

## ANGULAR CONTACT BALL BEARINGS

### SINGLE-ROW AND MATCHED ANGULAR CONTACT BALL BEARINGS

Bore Diameter 10 – 65mm.....	B50
Bore Diameter 70 – 120mm.....	B60
Bore Diameter 130 – 200mm.....	B66

### DOUBLE-ROW ANGULAR CONTACT BALL BEARINGS

Bore Diameter 10 – 85mm.....	B70
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### FOUR-POINT CONTACT BALL BEARINGS

Bore Diameter 30 – 200mm.....	B72
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## DESIGN, TYPES, AND FEATURES

### SINGLE-ROW ANGULAR CONTACT BALL BEARINGS

Since these bearings have a contact angle, they can sustain significant axial loads in one direction together with radial loads. Because of their design, when a radial load is applied, an axial force component is produced; therefore, two opposed bearings or a combination of more than two must be used.

Since the rigidity of single-row angular contact ball bearings can be increased by preloading, they are often used in the main spindles of machine tools, for which high running accuracy is required. (Refer to Chapter 10, Preload, Page A96).

Usually, the cages for angular contact ball bearings with a contact angle of 30° (Symbol A) or 40° (Symbol B) are in accordance with Table 1, but depending on the application, machined synthetic resin cages or molded polyamide resin cages are also used. The basic load ratings given in the bearing tables are based on the cage classification listed in Table 1.

Though the figures in the bearing tables (Pages B50 to B65; bearing bore diameters of 10 to 120) show bearings with single-shoulder-type inner rings, both-shoulder-type bearings are also available. Please consult NSK for more detailed information.

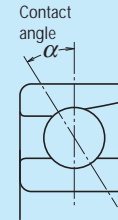


Table 1 Standard Cages for Angular Contact Ball Bearings

Series	Pressed Steel Cages	Machined Brass Cages
79A5, C	—	7900 – 7940
70A	7000 – 7018	7019 – 7040
70C	—	7000 – 7022
72A, B	7200 – 7222	7224 – 7240
72C	—	7200 – 7240
73A, B	7300 – 7320	7321 – 7340

In addition, for bearings with the same serial number, if the type of cages are different, the number of balls may also be different. In such a case, the load rating will differ from the one listed in the bearing tables.

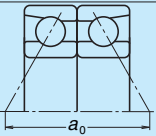
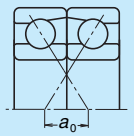
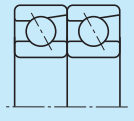
Angular Contact Ball Bearings with contact angles of 15° (Symbol C) and 25° (Symbol A5) are primarily for high precision or high speed applications, and machined brass or synthetic resin cages or molded polyamide cages are used.

The maximum operating temperature of molded polyamide cages is 120°C.

**MATCHED ANGULAR CONTACT BALL BEARINGS**

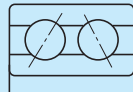
The types and features of matched angular contact ball bearings are shown in Table 2.

**Table 2 Types and Features of Matched Angular Contact Ball Bearings**

Figure	Arrangement	Features
	Back-to-back (DB) (Example) 7208 A DB	Radial loads and axial loads in both directions can be sustained. Since the distance between the effective load centers $a_0$ is big, this type is suitable if moments are applied.
	Face-to-face (DF) (Example) 7208 B DF	Radial loads and axial loads in both directions can be sustained. Compared with the DB Type, the distance between the effective load centers is small, so the capacity to sustain moments is inferior to the DB Type.
	Tandem (DT) (Example) 7208 A DT	Radial loads and axial loads in one direction can be sustained. Since two bearings share the axial load, this arrangement is used when the load in one direction is heavy.

**NSKHPS ANGULAR CONTACT BALL BEARINGS**

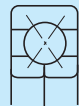
In comparison with standard angular contact ball bearings, these bearings have high capacity, high limiting speed, and highly accurate universal matching as the features. The molded polyamide cages are standard specification for the HPS type.



**DOUBLE-ROW ANGULAR CONTACT BALL BEARINGS**

This is basically a back-to-back mounting of two single-row angular contact ball bearings, but their inner and outer rings are each integrated into one. Axial loads in both directions can be sustained, and the capacity to sustain moments is good. This type is used as fixed-end bearings.

Their cages are pressed steel.



**FOUR-POINT CONTACT BALL BEARINGS**

The inner ring is split radially into two pieces. Their design allows one bearing to sustain significant axial loads in either direction.

The contact angle is 35°, so the axial load capacity is high. This type is suitable for carrying pure axial loads or combined loads where the axial loads are high.

The cages are made of machined brass.

**PRECAUTIONS FOR USE OF ANGULAR CONTACT BALL BEARINGS**

Under severe operating conditions where the speed and temperature are close to their limits, lubrication is marginal, vibration and moment loads are heavy, they may not be suitable, particularly for certain types of cages. In such a case, please consult with NSK beforehand.

And if the load on angular contact ball bearings becomes too small, or if the ratio of the axial and radial loads for matched bearings exceeds 'e' (e is listed in the bearings tables) during operation, slippage occurs between the balls and raceways, which may result in smearing. Especially with large bearings since the weight of the balls and cage is high. If such load conditions are expected, please consult with NSK for selection of the bearings.

**TOLERANCES AND RUNNING ACCURACY**

**SINGLE-ROW ANGULAR CONTACT**

**BALL BEARINGS**..... Table 8.2 (Pages A60 to A63)

**NSKHPS ANGULAR CONTACT BALL BEARINGS**

Tolerance for Dimensions: Class 6,  
Running Accuracy: Class 5..... Table 8.2 (Pages A60 to A63)

**MATCHED ANGULAR CONTACT**

**BALL BEARINGS**..... Table 8.2 (Pages A60 to A63)

**DOUBLE-ROW ANGULAR CONTACT**

**BALL BEARINGS**..... Table 8.2 (Pages A60 to A63)

**FOUR-POINT CONTACT BALL**

**BEARINGS**..... Table 8.2 (Pages A60 to A63)

**RECOMMENDED FITS**

**SINGLE-ROW ANGULAR CONTACT BALL**

**BEARINGS AND HPS ANGULAR CONTACT**

**BALL BEARINGS**..... Table 9.2 (Page A84)

Table 9.4 (Page A85)

**MATCHED ANGULAR CONTACT BALL BEARINGS**..... Table 9.2 (Page A84)

Table 9.4 (Page A85)

**DOUBLE-ROW ANGULAR CONTACT BALL**

**BEARINGS**..... Table 9.2 (Page A84)

Table 9.4 (Page A85)

**FOUR-POINT CONTACT BALL BEARINGS**..... Table 9.2 (Page A84)

Table 9.4 (Page A85)

**INTERNAL CLEARANCES**

**MATCHED ANGULAR CONTACT BALL BEARINGS**..... Table 9.17 (Page A94)

Matched angular contact ball bearings with precision better than P5 are primarily used in the main spindles of machine tools, so they are used with a preload for rigidity. For convenience of selection, internal clearances are adjusted to produce Very Light, Light, Medium, and Heavy Preloads. Their fitting is also special. Concerning these matters, please refer to Tables 10.1 and 10.2 (Pages A98 and A99).

The clearance (or preload) of matched bearings is obtained by axially tightening a pair of bearings till the side faces of their inner or outer rings are pressed against each other.

**NSKHPS ANGULAR CONTACT BALL BEARINGS**

**Axial Internal Clearance** (Measured Clearances) Units :  $\mu\text{m}$

Nominal Bore Diameter $d$ (mm)		Axial Internal Clearance			
over	incl.	CNB		GA	
		min.	max.	min.	max.
12	18	17	25	-2	6
18	30	20	28		
30	50	24	32		
50	80	29	41	-3	9

**DOUBLE-ROW ANGULAR CONTACT BALL BEARINGS**

For the clearance in double-row angular contact ball bearings, please consult with NSK.

