



Self-aligning ball bearings

Self-aligning ball bearings(open).....179



Sealed self-aligning ball bearings(closed).....189



Self-aligning ball bearings

HRB self-aligning ball bearings have two rows of balls, a spherical raceway in the outer ring and two raceways in the inner ring. During normal running, the bearing may allow a certain deflection of the balls, cage and inner ring relative to the outer ring, i.e. having self-aligning ability which can obtain self-adapting for shaft offsets or housing deformation resulting from machining or assembling, if the deflection of the inner ring relative to the outer ring is within 3° .

These bearings are mostly used to carry radial loads and can also accommodate a certain amount of simultaneously acting axial loads, not including purely axial loads.

Self-aligning bearings are basic design and sealed design.

Basic design

These bearings are available with cylindrical or tapered bore, the later of a bore taper 1:12. The self-aligning ball bearings with tapered bore can be mounted either directly on a tapered shaft or on a cylindrical shaft using adapter sleeve or withdrawal sleeve. With the help of the adapter sleeve, the bearing internal radial clearance is also to be adjusted.

HRB self-aligning ball bearings with basic design have been modified in internal structure to a chieve more load capacity than the old ones. Consequently they have more applications, that is the bearing of the same size can carry heavies loads, or with the same loads the bearing reliability and life can be improved.

Sealed self-aligning ball bearings

HRB sealed self-aligning ball bearings have rubbing seals of suffix 2RS or 2RS1 on two sides, made of synthetic rubber and reinforced with steel insert. For such bearings, lubrication for life is adopted, i.e. maintenance is not required, neither heat nor wash before mounting.

Dimensions

The boundary dimension of self-aligning ball bearings given in the bearing tables are in conformity with ISO15-1981.

Angular misalignment

Self-aligning ball bearings are designed to compensate for a slight allowable angular misalignment between the inner and outer rings.

Values for allowable angular misalignment under normal running conditions are given in the following table. Subject to the bearing arrangement, seal type and so on, the values would be allowed.

Bearings	Allowable angular misalignment (°)
12	2.5
13	3
22	2.5
22-2RS	1.5
23	3
23-2RS	1.5

Tolerances

HRB self-aligning ball bearings are machined to normal tolerances, And the precision products of P6 and P5 tolerances are also available. Tolerance values can be obtained from the table of relevant class tolerances for radial bearings.

Radial internal clearance

Standard self-aligning ball bearings are supplied with normal radial internal clearance. The bearings with tapered bore are available with C3 as standard clearance. According to customer' s requirement, the bearings with radial internal clearance is greater or less than the standard clearance can also be supplied. Values for radial internal clearance are given in the table of radial internal clearance of self-aligning ball bearings.

Cages

Self-aligning ball bearings are accompanied with the cage of fiber glass reinforced nylon 66 as standard one, suffix TN. Such cages made of the above material have many advantages up to +120℃

For very higher temperature and severe service conditions, pressed cages of steel or machined cages of brass have to be used. When the bearings incorporate non-standard cage, get in touch with **HRB** technology department.

Minimum rolling bearing load

In order to keep proper running of ball or roller bearings, the minimum required loads have to act on them including self-aligning ball bearings, or else during high speed running the mass forces of the balls and cage and the inadequate lubricant resistance may generate a harmful sliding between the balls and raceways, easy to lead to bearing damage.

Considering such a situation, the minimum required load is estimated from the equation:

$$F_m=k_r(\gamma n/1000)^{2/3}(dm/100)^2$$

where:

F_m — minimum radial load, N

k_r — minimum radial load factor

=40, for 12 or 13 series bearings

=45, for 22 series bearings

=50, for 23 series bearings

γ — kinematic viscosity of oil at operating temperature, mm²/s

n — bearing speed, r/min

dm — bearing mean diameter=0.5(d+D), mm

In general the bearing supporting weight adding the external forces always goes beyond the minimum required load. If not, an additional load has to be exerted, for example, increasing belt tension and so on.

