
	90	18	1.1	28 300	21 200	15.3	7 500	4 500	9 000	**6011**	**ZZ**	**VV**	**DDU**
	90	18	1.1	29 700	21 200	15.3	8 500	4 500	10 000	**6011***	**ZZ**	**VV**	**DDU**
	100	21	1.5	43 500	29 300	14.3	6 300	4 300	7 500	**6211**	**ZZ**	**VV**	**DDU**
	100	21	1.5	45 500	29 300	14.3	7 500	4 300	9 000	**6211***	**ZZ**	**VV**	**DDU**
	120	29	2	71 500	44 500	13.1	5 600	4 000	6 700	**6311**	**ZZ**	**VV**	**DDU**
	120	29	2.0	75 000	44 500	13.1	6 700	4 000	8 000	**6311***	**ZZ**	**VV**	**DDU**
60	78	10	0.3	11 500	10 900	16.9	8 000	4 500	9 500	**6812**	**ZZ**	**VV**	**DD**
	85	13	1	19 400	16 300	16.2	7 500	4 300	9 000	**6912**	**ZZ**	**VV**	**DDU**
	95	11	0.6	20 000	17 500	16.3	7 100	—	8 500	**16012**	—	—	—
	95	18	1.1	29 500	23 200	15.6	7 100	4 000	8 500	**6012**	**ZZ**	**VV**	**DDU**
	95	18	1.1	31 000	23 200	15.6	8 000	4 000	9 500	**6012***	**ZZ**	**VV**	**DDU**
	110	22	1.5	52 500	36 000	14.3	5 600	3 800	7 100	**6212**	**ZZ**	**VV**	**DDU**
	110	22	1.5	55 000	36 000	14.3	6 700	3 800	8 000	**6212***	**ZZ**	**VV**	**DDU**
	130	31	2.1	82 000	52 000	13.1	5 300	3 600	6 300	**6312**	**ZZ**	**VV**	**DDU**
	130	31	2.1	86 000	52 000	13.1	6 000	3 600	7 100	**6312***	**ZZ**	**VV**	**DDU**

Notes
(1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119.**
(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.
(3) Ring types N and NR applicable only to open-type bearings. Please consult NSK about the snap ring groove dimensions of sealed or shielded bearings.
(4) Not conformed to ISO15.



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

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

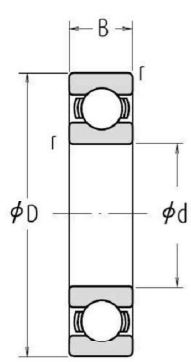
$\frac{F_a}{F_r} \leq 0.8$, $P_0=F_r$

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)
		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_y max.	approx.
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
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
—	—	—	—	—	—	—	—	—	54	—	76	0.6	—	—	0.175
N	NR	2.49	1.90	76.81	0.60	0.5	86.6	1.70	55	58.5	75	1	88	3.8	0.261
N	NR	2.49	1.90	76.81	0.60	0.5	86.6	1.70	55	58.5	75	1	88	3.8	0.261
N	NR	3.28	2.70	86.79	0.60	0.5	96.5	2.46	56.5	60	83.5	1	98	5.4	0.459
N	NR	3.28	2.70	86.79	0.60	0.5	96.5	2.46	56.5	60	83.5	1	98	5.4	0.459
N	NR	3.28	2.70	106.81	0.60	0.5	116.6	2.46	59	68	101	2	118	5.4	1.06
N	NR	3.28	2.70	106.81	0.60	0.5	116.6	2.46	59	68	101	2	118	5.4	1.06
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
N	NR	2.10	1.30	77.9	0.40	0.5	84.4	1.12	60	61.5	75	1	86	2.9	0.189
—	—	—	—	—	—	—	—	—	59	—	86	0.6	—	—	0.257
N	NR	2.87	2.70	86.79	0.60	0.5	96.5	2.46	61.5	64	83.5	1	98	5.0	0.381
N	NR	2.87	2.70	86.79	0.60	0.5	96.5	2.46	61.5	64	83.5	1	98	5.0	0.381
N	NR	3.28	2.70	96.8	0.60	0.5	106.5	2.46	63	66.5	92	1.5	108	5.4	0.619
N	NR	3.28	2.70	96.8	0.60	0.5	106.5	2.46	63	66.5	92	1.5	108	5.4	0.619
N	NR	4.06	3.10	115.21	0.60	0.5	129.7	2.82	64	72.5	111	2	131.5	6.5	1.37
N	NR	4.06	3.10	115.21	0.60	0.5	129.7	2.82	64	72.5	111	2	131.5	6.5	1.37
N	NR	1.70	1.30	76.2	0.40	0.3	82.7	1.12	62	64	76	0.3	84	2.5	0.103
N	NR	2.10	1.30	82.9	0.40	0.5	89.4	1.12	65	66	80	1	91	2.9	0.192
—	—	—	—	—	—	—	—	—	64	—	91	0.6	—	—	0.281
N	NR	2.87	2.70	91.82	0.60	0.5	101.6	2.46	66.5	69	88.5	1	103	5.0	0.412
N	NR	2.87	2.70	91.82	0.60	0.5	101.6	2.46	66.5	69	88.5	1	103	5.0	0.412
N	NR	3.28	2.70	106.81	0.60	0.5	116.6	2.46	68	74.5	102	1.5	118	5.4	0.783
N	NR	3.28	2.70	106.81	0.60	0.5	116.6	2.46	68	74.5	102	1.5	118	5.4	0.783
N	NR	4.06	3.10	125.22	0.60	0.5	139.7	2.82	71	79	119	2	141.5	6.5	1.72
N	NR	4.06	3.10	125.22	0.60	0.5	139.7	2.82	71	79	119	2	141.5	6.5	1.72

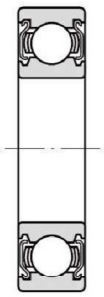
Remarks
1. Diameter Series 7 (extra thin section bearings) are also available, please contact NSK.
2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
3. The bearings denoted by an asterisk(*) are NSKHPS Deep groove ball bearings.

