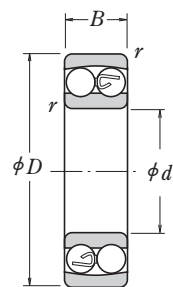
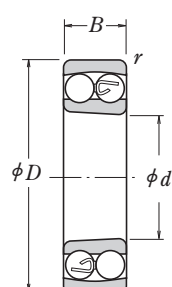


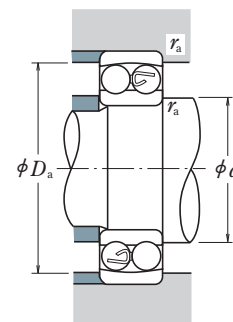
Bore Diameter 5 – 30 mm



Cylindrical Bore



Tapered Bore



Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$F_a/F_r \leq e$		$F_a/F_r > e$	
X	Y	X	Y
1	Y_3	0.65	Y_2

Static Equivalent Load

$$P_0 = F_r + Y_0 F_a$$

The values of e , Y_2 , Y_3 , and Y_0 are listed in the table below.

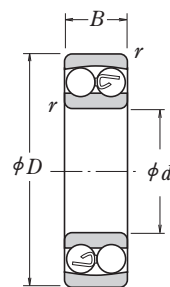
Boundary Dimensions (mm)				Basic Load Ratings (N)		Limiting Speeds (min ⁻¹)		Bearing	Designations	Abutment and Fillet Dimensions (mm)			Constant	Axial Load Factors			Mass (kg)
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C_{0r}</i>	Grease	Oil	Cylindrical Bore	Tapered Bore ⁽¹⁾	<i>d_a</i> min.	<i>D_a</i> max.	<i>r_a</i> max.	<i>e</i>	<i>Y₂</i>	<i>Y₃</i>	<i>Y₀</i>	approx.
5	19	6	0.3	2 790	475	30 000	36 000	135	—	7	17	0.3	0.34	2.9	1.9	1.9	0.009
6	19	6	0.3	2 790	475	30 000	36 000	126	—	8	17	0.3	0.34	2.9	1.9	1.9	0.008
7	22	7	0.3	3 000	600	26 000	32 000	127	—	9	20	0.3	0.31	3.1	2.0	2.1	0.013
8	22	7	0.3	3 000	600	26 000	32 000	108	—	10	20	0.3	0.31	3.1	2.0	2.1	0.016
9	26	8	0.6	4 550	895	26 000	30 000	129	—	13	22	0.6	0.32	3.1	2.0	2.1	0.021
10	30	9	0.6	6 150	1 190	22 000	28 000	1200	—	14	26	0.6	0.32	3.1	2.0	2.1	0.034
	30	14	0.6	8 200	1 590	24 000	28 000	2200	—	14	26	0.6	0.64	1.5	0.98	1.0	0.046
	35	11	0.6	8 100	1 620	20 000	24 000	1300	—	14	31	0.6	0.35	2.8	1.8	1.9	0.059
	35	17	0.6	10 100	2 010	18 000	22 000	2300	—	14	31	0.6	0.71	1.4	0.89	0.93	0.080
12	32	10	0.6	6 250	1 270	22 000	26 000	1201	—	16	28	0.6	0.36	2.7	1.8	1.8	0.041
	32	14	0.6	8 500	1 730	22 000	26 000	2201	—	16	28	0.6	0.58	1.7	1.1	1.1	0.051
	37	12	1	10 600	2 160	18 000	22 000	1301	—	17	32	1	0.33	2.9	1.9	2.0	0.068
	37	17	1	13 300	2 730	17 000	22 000	2301	—	17	32	1	0.60	1.6	1.1	1.1	0.089
15	35	11	0.6	8 350	1 750	18 000	22 000	1202	—	19	31	0.6	0.32	3.1	2.0	2.1	0.050
	35	14	0.6	8 550	1 850	18 000	22 000	2202	—	19	31	0.6	0.50	1.9	1.3	1.3	0.058
	42	13	1	10 700	2 290	16 000	20 000	1302	—	20	37	1	0.33	2.9	1.9	2.0	0.101
	42	17	1	13 500	2 910	14 000	18 000	2302	—	20	37	1	0.51	1.9	1.2	1.3	0.116
17	40	12	0.6	8 800	2 010	16 000	20 000	1203	—	21	36	0.6	0.31	3.1	2.0	2.1	0.074
	40	16	0.6	10 900	2 420	16 000	20 000	2203	—	21	36	0.6	0.50	1.9	1.3	1.3	0.089
	47	14	1	14 000	3 200	14 000	17 000	1303	—	22	42	1	0.32	3.1	2.0	2.1	0.13
	47	19	1	16 200	3 550	13 000	16 000	2303	—	22	42	1	0.51	1.9	1.2	1.3	0.16
20	47	14	1	11 000	2 610	14 000	17 000	1204	1204 K	25	42	1	0.29	3.4	2.2	2.3	0.12
	47	18	1	14 100	3 300	14 000	17 000	2204	2204 K	25	42	1	0.47	2.1	1.3	1.4	0.142
	52	15	1.1	13 800	3 350	12 000	15 000	1304	1304 K	26.5	45.5	1	0.29	3.4	2.2	2.3	0.164
	52	21	1.1	20 300	4 700	11 000	14 000	2304	2304 K	26.5	45.5	1	0.50	1.9	1.2	1.3	0.210
25	52	15	1	13 400	3 300	12 000	14 000	1205	1205 K	30	47	1	0.28	3.5	2.3	2.4	0.14
	52	18	1	13 600	3 450	12 000	14 000	2205	2205 K	30	47	1	0.41	2.4	1.5	1.6	0.16
	62	17	1.1	20 000	5 000	10 000	13 000	1305	1305 K	31.5	55.5	1	0.28	3.5	2.3	2.4	0.261
	62	24	1.1	27 300	6 600	9 500	12 000	2305	2305 K	31.5	55.5	1	0.47	2.1	1.4	1.4	0.340
30	62	16	1	17 300	4 650	10 000	12 000	1206	1206 K	35	57	1	0.25	3.9	2.5	2.6	0.22
	62	20	1	16 800	4 550	10 000	12 000	2206	2206 K	35	57	1	0.38	2.5	1.6	1.7	0.262
	72	19	1.1	23 600	6 300	8 500	11 000	1306	1306 K	36.5	65.5	1	0.26	3.7	2.4	2.5	0.391
	72	27	1.1	35 000	8 750	8 000	10 000	2306	2306 K	36.5	65.5	1	0.44	2.2	1.4	1.5	0.51

