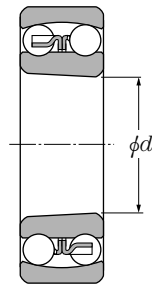
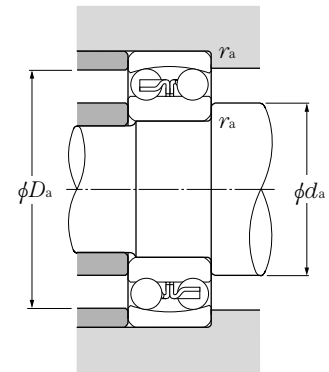


Cylindrical bore



Tapered bore



d 10 ~ 35mm

	Boundary dimensions				Basic load ratings				Limiting speeds		Bearing numbers		Abutment and fillet dimensions		
	mm				dynamic kN	static kN	dynamic kgf	static kgf	min ⁻¹		cylindrical bore	tapered ²⁾ bore	d_a min	D_a max	r_{as} max
<i>d</i>	<i>D</i>	<i>B</i>	$r_{s \min}^{1)}$	C_r	C_{or}	C_r	C_{or}	grease	oil						
10	30	9	0.6	5.55	1.19	570	121	22 000	28 000	1200S	—	14.0	26.0	0.6	
	30	14	0.6	7.45	1.59	760	162	24 000	28 000	2200S	—	14.0	26.0	0.6	
	35	11	0.6	7.35	1.62	750	165	20 000	24 000	1300S	—	14.0	31.0	0.6	
	35	17	0.6	9.20	2.01	935	205	18 000	22 000	2300S	—	14.0	31.0	0.6	
12	32	10	0.6	5.70	1.27	580	130	22 000	26 000	1201S	—	16.0	28.0	0.6	
	32	14	0.6	7.75	1.73	790	177	22 000	26 000	2201S	—	16.0	28.0	0.6	
	37	12	1	9.65	2.16	985	221	18 000	22 000	1301S	—	17.0	32.0	1	
	37	17	1	12.1	2.73	1 240	278	17 000	22 000	2301S	—	17.0	32.0	1	
15	35	11	0.6	7.60	1.75	775	179	18 000	22 000	1202S	—	19.0	31.0	0.6	
	35	14	0.6	7.80	1.85	795	188	18 000	22 000	2202S	—	19.0	31.0	0.6	
	42	13	1	9.70	2.29	990	234	16 000	20 000	1302S	—	20.0	37.0	1	
	42	17	1	12.3	2.91	1 250	296	14 000	18 000	2302S	—	20.0	37.0	1	
17	40	12	0.6	8.00	2.01	815	205	16 000	20 000	1203S	—	21.0	36.0	0.6	
	40	16	0.6	9.95	2.42	1 010	247	16 000	20 000	2203S	—	21.0	36.0	0.6	
	47	14	1	12.7	3.20	1 300	325	14 000	17 000	1303S	—	22.0	42.0	1	
	47	19	1	14.7	3.55	1 500	365	13 000	16 000	2303S	—	22.0	42.0	1	
20	47	14	1	10.0	2.61	1 020	266	14 000	17 000	1204S	1204SK	25.0	42.0	1	
	47	18	1	12.8	3.30	1 310	340	14 000	17 000	2204S	2204SK	25.0	42.0	1	
	52	15	1.1	12.6	3.35	1 280	340	12 000	15 000	1304S	1304SK	26.5	45.5	1	
	52	21	1.1	18.5	4.70	1 880	480	11 000	14 000	2304S	2304SK	26.5	45.5	1	
25	52	15	1	12.2	3.30	1 250	335	12 000	14 000	1205S	1205SK	30.0	47.0	1	
	52	18	1	12.4	3.45	1 270	350	12 000	14 000	2205S	2205SK	30.0	47.0	1	
	62	17	1.1	18.2	5.00	1 850	510	10 000	13 000	1305S	1305SK	31.5	55.5	1	
	62	24	1.1	24.9	6.60	2 530	675	9 500	12 000	2305S	2305SK	31.5	55.5	1	
30	62	16	1	15.8	4.65	1 610	475	10 000	12 000	1206S	1206SK	35.0	57.0	1	
	62	20	1	15.3	4.55	1 560	460	10 000	12 000	2206S	2206SK	35.0	57.0	1	
	72	19	1.1	21.4	6.30	2 190	645	8 500	11 000	1306S	1306SK	36.5	65.5	1	
	72	27	1.1	32.0	8.75	3 250	895	8 000	10 000	2306S	2306SK	36.5	65.5	1	
35	72	17	1.1	15.9	5.10	1 620	520	8 500	10 000	1207S	1207SK	41.5	65.5	1	
	72	23	1.1	21.7	6.60	2 210	675	8 500	10 000	2207S	2207SK	41.5	65.5	1	
	80	21	1.5	25.3	7.85	2 580	800	7 500	9 500	1307S	1307SK	43.0	72.0	1.5	
	80	31	1.5	40.0	11.3	4 100	1 150	7 100	9 000	2307S	2307SK	43.0	72.0	1.5	