Equivalent dynamic bearing load

$$P=F_r+Y_1F_a \quad [kN], \text{ for } F_a/F_r \leq e$$

$$P=0.65F_r+Y_2F_a \quad [kN], \text{ for } F_a/F_r > e$$

Values for Y_1 , Y_2 and e are listed in relevant bearing tables.

Equivalent static bearing load

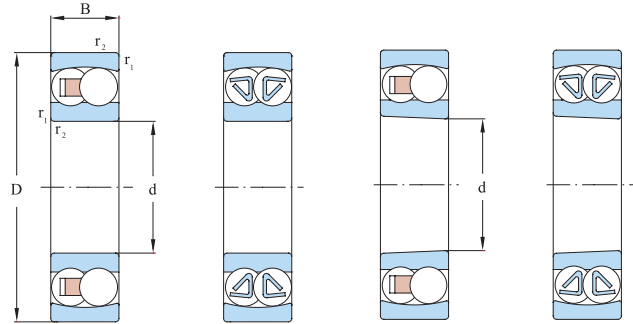
$$P=F_r+Y_0F_a \quad (kN)$$

Values for Y_0 are listed in relevant bearing tables.

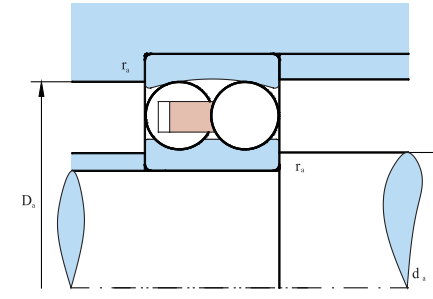


Self-aligning ball bearings

open



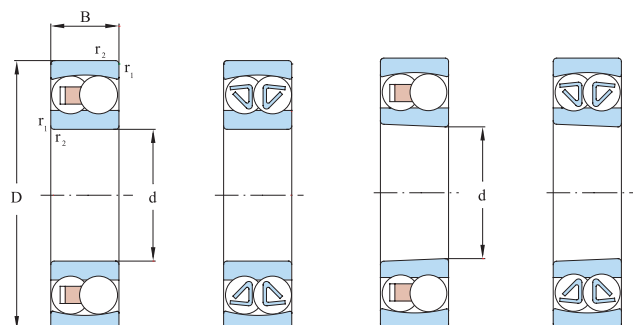
Designations		Boundary dimensions				Basic load ratings		Limiting speeds	
Cylindrical bore	Tapered bore	d	D	B	r _{1,2} min	Cr	Cor	Grease	Oil
		mm				kN		r/min	
1200ATN		10	30	9	0.6	5.06	1.18	24000	30000
2200ATN			30	14	0.6	8.06	1.73	22000	28000
1300ATN			35	11	0.6	8.16	1.8	20000	26000
1201ATN		12	32	10	0.6	5.58	1.48	22000	28000
2201ATN			32	14	0.6	8.52	1.9	20000	26000
1301ATN			37	12	1	8.74	2.1	18000	22000
2301ATN		15	37	17	1	11.7	2.7	17000	20000
1202ATN			35	11	0.6	7.47	2.01	19000	24000
2202ATN			35	14	0.6	8.71	2.04	18000	22000
1302ATN		17	42	13	1	9.52	2.63	17000	20000
2302ATN			42	17	1	11.9	2.9	15000	18000
1203ATN			40	12	0.6	7.9	2.4	18000	22000
2203ATN		20	40	16	0.6	10.6	2.55	17000	20000
1303ATN			47	14	0.6	11.8	3.33	14000	17000
2303ATN			47	19	1	14.6	3.55	13000	16000
1204ATN	1204AKTN	25	47	14	1	12.7	3.4	15000	18000
2204ATN	2204AKTN		47	18	1	15.2	4.15	14000	17000
1304ATN	1304AKTN		52	15	1.1	14.3	4.01	12000	15000
2304ATN	2304AKTN	30	52	21	1.1	18.3	4.75	11000	14000
1205ATN	1205AKTN		52	15	1	14.3	4	13000	16000
2205ATN	2205AKTN		52	18	1	16	4.47	11000	14000
1305ATN	1305AKTN	35	62	17	1.1	18.1	6	9500	12000
2305ATN	2305AKTN		62	24	1.1	24.6	6.62	9500	12000
1206A	1206AK		62	16	1	15.6	4.65	10000	13000
1206ATN	1206AKT	30	62	16	1	15.6	4.65	10000	13000
2206A	2206AK		62	20	1	23.8	6.58	9500	12000
2206ATN	2206AKTN		62	20	1	23.8	6.58	9500	12000
1306A	1306AK	35	72	19	1.1	21.3	7.75	9000	11000
1306ATN	1306AKTN		72	19	1.1	21.3	7.75	9000	11000
2306A	2306AK		72	27	1.1	31.7	8.82	8500	10000
2306ATN	2306AKTN	35	72	27	1.1	31.7	8.82	8500	10000
1207A	1207AK		72	17	1.1	18	6.23	9000	11000