Note (1) Suffix K represents bearings with tapered bores (1 : 12).

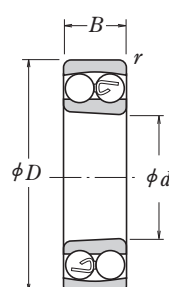
Remark For dimensions related to adapters, refer to Page C348.

SELF-ALIGNING BALL BEARINGS

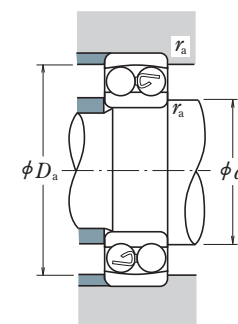
Bore Diameter 35 – 70 mm



Cylindrical Bore



Tapered Bore

**Dynamic Equivalent Load**

$$P = XF_r + YF_a$$

$F_a/F_r \leq e$		$F_a/F_r > e$	
X	Y	X	Y
1	Y_3	0.65	Y_2

Static Equivalent Load

$$P_0 = F_r + Y_0 F_a$$

The values of e , Y_2 , Y_3 , and Y_0 are listed in the table below.

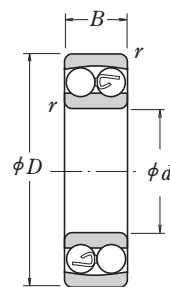
Boundary Dimensions (mm)				Basic Load Ratings (N)		Limiting Speeds (min ⁻¹)		Bearing Designations		Abutment and Fillet Dimensions (mm)			Constant	Axial Load Factors			Mass (kg)
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> min.	<i>C_r</i>	<i>C_{0r}</i>	Grease	Oil	Cylindrical Bore	Tapered Bore ⁽¹⁾	<i>d_a</i> min.	<i>D_a</i> max.	<i>r_a</i> max.	<i>e</i>	<i>Y</i> ₂	<i>Y</i> ₃	<i>Y</i> ₀	approx.
35	72	17	1.1	17 500	5 100	8 500	10 000	1207	1207 K	41.5	65.5	1	0.23	4.2	2.7	2.8	0.33
	72	23	1.1	23 900	6 600	8 500	10 000	2207	2207 K	41.5	65.5	1	0.37	2.6	1.7	1.8	0.403
	80	21	1.5	27 800	7 850	7 500	9 500	1307	1307 K	43	72	1.5	0.26	3.8	2.5	2.6	0.52
	80	31	1.5	44 000	11 300	7 100	9 000	2307	2307 K	43	72	1.5	0.46	2.1	1.4	1.4	0.687
40	80	18	1.1	21 200	6 500	7 500	9 000	1208	1208 K	46.5	73.5	1	0.22	4.3	2.8	2.9	0.42
	80	23	1.1	24 700	7 350	7 500	9 000	2208	2208 K	46.5	73.5	1	0.33	3.0	1.9	2.0	0.506
	90	23	1.5	33 000	9 700	6 700	8 500	1308	1308 K	48	82	1.5	0.24	4.0	2.6	2.7	0.727
	90	33	1.5	50 000	13 500	6 300	8 000	2308	2308 K	48	82	1.5	0.43	2.3	1.5	1.5	0.940
45	85	19	1.1	24 200	7 350	7 100	8 500	1209	1209 K	51.5	78.5	1	0.21	4.7	3.0	3.1	0.47
	85	23	1.1	25 700	8 150	7 100	8 500	2209	2209 K	51.5	78.5	1	0.30	3.2	2.1	2.2	0.556