1) Smallest allowable dimension for chamfer dimension r . 2) "K" indicates bearings have tapered bore with a taper ratio of 1: 12.

Equivalent bearing load
dynamic

$$P_r = XF_r + YF_a$$

$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y ₁	0.65	Y ₂

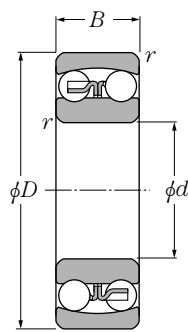
static

$$P_{or} = F_r + Y_o F_a$$

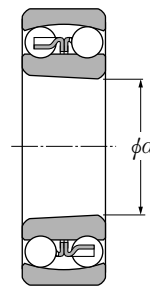
For values of e , Y_1 , Y_2 and Y_o see the table below.

Constant <i>e</i>	Axial load factors			Mass kg (approx.)
	Y ₁	Y ₂	Y _o	
0.32	2.00	3.10	2.10	0.033
0.64	0.98	1.50	1.00	0.042
0.35	1.80	2.80	1.90	0.057
0.71	0.89	1.40	0.93	0.077
0.36	1.80	2.70	1.80	0.039
0.58	1.10	1.70	1.10	0.048
0.33	1.90	2.90	2.00	0.066
0.60	1.10	1.60	1.10	0.082
0.32	2.00	3.10	2.10	0.051
0.50	1.30	1.90	1.30	0.055
0.33	1.90	2.90	2.00	0.093
0.51	1.20	1.90	1.30	0.108
0.31	2.00	3.10	2.10	0.072
0.50	1.30	1.90	1.30	0.085
0.32	2.00	3.10	2.10	0.130
0.51	1.20	1.90	1.30	0.150
0.29	2.20	3.40	2.30	0.120
0.47	1.30	2.10	1.40	0.133
0.29	2.20	3.40	2.30	0.15
0.50	1.20	1.90	1.30	0.193
0.28	2.30	3.50	2.40	0.140
0.41	1.50	2.40	1.60	0.150
0.28	2.30	3.50	2.40	0.255
0.47	1.40	2.10	1.40	0.319
0.25	2.50	3.90	2.60	0.220
0.38	1.60	2.50	1.70	0.249
0.26	2.40	3.70	2.50	0.385
0.44	1.40	2.20	1.50	0.480
0.23	2.70	4.20	2.80	0.320
0.37	1.70	2.60	1.80	0.378
0.26	2.50	3.80	2.60	0.510
0.46	1.40	2.10	1.40	0.642