Single-Row Deep Groove Ball Bearings

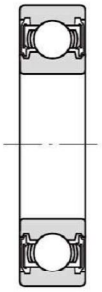
Bore Diameter 65 – 75 mm



Open Type

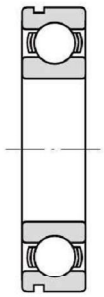


Shielded Type
ZZ

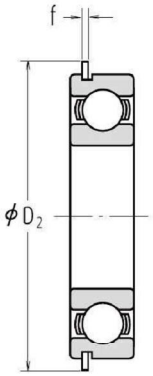


Non-Contact
Sealed Type
VV

Contact
Sealed Type
DD · DDU



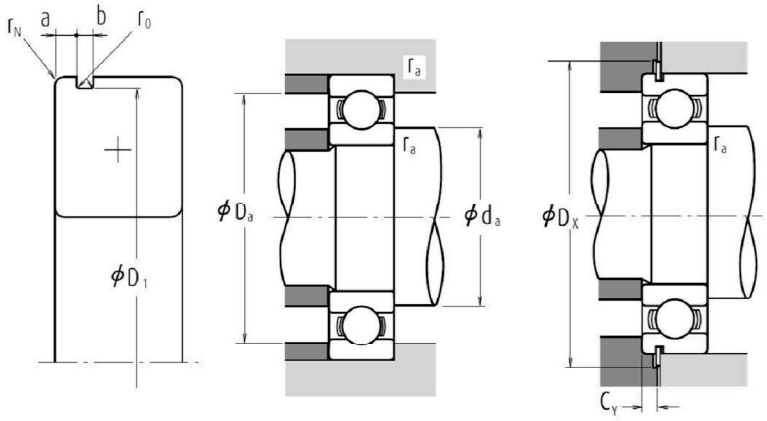
With Snap
Ring Groove
N



With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min⁻¹)			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
65	85	10	0.6	11 900	12 100	17.0	7 500	4 000	8 500	6813	ZZ	VV	DD
	90	13	1	17 400	16 100	16.6	7 100	4 000	8 500	6913	ZZ	VV	DDU
	100	11	0.6	20 500	18 700	16.5	6 700	—	8 000	16013	—	—	—
	100	18	1.1	30 500	25 200	15.8	6 700	4 000	8 000	6013	ZZ	VV	DDU
	100	18	1.1	32 000	25 200	15.8	7 500	4 000	9 000	6013*	ZZ	VV	DDU
	120	23	1.5	57 500	40 000	14.4	5 300	3 600	6 300	6213	ZZ	VV	DDU
	120	23	1.5	60 000	40 000	14.4	6 300	3 600	7 500	6213*	ZZ	VV	DDU
	140	33	2.1	92 500	60 000	13.2	4 800	3 400	6 000	6313	ZZ	VV	DDU
	140	33	2.1	97 500	60 000	13.2	5 600	3 400	6 700	6313*	ZZ	VV	DDU
70	90	10	0.6	12 100	12 700	17.2	6 700	3 800	8 000	6814	ZZ	VV	DD
	100	16	1	23 700	21 200	16.3	6 300	3 600	7 500	6914	ZZ	VV	DDU
	110	13	0.6	26 800	23 600	16.3	6 000	—	7 100	16014	—	—	—
	110	20	1.1	38 000	31 000	15.6	6 000	3 600	7 100	6014	ZZ	VV	DDU
	110	20	1.1	40 000	31 000	15.6	7 100	3 600	8 500	6014*	ZZ	VV	DDU
	125	24	1.5	62 000	44 000	14.5	5 000	3 400	6 300	6214	ZZ	VV	DDU
	125	24	1.5	65 500	44 000	14.5	6 000	3 400	7 100	6214*	ZZ	VV	DDU
	150	35	2.1	104 000	68 000	13.2	4 500	3 200	5 300	6314	ZZ	VV	DDU
	150	35	2.1	109 000	68 000	13.2	5 300	3 200	6 300	6314*	ZZ	VV	DDU
75	95	10	0.6	12 500	13 900	17.3	6 300	3 600	7 500	6815	ZZ	VV	DDU
	105	16	1	24 400	22 600	16.5	6 000	3 400	7 100	6915	ZZ	VV	DDU
	115	13	0.6	27 600	25 300	16.4	5 600	—	6 700	16015	—	—	—
	115	20	1.1	39 500	33 500	15.8	5 600	3 400	6 700	6015	ZZ	VV	DDU
	115	20	1.1	41 500	33 500	15.8	6 700	3 400	8 000	6015*	ZZ	VV	DDU
	130	25	1.5	66 000	49 500	14.7	4 800	3 200	5 600	6215	ZZ	VV	DDU
	130	25	1.5	69 500	49 500	14.7	5 600	3 200	6 700	6215*	ZZ	VV	DDU
	160	37	2.1	113 000	77 000	13.2	4 300	2 800	5 000	6315	ZZ	VV	DDU
	160	37	2.1	119 000	77 000	13.2	4 800	2 800	6 000	6315*	ZZ	VV	DDU

Notes
(1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119.**
(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.
(3) Ring types N and NR applicable only to open-type bearings. Please consult NSK about the snap ring groove dimensions of sealed or shielded bearings.
(4) Not conformed to ISO15.



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

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

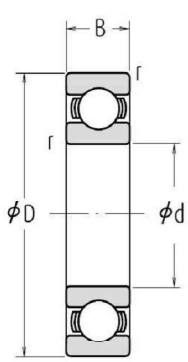
$\frac{F_a}{F_r} \leq 0.8$, $P_0=F_r$

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)
		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_y max.	approx.
N	NR	1.70	1.30	82.9	0.40	0.5	89.4	1.12	69	69	81	0.6	91	2.5	0.128
N	NR	2.10	1.30	87.9	0.40	0.5	94.4	1.12	70	71.5	85	1	96	2.9	0.218
—	—	—	—	—	—	—	—	—	69	—	96	0.6	—	—	0.30
N	NR	2.87	2.70	96.8	0.60	0.5	106.5	2.46	71.5	73	93.5	1	108	5.0	0.439
N	NR	2.87	2.70	96.8	0.60	0.5	106.5	2.46	71.5	73	93.5	1	108	5.0	0.439
N	NR	4.06	3.10	115.21	0.60	0.5	129.7	2.82	73	80	112	1.5	131.5	6.5	1.0
N	NR	4.06	3.10	115.21	0.60	0.5	129.7	2.82	73	80	112	1.5	131.5	6.5	1.0
N	NR	4.90	3.10	135.23	0.60	0.5	149.7	2.82	76	85.5	129	2	152	7.3	2.11
N	NR	4.90	3.10	135.23	0.60	0.5	149.7	2.82	76	85.5	129	2	152	7.3	2.11
N	NR	1.70	1.30	87.9	0.40	0.5	94.4	1.12	74	74.5	86	0.6	96	2.5	0.134
N	NR	2.50	1.30	97.9	0.40	0.5	104.4	1.12	75	77.5	95	1	106	3.3	0.349
—	—	—	—	—	—	—	—	—	74	—	106	0.6	—	—	0.441
N	NR	2.87	2.70	106.81	0.60	0.5	116.6	2.46	76.5	80.5	103.5	1	118	5.0	0.608
N	NR	2.87	2.70	106.81	0.60	0.5	116.6	2.46	76.5	80.5	103.5	1	118	5.0	0.608
N	NR	4.06	3.10	120.22	0.60	0.5	134.7	2.82	78	84	117	1.5	136.5	6.5	1.09
N	NR	4.06	3.10	120.22	0.60	0.5	134.7	2.82	78	84	117	1.5	136.5	6.5	1.09
N	NR	4.90	3.10	145.24	0.60	0.5	159.7	2.82	81	92	139	2	162	7.3	2.57
N	NR	4.90	3.10	145.24	0.60	0.5	159.7	2.82	81	92	139	2	162	7.3	2.57
N	NR	1.70	1.30	92.9	0.40	0.5	99.4	1.12	79	79.5	91	0.6	101	2.5	0.149
N	NR	2.50	1.30	102.60	0.40	0.5	110.7	1.12	80	82	100	1	112	3.3	0.364
—	—	—	—	—	—	—	—	—	79	—	111	0.6	—	—	0.463
N	NR	2.87	2.70	111.81	0.60	0.5	121.6	2.46	81.5	85.5	108.5	1	123	5.0	0.649
N	NR	2.87	2.70	111.81	0.60	0.5	121.6	2.46	81.5	85.5	108.5	1	123	5.0	0.649
N	NR	4.06	3.10	125.22	0.60	0.5	139.7	2.82	83	90	122	1.5	141.5	6.5	1.19
N	NR	4.06	3.10	125.22	0.60	0.5	139.7	2.82	83	90	122	1.5	141.5	6.5	1.19
N	NR	4.90	3.10	155.22	0.60	0.5	169.7	2.82	86	98.5	149	2	172	7.3	3.08
N	NR	4.90	3.10	155.22	0.60	0.5	169.7	2.82	86	98.5	149	2	172	7.3	3.08

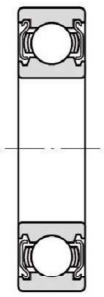
Remarks
1. Diameter Series 7 (extra thin section bearings) are also available, please contact NSK.
2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
3. The bearings denoted by an asterisk(*) are NSKHPS Deep groove ball bearings.