**FOUR-POINT CONTACT BALL BEARINGS**..... Table 9.18 (Page A94)

**LIMITING SPEEDS**

In cases of single-row and matched angular contact ball bearings, the Limiting speeds listed in the bearing table are for bearings with machined cage. For those with pressed cages, the listed speeds must be reduced by 20%.

The limiting speeds of bearings with contact angles of 15° (Symbol C) and 25° (Symbol A5) are for bearings with precision of P5 and better (with machined synthetic-resin cages or molded polyamide cages).

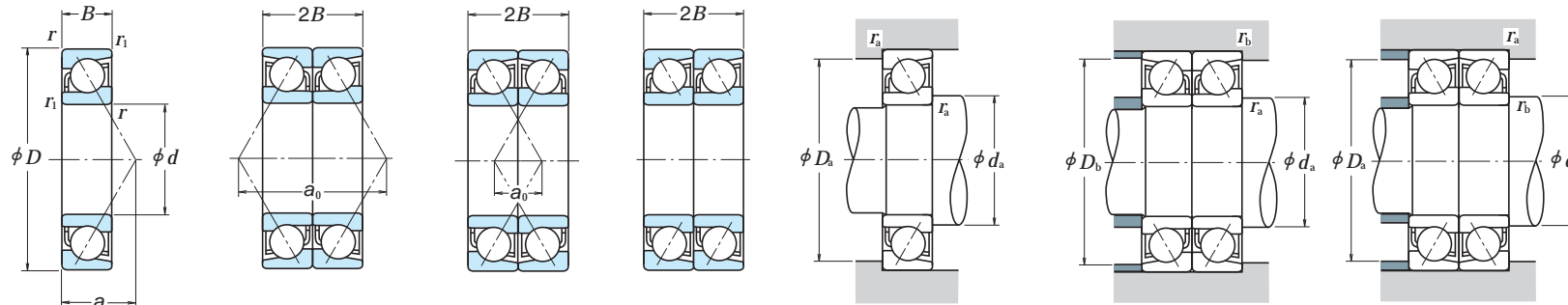
The limiting speeds listed in the bearing tables should be adjusted depending on the bearing load conditions. Also, higher speeds are attainable by making changes in the lubrication method, cage design, etc. Refer to Page A37 for detailed information.





SINGLE/MATCHED MOUNTINGS

Bore Diameter 25 – 40 mm



Single Back-to-Back DB Face-to-Face DF Tandem DT

Boundary Dimensions (mm)				Basic Load Ratings (Single) (N)				Factor	Limiting Speeds (1) (min <sup>-1</sup> )		Eff. Load Centers (mm)	Abutment and Fillet Dimensions (mm)			Mass (kg)
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> <sub>min.</sub> / <i>r</i> <sub>max.</sub>	<i>C<sub>r</sub></i>	<i>C<sub>0r</sub></i>	<i>C<sub>r</sub></i>	<i>C<sub>0r</sub></i>	<i>f<sub>0</sub></i>	Grease	Oil	<i>a</i>	<i>d</i> <sub>a min.</sub>	<i>D</i> <sub>a max.</sub>	<i>r</i> <sub>a max.</sub>	approx.
25	62	17	1.1 / 0.6	24 400	14 600	2 490	1 490	—	9 000	13 000	26.7	32	55	1	0.241
	62	17	1.1 / 0.6	27 200	14 900	2 770	1 520	—	10 000	15 000	26.8	32	55	1	0.229
30	47	9	0.3 / 0.15	7 850	5 950	800	605	—	18 000	24 000	13.5	32.5	44.5	0.3	0.049
	47	9	0.3 / 0.15	8 300	6 250	845	640	15.9	22 000	28 000	9.7	32.5	44.5	0.3	0.049
	55	13	1 / 0.6	14 500	10 100	1 480	1 030	—	13 000	18 000	18.8	36	49	1	0.116
35	55	13	1 / 0.6	15 100	10 300	1 540	1 050	14.9	19 000	26 000	12.2	36	49	1	0.134
	62	16	1 / 0.6	22 500	14 800	2 300	1 510	—	12 000	17 000	21.3	36	56	1	0.197
	62	16	1 / 0.6	20 500	13 500	2 090	1 380	—	8 500	12 000	27.3	36	56	1	0.202
	62	16	1 / 0.6	23 700	14 300	2 420	1 460	—	10 000	14 000	27.3	36	56	1	0.194
	62	16	1 / 0.6	23 000	14 700	2 350	1 500	13.9	18 000	24 000	14.2	36	56	1	0.222

Notes (1) For applications operating near the limiting speed, refer to Page B49.  
(2) The suffixes A, A5, B, and C represent contact angles of 30°, 25°, 40°, and 15° respectively.

Dynamic Equivalent Load  $P = X F_r + Y F_a$

Contact Angle	$i \frac{F_a}{F_r} \frac{e}{C_{0r}}$	<i>e</i>	Single, DT				DB or DF			
			$F_a/F_r \leq e$		$F_a/F_r > e$		$F_a/F_r \leq e$		$F_a/F_r > e$	
			<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>	<i>X</i>	<i>Y</i>
15°	0.178	0.38	1	0	0.44	1.47	1	1.65	0.72	2.39
	0.357	0.40	1	0	0.44	1.40	1	1.57	0.72	2.28
	0.714	0.43	1	0	0.44	1.30	1	1.46	0.72	2.11
	1.07	0.46	1	0	0.44	1.23	1	1.38	0.72	2.00
	1.43	0.47	1	0	0.44	1.19	1	1.34	0.72	1.93
	2.14	0.50	1	0	0.44	1.12	1	1.26	0.72	1.82
	3.57	0.55	1	0	0.44	1.02	1	1.14	0.72	1.66
	5.35	0.56	1	0	0.44	1.00	1	1.12	0.72	1.63
	—	0.68	1	0	0.41	0.87	1	0.92	0.67	1.41
25°	—	0.80	1	0	0.39	0.76	1	0.78	0.63	1.24
40°	—	1.14	1	0	0.35	0.57	1	0.55	0.57	0.93

\*For *i*, use 2 for DB, DF and 1 for DT

Static Equivalent Load  $P_0 = X_0 F_r + Y_0 F_a$

Contact Angle	Single, DT		DB or DF		Single or DT mounting When $F_a > 0.5 F_r + Y_0 F_a$ use $P_0 = F_r$
	<i>X<sub>0</sub></i>	<i>Y<sub>0</sub></i>	<i>X<sub>0</sub></i>	<i>Y<sub>0</sub></i>	
15°	0.5	0.46	1	0.92	—
25°	0.5	0.38	1	0.76	—
30°	0.5	0.33	1	0.66	—
40°	0.5	0.26	1	0.52	—

