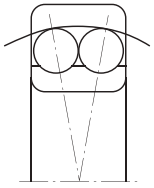
Self-Aligning Ball Bearings

DESIGN, TYPES, AND FEATURES

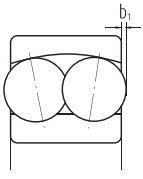


The outer ring has a spherical raceway and its center of curvature coincides with that of the bearing; therefore, the axis of the inner ring, balls and cage can deflect to some extent around the bearing center. This type is recommended when the alignment of the shaft and housing is difficult and when the shaft may bend. Since the contact angle is small, the axial load capacity is low.

Pressed steel cages are usually used.

PROTRUSION AMOUNT OF BALLS

Among self-aligning ball bearings, there are some in which the balls protrude from the side face as shown below. This protrusion amount b_1 is listed in the following table.



Bearing No.	b_1 (mm)
2222(K), 2316(K)	0.5
2319(K), 2320(K) 2321, 2322(K)	0.5
1318(K)	1.5
1319(K)	2
1320(K), 1321 1322(K)	3

PERMISSIBLE MISALIGNMENT

The permissible misalignment of self-aligning ball bearings is approximately 0.07 to 0.12 radian (4° to 7°) under normal loads. However, depending on the surrounding structure, such an angle may not be possible. Use care in the structural design.

CAGES

The cages of these bearings are made of pressed steel of glass-fibre reinforced Polyamid 66. Suffix

· (blank) - pressed steel

· J - pressed steel

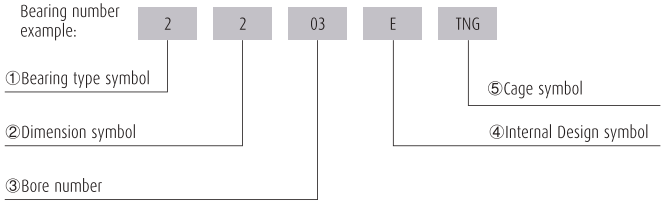
· TN/TNG - Polyamide 66

SEALS

ITJ manufactures Series 22.. and 23.. Self Aligning Ball Bearings, not only as an open version but also with seals on both sides of the bearing. These seals are made of nitrile rubber and are reinforced with a steel disc embedded in the rubber. The seals are fixed in the outer ring and seal against the inner ring with a friction sealing lip. Sealed Self Aligning Ball Bearings are filled with enough grease at the factory to last the normal life span of the bearing. The bearings are therefore maintenance free. Note that sealed Self Aligning Bearings have a lower load-carrying capacity than open bearings of the same type. During installation, it is essential that they are not twisted, as otherwise the seals may be forced out of position.

ANGLE ADJUSTMENT FACILITY

Self Aligning Bearings facilitate angle adjustment. The permitted angle of tilt from the central position for Series 12.. and 22.. open bearings is 2.5° and for Series 13.. and 23.. is 3°. With sealed bearings, the permitted angle of tilt is 1.5°.



①Self Aligning Ball Bearing

②1: series, 2: 2 series

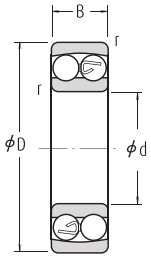
③Less than 03, Bearing bore 00 : 10 mm, 01 : 12 mm,
02 : 15 mm, 03 : 17 mm
Over 04, Bearing bore Bore number ×5 (mm)

④E: High Load Capacity

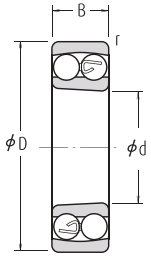
⑤(blank)/J: Pressed Steel Cage
TN/TNG Polyamide Cage

Self-Aligning Ball Bearings

Bore Diameter 5 – 17 mm

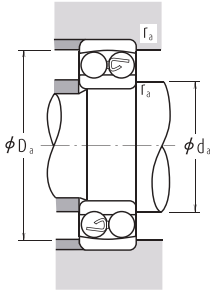


Cylindrical Bore



Tapered Bore

Boundary Dimensions (mm)				Basic Load Ratings (N)		Limiting Speeds (min^{-1})		Bearing
d	D	B	r min.	C_r	C_{0r}	Grease	Oil	Cylindrical Bore
5	19	6	0.3	2 530	475	30 000	36 000	**135**
6	19	6	0.3	2 530	475	30 000	36 000	**126**
7	22	7	0.3	2 750	600	26 000	32 000	**127**
8	22	7	0.3	2 750	600	26 000	32 000	**108**
9	26	8	0.6	4 150	895	26 000	30 000	**129**
10	30	9	0.6	5 550	1 190	22 000	28 000	**1200**
	30	9	0.6	5 500	1 530	24 000	30 000	**1200TN**
	30	14	0.6	7 450	1 590	24 000	28 000	**2200**
	30	14	0.6	7 200	2 040	24 000	30 000	**2200TN**
	35	11	0.6	7 350	1 620	20 000	24 000	**1300**
	35	17	0.6	9 200	2 010	18 000	22 000	**2300**
12	32	10	0.6	5 700	1 270	22 000	26 000	**1201**
	32	10	0.6	5 600	1 270	24 000	30 000	**1201TNG**
	32	14	0.6	7 750	1 730	22 000	26 000	**2201**
	32	14	0.6	9 000	1 960	20 000	26 000	**2201ETNG**
	37	12	1.0	9 650	2 160	18 000	22 000	**1301**
	37	12	1.0	9 500	2 160	18 000	22 000	**1301TN**
	37	17	1.0	12 100	2 730	17 000	22 000	**2301**
15	35	11	0.6	7 600	1 750	18 000	22 000	**1202**
	35	11	0.6	7 500	1 760	20 000	26 000	**1202TNG**
	35	14	0.6	7 800	1 850	18 000	22 000	**2202**
	35	14	0.6	9 150	2 080	19 000	24 000	**2202ETNG**
	42	13	1.0	9 700	2 290	16 000	20 000	**1302**
	42	13	1.0	9 500	2 280	17 000	20 000	**1302TN**
	42	17	1.0	12 300	2 910	14 000	18 000	**2302**
	42	17	1.0	12 000	2 900	16 000	19 000	**2302ETNG**
17	40	12	0.6	8 000	2 010	16 000	20 000	**1203**
	40	12	0.6	8 000	2 040	18 000	22 000	**1203TNG**
	40	16	0.6	9 950	2 420	16 000	20 000	**2203**
	40	16	0.6	11 400	2 750	16 000	19 000	**2203ETNG**
	47	14	1.0	12 700	3 200	14 000	17 000	**1303**
	47	14	1.0	12 500	3 200	15 000	18 000	**1303TN**
	47	19	1.0	14 700	3 550	13 000	16 000	**2303**
	47	19	1.0	14 300	3 550	14 000	17 000	**2303TN**