	100	25	1.5	42 000	12 700	6 000	7 500	1309	1309 K	53	92	1.5	0.25	4.0	2.6	2.7	0.971
	100	36	1.5	60 500	16 700	5 600	7 100	2309	2309 K	53	92	1.5	0.41	2.4	1.5	1.6	1.3
50	90	20	1.1	25 100	8 100	6 300	8 000	1210	1210 K	56.5	83.5	1	0.21	4.7	3.1	3.2	0.535
	90	23	1.1	25 700	8 450	6 300	8 000	2210	2210 K	56.5	83.5	1	0.28	3.4	2.2	2.3	0.598
	110	27	2	48 000	14 100	5 600	6 700	1310	1310 K	59	101	2	0.23	4.2	2.7	2.8	1.23
	110	40	2	72 000	20 200	5 000	6 300	2310	2310 K	59	101	2	0.42	2.3	1.5	1.6	1.66
55	100	21	1.5	29 600	10 000	6 000	7 100	1211	1211 K	63	92	1.5	0.20	4.9	3.2	3.3	0.708
	100	25	1.5	29 300	9 900	6 000	7 100	2211	2211 K	63	92	1.5	0.28	3.5	2.3	2.4	0.807
	120	29	2	57 000	17 900	5 000	6 300	1311	1311 K	64	111	2	0.23	4.2	2.7	2.8	1.6
	120	43	2	84 000	24 000	4 800	6 000	2311	2311 K	64	111	2	0.41	2.4	1.5	1.6	2.12
60	110	22	1.5	33 500	11 500	5 300	6 300	1212	1212 K	68	102	1.5	0.18	5.3	3.4	3.6	0.91
	110	28	1.5	37 500	12 600	5 300	6 300	2212	2212 K	68	102	1.5	0.28	3.5	2.3	2.4	1.1
	130	31	2.1	63 500	20 800	4 500	5 600	1312	1312 K	71	119	2	0.23	4.3	2.8	2.9	2.0
	130	46	2.1	97 000	28 300	4 300	5 300	2312	2312 K	71	119	2	0.40	2.4	1.6	1.6	2.63
65	120	23	1.5	34 000	12 500	4 800	6 000	1213	1213 K	73	112	1.5	0.17	5.7	3.7	3.8	1.16
	120	31	1.5	48 000	16 400	4 800	6 000	2213	2213 K	73	112	1.5	0.28	3.5	2.3	2.4	1.5
	140	33	2.1	68 500	22 900	4 300	5 300	1313	1313 K	76	129	2	0.23	4.2	2.7	2.9	2.47
	140	48	2.1	107 000	32 500	3 800	4 800	2313	2313 K	76	129	2	0.39	2.5	1.6	1.7	3.3
70	125	24	1.5	38 500	13 800	4 800	5 600	1214	—	78	117	1.5	0.18	5.3	3.4	3.6	1.3
	125	31	1.5	48 500	17 100	4 500	5 600	2214	—	78	117	1.5	0.26	3.7	2.4	2.5	1.55
	150	35	2.1	82 500	27 700	4 000	5 000	1314	—	81	139	2	0.22	4.4	2.8	3.0	3.03
	150	51	2.1	122 000	37 500	3 600	4 500	2314	—	81	139	2	0.38	2.6	1.7	1.8	4.0