Bearing Numbers (°)		Basic Load Ratings (Matched) (N)				Limiting Speeds (1) (Matched) (min <sup>-1</sup> )		Load Center Spacings (mm)		Abutment and Fillet Dimensions (mm)			
Single	Duplex	<i>C<sub>r</sub></i>	<i>C<sub>0r</sub></i>	<i>C<sub>r</sub></i>	<i>C<sub>0r</sub></i>	Grease	Oil	DB	DF	<i>d<sub>b</sub></i> (°) min.	<i>D<sub>b</sub></i> max.	<i>r<sub>b</sub></i> (°) max.	
7305 B DB DF DT	*7305 BEA	39 500	29 300	4 050	2 980	7 500	10 000	53.5	19.5	30	57	0.6	
		—	—	—	—	8 500	12 000	53.5	19.5	30	57	0.6	
		—	—	—	—	—	—	—	—	—	—	—	—
7906 A5 DB DF DT	7906 C DB DF DT	7006 A DB DF DT	12 800	11 900	1 300	1 210	14 000	19 000	27.0	9.0	—	45.8	0.15
			13 500	12 500	1 380	1 280	17 000	24 000	19.3	1.3	—	45.8	0.15
			23 600	20 200	2 410	2 060	11 000	15 000	37.5	11.5	35	50	0.6
7006 C DB DF DT	7206 A DB DF DT	7206 B DB DF DT	24 600	20 500	2 510	2 090	15 000	22 000	24.4	1.6	—	50	0.6
			36 500	29 500	3 750	3 000	10 000	13 000	42.6	10.6	35	57	0.6
			33 500	27 000	3 400	2 760	7 100	9 500	54.6	22.6	35	57	0.6
*7206 BEA	7206 C DB DF DT	7306 A DB DF DT	—	—	—	—	8 000	11 000	54.6	22.6	35	57	0.6
			37 500	29 300	3 800	2 990	14 000	20 000	28.3	3.7	—	57	0.6
			54 500	41 500	5 600	4 250	7 100	9 500	48.4	10.4	35	67	0.6
7306 B DB DF DT	*7306 BEA	7907 A5 DB DF DT	50 500	38 500	5 150	3 950	6 300	8 500	61.8	23.8	35	67	0.6
			—	—	—	—	7 100	10 000	61.8	23.8	35	67	0.6
			—	—	—	—	—	—	—	—	—	—	—
7907 C DB DF DT	7007 A DB DF DT	7207 A DB DF DT	18 600	17 400	1 890	1 770	12 000	17 000	31.0	11.0	—	52.5	0.3
			19 600	18 300	2 000	1 860	14 000	20 000	22.1	2.1	—	52.5	0.3
			29 700	26 800	3 050	2 740	9 500	13 000	42.0	14.0	40	57	0.6
7007 C DB DF DT	7207 B DB DF DT	*7207 BEA	31 000	27 300	3 150	2 790	13 000	19 000	27.0	1.0	—	57	0.6
			48 500	40 000	4 900	4 100	8 500	12 000	47.9	13.9	40	67	0.6
			44 000	36 500	4 500	3 750	6 000	8 000	61.9	27.9	40	67	0.6
*7207 BEA	7307 A DB DF DT	7908 A5 DB DF DT	—	—	—	—	6 700	9 500	61.9	27.9	40	67	0.6
			49 500	40 000	5 050	4 050	12 000	17 000	31.3	2.7	—	67	0.6
			65 000	52 500	6 600	5 350	6 300	8 500	54.2	12.2	41	74	1
7307 B DB DF DT	*7307 BEA	7908 C DB DF DT	59 500	48 500	6 100	4 950	5 600	7 500	69.2	27.2	41	74	1
			—	—	—	—	6 300	9 000	69.2	27.2	41	74	1
			—	—	—	—	—	—	—	—	—	—	—
7908 C DB DF DT	7008 A DB DF DT	7208 A DB DF DT	23 300	22 300	2 370	2 270	11 000	15 000	35.8	11.8	—	59.5	0.3
			24 600	23 500	2 510	2 390	13 000	18 000	25.7	1.7	—	59.5	0.3
			31 500	31 000	3 250	3 150	8 500	11 000	46.2	16.2	45	63	0.6
7008 C DB DF DT	7208 B DB DF DT	*7208 BEA	33 500	32 000	3 400	3 250	12 000	17 000	29.5	0.5	—	63	0.6
			57 500	50 500	5 850	5 150	7 500	10 000	52.6	16.6	45	75	0.6
			52 000	46 000	5 300	4 700	5 300	7 500	68.3	32.3	45	75	0.6

Note (3) For bearings marked — in the column for *d<sub>b</sub>*, *d<sub>f</sub>* and *r<sub>b</sub>* for shafts are *d<sub>a</sub>* (min.) and *r<sub>a</sub>* (max.) respectively.  
Remarks The bearings denoted by an asterisk (\*) are NSKHPS Angular contact ball bearings and the column of Duplex in Bearing Numbers indicates the universal matching.



SINGLE/MATCHED MOUNTINGS

Bore Diameter 40 – 55 mm

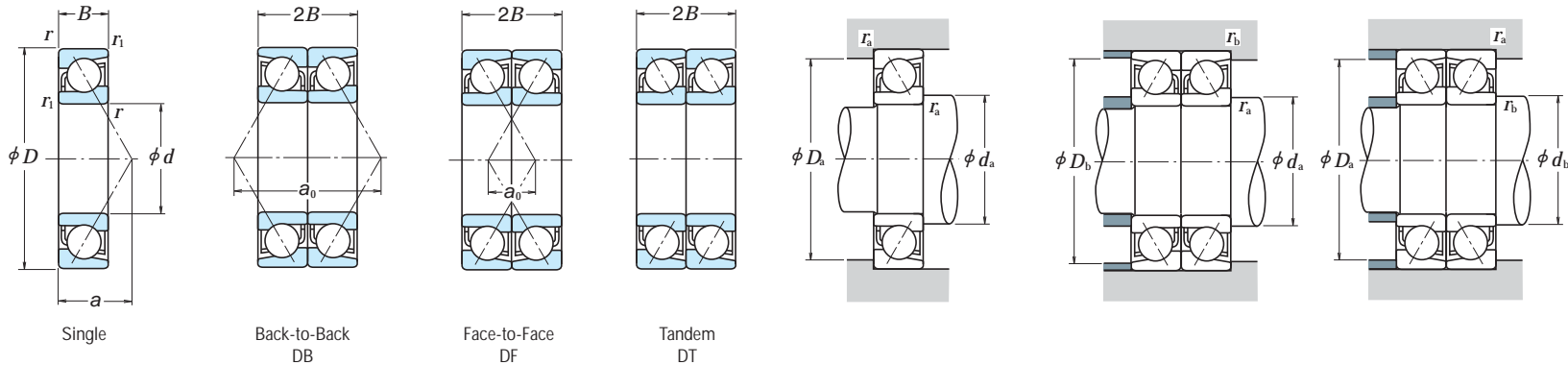


Table with columns: Boundary Dimensions (mm), Basic Load Ratings (Single) (N, kgf), Factor, Limiting Speeds (min⁻¹), Eff. Load Centers (mm), Abutment and Fillet Dimensions (mm), and Mass (kg). Rows are grouped by bore diameter (40, 45, 50, 55 mm).

Notes (1) For applications operating near the limiting speed, refer to Page B49. (2) The suffixes A, A5, B, and C represent contact angles of 30°, 25°, 40°, and 15° respectively.

Dynamic Equivalent Load P = XF\_r + YF\_a

Table for Dynamic Equivalent Load with columns for Contact Angle, iL/Cor, e, and Single/DB or DF load factors for different contact angle ranges.

\*For i, use 2 for DB, DF and 1 for DT

Static Equivalent Load P\_0 = X\_0 F\_r + Y\_0 F\_a

Table for Static Equivalent Load with columns for Contact Angle, Single/DB or DF load factors, and a note about F\_r > 0.5 F\_r + Y\_0 F\_a.