Single-Row Deep Groove Ball Bearings

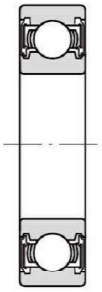
Bore Diameter 80 – 90 mm



Open Type

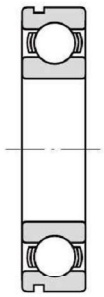


Shielded Type
ZZ

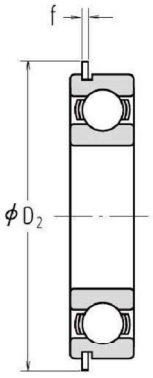


Non-Contact
Sealed Type
VV

Contact
Sealed Type
DD · DDU



With Snap
Ring Groove
N



With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min⁻¹)			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
80	100	10	0.6	12 700	14 500	17.4	6 000	3 400	7 100	**6816**	**ZZ**	**VV**	**DDU**
	110	16	1	25 000	24 000	16.6	5 600	3 200	6 700	**6916**	**ZZ**	**VV**	**DDU**
	125	14	0.6	32 000	29 600	16.4	5 300	—	6 300	**16016**	**—**	**—**	**—**
	125	22	1.1	47 500	40 000	15.6	5 300	3 200	6 300	**6016**	**ZZ**	**VV**	**DDU**
	125	22	1.1	50 000	40 000	15.6	6 300	3 200	7 100	**6016***	**ZZ**	**VV**	**DDU**
	140	26	2	72 500	53 000	14.6	4 500	3 000	5 300	**6216**	**ZZ**	**VV**	**DDU**
	140	26	2.0	76 500	53 000	14.6	5 300	3 000	6 300	**6216***	**ZZ**	**VV**	**DDU**
	170	39	2.1	123 000	86 500	13.3	4 000	2 800	4 800	**6316**	**ZZ**	**VV**	**DDU**
	170	39	2.1	129 000	86 500	13.3	4 500	2 800	5 600	**6316***	**ZZ**	**VV**	**DDU**
85	110	13	1	18 700	20 000	17.1	5 600	3 200	6 700	**6817**	**ZZ**	**VV**	**DDU**
	120	18	1.1	32 000	29 600	16.4	5 300	3 000	6 300	**6917**	**ZZ**	**VV**	**DDU**
	130	14	0.6	33 000	31 500	16.5	5 000	—	6 000	**16017**	**—**	**—**	**—**
	130	22	1.1	49 500	43 000	15.8	5 000	3 000	6 000	**6017**	**ZZ**	**VV**	**DDU**
	130	22	1.1	52 000	43 000	15.8	6 000	3 000	7 100	**6017***	**ZZ**	**VV**	**DDU**
	150	28	2	84 000	62 000	14.5	4 300	2 800	5 000	**6217**	**ZZ**	**VV**	**DDU**
	150	28	2.0	88 000	62 000	14.5	4 800	2 800	6 000	**6217***	**ZZ**	**VV**	**DDU**
	180	41	3	133 000	97 000	13.3	3 800	2 600	4 500	**6317**	**ZZ**	**VV**	**DDU**
	180	41	3.0	139 000	97 000	13.3	4 300	2 600	5 000	**6317***	**ZZ**	**VV**	**DDU**
90	115	13	1	19 000	21 000	17.2	5 300	3 000	6 300	**6818**	**ZZ**	**VV**	**DDU**
	125	18	1.1	33 000	31 500	16.5	5 000	2 800	6 000	**6918**	**ZZ**	**VV**	**DDU**
	140	16	1	41 500	39 500	16.3	4 800	—	5 600	**16018**	**—**	**—**	**—**
	140	24	1.5	58 000	50 000	15.6	4 800	2 800	5 600	**6018**	**ZZ**	**VV**	**DDU**
	140	24	1.5	61 000	50 000	15.6	5 600	2 800	6 300	**6018***	**ZZ**	**VV**	**DDU**
	160	30	2	96 000	71 500	14.5	4 000	2 600	4 800	**6218**	**ZZ**	**VV**	**DDU**
	160	30	2.0	101 000	71 500	14.5	4 500	2 600	5 600	**6218***	**ZZ**	**VV**	**DDU**
	190	43	3	143 000	107 000	13.3	3 600	2 400	4 300	**6318**	**ZZ**	**VV**	**DDU**
	190	43	3.0	150 000	107 000	13.3	4 000	2 400	4 800	**6318***	**ZZ**	**VV**	**DDU**

Notes

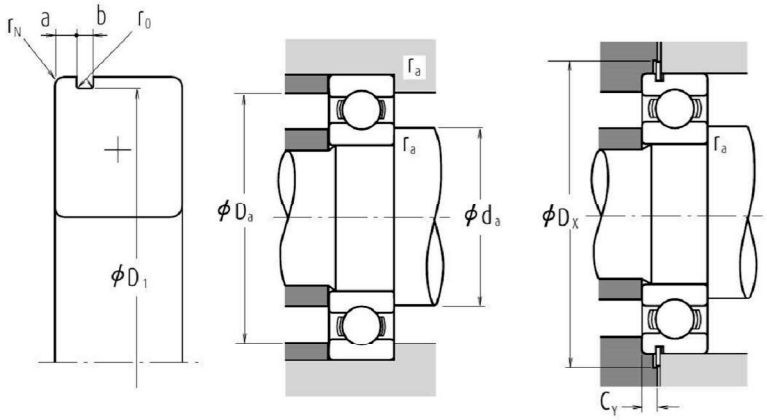
(1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119.**

(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.

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

(4) Not conformed to ISO15.

B 030



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

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

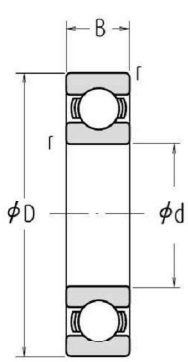
$\frac{F_a}{F_r} \leq 0.8$, $P_0=F_r$

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)
		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_y max.	approx.
N	NR	1.70	1.3	97.9	0.4	0.5	104.4	1.12	84	84.5	96	0.6	106	2.5	0.151
N	NR	2.50	1.3	107.60	0.4	0.5	115.7	1.12	85	87.5	105	1	117	3.3	0.391
—	—	—	—	—	—	—	—	—	84	—	121	0.6	—	—	0.621
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
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
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
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
N	NR	5.69	3.5	163.65	0.6	0.5	182.9	3.10	91	104.5	159	2	185	8.4	3.67
N	NR	5.69	3.5	163.65	0.6	0.5	182.9	3.10	91	104.5	159	2	185	8.4	3.67
N	NR	2.10	1.3	107.60	0.4	0.5	115.7	1.12	90	90.5	105	1	117	2.9	0.263
N	NR	3.30	1.3	117.60	0.4	0.5	125.7	1.12	91.5	94.5	113.5	1	127	4.1	0.55
—	—	—	—	—	—	—	—	—	89	—	126	0.6	—	—	0.652
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
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
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
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
N	NR	5.69	3.5	173.66	0.6	0.5	192.9	3.10	98	110.5	167	2.5	195	8.4	4.28
N	NR	5.69	3.5	173.66	0.6	0.5	192.9	3.10	98	110.5	167	2.5	195	8.4	4.28
N	NR	2.10	1.3	112.60	0.4	0.5	120.7	1.12	95	95.5	110	1	122	2.9	0.276
N	NR	3.30	1.3	122.60	0.4	0.5	130.7	1.12	96.5	98.5	118.5	1	132	4.1	0.585
—	—	—	—	—	—	—	—	—	95	—	135	1	—	—	0.873
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
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
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
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
N	NR	5.69	3.5	183.64	0.6	0.5	202.9	3.10	103	117	177	2.5	205	8.4	4.98
N	NR	5.69	3.5	183.64	0.6	0.5	202.9	3.10	103	117	177	2.5	205	8.4	4.98

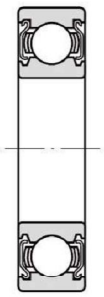
Remarks
1. Diameter Series 7 (extra thin section bearings) are also available, please contact NSK.
2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
3. The bearings denoted by an asterisk(*) are NSKHPS Deep groove ball bearings.