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

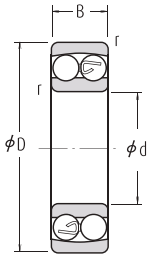
Static Equivalent Load $P_0=F_r+Y_0F_a$

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

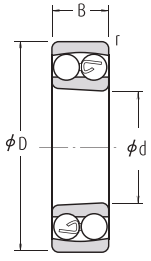
Numbers	Abutment and Fillet Dimensions (mm)			Constant	Axial Load Factors			Mass (kg)
Tapered Bore(1)	d_a min.	D_a max.	r_a max.	e	Y_2	Y_3	Y_0	approx.
—	7.0	17.0	0.3	0.34	2.9	1.9	1.9	0.009
—	8.0	17.0	0.3	0.34	2.9	1.9	1.9	0.008
—	9.0	20.0	0.3	0.31	3.1	2.0	2.1	0.013
—	10.0	20.0	0.3	0.31	3.1	2.0	2.1	0.016
—	13.0	22.0	0.6	0.32	3.1	2.0	2.1	0.021
—	14.0	26.0	0.6	0.32	3.1	2.0	2.1	0.034
—	14.0	26.0	0.6	0.32	3.00	2.0	2.1	0.034
—	14.0	26.0	0.6	0.64	1.5	0.98	1.0	0.046
—	14.0	26.0	0.6	0.66	1.50	1.0	1.0	0.047
—	14.0	31.0	0.6	0.35	2.8	1.8	1.9	0.059
—	14.0	31.0	0.6	0.71	1.4	0.89	0.93	0.080
—	16.0	28.0	0.6	0.36	2.7	1.8	1.8	0.041
—	16.0	28.0	0.6	0.37	2.60	1.7	0.040	0.040
—	16.0	28.0	0.6	0.58	1.7	1.1	1.1	0.051
—	16.0	28.0	0.6	0.53	1.85	1.2	1.3	0.053
—	17.0	32.0	1.0	0.33	2.9	1.9	2.0	0.068
—	17.0	32.0	1.0	0.35	2.80	1.8	1.9	0.067
—	17.0	32.0	1.0	0.60	1.6	1.1	1.1	0.089
—	19.0	31.0	0.6	0.32	3.1	2.0	2.1	0.050
—	19.0	31.0	0.6	0.34	2.90	1.9	2.0	0.049
—	19.0	31.0	0.6	0.50	1.9	1.3	1.3	0.058
—	19.0	31.0	0.6	0.46	2.10	1.4	1.4	0.060
—	20.0	37.0	1.0	0.33	2.9	1.9	2.0	0.101
—	20.0	37.0	1.0	0.35	2.80	1.8	1.9	0.094
—	20.0	37.0	1.0	0.51	1.9	1.2	1.3	0.116
—	20.0	37.0	1.0	0.51	1.90	1.2	1.3	0.110
—	21.0	36.0	0.6	0.31	3.1	2.0	2.1	0.074
—	21.0	36.0	0.6	0.33	3.00	1.9	2.0	0.073
—	21.0	36.0	0.6	0.50	1.9	1.3	1.3	0.089
—	21.0	36.0	0.6	0.46	2.10	1.4	1.4	0.088
—	22.0	42.0	1.0	0.32	3.1	2.0	2.1	0.13
—	22.0	42.0	1.0	0.32	3.00	1.9	2.0	0.130
—	22.0	42.0	1.0	0.51	1.9	1.2	1.3	0.16
—	22.0	42.0	1.0	0.53	1.90	1.2	1.3	0.160

Self-Aligning Ball Bearings

Bore Diameter 20 – 35 mm

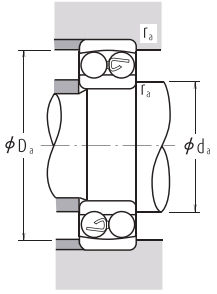


Cylindrical Bore



Tapered Bore

Boundary Dimensions (mm)				Basic Load Ratings (N)		Limiting Speeds (min^{-1})		Bearing
d	D	B	r min.	C_r	C_{0r}	Grease	Oil	Cylindrical Bore
20	47	14	1.0	10 000	2 610	14 000	17 000	**1204**
	47	14	1.0	10 000	2 650	15 000	18 000	**1204TNG**
	47	18	1.0	12 800	3 300	14 000	17 000	**2204**
	47	18	1.0	14 300	3 550	14 000	17 000	**2204ETNG**
	52	15	1.1	12 600	3 350	12 000	15 000	**1304**
	52	15	1.1	12 500	3 350	13 000	16 000	**1304TNG**
	52	21	1.1	18 500	4 700	11 000	14 000	**2304**
	52	21	1.1	18 000	4 650	13 000	16 000	**2304J**
25	52	15	1.0	12 200	3 300	12 000	14 000	**1205**
	52	15	1.0	12 200	3 350	13 000	16 000	**1205TNG**
	52	18	1.0	12 400	3 450	12 000	14 000	**2205**
	52	18	1.0	17 000	4 400	12 000	15 000	**2205ETNG**
	62	17	1.1	18 200	5 000	10 000	13 000	**1305**
	62	17	1.1	18 000	5 000	11 000	14 000	**1305TNG**
	62	24	1.1	24 900	6 600	9 500	12 000	**2305**
	62	24	1.1	24 500	6 550	10 000	13 000	**2305TNG**
30	62	16	1.0	15 800	4 650	10 000	12 000	**1206**
	62	16	1.0	15 600	4 650	11 000	14 000	**1206TNG**
	62	20	1.0	15 300	4 550	10 000	12 000	**2206**
	62	20	1.0	25 500	6 950	9 500	12 000	**2206ETNG**
	72	19	1.1	21 400	6 300	8 500	11 000	**1306**
	72	19	1.1	21 200	6 300	9 000	11 000	**1306TNG**
	72	27	1.1	32 000	8 750	8 000	10 000	**2306**
	72	27	1.1	31 500	8 650	8 500	10 000	**2306TNG**
35	72	17	1.1	15 900	5 100	8 500	10 000	**1207**
	72	17	1.1	16 000	5 200	9 500	12 000	**1207TNG**
	72	23	1.1	21 700	6 600	8 500	10 000	**2207**
	72	23	1.1	32 000	9 000	8 000	9 500	**2207ETNG**
	80	21	1.5	25 300	7 850	7 500	9 500	**1307**
	80	21	1.5	25 000	8 000	8 000	9 500	**1307TNG**
	80	31	1.5	40 000	11 300	7 100	9 000	**2307**
	80	31	1.5	39 000	11 200	7 500	9 000	**2307TNG**