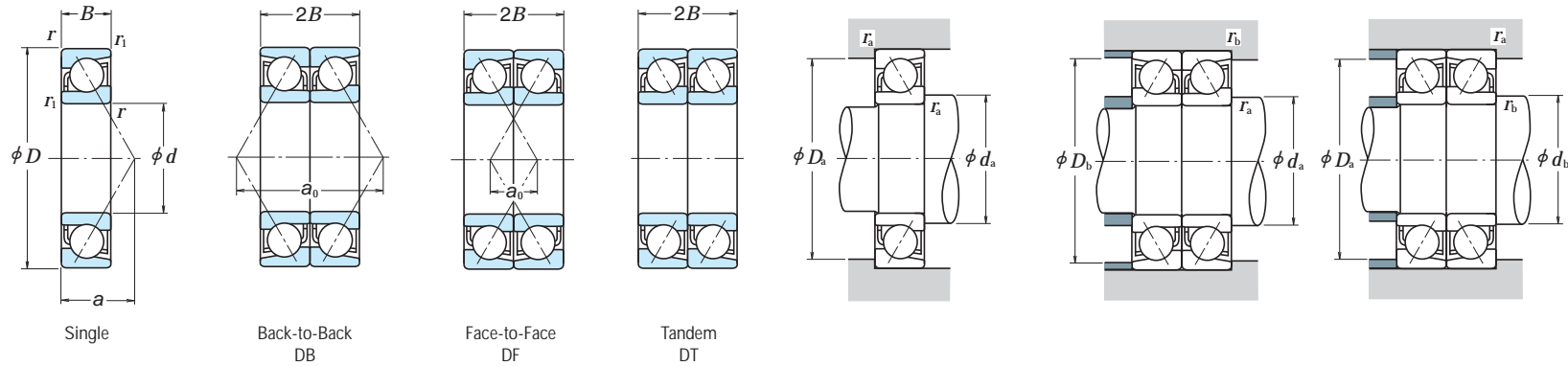
Table with columns: Bearing Numbers (Single/Duplex), Basic Load Ratings (Matched) (N, kgf), Limiting Speeds (Matched) (min⁻¹), Load Center Spacings (mm), and Abutment and Fillet Dimensions (mm). Rows list various bearing models like \*7208 BEA, \*7308 BEA, etc.

Note (3) For bearings marked — in the column for d\_b, d\_b and r\_b for shafts are d\_a (min.) and r\_a (max.) respectively.

Remarks The bearings denoted by an asterisk (\*) are NSKHPS Angular contact ball bearings and the column of Duplex in Bearing Numbers indicates the universal matching.

SINGLE/MATCHED MOUNTINGS

Bore Diameter 55 – 65 mm



**Dynamic Equivalent Load**  $= r + a$

Contact Angle	$\frac{a}{C_{or}}$	Single, DT				DB or DF				
		$\frac{a}{r} \leq 1$	$\frac{a}{r} > 1$	$\frac{a}{r} \leq 1$	$\frac{a}{r} > 1$	$\frac{a}{r} \leq 1$	$\frac{a}{r} > 1$	$\frac{a}{r} \leq 1$	$\frac{a}{r} > 1$	
15°	0.178	0.38	1	0	0.44	1.47	1	1.65	0.72	2.39
	0.357	0.40	1	0	0.44	1.40	1	1.57	0.72	2.28
	0.714	0.43	1	0	0.44	1.30	1	1.46	0.72	2.11
	1.07	0.46	1	0	0.44	1.23	1	1.38	0.72	2.00
	1.43	0.47	1	0	0.44	1.19	1	1.34	0.72	1.93
	2.14	0.50	1	0	0.44	1.12	1	1.26	0.72	1.82
	3.57	0.55	1	0	0.44	1.02	1	1.14	0.72	1.66
	5.35	0.56	1	0	0.44	1.00	1	1.12	0.72	1.63
25°	—	0.68	1	0	0.41	0.87	1	0.92	0.67	1.41
30°	—	0.80	1	0	0.39	0.76	1	0.78	0.63	1.24
40°	—	1.14	1	0	0.35	0.57	1	0.55	0.57	0.93

\*For  $\alpha$ , use 2 for DB, DF and 1 for DT

**Static Equivalent Load**  $\theta = \theta_r + \theta_a$

Contact Angle	Single, DT		DB or DF	
	$\theta$	$\theta$	$\theta$	$\theta$
15°	0.5	0.46	1	0.92
25°	0.5	0.38	1	0.76
30°	0.5	0.33	1	0.66
40°	0.5	0.26	1	0.52

Single or DT mounting When  $r > 0.5 r + \theta_a$  use  $\theta = r$

Boundary Dimensions (mm)	Basic Load Ratings (Single) (N)				Factor $\theta$	Limiting Speeds (1) (min <sup>-1</sup> )		Eff. Load Centers (mm) $a$	Abutment and Fillet Dimensions (mm)			Mass (kg) approx.					
	$d$	$D$	$B$	$r$ min.		$C_r$	$C_{0r}$		Grease	Oil	$d_a$ min.		$D_a$ max.	$r_a$ max.			
55	90	18	1.1	0.6	34 000	28 600	3 500	2 920	15.5	11 000	15 000	18.7	62	83	1	0.43	
	100	21	1.5	1	51 000	39 500	5 200	4 050	—	7 100	10 000	32.9	64	91	1.5	0.613	
	100	21	1.5	1	46 500	36 000	4 700	3 700	—	5 300	7 100	43.0	64	91	1.5	0.627	
	100	21	1.5	1	51 500	37 000	5 250	3 800	—	6 000	8 500	43.0	64	91	1.5	0.596	
	100	21	1.5	1	53 000	40 000	5 400	4 100	14.5	10 000	14 000	20.9	64	91	1.5	0.688	
	120	29	2	1	86 000	61 500	8 750	6 250	—	5 000	6 700	39.8	65	110	2	1.41	
	120	29	2	1	79 000	56 500	8 050	5 750	—	4 500	6 300	51.2	65	110	2	1.45	
	120	29	2	1	89 000	58 500	9 100	6 000	—	5 000	7 500	51.2	65	110	2	1.36	
	60	85	13	1	0.6	18 300	17 700	1 870	1 810	—	9 500	13 000	23.4	66	79	1	0.197
		85	13	1	0.6	19 400	18 700	1 980	1 910	16.5	11 000	15 000	16.2	66	79	1	0.194
		95	18	1.1	0.6	33 000	29 500	3 350	3 000	—	7 100	10 000	31.4	67	88	1	0.417
		95	18	1.1	0.6	35 000	30 500	3 600	3 150	15.7	10 000	14 000	19.4	67	88	1	0.46
110		22	1.5	1	62 000	48 500	6 300	4 950	—	6 700	9 000	35.5	69	101	1.5	0.798	
110		22	1.5	1	56 000	44 500	5 700	4 550	—	4 800	6 300	46.7	69	101	1.5	0.815	
110		22	1.5	1	61 500	45 000	6 300	4 600	—	5 300	7 500	46.7	69	101	1.5	0.791	
110		22	1.5	1	64 000	49 000	6 550	5 000	14.4	9 500	13 000	22.4	69	101	1.5	0.889	
130		31	2.1	1.1	98 000	71 500	10 000	7 250	—	4 800	6 300	42.9	72	118	2	1.74	
130		31	2.1	1.1	90 000	65 500	9 200	6 700	—	4 300	5 600	55.4	72	118	2	1.78	
130		31	2.1	1.1	102 000	68 500	10 500	7 000	—	4 800	6 700	55.4	72	118	2	1.7	
65		90	13	1	0.6	19 100	19 400	1 940	1 980	—	9 000	12 000	24.6	71	84	1	0.211
	90	13	1	0.6	20 200	20 500	2 060	2 090	16.7	10 000	14 000	16.9	71	84	1	0.208	
	100	18	1.1	0.6	35 000	33 000	3 550	3 350	—	6 700	9 500	32.8	72	93	1	0.455	
	100	18	1.1	0.6	37 000	34 500	3 800	3 500	15.9	10 000	13 000	20.0	72	93	1	0.493	
	120	23	1.5	1	70 500	58 000	7 150	5 900	—	6 000	8 500	38.2	74	111	1.5	1.03	
	120	23	1.5	1	63 500	52 500	6 500	5 350	—	4 300	6 000	50.3	74	111	1.5	1.05	
	120	23	1.5	1	70 000	53 500	7 150	5 450	—	4 800	7 100	50.3	74	111	1.5	1.01	
	120	23	1.5	1	73 000	58 500	7 450	6 000	14.6	9 000	12 000	23.9	74	111	1.5	1.14	
	140	33	2.1	1.1	111 000	82 000	11 300	8 350	—	4 300	6 000	46.1	77	128	2	2.12	
	140	33	2.1	1.1	102 000	75 500	10 400	7 700	—	3 800	5 300	59.5	77	128	2	2.17	
	140	33	2.1	1.1	114 000	77 000	11 600	7 850	—	4 300	6 300	59.5	77	128	2	2.09	

Notes (1) For applications operating near the limiting speed, refer to Page B49.  
 (2) The suffixes A, A5, B, and C represent contact angles of 30°, 25°, 40°, and 15° respectively.