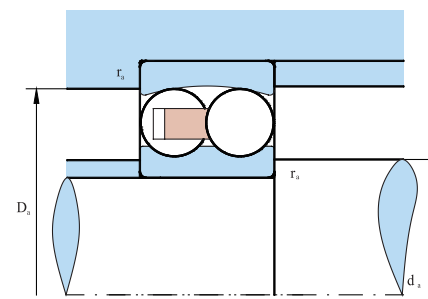
Abutment and fillet dimensions			Calculation factors				Mass
d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm							kg
14	26	0.6	0.33	1.9	3	2	0.0336
14	26	0.6	0.54	1.15	1.8	1.3	0.047
15	30	0.6	0.34	1.85	2.87	1.94	0.0571
16	28	0.6	0.33	1.9	3	2	0.0411
16	28	0.6	0.5	1.25	2	1.3	0.053
17	32	1	0.35	1.8	2.8	1.8	0.0663
17	32	1	0.6	1.05	1.6	1.1	0.095
19	31	0.6	0.33	1.9	3	2	0.0497
19	31	0.6	0.43	1.5	2.3	1.6	0.06
20	37	1	0.31	2	3.1	2.2	0.0966
20	37	1	0.52	1.2	1.9	1.3	0.11
21	36	0.6	0.31	2	3.1	2.2	0.0734
21	36	0.6	0.43	1.5	2.3	1.6	0.088
22	42	1	0.3	2.1	3.3	2.2	0.131
22	42	1	0.52	1.2	1.9	1.3	0.16
25	42	1	0.3	2.1	3.3	2.2	0.116
25	42	1	0.4	1.6	2.4	1.6	0.136
26.5	45.5	1	0.28	2.2	3.5	2.5	0.169
26.5	45.5	1	0.52	1.2	1.9	1.3	0.208
30	47	1	0.28	2.2	3.5	2.5	0.139
30	47	1	0.35	1.8	2.8	1.8	0.158
31.5	55.5	1	0.28	2.2	3.5	2.5	0.25
31.5	55.5	1	0.48	1.3	2	1.4	0.336
35	57	1	0.25	2.5	3.9	2.5	0.219
35	57	1	0.25	2.5	3.9	2.5	0.219
35	57	1	0.33	1.9	3	2	0.251
35	57	1	0.33	1.9	3	2	0.251
36.5	65.5	1	0.25	2.5	3.9	2.5	0.378
36.5	65.5	1	0.25	2.5	3.9	2.5	0.378
36.5	65.5	1	0.44	1.4	2.9	1.4	0.5
36.5	65.5	1	0.44	1.4	2.9	1.4	0.5
41.5	65.5	1	0.23	2.7	4.2	2.8	0.305