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

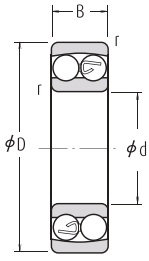
Static Equivalent Load $P_0=F_r+Y_0F_a$

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

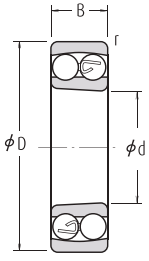
Numbers	Abutment and Fillet Dimensions (mm)			Constant	Axial Load Factors			Mass (kg)
Tapered Bore(1)	d_a min.	D_a max.	r_a max.	e	Y_2	Y_3	Y_0	approx.
1204 K	25.0	42.0	1.0	0.29	3.4	2.2	2.3	0.12
1204KTNG	25.0	42.0	1.0	0.28	3.50	2.2	2.3	0.120
2204 K	25.0	42.0	1.0	0.47	2.1	1.3	1.4	0.142
2204EKTNG	25.0	42.0	1.0	0.44	2.20	1.5	1.5	0.140
1304 K	26.5	45.5	1.0	0.29	3.4	2.2	2.3	0.164
1304KTNG	26.5	45.5	1.0	0.29	3.30	2.2	2.3	0.160
2304 K	26.5	45.5	1.0	0.50	1.9	1.2	1.3	0.210
2304KJ	26.5	45.5	1.0	0.51	1.90	1.2	1.3	0.210
1205 K	30.0	47.0	1.0	0.28	3.5	2.3	2.4	0.14
1205KTNG	30.0	47.0	1.0	0.27	3.70	2.4	2.5	0.140
2205 K	30.0	47.0	1.0	0.41	2.4	1.5	1.6	0.16
2205EKTNG	30.0	47.0	1.0	0.35	2.80	1.8	1.9	0.160
1305 K	31.5	55.5	1.0	0.28	3.5	2.3	2.4	0.261
1305KTNG	31.5	55.5	1.0	0.28	3.50	2.3	2.4	0.260
2305 K	31.5	55.5	1.0	0.47	2.1	1.4	1.4	0.340
2305KTNG	31.5	55.5	1.0	0.48	2.00	1.3	1.4	0.340
1206 K	35.0	57.0	1.0	0.25	3.9	2.5	2.6	0.22
1206KTNG	35.0	57.0	1.0	0.25	3.90	2.5	2.7	0.220
2206 K	35.0	57.0	1.0	0.38	2.5	1.6	1.7	0.262
2206EKTNG	35.0	57.0	1.0	0.30	3.30	2.1	2.2	0.260
1306 K	36.5	65.5	1.0	0.26	3.7	2.4	2.5	0.391
1306KTNG	36.5	65.5	1.0	0.26	3.70	2.4	2.5	0.390
2306 K	36.5	65.5	1.0	0.44	2.2	1.4	1.5	0.51
2306KTNG	36.5	65.5	1.0	0.45	2.20	1.4	1.5	0.500
1207 K	41.5	65.5	1.0	0.23	4.2	2.7	2.8	0.33
1207KTNG	41.5	65.5	1.0	0.22	4.30	2.8	2.9	0.320
2207 K	41.5	65.5	1.0	0.37	2.6	1.7	1.8	0.403
2207EKTNG	41.5	65.5	1.0	0.30	3.30	2.1	2.2	0.400
1307 K	43.0	72.0	1.5	0.26	3.8	2.5	2.6	0.52
1307KTNG	43.0	72.0	1.5	0.26	3.80	2.5	2.6	0.510
2307 K	43.0	72.0	1.5	0.46	2.1	1.4	1.4	0.687
2307KTNG	43.0	72.0	1.5	0.47	2.10	1.4	1.4	0.680

Self-Aligning Ball Bearings

Bore Diameter 40 – 55 mm

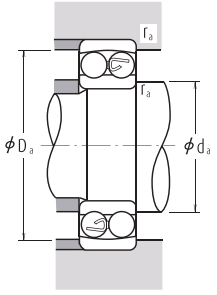


Cylindrical Bore



Tapered Bore

Boundary Dimensions (mm)				Basic Load Ratings (N)		Limiting Speeds (min^{-1})		Bearing
d	D	B	r min.	C_r	C_{0r}	Grease	Oil	Cylindrical Bore
40	80	18	1.1	19 300	6 500	7 500	9 000	**1208**
	80	18	1.1	19 300	6 550	8 500	10 000	**1208TNG**
	80	23	1.1	22 400	7 350	7 500	9 000	**2208**
	80	23	1.1	31 500	9 500	7 500	9 000	**2208ETNG**
	90	23	1.5	29 800	9 700	6 700	8 500	**1308**
	90	23	1.5	29 000	9 650	7 000	8 500	**1308TNG**
	90	33	1.5	45 500	13 500	6 300	8 000	**2308**
	90	33	1.5	45 000	13 400	6 700	8 000	**2308TNG**
45	85	19	1.1	22 000	7 350	7 100	8 500	**1209**
	85	19	1.1	22 000	7 350	7 500	9 000	**1209TNG**
	85	23	1.1	23 300	8 150	7 100	8 500	**2209**
	85	23	1.1	28 000	9 000	7 000	8 500	**2209ETNG**
	100	25	1.5	38 500	12 700	6 000	7 500	**1309**
	100	25	1.5	38 000	12 900	6 300	7 500	**1309TNG**
	100	36	1.5	55 000	16 700	5 600	7 100	**2309**
	100	36	1.5	54 000	16 300	6 000	7 000	**2309TNG**
50	90	20	1.1	22 800	8 100	6 300	8 000	**1210**
	90	20	1.1	22 800	8 150	7 000	8 500	**1210TNG**
	90	23	1.1	23 300	8 450	6 300	8 000	**2210**
	90	23	1.1	28 000	9 500	6 700	8 000	**2210ETNG**
	110	27	2.0	43 500	14 100	5 600	6 700	**1310**
	110	27	2.0	41 500	14 300	5 600	6 700	**1310TNG**
	110	40	2.0	65 000	20 200	5 000	6 300	**2310**
	110	40	2.0	64 000	20 000	5 300	6 300	**2310TNG**
55	100	21	1.5	26 900	10 000	6 000	7 100	**1211**
	100	21	1.5	27 000	10 000	6 300	7 500	**1211TNG**
	100	25	1.5	26 700	9 900	6 000	7 100	**2211**
	100	25	1.5	39 000	12 700	5 600	6 700	**2211ETNG**
	120	29	2.0	51 500	17 900	5 000	6 300	**1311**
	120	29	2.0	51 000	18 000	5 000	6 000	**1311TNG**
	120	43	2.0	76 500	24 000	4 800	6 000	**2311**
	120	43	2.0	75 000	23 600	4 800	5 600	**2311TNG**