Bearing Numbers (°)	Basic Load Ratings (Matched) (N)				Limiting Speeds (1) (Matched) (min <sup>-1</sup> )		Load Center Spacings (mm) $a_0$		Abutment and Fillet Dimensions (mm)		
	Single	Duplex	$C_r$	$C_{0r}$	Grease	Oil	DB	DF	$d_b$ (°) min.	$D_b$ max.	$r_b$ (°) max.
7011 C DB DF DT	—	—	55 500	57 500	9 000	12 000	37.4	1.4	—	85	0.6
7211 A DB DF DT	—	—	83 000	79 000	6 000	8 000	65.7	23.7	61	94	1
7211 B DB DF DT	—	—	75 000	72 000	4 000	5 600	86.0	44.0	61	94	1
*7211 BEA	—	—	—	—	4 500	6 700	86.0	44.0	61	94	1
7211 C DB DF DT	—	—	86 000	80 000	8 500	12 000	41.7	0.3	—	94	1
7311 A DB DF DT	—	—	139 000	123 000	4 000	5 600	79.5	21.5	61	114	1
7311 B DB DF DT	—	—	128 000	113 000	3 600	5 000	102.4	44.4	61	114	1
*7311 BEA	—	—	—	—	4 000	6 000	102.4	44.4	61	114	1
7912 A5 DB DF DT	—	—	29 800	35 500	7 500	10 000	46.8	20.8	—	80	0.6
7912 C DB DF DT	—	—	31 500	37 500	9 000	12 000	32.4	6.4	—	80	0.6
7012 A DB DF DT	—	—	53 500	59 000	6 000	8 000	62.7	26.7	65	90	0.6
7012 C DB DF DT	—	—	57 000	61 500	8 500	12 000	38.8	2.8	—	90	0.6
7212 A DB DF DT	—	—	100 000	97 500	5 300	7 100	71.1	27.1	66	104	1
7212 B DB DF DT	—	—	91 000	89 000	3 800	5 300	93.3	49.3	66	104	1
*7212 BEA	—	—	—	—	4 300	6 000	93.3	49.3	66	104	1
7212 C DB DF DT	—	—	104 000	98 500	7 500	11 000	44.8	0.8	—	104	1
7312 A DB DF DT	—	—	159 000	143 000	3 800	5 000	85.9	23.9	67	123	1
7312 B DB DF DT	—	—	146 000	131 000	3 400	4 500	110.7	48.7	67	123	1
*7312 BEA	—	—	—	—	3 800	5 600	110.7	48.7	67	123	1
7013 A5 DB DF DT	—	—	31 000	39 000	7 100	9 500	49.1	23.1	—	85	0.6
7913 C DB DF DT	—	—	33 000	41 000	8 500	12 000	33.8	7.8	—	85	0.6
7013 A DB DF DT	—	—	56 500	65 500	5 600	7 500	65.6	29.6	70	95	0.6
7013 C DB DF DT	—	—	60 500	68 500	8 000	11 000	40.1	4.1	—	95	0.6
7213 A DB DF DT	—	—	114 000	116 000	4 800	6 700	76.4	30.4	71	114	1
7213 B DB DF DT	—	—	103 000	105 000	3 400	4 800	100.6	54.6	71	114	1
*7213 BEA	—	—	—	—	3 800	5 600	100.6	54.6	71	114	1
7213 C DB DF DT	—	—	119 000	117 000	7 100	9 500	47.8	1.8	—	114	1
7313 A DB DF DT	—	—	180 000	164 000	3 600	4 800	92.2	26.2	72	133	1
7313 B DB DF DT	—	—	166 000	151 000	3 200	4 300	119.0	53.0	72	133	1
*7313 BEA	—	—	—	—	3 600	5 000	119.0	53.0	72	133	1

Note (3) For bearings marked — in the column for  $d_b$ ,  $D_b$  and  $r_b$  for shafts are  $d_a$  (min.) and  $r_a$  (max.) respectively.  
 Remarks The bearings denoted by an asterisk (\*) are NSKHPS Angular contact ball bearings and the column of Duplex in Bearing Numbers indicates the universal matching.





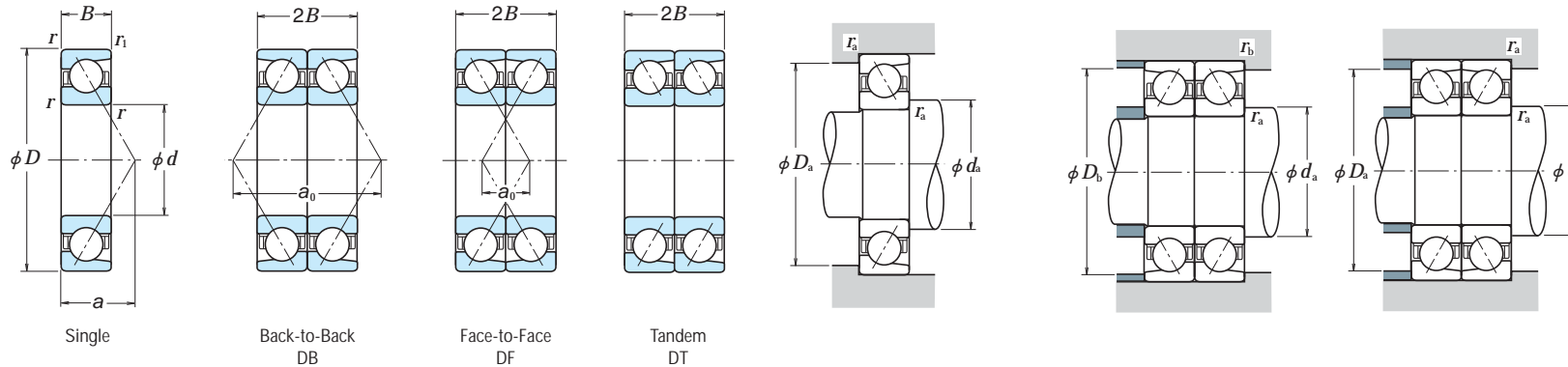






SINGLE/MATCHED MOUNTINGS

Bore Diameter 180 – 200 mm



Boundary Dimensions (mm)	Basic Load Ratings (Single) (N)				Factor $f_0$	Limiting Speeds (1) (min <sup>-1</sup> )		Eff. Load Centers (mm) $\bar{a}$	Abutment and Fillet Dimensions (mm)			Mass (kg) approx.				
	$d$	$D$	$B$	$r_{1 \min.}$		$C_r$	$C_{0r}$		Grease	Oil	$d_a \min.$		$D_a \max.$	$r_a \max.$		
180	250	33	2	1	145 000	184 000	14 800	18 800	16.6	3 200	4 500	45.3	190	240	2	4.9
	280	46	2.1	1.1	207 000	252 000	21 100	25 700	—	1 900	2 400	89.4	192	268	2	10.5
	320	52	4	1.5	305 000	385 000	31 000	39 000	—	1 700	2 200	98.2	198	302	3	18.1
190	260	33	2	1	147 000	192 000	15 000	19 600	16.7	3 000	4 300	46.6	200	250	2	4.98
	290	46	2.1	1.1	224 000	280 000	22 800	28 600	—	1 800	2 400	92.3	202	278	2	11.3
	340	55	4	1.5	315 000	410 000	32 000	42 000	—	1 600	2 200	104.0	208	322	3	22.4
200	280	38	2.1	1.1	189 000	244 000	19 300	24 900	16.5	2 800	4 000	51.2	212	268	2	6.85
	310	51	2.1	1.1	240 000	310 000	24 500	31 500	—	1 700	2 200	99.1	212	298	2	13.7
	360	58	4	1.5	335 000	450 000	34 500	46 000	—	1 500	2 000	109.8	218	342	3	26.5
200	360	58	4	1.5	305 000	410 000	31 000	41 500	—	1 300	1 800	146.5	218	342	3	26.6
	420	80	5	2	475 000	660 000	48 500	67 000	—	1 300	1 800	129.5	222	398	4	54.4
	420	80	5	2	430 000	600 000	44 000	61 500	—	1 200	1 600	170.1	222	398	4	55.3

Notes (1) For applications operating near the limiting speed, refer to Page B49.  
 (2) The suffixes A, A5, B, and C represent contact angles of 30°, 25°, 40°, and 15° respectively.