Single-Row Deep Groove Ball Bearings

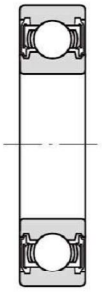
Bore Diameter 95 – 105 mm



Open Type

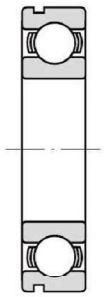


Shielded Type
ZZ · ZZS

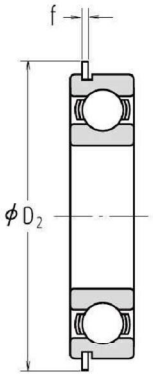


Non-Contact
Sealed Type
VV

Contact
Sealed Type
DD · DDU



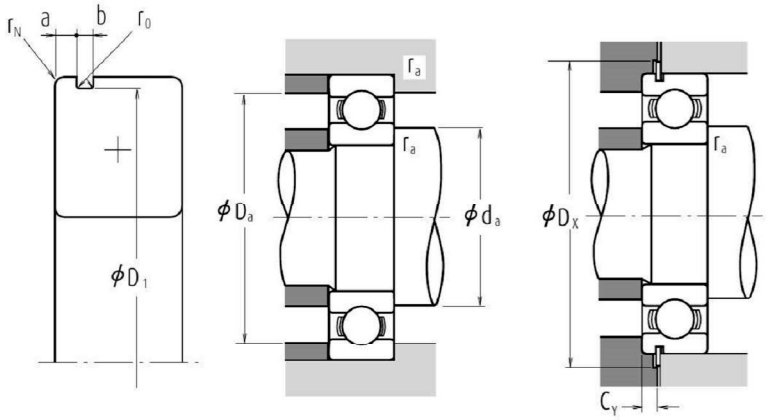
With Snap
Ring Groove
N



With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min⁻¹)			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
95	120	13	1	19 300	22 000	17.2	5 000	2 800	6 000	6819	ZZ	VV	DD
	130	18	1.1	33 500	33 500	16.6	4 800	2 800	5 600	6919	ZZ	VV	DDU
	145	16	1	43 000	42 000	16.4	4 500	—	5 300	16019	—	—	—
	145	24	1.5	60 500	54 000	15.8	4 500	2 600	5 300	6019	ZZ	VV	DDU
	145	24	1.5	63 500	54 000	15.8	5 300	2 600	6 000	6019*	ZZ	VV	DDU
	170	32	2.1	109 000	82 000	14.4	3 800	2 600	4 500	6219	ZZ	VV	DDU
	170	32	2.1	114 000	82 000	14.4	4 300	2 600	5 000	6219*	ZZ	VV	DDU
	200	45	3	153 000	119 000	13.3	3 000	2 400	3 600	6319	ZZ	VV	DDU
	200	45	3.0	160 000	119 000	13.3	3 400	2 400	4 300	6319*	ZZ	VV	DDU
100	125	13	1	19 600	23 000	17.3	4 800	2 800	5 600	6820	ZZ	VV	DD
	140	20	1.1	43 000	42 000	16.4	4 500	2 600	5 300	6920	ZZ	VV	DDU
	150	16	1	42 500	42 000	16.5	4 300	—	5 300	16020	—	—	—
	150	24	1.5	60 000	54 000	15.9	4 300	2 600	5 300	6020	ZZ	VV	DDU
	150	24	1.5	63 000	54 000	15.9	5 000	2 600	6 000	6020*	ZZ	VV	DDU
	180	34	2.1	122 000	93 000	14.4	3 600	2 400	4 300	6220	ZZ	VV	DDU
	180	34	2.1	128 000	93 000	14.4	4 000	2 400	4 800	6220*	ZZ	VV	DDU
	215	47	3	173 000	141 000	13.2	2 800	2 200	3 400	6320	ZZ	VV	DDU
105	130	13	1	19 800	23 900	17.4	4 800	2 600	5 600	6821	ZZ	VV	DDU
	145	20	1.1	42 500	42 000	16.5	4 300	—	5 300	6921	ZZ	VV	—
	160	18	1	52 000	50 500	16.3	4 000	—	4 800	16021	—	—	—
	160	26	2	72 500	66 000	15.8	4 000	2 400	4 800	6021	ZZ	VV	DDU
	160	26	2.0	76 000	66 000	15.8	4 500	2 400	5 600	6021*	ZZ	VV	DDU
	190	36	2.1	133 000	105 000	14.4	3 400	2 200	4 000	6221	ZZ	VV	DDU
	190	36	2.1	140 000	105 000	14.4	3 800	2 200	4 500	6221*	ZZ	VV	DDU
	225	49	3	184 000	154 000	13.2	2 600	2 000	3 200	6321	ZZ	—	DDU

Notes
(1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119.**
(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.
(3) Ring types N and NR applicable only to open-type bearings. Please consult NSK about the snap ring groove dimensions of sealed or shielded bearings.
(4) Not conformed to ISO15.



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

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

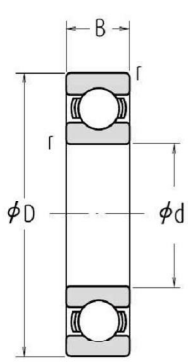
$\frac{F_a}{F_r} \leq 0.8$, $P_0=F_r$

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)
		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_y max.	approx.
N	NR	2.10	1.3	117.60	0.4	0.5	125.7	1.12	100	101.5	115	1	127	2.9	0.297
N	NR	3.30	1.3	127.60	0.4	0.5	135.7	1.12	101.5	103.5	123.5	1	137	4.1	0.601
—	—	—	—	—	—	—	—	—	100	—	140	1	—	—	0.904
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
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
N	NR	5.69	3.5	163.65	0.6	0.5	182.9	3.10	106	114	159	2	185	8.4	2.64
N	NR	5.69	3.5	163.65	0.6	0.5	182.9	3.10	106	114	159	2	185	8.4	2.64
N	NR	5.69	3.5	193.65	0.6	0.5	212.9	3.10	108	123.5	187	2.5	215	8.4	5.76
N	NR	5.69	3.5	193.65	0.6	0.5	212.9	3.10	108	123.5	187	2.5	215	8.4	5.76
N	NR	2.10	1.3	122.60	0.4	0.5	130.7	1.12	105	105.5	120	1	132	2.9	0.31
N	NR	3.30	1.9	137.60	0.6	0.5	145.7	1.70	106.5	111	133.5	1	147	4.7	0.828
—	—	—	—	—	—	—	—	—	105	—	145	1	—	—	0.945
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
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
N	NR	5.69	3.5	173.66	0.6	0.5	192.9	3.10	111	121.5	169	2	195	8.4	3.17
N	NR	5.69	3.5	173.66	0.6	0.5	192.9	3.10	111	121.5	169	2	195	8.4	3.17
—	—	—	—	—	—	—	—	—	113	133	202	2.5	—	—	7.04
N	NR	2.10	1.3	127.60	0.4	0.5	135.7	1.12	110	110.5	125	1	137	2.9	0.324
N	NR	3.30	1.9	142.60	0.6	0.5	150.7	1.70	111.5	116	138.5	1	152	4.7	0.856
—	—	—	—	—	—	—	—	—	110	—	155	1	—	—	1.24
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
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
N	NR	5.69	3.5	183.64	0.6	0.5	202.9	3.10	116	127.5	179	2	205	8.4	3.79
N	NR	5.69	3.5	183.64	0.6	0.5	202.9	3.10	116	127.5	179	2	205	8.4	3.79
—	—	—	—	—	—	—	—	—	118	138	212	2.5	—	—	8.09

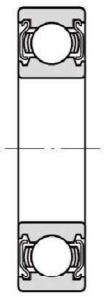
Remarks
1. Diameter Series 7 (extra thin section bearings) are also available, please contact NSK.
2. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
3. The bearings denoted by an asterisk(*) are NSKHPS Deep groove ball bearings.