Self-aligning ball bearings

open



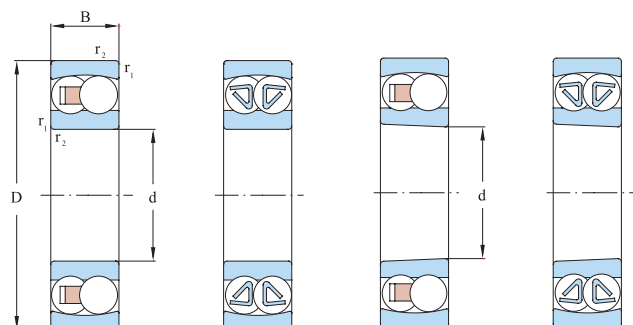
Designations		Boundary dimensions				Basic load ratings		Limiting speeds	
Cylindrical bore	Tapered bore	d	D	B	r _{1,2} min	Cr	Cor	Grease	Oil
		mm				kN		r/min	
1207ATN	1207AKTN	35	72	17	1.1	18	6.23	9000	11000
2207A	2207AK		72	23	1.1	30.5	8.72	8500	10000
2207ATN	2207AKTN		72	23	1.1	30.5	8.72	8500	10000
1307A	1307AK		80	21	1.5	25.1	9.81	7500	9000
1307ATN	1307AKTN		80	21	1.5	25.1	9.81	7500	9000
2307A	2307AK		80	31	1.5	39.9	11.3	7000	8500
2307ATN	2307AKTN		80	31	1.5	39.9	11.3	7000	8500
1208A	1208AK	40	80	18	1.1	18.5	6.95	8500	10000
1208ATN	1208AKTN		80	18	1.1	18.5	6.95	8500	10000
2208A	2208AK		80	23	1.1	31.8	10.1	7500	9000
2208ATN	2208AKTN		80	23	1.1	31.8	10.1	7500	9000
1308A	1308AK		90	23	1.5	33.8	11.4	6700	8000
1308ATN	1308AKTN		90	23	1.5	33.8	11.4	6700	8000
2308A	2308AK		90	33	1.5	54.2	15.9	6300	7500
2308ATN	2308AKTN		90	33	1.5	54.2	15.9	6300	7500
1209A	1209AK	45	85	19	1.1	21.7	9.56	7500	9000
1209ATN	1209AKTN		85	19	1.1	21.7	9.56	7500	9000
2209A	2209AK		85	23	1.1	32	10.6	7000	8500
2209ATN	2209AKTN		85	23	1.1	32	10.6	7000	8500
1309A	1309AK	50	100	25	1.5	38	13.4	6300	7500
1309ATN	1309AKTN		100	25	1.5	38	13.4	6300	7500
2309A	2309AK		100	36	1.5	63.7	19.3	5600	6700
2309ATN	2309AKTN		100	36	1.5	63.7	19.3	5600	6700
1210A	1210AK	55	90	20	1.1	26.5	9.15	7000	8500
1210ATN	1210AKTN		90	20	1.1	26.5	9.15	7000	8500
2210A	2210AK		90	23	1.1	33.6	11.3	6300	7500
2210ATN	2210AKTN		90	23	1.1	33.6	11.3	6300	7500
1310A	1310AK		110	27	2	43.3	14	5600	6700
1310ATN	1310AKTN		110	27	2	43.3	14	5600	6700
2310A	2310AK		110	40	2	63.7	20	5300	6300
2310ATN	2310AKTN		110	40	2	63.7	20	5300	6300
1211A	1211AK	55	100	21	1.5	26.8	10.6	6300	7500