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

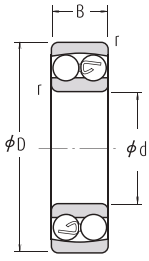
Static Equivalent Load $P_0=F_r+Y_0F_a$

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

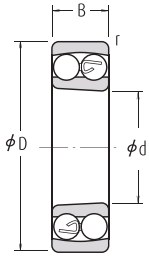
Numbers	Abutment and Fillet Dimensions (mm)			Constant	Axial Load Factors			Mass (kg)
Tapered Bore(1)	d_a min.	D_a max.	r_a max.	e	Y_2	Y_3	Y_0	approx.
1208 K	46.5	73.5	1.0	0.22	4.3	2.8	2.9	0.42
1208KTNG	46.5	73.5	1.0	0.22	4.5	2.9	3.0	0.420
2208 K	46.5	73.5	1.0	0.33	3.0	1.9	2.0	0.506
2208EKTNG	46.5	73.5	1.0	0.26	3.8	2.4	2.5	0.510
1308 K	48.0	82.0	1.5	0.24	4.0	2.6	2.7	0.727
1308KTNG	48.0	82.0	1.5	0.25	3.9	2.5	2.6	0.720
2308 K	48.0	82.0	1.5	0.43	2.3	1.5	1.5	0.940
2308KTNG	48.0	82.0	1.5	0.43	2.3	1.5	1.5	0.93
1209 K	51.5	78.5	1.0	0.21	4.7	3.0	3.1	0.47
1209KTNG	51.5	78.5	1.0	0.21	4.7	3.0	3.2	0.47
2209 K	51.5	78.5	1.0	0.30	3.2	2.1	2.2	0.556
2209EKTNG	51.5	78.5	1.0	0.26	3.8	2.4	2.5	0.55
1309 K	53.0	92.0	1.5	0.25	4.0	2.6	2.7	0.971
1309KTNG	53.0	92.0	1.5	0.25	3.9	2.5	2.6	0.96
2309 K	53.0	92.0	1.5	0.41	2.4	1.5	1.6	1.3
2309KTNG	53.0	92.0	1.5	0.43	2.3	1.5	1.6	1.25
1210 K	56.5	83.5	1.0	0.21	4.7	3.1	3.2	0.535
1210KTNG	56.5	83.5	1.0	0.19	4.9	3.2	3.3	0.53
2210 K	56.5	83.5	1.0	0.28	3.4	2.2	2.3	0.598
2210EKTNG	56.5	83.5	1.0	0.22	4.1	2.6	3.7	0.59
1310 K	59.0	101.0	2.0	0.23	4.2	2.7	2.8	1.23
1310KTNG	59.0	101.0	2.0	0.24	4.0	2.6	2.7	1.20
2310 K	59.0	101.0	2.0	0.42	2.3	1.5	1.6	1.66
2310KTNG	59.0	101.0	2.0	0.43	2.3	1.5	1.5	1.65
1211 K	63.0	92.0	1.5	0.20	4.9	3.2	3.3	0.708
1211KTNG	63.0	92.0	1.5	0.19	5.1	3.3	3.5	0.71
2211 K	63.0	92.0	1.5	0.28	3.5	2.3	2.4	0.807
2211EKTNG	63.0	92.0	1.5	0.22	4.5	2.9	2.1	0.81
1311 K	64.0	111.0	2.0	0.23	4.2	2.7	2.8	1.6
1311KTNG	64.0	111.0	2.0	0.24	4.1	2.7	2.8	1.60
2311 K	64.0	111.0	2.0	0.41	2.4	1.5	1.6	2.12
2311KTNG	64.0	111.0	2.0	0.42	2.3	1.5	1.6	2.10

Self-Aligning Ball Bearings

Bore Diameter 60 – 75 mm



Cylindrical Bore



Tapered Bore

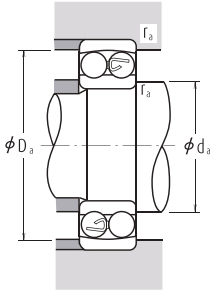
Boundary Dimensions (mm)				Basic Load Ratings (N)		Limiting Speeds (min^{-1})		Bearing
d	D	B	r min.	C_r	C_{0r}	Grease	Oil	Cylindrical Bore
60	110	22	1.5	30 500	11 500	5 300	6 300	**1212**
	110	22	1.5	30 000	11 600	5 600	6 700	**1212TNG**
	110	28	1.5	34 000	12 600	5 300	6 300	**2212**
	110	28	1.5	47 500	16 600	5 300	6 300	**2212ETNG**
	130	31	2.1	57 500	20 800	4 500	5 600	**1312**
	130	31	2.0	57 500	20 800	4 800	5 600	**1312TNG**
	130	46	2.1	88 500	28 300	4 300	5 300	**2312**
	130	46	2.0	88 500	28 300	4 300	5 300	**2312TNG**
65	120	23	1.5	31 000	12 500	4 800	6 000	**1213**
	120	23	1.5	31 000	12 500	5 300	6 300	**1213TNG**
	120	31	1.5	43 500	16 400	4 800	6 000	**2213**
	120	31	1.5	57 000	19 300	4 500	5 300	**2213ETNG**
	140	33	2.1	62 500	22 900	4 300	5 300	**1313**
	140	33	2.1	62 500	22 900	4 300	5 300	**1313J**
	140	48	2.1	97 000	32 500	3 800	4 800	**2313**
	140	48	2.1	96 500	32 500	4 000	4 800	**2313J**
70	125	24	1.5	35 000	13 800	4 800	5 600	**1214**
	125	24	1.5	34 500	13 700	5 000	6 000	**1214TNG**
	125	31	1.5	44 000	17 100	4 500	5 600	**2214**
	125	31	1.5	44 000	17 100	4 500	5 600	**2214J**
	150	35	2.1	75 000	27 700	4 000	5 000	**1314**
	150	35	2.1	67 500	25 100	4 000	5 000	**1314J**
	150	51	2.1	111 000	37 500	3 600	4 500	**2314**
	150	51	2.1	111 000	37 500	3 600	4 300	**2314J**
75	130	25	1.5	39 000	15 700	4 300	5 300	**1215**
	130	25	1.5	39 000	15 600	4 800	5 600	**1215TNG**
	130	31	1.5	44 500	17 800	4 300	5 300	**2215**
	130	31	1.5	44 500	17 800	4 300	5 300	**2215J**
	160	37	2.1	80 000	30 000	3 800	4 500	**1315**
	160	37	2.1	80 000	30 000	3 800	4 500	**1315J**
	160	55	2.1	125 000	43 000	3 400	4 300	**2315**
	160	55	2.1	125 000	43 000	3 400	4 300	**2315J**

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 $P_0=F_r+Y_0F_a$

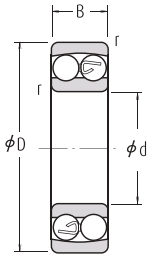
The values of e, Y_2 , Y_3 , and Y_0 are listed in the table below.