Note (1) Suffix K represents bearings with tapered bores (1 : 12).

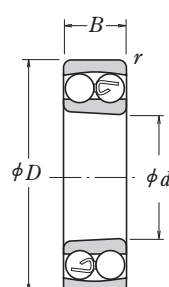
Remark For dimensions related to adapters, refer to Pages C348 and C349.

SELF-ALIGNING BALL BEARINGS

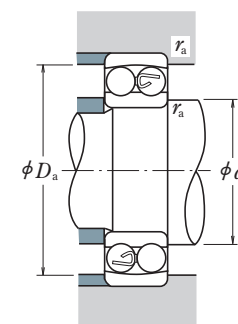
Bore Diameter 75 – 110 mm



Cylindrical Bore



Tapered Bore



Dynamic Equivalent Load

$$P = XF_r + YF_a$$

$F_a/F_r \leq e$		$F_a/F_r > e$	
X	Y	X	Y
1	Y_3	0.65	Y_2

Static Equivalent Load

$$P_0 = F_r + Y_0 F_a$$

The values of e , Y_2 , Y_3 , and Y_0 are listed in the table below.

Boundary Dimensions (mm)				Basic Load Ratings (N)		Limiting Speeds (min ⁻¹)		Bearing Designations		Abutment and Fillet Dimensions (mm)			Constant	Axial Load Factors			Mass (kg)
d	D	B	r min.	C_r	C_{0r}	Grease	Oil	Cylindrical Bore	Tapered Bore ⁽¹⁾	d_a min.	D_a max.	r_a max.	e	Y_2	Y_3	Y_0	approx.
75	130	25	1.5	43 000	15 700	4 300	5 300	1215	1215 K	83	122	1.5	0.17	5.6	3.6	3.8	1.36
	130	31	1.5	49 000	17 800	4 300	5 300	2215	2215 K	83	122	1.5	0.25	3.9	2.5	2.6	1.6
	160	37	2.1	88 000	30 000	3 800	4 500	1315	1315 K	86	149	2	0.22	4.4	2.8	2.9	3.63
	160	55	2.1	137 000	43 000	3 400	4 300	2315	2315 K	86	149	2	0.38	2.5	1.6	1.7	4.84
80	140	26	2	44 000	17 000	4 000	5 000	1216	1216 K	89	131	2	0.16	6.0	3.9	4.1	1.68
	140	33	2	54 000	19 900	4 000	5 000	2216	2216 K	89	131	2	0.25	3.9	2.5	2.7	2.02
	170	39	2.1	98 000	33 000	3 600	4 300	1316	1316 K	91	159	2	0.22	4.5	2.9	3.1	4.24
	170	58	2.1	143 000	45 000	3 200	4 000	* 2316	* 2316 K	91	159	2	0.39	2.5	1.6	1.7	5.75
85	150	28	2	54 500	20 800	3 800	4 500	1217	1217 K	94	141	2	0.17	5.7	3.7	3.8	2.1
	150	36	2	64 500	23 600	3 800	4 800	2217	2217 K	94	141	2	0.25	3.9	2.5	2.6	2.56
	180	41	3	108 000	38 000	3 400	4 000	1317	1317 K	98	167	2.5	0.21	4.6	2.9	3.1	5.03
	180	60	3	156 000	51 500	3 000	3 800	2317	2317 K	98	167	2.5	0.37	2.6	1.7	1.8	6.68
90	160	30	2	63 000	23 500	3 600	4 300	1218	1218 K	99	151	2	0.17	5.8	3.8	3.9	2.56