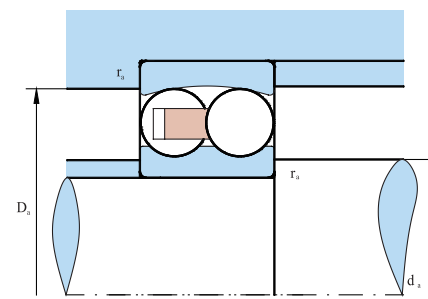
Abutment and fillet dimensions			Calculation factors				Mass
d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm							kg
41.5	65.5	1	0.23	2.7	4.2	2.8	0.305
41.5	65.5	1	0.31	2	3.1	2.2	0.385
41.5	65.5	1	0.31	2	3.1	2.2	0.385
43	72	1.5	0.25	2.5	3.9	2.5	0.525
43	72	1.5	0.25	2.5	3.9	2.5	0.525
43	72	1.5	0.46	1.35	2.1	1.4	0.677
43	72	1.5	0.46	1.35	2.1	1.4	0.677
46.5	73.5	1	0.22	2.9	4.5	2.8	0.393
46.5	73.5	1	0.22	2.9	4.5	2.8	0.393
46.5	73.5	1	0.28	2.2	3.5	2.5	0.488
46.5	73.5	1	0.28	2.2	3.5	2.5	0.488
48	82	1.5	0.23	2.7	4.2	2.8	0.673
48	82	1.5	0.23	2.7	4.2	2.8	0.673
48	82	1.5	0.4	1.6	2.4	1.6	0.897
48	82	1.5	0.4	1.6	2.4	1.6	0.897
51.5	78.5	1	0.21	3	4.6	3.2	0.473
51.5	78.5	1	0.21	3	4.6	3.2	0.473
51.5	78.5	1	0.26	2.4	3.7	2.5	0.526
51.5	78.5	1	0.26	2.4	3.7	2.5	0.526
53	92	1.5	0.23	2.7	4.2	2.8	0.932
53	92	1.5	0.23	2.7	4.2	2.8	0.932
53	92	1.5	0.33	1.9	3	2	1.25
53	92	1.5	0.33	1.9	3	2	1.25
56.5	83.5	1	0.21	3	4.6	3.2	0.525
56.5	83.5	1	0.21	3	4.6	3.2	0.525
56.5	83.5	1	0.23	2.7	4.2	2.8	0.559
56.5	83.5	1	0.23	2.7	4.2	2.8	0.559
59	101	2	0.24	2.6	4.1	2.8	1.17
59	101	2	0.24	2.6	4.1	2.8	1.17
59	101	2	0.43	1.5	2.3	1.6	1.65
59	101	2	0.43	1.5	2.3	1.6	1.65
63	95	1.5	0.19	3.3	5.1	3.6	0.703

Self-aligning ball bearings

open



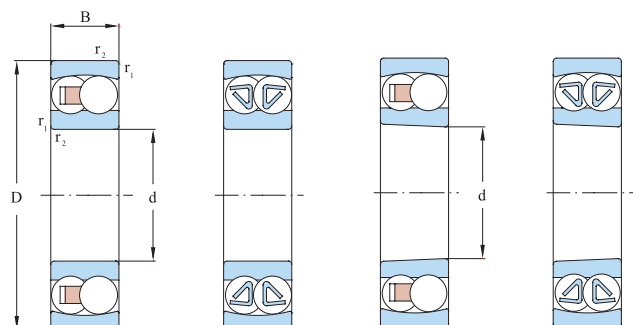
Designations		Boundary dimensions				Basic load ratings		Limiting speeds	
Cylindrical bore	Tapered bore	d	D	B	r _{1,2} min	Cr	Cor	Grease	Oil
		mm				kN		r/min	
1211ATN	1211AKTN	55	100	21	1.5	26.8	10.6	6300	7500
2211A	2211AK		100	25	1.5	37.3	13.2	6000	7000
2211ATN	2211AKTN		100	25	1.5	37.3	13.2	6000	7000
1311A	1311AK		120	29	2	51.5	18	5000	6000
1311ATN	1311AKTN		120	29	2	51.5	18	5000	6000
2311A	2311AK		120	43	2	76.1	24	4800	5600
2311ATN	2311AKTN	60	120	43	2	76.1	24	4800	5600
1212A	1212AK		110	22	1.5	30.2	12.2	5600	6700
1212ATN	1212AKTN		110	22	1.5	30.2	12.2	5600	6700
2212A	2212AK		110	28	1.5	48.1	17.1	5300	6300
2212ATN	2212AKTN		110	28	1.5	48.1	17.1	5300	6300
1312A	1312AK		130	31	2.1	57.9	22	4500	5300
1312ATN	1312AKTN	65	130	31	2.1	57.9	22	4500	5300
2312A	2312AK		130	46	2.1	87.7	28.3	4500	5300
2312ATN	2312AKTN		130	46	2.1	87.7	28.3	4500	5300
1213A	1213AK		120	23	1.5	35.1	14	5300	6300
1213ATN	1213AKTN		120	23	1.5	35.1	14	5300	6300
2213A	2213AK		120	31	1.5	57.2	20	5000	6000
2213ATN	2213AKTN	70	120	31	1.5	57.2	20	5000	6000
1313A	1313AK		140	33	2.1	65	25.5	4300	5000
1313ATN	1313AKTN		140	33	2.1	65	25.5	4300	5000
2313A	2313AK		140	48	2.1	95.6	32.5	4000	4800
2313ATN	2313AKTN		140	48	2.1	95.6	32.5	4000	4800
1214A	1214AK		125	24	1.5	34.2	13.5	5000	6000
1214ATN	1214AKTN	75	125	24	1.5	34.2	13.5	5000	6000
2214A	2214AK		125	31	1.5	44.2	17	4800	5600
2214ATN	2214AKTN		125	31	1.5	44.2	17	4800	5600
1314A	1314AK		150	35	2.1	74.1	27.5	4000	4800
1314ATN	1314AKTN		150	35	2.1	74.1	27.5	4000	4800
2314A	2314AK		150	51	2.1	111	37.5	3800	4500
2314ATN	2314AKTN		150	51	2.1	111	37.5	3800	4500
1215A	1215AK	75	130	25	1.5	38.7	15.5	4800	5600