Single-Row Deep Groove Ball Bearings

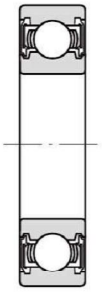
Bore Diameter 110 – 150 mm



Open Type

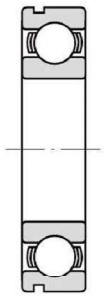


Shielded Type
ZZ · ZZS

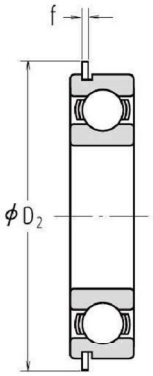


Non-Contact
Sealed Type
VV

Contact
Sealed Type
DD · DDU



With Snap
Ring Groove
N

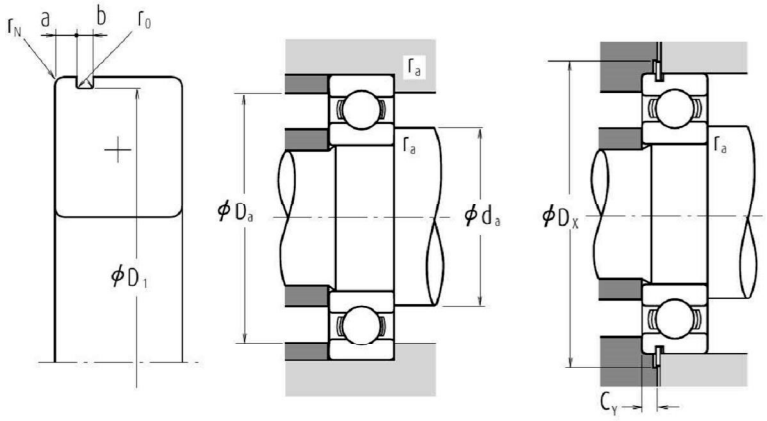


With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min^{-1})			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
110	140	16	1	28 100	32 500	17.1	4 300	2 400	5 300	**6822**	**ZZ**	**VV**	**DDU**
	150	20	1.1	43 500	44 500	16.6	4 300	2 400	5 000	**6922**	**ZZ**	**VV**	**DDU**
	170	19	1	57 500	56 500	16.3	3 800	–	4 500	**16022**	–	–	–
	170	28	2	85 000	73 000	15.5	3 800	2 200	4 500	**6022**	**ZZ**	**VV**	**DDU**
	170	28	2.0	89 000	73 000	15.5	4 500	2 200	5 300	**6022***	**ZZ**	**VV**	**DDU**
	200	38	2.1	144 000	117 000	14.3	2 800	2 200	3 400	**6222**	**ZZ**	**VV**	**DDU**
	240	50	3	205 000	179 000	13.2	2 400	–	3 000	**6322**	**ZZ**	–	–
120	150	16	1	28 900	35 500	17.3	4 000	2 200	4 800	**6824**	**ZZ**	**VV**	**DD**
	165	22	1.1	53 000	54 000	16.5	3 800	–	4 500	**6924**	**ZZ**	–	–
	180	19	1	56 500	57 500	16.5	3 600	–	4 300	**16024**	–	–	–
	180	28	2	88 000	80 000	15.7	3 600	2 200	4 300	**6024**	**ZZ**	**VV**	**DDU**
	180	28	2.0	92 500	80 000	15.7	4 000	2 200	4 800	**6024***	**ZZ**	**VV**	**DDU**
	215	40	2.1	155 000	131 000	14.4	2 600	2 000	3 200	**6224**	**ZZ**	**VV**	**DDU**
	260	55	3	207 000	185 000	13.5	2 200	1 800	2 800	**6324**	**ZZS**	–	**DDU**
130	165	18	1.1	37 000	44 000	17.1	3 600	2 000	4 300	**6826**	**ZZS**	**VV**	**DD**
	180	24	1.5	65 000	67 500	16.5	3 400	–	4 000	**6926**	**ZZ**	–	–
	200	22	1.1	75 500	77 500	16.4	3 000	–	3 600	**16026**	–	–	–
	200	33	2	106 000	101 000	15.8	3 000	1 900	3 600	**6026**	**ZZ**	–	**DDU**
	230	40	3	167 000	146 000	14.5	2 400	–	3 000	**6226**	**ZZ**	–	–
	280	58	4	229 000	214 000	13.6	2 200	–	2 600	**6326**	**ZZS**	–	–
140	175	18	1.1	38 500	48 000	17.3	3 400	1 900	4 000	**6828**	**ZZ**	**VV**	**DDU**
	190	24	1.5	66 500	72 000	16.6	3 200	–	3 800	**6928**	**ZZS**	**VV**	–
	210	22	1.1	77 500	82 500	16.5	2 800	–	3 400	**16028**	–	–	–
	210	33	2	110 000	109 000	16.0	2 800	1 800	3 400	**6028**	**ZZ**	–	**DDU**
	250	42	3	166 000	150 000	14.9	2 200	1 700	2 800	**6228**	**ZZS**	–	**DDU**
	300	62	4	253 000	246 000	13.6	2 000	–	2 400	**6328**	**ZZS**	–	–
150	190	20	1.1	47 500	58 500	17.1	3 200	1 800	3 800	**6830**	**ZZ**	**VV**	**DDU**
	210	28	2	85 000	90 500	16.5	2 600	1 700	3 200	**6930**	**ZZS**	–	**DDU**
	225	24	1.1	84 000	91 000	16.6	2 600	–	3 000	**16030**	–	–	–
	225	35	2.1	126 000	126 000	15.9	2 600	1 700	3 000	**6030**	**ZZ**	**VV**	**DDU**
	270	45	3	176 000	168 000	15.1	2 000	–	2 600	**6230**	**ZZS**	–	–
	320	65	4	274 000	284 000	13.9	1 800	–	2 200	**6330**	**ZZS**	–	–

Notes (1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119.**
(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.

B 034



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	e	$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
		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