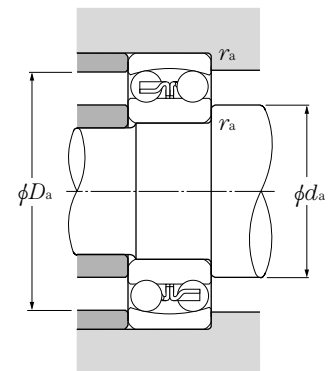




Cylindrical bore



Tapered bore



d 40 ~ 75mm

	Boundary dimensions				Basic load ratings				Limiting speeds		Bearing numbers		Abutment and fillet dimensions		
	mm				dynamic	static	dynamic	static	min ⁻¹		cylindrical bore	tapered ²⁾ bore	<i>d</i> _a	<i>D</i> _a	<i>r</i> _{as}
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> _{s min¹⁾}	<i>C</i> _r	<i>C</i> _{or}	<i>C</i> _r	<i>C</i> _{or}	grease	oil			min	max	max	
40	80	18	1.1	19.3	6.50	1 970	665	7 500	9 000	1208S	1208SK	46.5	73.5	1	
	80	23	1.1	22.4	7.35	2 290	750	7 500	9 000	2208S	2208SK	46.5	73.5	1	
	90	23	1.5	29.8	9.70	3 050	990	6 700	8 500	1308S	1308SK	48.0	82.0	1.5	
	90	33	1.5	45.5	13.5	4 650	1 380	6 300	8 000	2308S	2308SK	48.0	82.0	1.5	
45	85	19	1.1	22.0	7.35	2 240	750	7 100	8 500	1209S	1209SK	51.5	78.5	1	
	85	23	1.1	23.3	8.15	2 380	830	7 100	8 500	2209S	2209SK	51.5	78.5	1	
	100	25	1.5	38.5	12.7	3 900	1 300	6 000	7 500	1309S	1309SK	53.0	92.0	1.5	
	100	36	1.5	55.0	16.7	5 600	1 700	5 600	7 100	2309S	2309SK	53.0	92.0	1.5	
50	90	20	1.1	22.8	8.10	2 330	830	6 300	8 000	1210S	1210SK	56.5	83.5	1	
	90	23	1.1	23.3	8.45	2 380	865	6 300	8 000	2210S	2210SK	56.5	83.5	1	
	110	27	2	43.5	14.1	4 450	1 440	5 600	6 700	1310S	1310SK	59.0	101	2	
	110	40	2	65.0	20.2	6 650	2 060	5 000	6 300	2310S	2310SK	59.0	101	2	
55	100	21	1.5	26.9	10.0	2 750	1 020	6 000	7 100	1211S	1211SK	63.0	92.0	1.5	
	100	25	1.5	26.7	9.90	2 720	1 010	6 000	7 100	2211S	2211SK	63.0	92.0	1.5	
	120	29	2	51.5	17.9	5 250	1 820	5 000	6 300	1311S	1311SK	64.0	111	2	
	120	43	2	76.5	24.0	7 800	2 450	4 800	6 000	2311S	2311SK	64.0	111	2	
60	110	22	1.5	30.5	11.5	3 100	1 180	5 300	6 300	1212S	1212SK	68.0	102	1.5	
	110	28	1.5	34.0	12.6	3 500	1 290	5 300	6 300	2212S	2212SK	68.0	102	1.5	
	130	31	2.1	57.5	20.8	5 900	2 130	4 500	5 600	1312S	1312SK	71.0	119	2	
	130	46	2.1	88.5	28.3	9 000	2 880	4 300	5 300	2312S	2312SK	71.0	119	2	
65	120	23	1.5	31.0	12.5	3 150	1 280	4 800	6 000	1213S	1213SK	73.0	112	1.5	
	120	31	1.5	43.5	16.4	4 450	1 670	4 800	6 000	2213S	2213SK	73.0	112	1.5	
	140	33	2.1	62.5	22.9	6 350	2 330	4 300	5 300	1313S	1313SK	76.0	129	2	
	140	48	2.1	97.0	32.5	9 900	3 300	3 800	4 800	2313S	2313SK	76.0	129	2	
70	125	24	1.5	35.0	13.8	3 550	1 410	4 800	5 600	1214S	—	78.0	117	1.5	
	125	31	1.5	44.0	17.1	4 500	1 740	4 500	5 600	2214S	—	78.0	117	1.5	
	150	35	2.1	75.0	27.7	7 650	2 830	4 000	5 000	1314S	—	81.0	139	2	
	150	51	2.1	111	37.5	11 300	3 850	3 600	4 500	2314S	—	81.0	139	2	
75	130	25	1.5	39.0	15.7	4 000	1 600	4 300	5 300	1215S	1215SK	83.0	122	1.5	
	130	31	1.5	44.5	17.8	4 550	1 820	4 300	5 300	2215S	2215SK	83.0	122	1.5	
	160	37	2.1	80.0	30.0	8 150	3 050	3 800	4 500	1315S	1315SK	86.0	149	2	
	160	55	2.1	125	43.0	12 700	4 400	3 400	4 300	2315S	2315SK	86.0	149	2	

1) Smallest allowable dimension for chamfer dimension *r*. 2) "K" indicates bearings have tapered bore with a taper ratio of 1: 12.