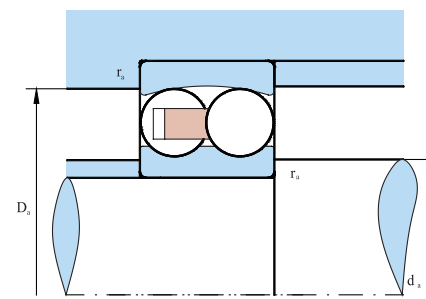
Abutment and fillet dimensions			Calculation factors				Mass
d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm							kg
63	95	1.5	0.19	3.3	5.1	3.6	0.703
63	95	1.5	0.23	2.7	4.2	2.8	0.935
63	95	1.5	0.23	2.7	4.2	2.8	0.935
64	111	2	0.23	2.7	4.2	2.8	1.53
64	111	2	0.23	2.7	4.2	2.8	1.53
64	111	2	0.4	1.6	2.4	1.6	2.1
64	111	2	0.4	1.6	2.4	1.6	2.1
68	102	1.5	0.19	3.3	5.1	3.6	0.87
68	102	1.5	0.19	3.3	5.1	3.6	0.87
68	102	1.5	0.24	2.6	4.1	2.8	1.06
68	102	1.5	0.24	2.6	4.1	2.8	1.06
71	119	2	0.23	2.7	4.2	2.8	1.97
71	119	2	0.23	2.7	4.2	2.8	1.97
71	119	2	0.33	1.9	3	2	2.62
71	119	2	0.33	1.9	3	2	2.62
73	112	1.5	0.18	3.5	5.4	3.6	0.89
73	112	1.5	0.18	3.5	5.4	3.6	0.89
73	112	1.5	0.24	2.6	4.1	2.8	1.45
73	112	1.5	0.24	2.6	4.1	2.8	1.45
76	129	2	0.22	2.9	4.5	2.8	2.34
76	129	2	0.22	2.9	4.5	2.8	2.34
76	129	2	0.37	1.7	2.6	1.8	3.25
76	129	2	0.37	1.7	2.6	1.8	3.25
78	117	1.5	0.18	3.5	5.4	3.6	1.21
78	117	1.5	0.18	3.5	5.4	3.6	1.21
78	117	1.5	0.27	2.3	3.6	2.5	1.5
78	117	1.5	0.27	2.3	3.6	2.5	1.5
81	139	2	0.22	2.9	4.5	2.8	2.92
81	139	2	0.22	2.9	4.5	2.8	2.92
81	139	2	0.37	1.7	2.6	1.8	3.9
81	139	2	0.37	1.7	2.6	1.8	3.9
83	122	1.5	0.17	3.7	5.7	4	1.31