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

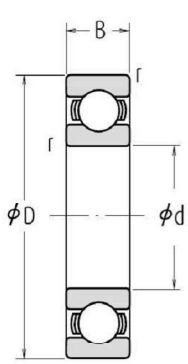
$\frac{F_a}{F_r} \le 0.8$, $P_0=F_r$

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)
		a	b	D_1	r_0	r_N	D_2	f	d_a(2)		D_a(2)	r_a	D_x	C_y	
		max.	min.	max.	max.	min.	max.	max.	min.	max.	max.	max.	min.	max.	approx.
N	NR	2.50	1.9	137.60	0.6	0.5	145.7	1.7	115	117	135	1	147	3.9	0.497
N	NR	3.30	1.9	147.60	0.6	0.5	155.7	1.7	116.5	121	143.5	1	157	4.7	0.893
—	—	—	—	—	—	—	—	—	115	—	165	1	—	—	1.51
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
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
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
—	—	—	—	—	—	—	—	—	123	147	227	2.5	—	—	9.51
N	NR	2.50	1.9	147.60	0.6	0.5	155.7	1.7	125	127	145	1	157	3.9	0.537
N	NR	3.70	1.9	161.80	0.6	0.5	171.5	1.7	126.5	132	158.5	1	173	5.1	1.21
—	—	—	—	—	—	—	—	—	125	—	175	1	—	—	1.6
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
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
—	—	—	—	—	—	—	—	—	131	146	204	2	—	—	5.29
—	—	—	—	—	—	—	—	—	133	161	247	2.5	—	—	12.5
N	NR	3.30	1.9	161.80	0.6	0.5	171.5	1.7	136.5	138	158.5	1	173	4.7	0.758
N	NR	3.70	1.9	176.80	0.6	0.5	186.5	1.7	138	144	172	1.5	188	5.1	1.57
—	—	—	—	—	—	—	—	—	136.5	—	193.5	1	—	—	2.4
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
—	—	—	—	—	—	—	—	—	143	157	217	2.5	—	—	5.96
—	—	—	—	—	—	—	—	—	146	175	264	3	—	—	15.2
N	NR	3.30	1.9	171.80	0.6	0.5	181.5	1.7	146.5	148.5	168.5	1	183	4.7	0.832
N	NR	3.70	1.9	186.80	0.6	0.5	196.5	1.7	148	153.5	182	1.5	198	5.1	1.67
—	—	—	—	—	—	—	—	—	146.5	—	203.5	1	—	—	2.84
—	—	—	—	—	—	—	—	—	149	158.5	201	2	—	—	3.48
—	—	—	—	—	—	—	—	—	153	171.5	237	2.5	—	—	7.68
—	—	—	—	—	—	—	—	—	156	187	284	3	—	—	18.5
N	NR	3.30	1.9	186.80	0.6	0.5	196.5	1.7	156.5	160	183.5	1	198	4.7	1.15
—	—	—	—	—	—	—	—	—	159	166	201	2	—	—	3.01
—	—	—	—	—	—	—	—	—	156.5	—	218.5	1	—	—	3.62
—	—	—	—	—	—	—	—	—	161	170	214	2	—	—	4.24
—	—	—	—	—	—	—	—	—	163	186	257	2.5	—	—	10
—	—	—	—	—	—	—	—	—	166	203	304	3	—	—	22.7

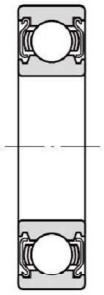
Remarks
1. When using bearings with rotating outer rings, contact NSK if they are sealed, shielded, or have snap rings.
2. Please consult NSK about the snap ring groove dimensions of sealed and shielded bearings when the diameter of dimension series 18 and 19 is 50 mm or more.
3. The bearings denoted by an asterisk(*) are NSKHPS Deep groove ball bearings.

Single-Row Deep Groove Ball Bearings

Bore Diameter 160 mm

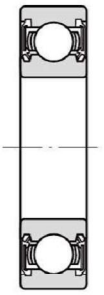


Open Type

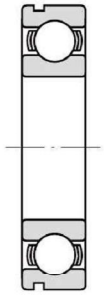


Shielded Type
ZZ · ZZS

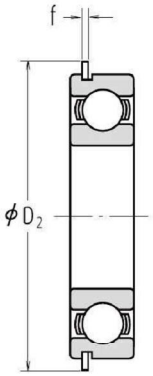
Non-Contact
Sealed Type
VV



Contact
Sealed Type
DD · DDU



With Snap
Ring Groove
N

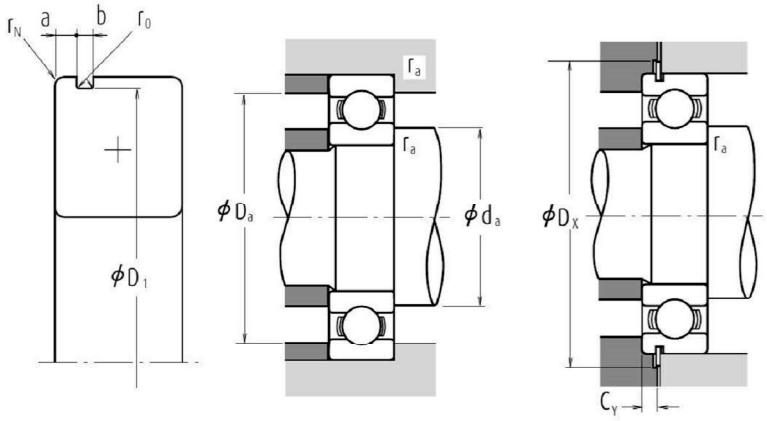


With
Snap Ring
NR

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min^{-1})			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{or}	f_o	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
160	200	20	1.1	48 500	61 000	17.2	2 600	1 700	3 200	**6832**	**ZZS**	**VV**	**DDU**
	220	28	2	87 000	96 000	16.6	2 600	1 600	3 000	**6932**	**ZZS**	—	**DDU**
	240	25	1.5	99 000	108 000	16.5	2 400	—	2 800	**16032**	—	—	—
	240	38	2.1	137 000	135 000	15.9	2 400	1 600	2 800	**6032**	**ZZ**	—	**DDU**
	290	48	3	185 000	186 000	15.4	1 900	—	2 400	**6232**	**ZZS**	—	—
	340	68	4	278 000	287 000	13.9	1 700	—	2 000	**6332**	**ZZS**	—	—

Notes (1) For tolerances for the snap ring grooves and snap ring dimensions, refer to Pages **A116** to **A119.**
(2) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.

B 036



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

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

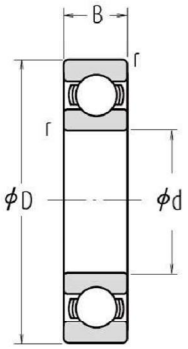
$\frac{F_a}{F_r}\leq 0.8$, $P_0=F_r$

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)
		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_y max.	approx.
N	NR	3.30	1.9	196.80	0.6	0.5	206.5	1.7	166.5	170.5	193.5	1	208	4.7	1.23
—	—	—	—	—	—	—	—	—	169	176	211	2	—	—	2.71
—	—	—	—	—	—	—	—	—	168	—	232	1.5	—	—	4.2
—	—	—	—	—	—	—	—	—	171	181.5	229	2	—	—	5.15
—	—	—	—	—	—	—	—	—	173	202	277	2.5	—	—	12.8
—	—	—	—	—	—	—	—	—	176	215.5	324	3	—	—	26.2

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 sealed and shielded bearings when the diameter of dimension series 18 and 19 is 50 mm or more.