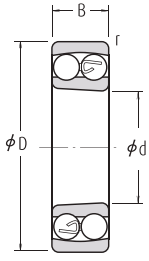
Numbers	Abutment and Fillet Dimensions (mm)			Constant	Axial Load Factors			Mass (kg)
Tapered Bore(1)	d_a min.	D_a max.	r_a max.	e	Y_2	Y_3	Y_0	approx.
1212 K	68.0	102.0	1.5	0.18	5.3	3.4	3.6	0.91
1212KTNG	68.5	101.5	1.5	0.18	5.4	3.5	3.6	0.90
2212 K	68.0	102.0	1.5	0.28	3.5	2.3	2.4	1.1
2212EKTNG	68.5	101.5	1.5	0.23	4.2	2.7	2.8	1.10
1312 K	71.0	119.0	2.0	0.23	4.3	2.8	2.9	2.0
1312KJ	72.0	118.0	2.0	0.23	4.3	2.8	2.9	1.95
2312 K	71.0	119.0	2.0	0.40	2.4	1.6	1.6	2.63
2312KJ	72.0	118.0	2.0	0.40	2.4	1.6	1.7	2.60
1213 K	73.0	112.0	1.5	0.17	5.7	3.7	3.8	1.16
1213KTNG	73.0	112.0	1.5	0.18	5.5	3.6	3.7	1.15
2213 K	73.0	112.0	1.5	0.28	3.5	2.3	2.4	1.5
2213EKTNG	73.0	112.0	1.5	0.23	4.3	2.8	2.9	1.45
1313 K	76.0	129.0	2.0	0.23	4.2	2.7	2.9	2.47
1313KTNG	76.0	128.0	2.0	0.23	4.3	2.8	2.9	2.45
2313 K	76.0	129.0	2.0	0.39	2.5	1.6	1.7	3.3
2313KTNG	76.0	128.0	2.0	0.39	2.5	1.6	1.7	3.25
—	78.0	117.0	1.5	0.18	5.3	3.4	3.6	1.3
—	78.0	116.5	1.5	0.19	5.1	3.3	3.5	1.25
—	78.0	117.0	1.5	0.26	3.7	2.4	2.5	1.55
—	78.0	116.5	1.5	0.26	3.7	2.4	2.5	1.50
—	81.0	139.0	2.0	0.22	4.4	2.8	3.0	3.03
—	81.0	138.0	2.0	0.22	4.4	2.8	3.0	3.00
—	81.0	139.0	2.0	0.38	2.6	1.7	1.8	4.0
—	81.0	138.0	2.0	0.38	2.6	1.7	1.8	4.25
1215 K	83.0	122.0	1.5	0.17	5.6	3.6	3.8	1.36
1215KTNG	83.5	121.5	1.5	0.17	5.6	3.6	3.8	1.35
2215 K	83.0	122.0	1.5	0.25	3.9	2.5	2.6	1.6
2215KJ	83.5	121.5	1.5	0.25	3.9	2.5	2.6	1.60
1315 K	86.0	149.0	2.0	0.22	4.4	2.8	2.9	3.63
1315KJ	87.0	148.0	2.0	0.22	4.4	2.8	3.0	3.55
2315 K	86.0	149.0	2.0	0.38	2.5	1.6	1.7	4.84
2315KJ	87.0	148.0	2.0	0.38	2.6	1.6	1.7	5.15

Self-Aligning Ball Bearings

Bore Diameter 80 – 110 mm

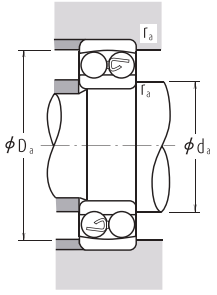


Cylindrical Bore



Tapered Bore

Boundary Dimensions (mm)				Basic Load Ratings (N)		Limiting Speeds (min^{-1})		Bearing
d	D	B	r min.	C_r	C_{0r}	Grease	Oil	Cylindrical Bore
80	140	26	2.0	40 000	17 000	4 000	5 000	**1216**
	140	33	2.0	49 000	19 900	4 000	5 000	**2216**
	170	39	2.1	89 000	33 000	3 600	4 300	**1316**
	170	58	2.1	130 000	45 000	3 200	4 000	* **2316**
85	150	28	2.0	49 500	20 800	3 800	4 500	**1217**
	150	36	2.0	58 500	23 600	3 800	4 800	**2217**
	180	41	3.0	98 500	38 000	3 400	4 000	**1317**
	180	60	3.0	142 000	51 500	3 000	3 800	**2317**
90	160	30	2.0	57 500	23 500	3 600	4 300	**1218**
	160	40	2.0	70 500	28 700	3 600	4 300	**2218**
	190	43	3.0	117 000	44 500	3 200	3 800	* **1318**
	190	64	3.0	154 000	57 500	2 800	3 600	**2318**
95	170	32	2.1	64 000	27 100	3 400	4 000	**1219**
	170	43	2.1	84 000	34 500	3 400	4 000	**2219**
	200	45	3.0	129 000	51 000	3 000	3 600	* **1319**
	200	67	3.0	161 000	64 500	2 800	3 400	* **2319**
100	180	34	2.1	69 500	29 700	3 200	3 800	**1220**
	180	46	2.1	94 500	38 500	3 200	3 800	**2220**
	215	47	3.0	140 000	57 500	2 800	3 400	* **1320**
	215	73	3.0	187 000	79 000	2 400	3 200	* **2320**
105	190	36	2.1	75 000	32 500	3 000	3 600	**1221**
	190	50	2.1	109 000	45 000	3 000	3 600	**2221**
	225	49	3.0	154 000	64 500	2 600	3 200	* **1321**
	225	77	3.0	200 000	87 000	2 400	3 000	* **2321**
110	200	38	2.1	87 000	38 500	2 800	3 400	**1222**
	200	53	2.1	122 000	51 500	2 800	3 400	* **2222**
	240	50	3.0	161 000	72 000	2 400	3 000	* **1322**
	240	80	3.0	211 000	94 500	2 200	2 800	* **2322**



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

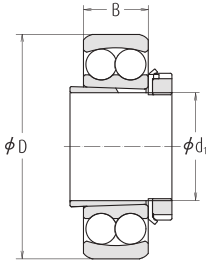
Static Equivalent Load $P_0=F_r+Y_0F_a$

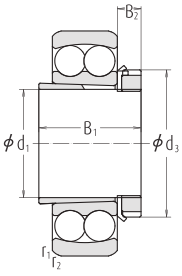
The values of e, Y_2 , Y_3 , and Y_0 are listed in the table below.

Numbers	Abutment and Fillet Dimensions (mm)			Constant	Axial Load Factors			Mass (kg)
Tapered Bore(1)	d_a min.	D_a max.	r_a max.	e	Y_2	Y_3	Y_0	approx.
1216 K	89	131	2.0	0.16	6.0	3.9	4.1	1.68
2216 K	89	131	2.0	0.25	3.9	2.5	2.7	1.97
1316 K	91	159	2.0	0.22	4.5	2.9	3.1	4.24
* 2316 K	91	159	2.0	0.39	2.5	1.6	1.7	5.75
1217 K	94	141	2.0	0.17	5.7	3.7	3.8	2.1
2217 K	94	141	2.0	0.25	3.9	2.5	2.6	2.56
1317 K	98	167	2.5	0.21	4.6	2.9	3.1	5.03
2317 K	98	167	2.5	0.37	2.6	1.7	1.8	6.68
1218 K	99	151	2.0	0.17	5.8	3.8	3.9	2.56
2218 K	99	151	2.0	0.27	3.7	2.4	2.5	3.22
* 1318 K	103	177	2.5	0.22	4.3	2.8	2.9	5.83
2318 K	103	177	2.5	0.38	2.6	1.7	1.7	7.87
1219 K	106	159	2.0	0.17	5.8	3.7	3.9	3.12
2219 K	106	159	2.0	0.27	3.7	2.4	2.5	3.96
* 1319 K	108	187	2.5	0.23	4.3	2.8	2.9	6.79
* 2319 K	108	187	2.5	0.38	2.6	1.7	1.8	9.09
1220 K	111	169	2.0	0.17	5.6	3.6	3.8	3.82
2220 K	111	169	2.0	0.27	3.7	2.4	2.5	4.71
* 1320 K	113	202	2.5	0.24	4.1	2.7	2.8	8.4
* 2320 K	113	202	2.5	0.38	2.6	1.7	1.8	11.5
—	116	179	2.0	0.18	5.5	3.6	3.7	4.43
—	116	179	2.0	0.28	3.5	2.3	2.4	5.73
—	118	212	2.5	0.23	4.2	2.7	2.9	9.58
—	118	212	2.5	0.38	2.6	1.7	1.7	14.5
1222 K	121	189	2.0	0.17	5.7	3.7	3.9	5.21
* 2222 K	121	189	2.0	0.28	3.5	2.2	2.3	6.75
* 1322 K	123	227	2.5	0.22	4.4	2.8	3.0	11.5
* 2322 K	123	227	2.5	0.37	2.6	1.7	1.8	17.5