Self-aligning ball bearings

open



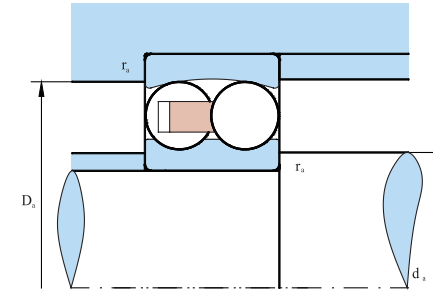
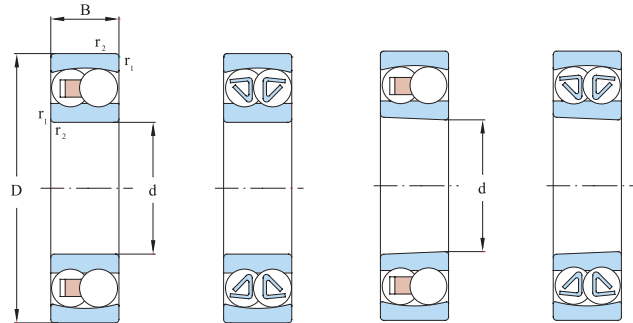
Designations		Boundary dimensions				Basic load ratings		Limiting speeds	
Cylindrical bore	Tapered bore	d	D	B	r _{1,2} min	Cr	Cor	Grease	Oil
		mm				kN		r/min	
1215ATN	1215AKTN	75	130	25	1.5	38.7	15.5	4800	5600
2215A	2215AK		130	31	1.5	44.4	18	4500	5300
2215ATN	2215AKTN		130	31	1.5	44.4	18	4500	5300
1315A	1315AK		160	37	2.1	77.6	30.8	3800	4500
1315ATN	1315AKTN		160	37	2.1	77.6	30.8	3800	4500
2315A	2315AK		160	55	2.1	124	43	3400	4000
2315ATN	2315AKTN	80	160	55	2.1	124	43	3400	4000
1216A	1216AK		140	26	2	39.8	16.9	4500	5300
1216ATN	1216AKTN		140	26	2	39.8	16.9	4500	5300
2216A	2216AK		140	33	2	65	25.5	4000	4800
2216ATN	2216AKTN		140	33	2	65	25.5	4000	4800
1316A	1316AK		170	39	2.1	83.2	33.6	3600	4300
1316ATN	1316AKTN	85	170	39	2.1	83.2	33.6	3600	4300
2316A	2316AK		170	58	2.1	135	49	3200	3800
2316ATN	2316AKTN		170	58	2.1	135	49	3200	3800
1217A	1217AK		150	28	2	48.8	20.8	4000	4800
1217ATN	1217AKTN		150	28	2	48.8	20.8	4000	4800
2217A	2217AK		150	36	2	58.5	23.6	3800	4500
2217ATN	2217AKTN	90	150	36	2	58.5	23.6	3800	4500
1317A	1317AK		180	41	3	97.5	38	3400	4000
1317ATN	1317AKTN		180	41	3	97.5	38	3400	4000
2317A	2317AK		180	60	3	140	51	3000	3600
2317ATN	2317AKTN		180	60	3	140	51	3000	3600
1218A	1218AK		160	30	2	57.2	23.6	3800	4500
1218ATN	1218AKTN	95	160	30	2	57.2	23.6	3800	4500
2218A	2218AK		160	40	2	70.2	28.5	3600	4300
2218ATN	2218AKTN		160	40	2	70.2	28.5	3600	4300
1318A	1318AK		190	43	3	117	44	3200	3800
1318ATN	1318AKTN		190	43	3	117	44	3200	3800
2318A	2318AK		190	64	3	153	57	2800	3400
2318ATN	2318AKTN	95	190	64	3	153	57	2800	3400
1219A	1219AK		170	32	2.1	63.7	27	3600	4300