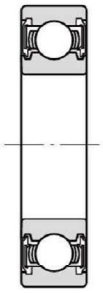
Single-Row Deep Groove Ball Bearings

Bore Diameter 170 – 240 mm



Open Type

Shielded Type
ZZS



Non-Contact
Sealed Type
VV

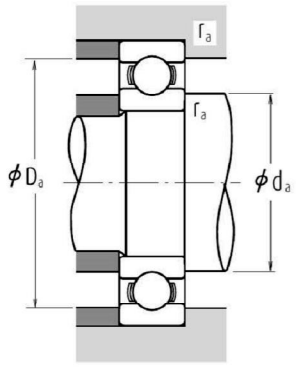
Contact
Sealed Type
DDU

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min^{-1})			Bearing Numbers			
							Grease		Oil				
d	D	B	r min.	C_r	C_{0r}	f_0	Open Z · ZZ V · VV	DU DDU	Open Z	Open	Shielded	Sealed	
170	215	22	1.1	60 000	75 000	17.1	2 600	1 600	3 000	**6834**	**ZZS**	**VV**	**DDU**
	230	28	2	86 000	97 000	16.7	2 400	–	2 800	**6934**	**ZZS**	–	–
	260	28	1.5	114 000	126 000	16.5	2 200	–	2 600	**16034**	–	–	–
	260	42	2.1	161 000	161 000	15.8	2 200	–	2 600	**6034**	**ZZS**	**VV**	–
	310	52	4	212 000	224 000	15.3	1 800	–	2 200	**6234**	**ZZS**	–	–
	360	72	4	325 000	355 000	13.6	1 600	–	2 000	**6334**	–	–	–
180	225	22	1.1	60 500	78 500	17.2	2 400	–	2 800	**6836**	–	**VV**	–
	250	33	2	119 000	128 000	16.4	2 200	–	2 600	**6936**	**ZZS**	–	–
	280	31	2	145 000	157 000	16.3	2 000	–	2 400	**16036**	–	–	–
	280	46	2.1	180 000	185 000	15.6	2 000	–	2 400	**6036**	**ZZS**	**VV**	–
	320	52	4	227 000	241 000	15.1	1 700	–	2 000	**6236**	**ZZS**	–	–
	380	75	4	355 000	405 000	13.9	1 500	–	1 800	**6336**	–	–	–
190	240	24	1.5	73 000	93 500	17.1	2 200	–	2 600	**6838**	–	**VV**	–
	260	33	2	113 000	127 000	16.6	2 200	–	2 600	**6938**	–	–	–
	290	31	2	149 000	168 000	16.4	2 000	–	2 400	**16038**	–	–	–
	290	46	2.1	188 000	201 000	15.8	2 000	–	2 400	**6038**	**ZZS**	–	–
	340	55	4	255 000	282 000	15.0	1 600	–	2 000	**6238**	**ZZS**	–	–
	400	78	5	355 000	415 000	14.1	1 400	–	1 700	**6338**	–	–	–
200	250	24	1.5	74 000	98 000	17.2	2 200	–	2 600	**6840**	–	–	–
	280	38	2.1	143 000	158 000	16.4	2 000	–	2 400	**6940**	**ZZS**	–	–
	310	34	2	161 000	180 000	16.4	1 900	–	2 200	**16040**	–	–	–
	310	51	2.1	207 000	226 000	15.6	1 900	–	2 200	**6040**	**ZZS**	–	–
	360	58	4	269 000	310 000	15.2	1 500	–	1 800	**6240**	**ZZS**	–	–
	420	80	5	380 000	445 000	13.8	1 300	–	1 600	**6340**	–	–	–
220	270	24	1.5	76 500	107 000	17.4	1 900	–	2 400	**6844**	**ZZS**	–	–
	300	38	2.1	146 000	169 000	16.6	1 800	–	2 200	**6944**	**ZZS**	–	–
	340	37	2.1	180 000	217 000	16.5	1 600	–	2 000	**16044**	–	–	–
	340	56	3	235 000	271 000	15.6	1 700	–	2 000	**6044**	**ZZS**	–	–
	400	65	4	310 000	375 000	15.1	1 300	–	1 600	**6244**	–	–	–
	460	88	5	410 000	520 000	14.3	1 200	–	1 500	**6344**	–	–	–
240	300	28	2	98 500	137 000	17.3	1 700	–	2 000	**6848**	–	–	–
	320	38	2.1	154 000	190 000	16.8	1 700	–	2 000	**6948**	**ZZS**	–	–
	360	37	2.1	196 000	243 000	16.5	1 500	–	1 900	**16048**	–	–	–
	360	56	3	244 000	296 000	15.9	1 500	–	1 900	**6048**	–	–	–
	440	72	4	340 000	430 000	15.2	1 200	–	1 500	**6248**	–	–	–
	500	95	5	470 000	625 000	14.2	1 100	–	1 300	**6348**	–	–	–

Note (1) When heavy axial loads are applied, increase d_a and decrease D_a from the above values.

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

B 038



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	e	$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
		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

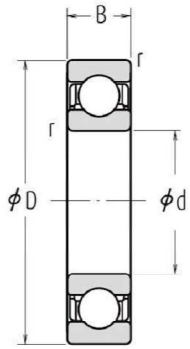
$\frac{F_a}{F_r} > 0.8$, $P_0=0.6F_r+0.5F_a$

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

Abutment and Fillet Dimensions (mm)				Mass (kg)
d_a(1) min.	d_a(1) max.	D_a(1) max.	r_a max.	approx.
176.5	182.0	208.5	1	1.86
179	186.0	221	2	3.34
178	—	252	1.5	5.71
181	194.5	249	2	6.89
186	215.0	294	3	15.8
186	—	344	3	36.6
186.5	192.0	218.5	1	1.98
189	198.5	241	2	4.16
189	—	271	2	7.5
191	208.0	269	2	8.88
196	223.0	304	3	15.9
196	—	364	3	43.1
198	202.5	232	1.5	2.53
199	—	251	2	5.18
199	—	281	2	7.78
201	218.0	279	2	9.39
206	236.0	324	3	22.3
210	—	380	4	49.7
208	—	242	1.5	2.67
211	222.0	269	2	7.28
209	—	301	2	10
211	231.5	299	2	12
216	252.0	344	3	26.7
220	—	400	4	55.3
228	233.5	262	1.5	2.9
231	242.0	289	2	7.88
231	—	329	2	13.1
233	254.5	327	2.5	18.6
236	—	384	3	37.4
240	—	440	4	73.9
249	—	291	2	4.48
251	262.0	309	2	8.49
251	—	349	2	13.9
253	—	347	2.5	19.9
256	—	424	3	50.5
260	—	480	4	94.4

Single-Row Deep Groove Ball Bearings

Bore Diameter 260 – 360 mm

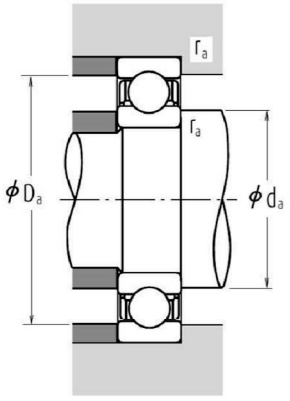


Open Type

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min^{-1})		Bearing Numbers
d	D	B	r min.	C_r	C_{0r}	f_0	Grease	Oil	Open
260	320	28	2	101 000	148 000	17.4	1 600	1 900	6852
	360	46	2.1	204 000	255 000	16.5	1 500	1 800	6952
	400	44	3	237 000	310 000	16.4	1 400	1 700	16052
	400	65	4	291 000	375 000	15.8	1 400	1 700	6052
	480	80	5	400 000	540 000	15.1	1 100	1 300	6252
	540	102	6	505 000	710 000	14.6	1 000	1 200	6352
280	350	33	2	133 000	191 000	17.3	1 500	1 700	6856
	380	46	2.1	209 000	272 000	16.6	1 400	1 700	6956
	420	44	3	243 000	330 000	16.5	1 300	1 600	16056
	420	65	4	300 000	410 000	16.0	1 300	1 600	6056
	500	80	5	400 000	550 000	15.2	1 000	1 300	6256
	580	108	6	570 000	840 000	14.5	900	1 100	6356
300	380	38	2.1	166 000	233 000	17.1	1 300	1 600	6860
	420	56	3	269 000	370 000	16.4	1 300	1 500	6960
	460	50	4	285 000	405 000	16.4	1 200	1 400	16060
	460	74	4	355 000	500 000	15.8	1 200	1 400	6060
	540	85	5	465 000	670 000	15.1	950	1 200	6260
320	400	38	2.1	168 000	244 000	17.2	1 300	1 500	6864
	440	56	3	266 000	375 000	16.5	1 200	1 400	6964
	480	50	4	293 000	430 000	16.5	1 100	1 300	16064
	480	74	4	390 000	570 000	15.7	1 100	1 300	6064
	580	92	5	530 000	805 000	15.0	850	1 100	6264
340	420	38	2.1	175 000	265 000	17.3	1 200	1 400	6868
	460	56	3	273 000	400 000	16.6	1 100	1 300	6968
	520	82	5	440 000	660 000	15.6	1 000	1 200	6068
	620	92	6	530 000	820 000	15.3	800	1 000	6268
360	440	38	2.1	192 000	290 000	17.3	1 100	1 300	6872
	480	56	3	280 000	425 000	16.7	1 100	1 300	6972
	540	82	5	460 000	720 000	15.7	950	1 200	6072
	650	95	6	555 000	905 000	15.4	750	950	6272

Note (1) When heavy axial loads are applied. increase d_a and decrease D_a from the above values.