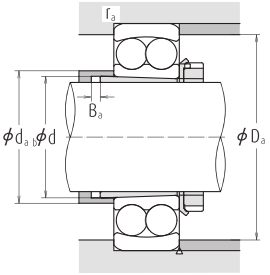
Self-Aligning Ball Bearings

With adapter sleeve | Shaft 17–65 mm





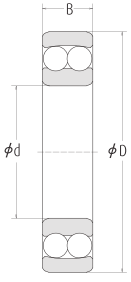
Dimensions				Load ratings		Speed limits		Abbreviation for	
d_1 Shaft	D	B	$r_{1,2}$ min.	dyn. C	stat. C_0	Grease	Oil	Bearing	Sleeve
	mm			kN		(min^{-1})			
17	47	14	1.0	10.00	2.65	15 000	18 000	1204KTNG	H204
	47	18	1.0	14.30	3.55	14 000	17 000	2204EKTNG	H304
	52	15	1.1	12.50	3.35	13 000	16 000	1304KTNG	H304
	52	21	1.1	18.00	4.65	13 000	16 000	2304KJ	H2304
20	52	15	1.0	12.20	3.35	13 000	16 000	1205KTNG	H205
	52	18	1.0	17.00	4.40	12 000	15 000	2205EKTNG	H305
	62	17	1.1	18.00	5.00	11 000	14 000	1305KTNG	H305
	62	24	1.1	24.50	6.55	10 000	13 000	2305KTNG	H2305
25	62	16	1.0	15.60	4.65	11 000	14 000	1206KTNG	H206
	62	20	1.0	25.50	6.95	9 500	12 000	2206EKTNG	H306
	72	19	1.1	21.20	6.30	9 000	11 000	1306KTNG	H306
	72	27	1.1	31.50	8.65	8 500	10 000	2306KTNG	H2306
30	72	17	1.1	16.00	5.20	9 500	12 000	1207KTNG	H207
	72	23	1.1	32.00	9.00	8 000	9 500	2207EKTNG	H307
	80	21	1.5	25.00	8.00	8 000	9 500	1307KTNG	H307
	80	31	1.5	39.00	11.20	7 500	9 000	2307KTNG	H2307
35	80	18	1.1	19.30	6.55	8 500	10 000	1208KTNG	H208
	80	23	1.1	31.50	9.50	7 500	9 000	2208EKTNG	H308
	90	23	1.5	29.00	9.65	7 000	8 500	1308KTNG	H308
	90	33	1.5	45.00	13.40	6 700	8 000	2308KTNG	H2308
40	85	19	1.1	22.00	7.35	7 500	9 000	1209KTNG	H209
	85	23	1.1	28.00	9.00	7 000	8 500	2209EKTNG	H309
	100	25	1.5	38.00	12.90	6 300	7 500	1309KTNG	H309
	100	36	1.5	54.00	16.30	6 000	7 000	2309KTNG	H2309
45	90	20	1.1	22.90	8.15	7 000	8 500	1210KTNG	H210
	90	23	1.1	28.00	9.50	6 700	8 000	2210EKTNG	H310
	110	27	2.0	41.50	14.30	5 600	6 700	1310KTNG	H310
	110	40	2.0	64.00	20.00	5 300	6 300	2310KTNG	H2310
50	100	21	1.5	27.00	10.00	6 300	7 500	1211KTNG	H211
	100	25	1.5	39.00	12.70	5 600	6 700	2211EKTNG	H311
	120	29	2.0	51.00	18.00	5 000	6 000	1311KTNG	H311
	120	43	2.0	75.00	23.60	4 800	5 600	2311KTNG	H2311
55	110	22	1.5	30.00	11.60	5 600	6 700	1212KTNG	H212
	110	28	1.5	47.50	16.60	5 300	6 300	2212EKTNG	H312
	130	31	2.0	57.50	20.80	4 800	5 600	1312KJ	H312
	130	46	2.0	88.50	28.30	4 300	5 300	2312KJ	H2312
60	120	23	1.5	31.00	12.50	5 300	6 300	1213KTNG	H213
	120	31	1.5	57.00	19.30	4 500	5 300	2213EKTNG	H313
	140	33	2.1	62.50	22.90	4 300	5 300	1313KJ	H313
	140	48	2.1	96.50	32.50	4 000	4 800	2313KJ	H2313
65	130	25	1.5	39.00	15.60	4 800	5 600	1215KTNG	H215
	130	31	1.5	44.50	17.80	4 300	5 300	2215KJ	H315
	160	37	2.1	80.00	30.00	3 800	4 500	1315KJ	H315
	160	55	2.1	125.00	43.00	3 400	4 300	2315KJ	H2315