Dynamic Equivalent Load  $P = X F_r + Y F_a$

Contact Angle	$i f_0 F_a^*$ $C_{0r}$	$e$	Single, DT				DB or DF			
			$F_a/F_r \leq e$		$F_a/F_r > e$		$F_a/F_r \leq e$		$F_a/F_r > e$	
			X	Y	X	Y	X	Y	X	Y
15°	0.178	0.38	1	0	0.44	1.47	1	1.65	0.72	2.39
	0.357	0.40	1	0	0.44	1.40	1	1.57	0.72	2.28
	0.714	0.43	1	0	0.44	1.30	1	1.46	0.72	2.11
	1.07	0.46	1	0	0.44	1.23	1	1.38	0.72	2.00
	1.43	0.47	1	0	0.44	1.19	1	1.34	0.72	1.93
	2.14	0.50	1	0	0.44	1.12	1	1.26	0.72	1.82
	3.57	0.55	1	0	0.44	1.02	1	1.14	0.72	1.66
5.35	0.56	1	0	0.44	1.00	1	1.12	0.72	1.63	
25°	—	0.68	1	0	0.41	0.87	1	0.92	0.67	1.41
30°	—	0.80	1	0	0.39	0.76	1	0.78	0.63	1.24
40°	—	1.14	1	0	0.35	0.57	1	0.55	0.57	0.93

\*For  $i$ , use 2 for DB, DF and 1 for DT

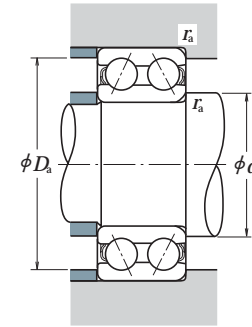
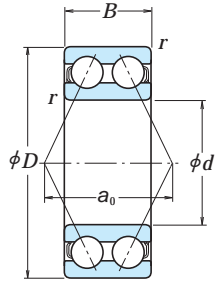
Static Equivalent Load  $P_0 = X_0 F_r + Y_0 F_a$

Contact Angle	Single, DT		DB or DF		Single or DT mounting When $F_r > 0.5 F_r + Y_0 F_a$ use $P_0 = F_r$
	$X_0$	$Y_0$	$X_0$	$Y_0$	
15°	0.5	0.46	1	0.92	
25°	0.5	0.38	1	0.76	
30°	0.5	0.33	1	0.66	
40°	0.5	0.26	1	0.52	

Bearing Numbers (2)		Basic Load Ratings (Matched) (N)				Limiting Speeds (1) (Matched) (min <sup>-1</sup> )		Load Center Spacings (mm) $a_0$		Abutment and Fillet Dimensions (mm)		
Single	Duplex	$C_r$	$C_{0r}$	$C_r$	$C_{0r}$	Grease	Oil	DB	DF	$d_b$ (3) min.	$D_b$ max.	$r_b$ (3) max.
7936 C	DB DF DT	236 000	370 000	24 000	37 500	2 600	3 600	90.6	24.6	—	244	1
7036 A	DB DF DT	335 000	505 000	34 500	51 500	1 500	2 000	178.8	86.8	—	273	1
7236 A	DB DF DT	495 000	770 000	50 500	78 500	1 400	1 800	196.3	92.3	—	311	1.5
7236 B	DB DF DT	450 000	700 000	45 500	71 000	1 200	1 700	261.8	157.8	—	311	1.5
7336 A	DB DF DT	665 000	1 070 000	68 000	109 000	1 200	1 600	236.6	86.6	—	371	1.5
7336 B	DB DF DT	605 000	975 000	62 000	99 500	1 100	1 500	309.9	159.9	—	371	1.5
7938 C	DB DF DT	239 000	385 000	24 400	39 000	2 400	3 400	93.3	27.3	—	254	1
7038 A	DB DF DT	365 000	560 000	37 000	57 000	1 400	1 900	184.6	92.6	—	283	1
7238 A	DB DF DT	510 000	825 000	52 000	84 000	1 300	1 700	208.0	98.0	—	331	1.5
7238 B	DB DF DT	460 000	750 000	47 000	76 000	1 100	1 600	277.3	167.3	—	331	1.5
7338 A	DB DF DT	730 000	1 200 000	74 500	122 000	1 100	1 500	248.3	92.3	—	390	2
7338 B	DB DF DT	670 000	1 100 000	68 000	112 000	1 000	1 400	325.5	169.5	—	390	2
7940 C	DB DF DT	305 000	490 000	31 500	50 000	2 200	3 200	102.3	26.3	—	273	1
7040 A	DB DF DT	390 000	620 000	40 000	63 500	1 300	1 800	198.2	96.2	—	303	1
7240 A	DB DF DT	550 000	900 000	56 000	92 000	1 200	1 600	219.6	103.6	—	351	1.5
7240 B	DB DF DT	495 000	815 000	50 500	83 000	1 100	1 500	292.9	176.9	—	351	1.5
7340 A	DB DF DT	770 000	1 320 000	78 500	134 000	1 100	1 400	259.0	99.0	—	410	2
7340 B	DB DF DT	700 000	1 200 000	71 500	123 000	950	1 300	340.1	180.1	—	410	2

Note (3) For bearings marked — in the column for  $d_b$ ,  $D_b$  and  $r_b$  for shafts are  $d_a$  (min.) and  $r_a$  (max.) respectively.

Bore Diameter 10 – 85 mm



Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$F_a/F_r \leq e$		$F_a/F_r > e$		e
X	Y	X	Y	
1	0.92	0.67	1.41	0.68

Static Equivalent Load

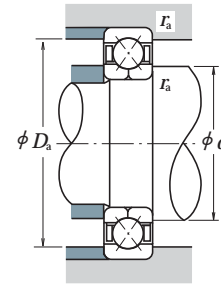
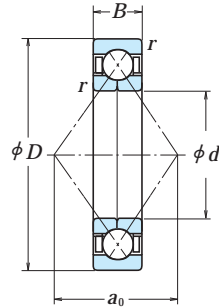
$$P_0 = F_r + 0.76 F_a$$