B 040



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_0F_a}{C_{or}}$	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

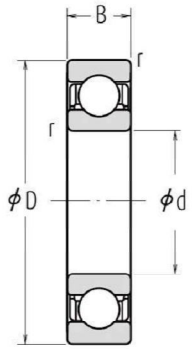
$\frac{F_a}{F_r} > 0.8$, $P_0=0.6F_r+0.5F_a$

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

Abutment and Fillet Dimensions (mm)			Mass (kg)
d_a(1) min.	D_a(1) max.	r_a max.	approx.
269	311	2	4.84
271	349	2	14
273	387	2.5	21.1
276	384	3	29.4
280	460	4	67
286	514	5	118
289	341	2	7.2
291	369	2	15.1
293	407	2.5	22.7
296	404	3	31.2
300	480	4	70.4
306	554	5	144
311	369	2	10.3
313	407	2.5	23.9
316	444	3	31.5
316	444	3	44.2
320	520	4	87.8
331	389	2	10.8
333	427	2.5	25.3
336	464	3	33.2
336	464	3	46.5
340	560	4	111
351	409	2	11.5
353	447	2.5	26.6
360	500	4	62.3
366	594	5	129
371	429	2	11.8
373	467	2.5	27.9
380	520	4	65.3
386	624	5	145

Single-Row Deep Groove Ball Bearings

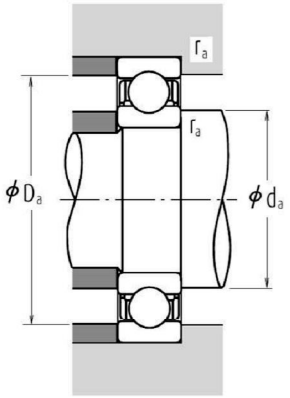
Bore Diameter 380 – 600 mm



Open Type

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min⁻¹)		Bearing Numbers
d	D	B	r min.	C_r	C_{0r}	f_0	Grease	Oil	Open
380	480	46	2.1	238 000	375 000	17.1	1 000	1 200	6876
	520	65	4	325 000	510 000	16.6	950	1 200	6976
	560	82	5	455 000	725 000	15.9	900	1 100	6076
400	500	46	2.1	241 000	390 000	17.2	950	1 200	6880
	540	65	4	335 000	540 000	16.7	900	1 100	6980
	600	90	5	510 000	825 000	15.7	850	1 000	6080
420	520	46	2.1	245 000	410 000	17.3	900	1 100	6884
	560	65	4	340 000	570 000	16.8	900	1 100	6984
	620	90	5	530 000	895 000	15.8	800	1 000	6084
440	540	46	2.1	248 000	425 000	17.4	900	1 100	6888
	600	74	4	395 000	680 000	16.6	800	1 000	6988
	650	94	6	550 000	965 000	16.0	750	900	6088
460	580	56	3	310 000	550 000	17.1	800	1 000	6892
	620	74	4	405 000	720 000	16.7	800	950	6992
	680	100	6	605 000	1 080 000	15.8	710	850	6092
480	600	56	3	315 000	575 000	17.2	800	950	6896
	650	78	5	450 000	815 000	16.6	750	900	6996
	700	100	6	605 000	1 090 000	15.9	710	850	6096
500	620	56	3	320 000	600 000	17.3	750	900	68/500
	670	78	5	460 000	865 000	16.7	710	850	69/500
	720	100	6	630 000	1 170 000	16.0	670	800	60/500
530	650	56	3	325 000	625 000	17.4	710	850	68/530
	710	82	5	455 000	870 000	16.8	670	800	69/530
	780	112	6	680 000	1 300 000	16.0	600	750	60/530
560	680	56	3	330 000	650 000	17.4	670	800	68/560
	750	85	5	525 000	1 040 000	16.7	600	750	69/560
	820	115	6	735 000	1 500 000	16.2	560	670	60/560
600	730	60	3	355 000	735 000	17.5	600	710	68/600
	800	90	5	550 000	1 160 000	16.9	560	670	69/600
	870	118	6	790 000	1 640 000	16.1	530	630	60/600

Note (1) When heavy axial loads are applied. increase d_a and decrease D_a from the above values.



Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_oF_a}{C_{or}}$	e	$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
		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

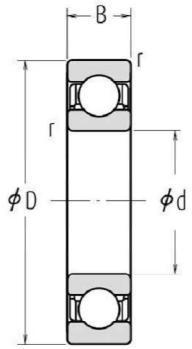
$\frac{F_a}{F_r} > 0.8$, $P_0=0.6F_r+0.5F_a$

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

Abutment and Fillet Dimensions (mm)			Mass (kg)
d_a(1) min.	D_a(1) max.	r_a max.	approx.
391	469	2	19.5
396	504	3	40
400	540	4	68
411	489	2	20.5
416	524	3	42
420	580	4	88.4
431	509	2	21.4
436	544	3	43.6
440	600	4	92.2
451	529	2	22.3
456	584	3	60.2
466	624	5	106
473	567	2.5	34.3
476	604	3	62.6
486	654	5	123
493	587	2.5	35.4
500	630	4	73.5
506	674	5	127
513	607	2.5	37.2
520	650	4	82
526	694	5	131
543	637	2.5	39.8
550	690	4	89.8
556	754	5	184
573	667	2.5	41.5
580	730	4	105
586	793.5	5	203
613	717	2.5	50.9
620	780	4	120
626	844	5	236

Single-Row Deep Groove Ball Bearings

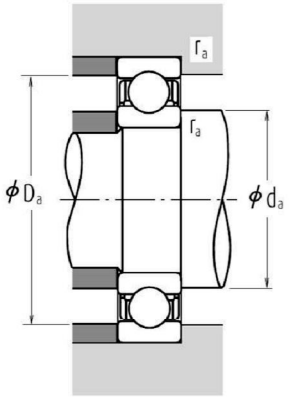
Bore Diameter 630 – 800 mm



Open Type

Boundary Dimensions (mm)				Basic Load Ratings (N)		Factor	Limiting Speeds (min⁻¹)		Bearing Numbers
d	D	B	r min.	C_r	C_{0r}	f_0	Grease	Oil	Open
630	780	69	4	420 000	890 000	17.3	560	670	**68/630**
	850	100	6	625 000	1 350 000	16.7	530	630	**69/630**
	920	128	7.5	750 000	1 620 000	16.4	480	600	**60/630**
670	820	69	4	435 000	965 000	17.4	500	630	**68/670**
	900	103	6	675 000	1 460 000	16.7	480	560	**69/670**
	980	136	7.5	765 000	1 730 000	16.6	450	530	**60/670**
710	870	74	4	480 000	1 100 000	17.4	480	560	**68/710**
	950	106	6	715 000	1 640 000	16.8	450	530	**69/710**
750	920	78	5	525 000	1 260 000	17.4	430	530	**68/750**
	1 000	112	6	785 000	1 840 000	16.7	400	500	**69/750**
800	980	82	5	530 000	1 310 000	17.5	400	480	**68/800**
	1 060	115	6	825 000	2 050 000	16.8	380	450	**69/800**

Note (1) When heavy axial loads are applied. increase d_a and decrease D_a from the above values.



Abutment and Fillet Dimensions (mm)			Mass (kg)
d_a(1) min.	D_a(1) max.	r_a max.	approx.
646	764	3	71.3
656	824	5	163
662	888	6	285
686	804	3	75.4
696	874	5	181
702	948	6	351
726	854	3	92.6
736	924	5	208
770	900	4	110
776	974	5	245
820	960	4	132
826	1034	5	275

Dynamic Equivalent Load $P=XF_r+YF_a$

$\frac{f_oF_a}{C_{or}}$	e	$\frac{F_a}{F_r} \le e$		$\frac{F_a}{F_r} > e$	
		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

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

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