Dimensions (mm)			Abutment dimensions (mm)					Factors				Weight	
d_3	B_1	B_2	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1 Fa/fr ≤ e	Y_2 Fa/fr > e	Y_0	Bearing kg	Sleeve kg
32	24	7	27	23	42.0	5	1.0	0.28	2.2	3.5	2.3	0.12	0.041
32	28	7	27	23	42.0	5	1.0	0.44	1.5	2.2	1.5	0.14	0.045
32	28	7	30	23	45.5	8	1.0	0.29	2.2	3.3	2.3	0.16	0.045
32	31	7	28	24	45.5	5	1.0	0.51	1.2	1.9	1.3	0.21	0.049
38	26	8	32	28	47.0	5	1.0	0.27	2.4	3.7	2.5	0.14	0.070
38	29	8	32	28	47.0	5	1.0	0.35	1.8	2.8	1.9	0.16	0.075
38	29	8	35	28	55.5	6	1.0	0.28	2.3	3.5	2.4	0.26	0.075
38	35	8	34	30	55.5	5	1.0	0.48	1.3	2.0	1.4	0.34	0.087
45	27	8	38	33	57.0	5	1.0	0.25	2.5	3.9	2.7	0.22	0.100
45	31	8	39	33	57.0	5	1.0	0.30	2.1	3.3	2.2	0.24	0.110
45	31	8	42	33	65.5	6	1.0	0.26	2.4	3.7	2.5	0.38	0.110
45	38	8	40	35	65.5	5	1.0	0.45	1.4	2.2	1.5	0.49	0.130
52	29	9	45	38	65.5	5	1.0	0.22	2.8	4.3	2.9	0.32	0.130
52	35	9	44	39	65.5	5	1.0	0.30	2.1	3.3	2.2	0.40	0.140
52	35	9	49	39	72.0	7	1.5	0.26	2.5	3.8	2.6	0.50	0.140
52	43	9	45	40	72.0	5	1.5	0.47	1.4	2.1	1.4	0.66	0.170
58	31	10	52	43	73.5	6	1.0	0.22	2.9	4.5	3.0	0.41	0.170
58	36	10	50	44	73.5	6	1.0	0.26	2.4	3.8	2.5	0.49	0.190
58	36	10	55	44	82.0	6	1.5	0.25	2.5	3.9	2.6	0.70	0.190
58	46	10	51	45	82.0	6	1.5	0.43	1.5	2.3	1.5	0.90	0.220
65	33	11	57	48	78.5	6	1.0	0.21	3.0	4.7	3.2	0.46	0.230
65	39	11	56	50	78.5	8	1.0	0.26	2.4	3.8	2.5	0.53	0.250
65	39	11	61	50	92.0	6	1.5	0.25	2.5	3.9	2.6	0.94	0.250
65	50	11	57	50	92.0	6	1.5	0.43	1.5	2.3	1.6	1.20	0.280
70	35	12	62	53	83.5	6	1.0	0.20	3.2	4.9	3.3	0.52	0.270
70	42	12	61	55	83.5	10	1.0	0.24	2.6	4.1	2.7	0.58	0.300
70	42	12	68	55	101.0	6	2.0	0.24	2.6	4.0	2.7	1.20	0.300
70	55	12	63	56	101.0	6	2.0	0.43	1.5	2.3	1.5	1.60	0.360
75	37	12	69	60	92.0	7	1.5	0.19	3.3	5.1	3.5	0.69	0.310
75	45	12	68	60	92.0	11	1.5	0.22	2.9	4.5	2.1	0.79	0.390
75	45	12	74	60	111.0	7	2.0	0.24	2.7	4.1	2.8	1.55	0.390
75	59	12	69	61	111.0	7	2.0	0.42	1.5	2.3	1.6	2.05	0.420
80	38	13	75	64	102.0	7	1.5	0.18	3.5	5.4	3.6	0.90	0.350
80	47	13	73	65	102.0	9	1.5	0.23	2.7	4.2	2.8	1.10	0.390
80	47	13	83	65	119.0	7	2.0	0.23	2.8	4.3	2.9	1.95	0.390
80	62	13	74	66	119.0	7	2.0	0.40	1.6	2.4	1.7	2.60	0.490
85	40	14	83	70	112.0	7	1.5	0.18	3.6	5.5	3.7	1.15	0.400
85	50	14	79	70	112.0	9	1.5	0.23	2.8	4.3	2.9	1.45	0.460
85	50	14	89	70	129.0	7	2.0	0.23	2.8	4.3	2.9	2.45	0.460
85	65	14	82	72	129.0	7	2.0	0.39	1.6	2.5	1.7	3.25	0.550
98	43	15	92	80	122.0	7	1.5	0.17	3.6	5.6	3.8	1.35	0.710
98	55	15	90	80	122.0	13	1.5	0.25	2.5	3.9	2.6	1.60	0.830
98	55	15	100	80	149.0	7	2.0	0.22	2.8	4.4	3.0	3.55	0.830
98	73	15	94	82	149.0	7	2.0	0.38	1.6	2.6	1.7	5.15	1.050

Self-Aligning Ball Bearings

Sealed on both sides | Bore 12–65 mm



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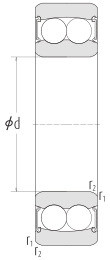
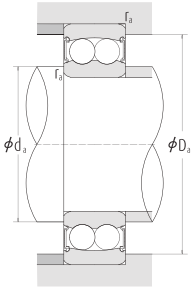


2RS

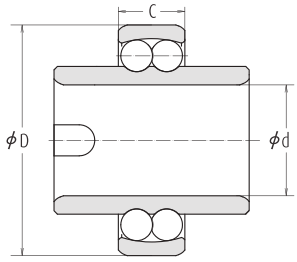
Dimensions				Load ratings		Speed limits Grease	Abbreviation	
d	D	B	$r_{1,2}$ min	dyn. C	stat. C_0		Cylindrical bore	Tapered bore
	mm			kN		min^{-1}		
12	32	14	0.6	5.60	1.27	16 000	2201-2RSTNG	–
15	35	14	0.6	7.50	1.76	15 000	2202-2RSTNG	–
	42	17	1.0	9.50	2.28	15 000	2302-2RSTN	–
17	40	16	0.6	8.00	2.04	14 000	2203-2RSTNG	–
	47	19	1.0	12.50	3.20	11 000	2303-2RSTN	–
20	47	18	1.0	10.00	2.65	11 000	2204-2RSTNG	2204K2RSTNG
	52	21	1.1	12.50	3.35	10 000	2304-2RSTNG	2304K2RSTNG
25	52	18	1.0	12.20	3.35	9 500	2205-2RSTNG	2205K2RSTNG
	62	24	1.1	18.00	5.00	8 000	2305-2RSTNG	2305K2RSTNG
30	62	20	1.0	15.60	4.65	8 000	2206-2RSTNG	2206K2RSTNG
	72	27	1.1	21.20	6.30	6 700	2306-2RSTNG	2306K2RSTNG
35	72	23	1.1	16.00	5.20	7 000	2207-2RSTNG	2207K2RSTNG
	80	31	1.5	25.00	8.00	6 000	2307-2RSTNG	2307K2RSTNG
40	80	23	1.1	19.30	6.55	6 300	2208-2RSTNG	2208K2RSTNG
	90	33	1.5	29.00	9.65	5 300	2308-2RSTNG	2308K2RSTNG
45	85	23	1.1	22.00	7.35	5 600	2209-2RSTNG	2209K2RSTNG
	100	36	1.5	38.00	12.90	4 800	2309-2RSTNG	2309K2RSTNG
50	90	23	1.1	22.80	8.15	5 300	2210-2RSTNG	2210K2RSTNG
	100	40	2.0	41.50	14.30	4 300	2310-2RSTNG	2310K2RSTNG
55	100	25	1.5	27.00	10.00	4 800	2211-2RSTNG	2211K2RSTNG
	120	43	2.0	51.00	18.00	3 800	2311-2RSTNG	2311K2RSTNG
60	110	28	1.5	30.00	11.60	4 300	2212-2RSTNG	2212K2RSTNG
65	120	31	1.5	31.00	12.40	4 000	2213-2RSTNG	2213K2RSTNG