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds		Bearing Numbers
d	D	B	r min.	(N)	(kgf)	(min <sup>-1</sup> )		Grease	Oil	
				$C_r$	$C_{0r}$	$C_r$	$C_{0r}$			
10	30	14.3	0.6	7 150	3 900	730	400	17 000	22 000	5200
12	32	15.9	0.6	10 500	5 800	1 070	590	15 000	20 000	5201
15	35	15.9	0.6	11 700	7 050	1 190	715	13 000	17 000	5202
	42	19	1	17 600	10 200	1 800	1 040	11 000	15 000	5302
17	40	17.5	0.6	14 600	9 050	1 490	920	11 000	15 000	5203
	47	22.2	1	21 000	12 600	2 140	1 280	10 000	13 000	5303
20	47	20.6	1	19 600	12 400	2 000	1 270	10 000	13 000	5204
	52	22.2	1.1	24 600	15 000	2 510	1 530	9 000	12 000	5304
25	52	20.6	1	21 300	14 700	2 170	1 500	8 500	11 000	5205
	62	25.4	1.1	32 500	20 700	3 350	2 110	7 500	10 000	5305
30	62	23.8	1	29 600	21 100	3 000	2 150	7 100	9 500	5206
	72	30.2	1.1	40 500	28 100	4 150	2 870	6 300	8 500	5306
35	72	27	1.1	39 000	28 700	4 000	2 920	6 300	8 000	5207
	80	34.9	1.5	51 000	36 000	5 200	3 700	5 600	7 500	5307
40	80	30.2	1.1	44 000	33 500	4 500	3 400	5 600	7 100	5208
	90	36.5	1.5	56 500	41 000	5 800	4 200	5 300	6 700	5308
45	85	30.2	1.1	49 500	38 000	5 050	3 900	5 000	6 700	5209
	100	39.7	1.5	68 500	51 000	7 000	5 200	4 500	6 000	5309
50	90	30.2	1.1	53 000	43 500	5 400	4 400	4 800	6 000	5210
	110	44.4	2	81 500	61 500	8 300	6 250	4 300	5 600	5310
55	100	33.3	1.5	56 000	49 000	5 700	5 000	4 300	5 600	5211
	120	49.2	2	95 000	73 000	9 700	7 450	3 800	5 000	5311
60	110	36.5	1.5	69 000	62 000	7 050	6 300	3 800	5 000	5212
	130	54	2.1	125 000	98 500	12 800	10 000	3 400	4 500	5312
65	120	38.1	1.5	76 500	69 000	7 800	7 050	3 600	4 500	5213
	140	58.7	2.1	142 000	113 000	14 500	11 500	3 200	4 300	5313
70	125	39.7	1.5	94 000	82 000	9 600	8 400	3 400	4 500	5214
	150	63.5	2.1	159 000	128 000	16 200	13 100	3 000	3 800	5314
75	130	41.3	1.5	93 500	83 000	9 550	8 500	3 200	4 300	5215
80	140	44.4	2	99 000	93 000	10 100	9 500	3 000	3 800	5216
85	150	49.2	2	116 000	110 000	11 800	11 200	2 800	3 600	5217

Load Center Spacings (mm) $a_0$	Abutment and Fillet Dimensions (mm)			Mass (kg) approx.
	$d_a$ min.	$D_a$ max.	$r_a$ max.	
14.5	15	25	0.6	0.050
16.7	17	27	0.6	0.060
18.3	20	30	0.6	0.070
22.0	21	36	1	0.11
20.8	22	35	0.6	0.090
25.0	23	41	1	0.14
24.3	26	41	1	0.12
26.7	27	45	1	0.23
26.8	31	46	1	0.19
31.8	32	55	1	0.34
31.6	36	56	1	0.29
36.5	37	65	1	0.51
36.6	42	65	1	0.43
41.6	44	71	1.5	0.79
41.5	47	73	1	0.57
45.5	49	81	1.5	1.05
43.4	52	78	1	0.62
50.6	54	91	1.5	1.4
45.9	57	83	1	0.67
55.6	60	100	2	1.95
50.1	64	91	1.5	0.96
60.6	65	110	2	2.3
56.5	69	101	1.5	1.35
69.2	72	118	2	3.15
59.7	74	111	1.5	1.65
72.8	77	128	2	3.85
63.8	79	116	1.5	1.8
78.3	82	138	2	4.9
66.1	84	121	1.5	1.9
69.6	90	130	2	2.5
75.3	95	140	2	3.4



Bore Diameter 30 – 95 mm



Dynamic Equivalent Load  
 $P_a = F_a$

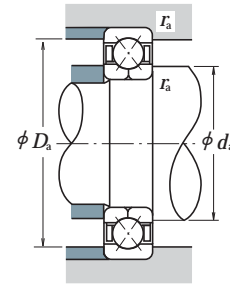
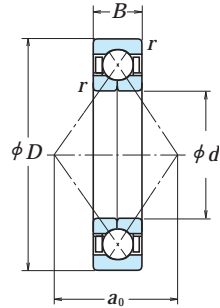
Static Equivalent Load  
 $P_{0a} = F_a$

Boundary Dimensions (mm)				Basic Load Ratings				Limiting Speeds	
d	D	B	r min.	(N)		(kgf)		Grease	Oil
				$C_a$	$C_{0a}$	$C_a$	$C_{0a}$		
30	62	16	1	31 000	45 000	3 150	4 600	8 500	12 000
	72	19	1.1	46 000	63 000	4 700	6 450	8 000	11 000
35	72	17	1.1	41 000	61 500	4 200	6 250	7 500	10 000
	80	21	1.5	55 000	80 000	5 600	8 150	7 100	9 500
40	80	18	1.1	49 000	77 500	5 000	7 900	6 700	9 000
	90	23	1.5	67 000	100 000	6 850	10 200	6 300	8 500
45	85	19	1.1	55 000	88 500	5 600	9 000	6 300	8 500
	100	25	1.5	87 500	133 000	8 900	13 500	5 600	7 500
50	90	20	1.1	57 000	97 000	5 850	9 900	5 600	8 000
	110	27	2	102 000	159 000	10 400	16 200	5 000	6 700
55	100	21	1.5	71 000	122 000	7 200	12 500	5 300	7 100
	120	29	2	118 000	187 000	12 000	19 100	4 500	6 300
60	110	22	1.5	85 500	150 000	8 750	15 300	4 800	6 300
	130	31	2.1	135 000	217 000	13 800	22 200	4 300	5 600
65	120	23	1.5	97 500	179 000	9 950	18 300	4 300	6 000
	140	33	2.1	153 000	250 000	15 600	25 500	3 800	5 300
70	125	24	1.5	106 000	197 000	10 800	20 100	4 000	5 600
	150	35	2.1	172 000	285 000	17 500	29 100	3 600	5 000
75	130	25	1.5	110 000	212 000	11 200	21 700	3 800	5 300
	160	37	2.1	187 000	320 000	19 100	33 000	3 400	4 800
80	125	22	1.1	77 000	167 000	7 850	17 000	3 800	5 300
	140	26	2	124 000	236 000	12 600	24 100	3 600	5 000
	170	39	2.1	202 000	360 000	20 600	37 000	3 200	4 300
85	130	22	1.1	79 000	176 000	8 050	18 000	3 800	5 000
	150	28	2	143 000	276 000	14 600	28 200	3 400	4 800
	180	41	3	218 000	405 000	22 300	41 000	3 000	4 000
90	140	24	1.5	94 000	208 000	9 600	21 200	3 400	4 800
	160	30	2	164 000	320 000	16 700	32 500	3 200	4 300
	190	43	3	235 000	450 000	23 900	45 500	2 800	3 800
95	145	24	1.5	96 500	220 000	9 800	22 500	3 400	4 500
	170	32	2.1	177 000	340 000	18 000	35 000	3 000	4 000
	200	45	3	251 000	495 000	25 600	50 500	2 600	3 600