	160	40	2	77 500	28 700	3 600	4 300	2218	2218 K	99	151	2	0.27	3.7	2.4	2.5	3.22
	190	43	3	129 000	44 500	3 200	3 800	* 1318	* 1318 K	103	177	2.5	0.22	4.3	2.8	2.9	5.83
	190	64	3	170 000	57 500	2 800	3 600	2318	2318 K	103	177	2.5	0.38	2.6	1.7	1.7	7.87
95	170	32	2.1	70 500	27 100	3 400	4 000	1219	1219 K	106	159	2	0.17	5.8	3.7	3.9	3.12
	170	43	2.1	92 000	34 500	3 400	4 000	2219	2219 K	106	159	2	0.27	3.7	2.4	2.5	3.96
	200	45	3	142 000	51 000	3 000	3 600	* 1319	* 1319 K	108	187	2.5	0.23	4.3	2.8	2.9	6.79
	200	67	3	177 000	64 500	2 800	3 400	* 2319	* 2319 K	108	187	2.5	0.38	2.6	1.7	1.8	9.09
100	180	34	2.1	76 500	29 700	3 200	3 800	1220	1220 K	111	169	2	0.17	5.6	3.6	3.8	3.74
	180	46	2.1	104 000	38 500	3 200	3 800	2220	2220 K	111	169	2	0.27	3.7	2.4	2.5	4.71
	215	47	3	155 000	57 500	2 800	3 400	* 1320	* 1320 K	113	202	2.5	0.24	4.1	2.7	2.8	8.4
	215	73	3	206 000	79 000	2 400	3 200	* 2320	* 2320 K	113	202	2.5	0.38	2.6	1.7	1.8	11.7
105	190	36	2.1	82 500	32 500	3 000	3 600	1221	—	116	179	2	0.18	5.5	3.6	3.7	4.43
	190	50	2.1	120 000	45 000	3 000	3 600	2221	—	116	179	2	0.28	3.5	2.3	2.4	5.73
	225	49	3	169 000	64 500	2 600	3 200	* 1321	—	118	212	2.5	0.23	4.2	2.7	2.9	9.58
	225	77	3	220 000	87 000	2 400	3 000	* 2321	—	118	212	2.5	0.38	2.6	1.7	1.7	14.5
110	200	38	2.1	96 000	38 500	2 800	3 400	1222	1222 K	121	189	2	0.17	5.7	3.7	3.9	5.21
	200	53	2.1	135 000	51 500	2 800	3 400	* 2222	* 2222 K	121	189	2	0.28	3.5	2.2	2.3	6.75
	240	50	3	177 000	72 000	2 400	3 000	* 1322	* 1322 K	123	227	2.5	0.22	4.4	2.8	3.0	11.5
	240	80	3	233 000	94 500	2 200	2 800	* 2322	* 2322 K	123	227	2.5	0.37	2.6	1.7	1.8	17.5

Notes ⁽¹⁾ Suffix K represents bearings with tapered bores (1 : 12).

(*) The balls of the bearings marked * protrude slightly from the bearing face. The protrusion amounts are shown on Page C114.

Remark For dimensions related to adapters, refer to Pages C350 and C351.