Equivalent bearing load
dynamic

$$P_r = XF_r + YF_a$$

$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y ₁	0.65	Y ₂

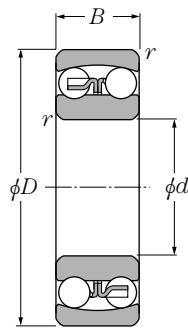
static

$$P_{0r} = F_r + Y_0 F_a$$

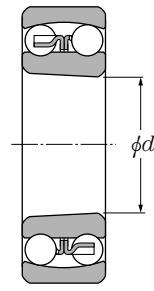
For values of e , Y_1 , Y_2 and Y_0 see the table below.

Constant <i>e</i>	Axial load factors			Mass kg (approx.)
	Y ₁	Y ₂	Y ₀	
0.22	2.8	4.3	2.9	0.415
0.33	1.9	3.0	2.0	0.477
0.24	2.6	4.0	2.7	0.715
0.43	1.5	2.3	1.5	0.889
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0.21	3.0	4.7	3.1	0.465
0.30	2.1	3.2	2.2	0.522
0.25	2.6	4.0	2.7	0.955
0.41	1.5	2.4	1.6	1.200
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0.21	3.1	4.7	3.2	0.525
0.28	2.2	3.4	2.3	0.564
0.23	2.7	4.2	2.8	1.250
0.42	1.5	2.3	1.6	1.580
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0.20	3.2	4.9	3.3	0.705
0.28	2.3	3.5	2.4	0.746
0.23	2.7	4.2	2.8	1.600
0.41	1.5	2.4	1.6	2.030
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0.18	3.4	5.3	3.6	0.900
0.28	2.3	3.5	2.4	1.030
0.23	2.8	4.3	2.9	2.030
0.40	1.6	2.4	1.6	2.570
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0.17	3.7	5.7	3.8	1.150
0.28	2.3	3.5	2.4	1.400
0.23	2.7	4.2	2.9	2.540
0.39	1.6	2.5	1.7	3.200
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0.18	3.4	5.3	3.6	1.300
0.26	2.4	3.7	2.5	1.520
0.22	2.8	4.4	3.0	3.190
0.38	1.7	2.6	1.8	3.900
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0.17	3.6	5.6	3.8	1.410
0.25	2.5	3.9	2.6	1.600
0.22	2.8	4.4	2.9	3.650
0.38	1.6	2.5	1.7	4.770