Bearing Numbers	Load Center Spacings (mm) $a_0$	Abutment and Fillet Dimensions (mm)			Mass (kg) approx.
		$d_a$ min.	$D_a$ max.	$r_a$ max.	
<b>QJ 206</b>	32.2	36	56	1	0.24
<b>QJ 306</b>	35.7	37	65	1	0.42
<b>QJ 207</b>	37.5	42	65	1	0.35
<b>QJ 307</b>	40.3	44	71	1.5	0.57
<b>QJ 208</b>	42.0	47	73	1	0.45
<b>QJ 308</b>	45.5	49	81	1.5	0.78
<b>QJ 209</b>	45.5	52	78	1	0.52
<b>QJ 309</b>	50.8	54	91	1.5	1.05
<b>QJ 210</b>	49.0	57	83	1	0.59
<b>QJ 310</b>	56.0	60	100	2	1.35
<b>QJ 211</b>	54.3	64	91	1.5	0.77
<b>QJ 311</b>	61.3	65	110	2	1.75
<b>QJ 212</b>	59.5	69	101	1.5	0.98
<b>QJ 312</b>	66.5	72	118	2	2.15
<b>QJ 213</b>	64.8	74	111	1.5	1.2
<b>QJ 313</b>	71.8	77	128	2	2.7
<b>QJ 214</b>	68.3	79	116	1.5	1.3
<b>QJ 314</b>	77.0	82	138	2	3.18
<b>QJ 215</b>	71.8	84	121	1.5	1.5
<b>QJ 315</b>	82.3	87	148	2	3.9
<b>QJ 1016</b>	71.8	87	118	1	1.05
<b>QJ 216</b>	77.0	90	130	2	1.85
<b>QJ 316</b>	87.5	92	158	2	4.6
<b>QJ 1017</b>	75.3	92	123	1	1.1
<b>QJ 217</b>	82.3	95	140	2	2.2
<b>QJ 317</b>	92.8	99	166	2.5	5.34
<b>QJ 1018</b>	80.5	99	131	1.5	1.45
<b>QJ 218</b>	87.5	100	150	2	2.75
<b>QJ 318</b>	98.0	104	176	2.5	6.4
<b>QJ 1019</b>	84.0	104	136	1.5	1.5
<b>QJ 219</b>	92.8	107	158	2	3.35
<b>QJ 319</b>	103.3	109	186	2.5	7.4

Remarks When using four-point contact ball bearings, please contact NSK.

Bore Diameter 100 – 200 mm



Dynamic Equivalent Load  
 $P_a = F_a$

Static Equivalent Load  
 $P_{0a} = F_a$

Boundary Dimensions (mm)				Basic Load Ratings (N)				Limiting Speeds (min <sup>-1</sup> )	
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> <sub>min.</sub>	<i>C<sub>a</sub></i>	<i>C<sub>0a</sub></i>	(kgf)		Grease	Oil
						<i>C<sub>a</sub></i>	<i>C<sub>0a</sub></i>		
100	150	24	1.5	98 000	232 000	10 000	23 700	3 200	4 300
	180	34	2.1	199 000	390 000	20 300	39 500	2 800	3 800
	215	47	3	300 000	640 000	31 000	65 500	2 400	3 400
105	160	26	2	115 000	269 000	11 800	27 400	3 000	4 000
	190	36	2.1	217 000	435 000	22 100	44 500	2 600	3 600
	225	49	3	305 000	640 000	31 000	65 500	2 400	3 200
110	170	28	2	139 000	315 000	14 200	27 400	2 800	3 800
	200	38	2.1	235 000	490 000	24 000	50 000	2 600	3 400
	240	50	3	320 000	710 000	32 500	72 500	2 200	3 000
120	180	28	2	147 000	350 000	15 000	36 000	2 600	3 600
	215	40	2.1	265 000	585 000	27 000	60 000	2 400	3 200
	260	55	3	360 000	835 000	36 500	85 500	2 000	2 800
130	200	33	2	169 000	415 000	17 300	42 000	2 400	3 200
	230	40	3	274 000	635 000	28 000	65 000	2 200	3 000
	280	58	4	400 000	970 000	40 500	99 000	1 900	2 600
140	210	33	2	172 000	435 000	17 600	44 500	2 200	3 000
	250	42	3	239 000	710 000	29 900	72 500	2 000	2 800
	300	62	4	440 000	1 110 000	44 500	114 000	1 700	2 400
150	225	35	2.1	197 000	505 000	20 100	51 500	2 000	2 800
	270	45	3	315 000	785 000	32 000	80 000	1 800	2 600
	320	65	4	460 000	1 230 000	47 000	125 000	1 600	2 200
160	240	38	2.1	224 000	580 000	22 800	59 000	1 900	2 600
	290	48	3	380 000	1 010 000	39 000	103 000	1 700	2 400
	340	68	4	505 000	1 400 000	51 500	143 000	1 500	2 000
170	260	42	2.1	268 000	705 000	27 300	72 000	1 800	2 400
	310	52	4	425 000	1 180 000	43 500	121 000	1 600	2 200
	360	72	4	565 000	1 610 000	57 500	164 000	1 400	2 000
180	280	46	2.1	299 000	830 000	30 500	84 500	1 700	2 200
	320	52	4	440 000	1 270 000	45 000	130 000	1 500	2 000
	380	75	4	595 000	1 770 000	60 500	180 000	1 300	1 800
190	290	46	2.1	325 000	925 000	33 000	94 000	1 600	2 200
	340	55	4	440 000	1 290 000	44 500	131 000	1 400	2 000
	400	78	5	655 000	1 980 000	67 000	202 000	1 300	1 700
200	310	51	2.1	345 000	1 020 000	35 500	104 000	1 500	2 000
	360	58	4	490 000	1 480 000	49 500	151 000	1 300	1 800
	420	80	5	690 000	2 180 000	70 500	222 000	1 200	1 600

Bearing Numbers	Load Center Spacings (mm) <i>a</i> <sub>0</sub>	Abutment and Fillet Dimensions (mm)			Mass (kg) approx.
		<i>d</i> <sub>a</sub> min.	<i>D</i> <sub>a</sub> max.	<i>r</i> <sub>a</sub> max.	
<b>QJ 1020</b>	87.5	109	141	1.5	1.6
<b>QJ 220</b>	98.0	112	168	2	4.0
<b>QJ 320</b>	110.3	114	201	2.5	9.3
<b>QJ 1021</b>	92.8	115	150	2	2.0
<b>QJ 221</b>	103.3	117	178	2	4.7
<b>QJ 321</b>	115.5	119	211	2.5	10.5
<b>QJ 1022</b>	98.0	120	160	2	2.5
<b>QJ 222</b>	108.5	122	188	2	5.6
<b>QJ 322</b>	122.5	124	226	2.5	12.5
<b>QJ 1024</b>	105.0	130	170	2	2.65
<b>QJ 224</b>	117.3	132	203	2	6.9
<b>QJ 324</b>	133.0	134	246	2.5	15.4
<b>QJ 1026</b>	115.5	140	190	2	4.0
<b>QJ 226</b>	126.0	144	216	2.5	7.7
<b>QJ 326</b>	143.5	148	262	3	19
<b>QJ 1028</b>	122.5	150	200	2	4.3
<b>QJ 228</b>	136.5	154	236	2.5	9.8
<b>QJ 328</b>	154.0	158	282	3	24
<b>QJ 1030</b>	131.3	162	213	2	5.2
<b>QJ 230</b>	147.0	164	256	2.5	12
<b>QJ 330</b>	164.5	168	302	3	29
<b>QJ 1032</b>	140.0	172	228	2	6.4
<b>QJ 232</b>	157.5	174	276	2.5	15
<b>QJ 332</b>	175.1	178	322	3	31
<b>QJ 1034</b>	150.5	182	248	2	8.6
<b>QJ 234</b>	168.0	188	292	3	19.5
<b>QJ 334</b>	185.6	188	342	3	41
<b>QJ 1036</b>	161.0	192	268	2	11
<b>QJ 236</b>	175.1	198	302	3	20.5
<b>QJ 336</b>	196.1	198	362	3	48
<b>QJ 1038</b>	168.0	202	278	2	11.5
<b>QJ 238</b>	185.6	208	322	3	23
<b>QJ 338</b>	206.6	212	378	4	54.5
<b>QJ 1040</b>	178.6	212	298	2	15
<b>QJ 240</b>	196.1	218	342	3	27
<b>QJ 340</b>	217.1	222	398	4	61.5

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