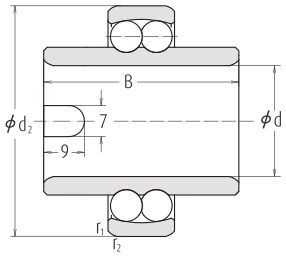


Abutment dimensions (mm)			Factors				Weight
d_a min	D_a max	r_a max	e	Y_1 Fa/fr ≤ e	Y_2 Fa/fr > e	Y_0	
	mm						kg
16.0	28.0	0.6	0.37	1.7	2.6	1.8	0.06
19.0	31.0	0.6	0.34	1.9	2.9	2.0	0.06
20.0	37.0	1.0	0.35	1.8	2.8	1.9	0.13
21.0	36.0	0.6	0.33	1.9	3.0	2.0	0.10
22.0	42.0	1.0	0.32	1.9	3.0	2.0	0.18
25.0	42.0	1.0	0.28	2.2	3.5	2.3	0.16
26.5	45.5	1.0	0.29	2.2	3.3	2.3	0.24
30.0	47.0	1.0	0.27	2.4	3.7	2.5	0.17
31.5	55.5	1.0	0.28	2.3	3.5	2.4	0.38
35.0	57.0	1.0	0.25	2.5	3.9	2.7	0.28
36.5	65.5	1.0	0.26	2.4	3.7	2.5	0.57
41.4	65.5	1.0	0.22	2.8	4.3	2.9	0.45
43.0	72.0	1.5	0.26	2.5	3.8	2.6	0.79
46.5	73.5	1.0	0.22	2.9	4.5	3.0	0.55
48.0	82.0	1.5	0.25	2.5	3.9	2.6	0.05
51.5	78.5	1.0	0.21	3.0	4.7	3.2	0.58
53.0	92.0	1.5	0.25	2.5	3.9	2.6	0.40
56.5	83.5	1.0	0.20	3.2	4.9	3.3	0.63
59.0	101.0	2.0	0.24	2.6	4.0	2.7	1.89
63.0	92.0	1.5	0.19	3.3	5.1	3.5	0.76
66.0	109.0	2.0	0.24	2.7	4.1	2.8	2.37
68.5	101.5	1.5	0.18	3.5	5.4	3.6	1.11
74.0	111.0	1.5	0.18	3.6	5.5	3.7	1.53

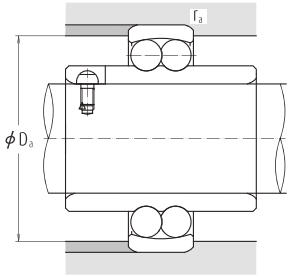
Self-Aligning Ball Bearings

With extended inner ring | Bore 20–60 mm





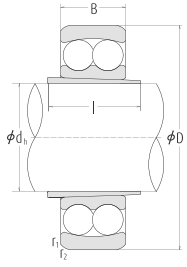
Dimensions				Load ratings		Speed limits Grease	Abbreviation
d	D	B	$r_{1,2}$ min	dyn. C	stat. C_0		
	mm			kN		min^{-1}	
20	47	14	1.0	10.0	2.65	9 000	11204TNG
	52	15	1.0	12.5	3.20	8 500	11304TNG
25	52	15	1.0	12.2	3.35	8 000	11205TNG
	62	17	1.0	18.0	5.00	6 700	11305TNG
30	62	16	1.0	15.6	4.65	6 700	11206TNG
	72	19	1.0	21.2	6.30	5 600	11306TNG
35	72	17	1.1	16.0	5.20	5 600	11207TNG
	80	21	1.1	25.0	8.00	5 000	11307TNG
40	80	18	1.1	19.3	6.55	5 000	11208TNG
	90	23	1.1	29.0	9.65	4 500	11308TNG
45	85	19	1.1	22.0	7.35	4 500	11209TNG
	100	25	1.1	38.0	12.90	3 800	11309TNG
50	90	20	1.1	22.8	8.15	4 300	11210TNG
	110	27	1.1	41.5	14.30	3 600	11310TNG
55	100	21	1.5	27.0	10.00	4 000	11211TNG
60	110	22	1.5	30.0	11.60	3 600	11212TNG



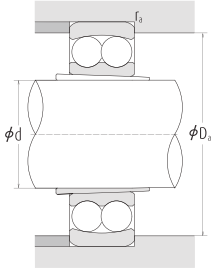
Dimensions		Abutment dimensions		Factors				Weight
d_2	B	D_a max	r_a max	e	Y_1	Y_2	Y_0	
mm					Fa/Fr ≤ e	Fa/fr > e		kg
29.2	40	42.0	1.0	0.28	2.2	3.5	2.3	0.18
31.5	44	45.5	1.0	0.29	2.2	3.3	2.3	0.28
33.3	44	47.0	1.0	0.27	2.4	3.7	2.5	0.22
38.0	48	55.5	1.0	0.28	2.3	3.5	2.4	0.43
40.1	48	57.0	1.0	0.25	2.5	3.9	2.7	0.35
45.0	52	65.5	1.0	0.26	2.4	3.7	2.5	0.64
47.7	52	65.5	1.0	0.22	2.8	4.3	2.9	0.54
51.7	56	72.0	1.0	0.26	2.5	3.8	2.6	0.85
54.0	56	73.5	1.0	0.22	2.9	4.5	3.0	0.72
57.7	58	82.0	1.0	0.25	2.5	3.9	2.6	1.12
57.7	58	78.5	1.0	0.21	3.0	4.7	3.2	0.77
63.9	60	92.0	1.0	0.25	2.5	3.9	2.6	1.43
62.7	58	83.5	1.0	0.20	3.2	4.9	3.3	0.85
70.3	62	83.5	1.0	0.24	2.6	4.0	2.7	1.82
70.3	60	92.0	1.5	0.19	3.3	5.1	3.5	1.17
78.0	62	102.0	1.5	0.18	3.5	5.4	3.6	1.50

Self-Aligning Ball Bearings

Sleeve | Shaft 20–50 mm



Dimensions						Load ratings		Abbreviation
d Shaft	d_h	D	B	l	$r_{1,2}$ min	dyn. C	stat. C_0	
		mm				kN		
20	20	47	14	23	1.0	10.0	2.65	11504TNG
25	25	52	15	25	1.0	12.2	3.35	11505TNG
30	30	62	16	25	1.0	15.6	4.65	11506TNG
35	35	72	17	26	1.1	16.0	5.20	11507TNG
40	40	80	18	27	1.1	19.3	6.55	11508TNG
45	45	85	19	28	1.1	22.0	7.35	11509TNG
50	50	90	20	30	1.1	22.8	8.15	11510TNG



Speed limits		Abutment dimensions		Factors				Weight
Grease	Oil	D_a max	r_a max	e	Y_1	Y_2	Y_0	
min^{-1}		mm			Fa/Fr ≤ e	Fa/fr > e		kg
15 000	18 000	41.0	1.0	0.28	2.2	3.5	2.3	0.120
13 000	16 000	46.5	1.0	0.27	2.4	3.7	2.5	0.144
11 000	14 000	56.5	1.0	0.25	2.5	3.9	2.7	0.227
9 500	12 000	65.0	1.0	0.22	2.8	4.3	2.9	0.335
8 500	10 000	73.0	1.0	0.22	2.9	4.5	3.0	0.435
7 500	9 000	78.0	1.0	0.21	3.0	4.7	3.2	0.480
7 000	8 500	83.0	1.0	0.20	3.2	4.9	3.3	0.540