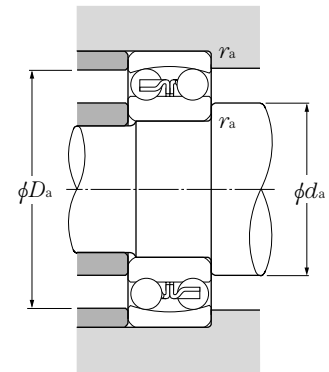




Cylindrical bore



Tapered bore



d 80 ~ 110mm

	Boundary dimensions				Basic load ratings				Limiting speeds		Bearing numbers		Abutment and fillet dimensions		
	mm				dynamic kN	static kN	dynamic kgf	static kgf	min ⁻¹		cylindrical bore	tapered ²⁾ bore	<i>d</i> _a min	<i>D</i> _a max	<i>r</i> _{as} max
<i>d</i>	<i>D</i>	<i>B</i>	<i>r</i> _{s min} ¹⁾	<i>C</i> _r	<i>C</i> _{or}	<i>C</i> _r	<i>C</i> _{or}	grease	oil						
80	140	26	2	40.0	17.0	4 100	1 730	4 000	5 000	1216S	1216SK	89	131	2	
	140	33	2	49.0	19.9	5 000	2 030	4 000	5 000	2216S	2216SK	89	131	2	
	170	39	2.1	89.0	33.0	9 100	3 400	3 600	4 300	1316S	1316SK	91	159	2	
	170	58	2.1	130	45.0	13 200	4 600	3 200	4 000	2316S	2316SK	91	159	2	
85	150	28	2	49.5	20.8	5 050	2 120	3 800	4 500	1217S	1217SK	94	141	2	
	150	36	2	58.5	23.6	5 950	2 400	3 800	4 800	2217S	2217SK	94	141	2	
	180	41	3	98.5	38.0	10 000	3 850	3 400	4 000	1317S	1317SK	98	167	2.5	
	180	60	3	142	51.5	14 500	5 250	3 000	3 800	2317S	2317SK	98	167	2.5	
90	160	30	2	57.5	23.5	5 850	2 400	3 600	4 300	1218S	1218SK	99	151	2	
	160	40	2	70.5	28.7	7 200	2 930	3 600	4 300	2218S	2218SK	99	151	2	
	190	43	3	117	44.5	12 000	4 550	3 200	3 800	1318S	1318SK	103	177	2.5	
	190	64	3	154	57.5	15 700	5 850	2 800	3 600	2318S	2318SK	103	177	2.5	
95	170	32	2.1	64.0	27.1	6 550	2 770	3 400	4 000	1219S	1219SK	106	159	2	
	170	43	2.1	84.0	34.5	8 550	3 500	3 400	4 000	2219S	2219SK	106	159	2	
	200	45	3	129	51.0	13 200	5 200	3 000	3 600	1319S	1319SK	108	187	2.5	
	200	67	3	161	64.5	16 400	6 550	2 800	3 400	2319S	2319SK	108	187	2.5	
100	180	34	2.1	69.5	29.7	7 100	3 050	3 200	3 800	1220S	1220SK	111	169	2	
	180	46	2.1	94.5	38.5	9 650	3 900	3 200	3 800	2220S	2220SK	111	169	2	
	215	47	3	140	57.5	14 300	5 850	2 800	3 400	1320S	1320SK	113	202	2.5	
	215	73	3	187	79.0	19 100	8 050	2 400	3 200	2320S	2320SK	113	202	2.5	
105	190	36	2.1	75.0	32.5	7 650	3 300	3 000	3 600	1221S	—	116	179	2	
	190	50	2.1	109	45.0	11 100	4 550	3 000	3 600	2221S	—	116	179	2	
	225	49	3	154	64.5	15 700	6 600	2 600	3 200	1321S	—	118	212	2.5	
	225	77	3	200	87.0	20 400	8 850	2 400	3 000	2321S	—	118	212	2.5	
110	200	38	2.1	87.0	38.5	8 900	3 950	2 800	3 400	1222S	1222SK	121	189	2	
	200	53	2.1	122	51.5	12 500	5 250	2 800	3 400	2222S	2222SK	121	189	2	
	240	50	3	161	72.5	16 400	7 300	2 400	3 000	1322S	1322SK	123	227	2.5	
	240	80	3	211	94.5	21 600	9 650	2 200	2 800	2322S ³⁾	2322SK	123	227	2.5	

1) Smallest allowable dimension for chamfer dimension *r*. 2) "K" indicates bearings have tapered bore with a taper ratio of 1: 12.

3) Machined cage is standard for 2322S (K).

**Equivalent bearing load
dynamic**

$$P_r = XF_r + YF_a$$

$\frac{F_a}{F_r} \leq e$		$\frac{F_a}{F_r} > e$	
X	Y	X	Y
1	Y ₁	0.65	Y ₂

static

$$P_{or} = F_r + Y_o F_a$$

For values of e , Y_1 , Y_2 and Y_o see the table below.

Constant	Axial load factors			Mass kg
e	Y_1	Y_2	Y_o	(approx.)
0.16	3.9	6.0	4.1	1.73
0.25	2.5	3.9	2.7	1.97
0.22	2.9	4.5	3.1	4.31
0.39	1.6	2.5	1.7	5.54
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0.17	3.7	5.7	3.8	2.09
0.25	2.5	3.9	2.6	2.48
0.21	2.9	4.6	3.1	5.13
0.37	1.7	2.6	1.8	6.56
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0.17	3.8	5.8	3.9	2.55
0.27	2.4	3.7	2.5	3.13
0.22	2.8	4.3	2.9	5.94
0.38	1.7	2.6	1.7	7.76
<hr/>				
0.17	3.7	5.8	3.9	3.21
0.27	2.4	3.7	2.5	3.87
0.23	2.8	4.3	2.9	6.84
0.38	1.7	2.6	1.8	9.01
<hr/>				
0.17	3.6	5.6	3.8	3.82
0.27	2.4	3.7	2.5	4.53
0.24	2.7	4.1	2.8	8.46
0.38	1.7	2.6	1.8	11.6
<hr/>				
0.18	3.6	5.5	3.7	4.52
0.28	2.3	3.5	2.4	5.64
0.23	2.7	4.2	2.9	10.0
0.38	1.7	2.6	1.7	14.4
<hr/>				
0.18	3.7	5.7	3.9	5.33
0.28	2.2	3.5	2.3	6.64
0.22	2.8	4.4	3.0	12.0
0.37	1.7	2.6	1.8	17.4