Abutment and fillet dimensions			Calculation factors				Mass
d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm							kg
83	122	1.5	0.17	3.7	5.7	4	1.31
83	122	1.5	0.25	2.5	3.9	2.5	1.6
83	122	1.5	0.25	2.5	3.9	2.5	1.6
86	149	2	0.22	2.9	4.5	2.8	3.6
86	149	2	0.22	2.9	4.5	2.8	3.6
86	149	2	0.37	1.7	2.6	1.8	4.7
86	149	2	0.37	1.7	2.6	1.8	4.7
89	131	2	0.16	3.9	6.1	4	1.63
89	131	2	0.16	3.9	6.1	4	1.63
89	131	2	0.22	2.9	4.5	2.8	2
89	131	2	0.22	2.9	4.5	2.8	2
91	159	2	0.22	2.9	4.5	2.8	4.28
91	159	2	0.22	2.9	4.5	2.8	4.28
91	159	2	0.37	1.7	2.6	1.8	6.1
91	159	2	0.37	1.7	2.6	1.8	6.1
94	141	2	0.17	3.7	5.7	4	2.05
94	141	2	0.17	3.7	5.7	4	2.05
94	141	2	0.25	2.5	3.9	2.5	2.5
94	141	2	0.25	2.5	3.9	2.5	2.5
98	167	2.5	0.22	2.9	4.5	2.8	5
98	167	2.5	0.22	2.9	4.5	2.8	5
98	167	2.5	0.37	1.7	2.6	1.8	7.05
98	167	2.5	0.37	1.7	2.6	1.8	7.05
99	151	2	0.17	3.7	5.7	4	2.5
99	151	2	0.17	3.7	5.7	4	2.5
99	151	2	0.27	2.3	3.6	2.5	3.4
99	151	2	0.27	2.3	3.6	2.5	3.4
103	177	2.5	0.22	2.9	4.5	2.8	5.8
103	177	2.5	0.22	2.9	4.5	2.8	5.8
103	177	2.5	0.37	1.7	2.6	1.8	8.45
103	177	2.5	0.37	1.7	2.6	1.8	8.45
106	159	2	0.17	3.7	5.7	4	3.1

Self-aligning ball bearings

open

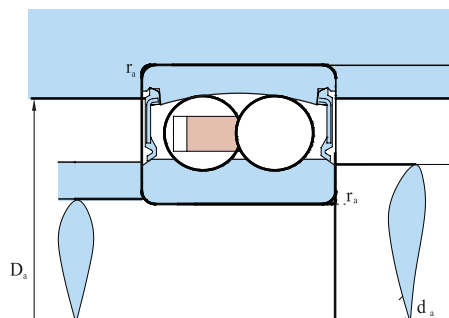
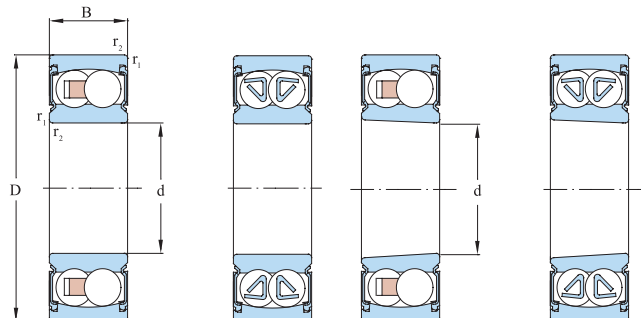


Designations		Boundary dimensions				Basic load ratings		Limiting speeds	
Cylindrical bore	Tapered bore	d	D	B	r _{1,2} min	Cr	Cor	Grease	Oil
		mm				kN		r/min	
1219ATN	1219AKTN	95	170	32	2.1	63.7	27	3600	4300
2219A	2219AK		170	43	2.1	83.2	34.5	3400	4000
2219ATN	2219AKTN		170	43	2.1	83.2	34.5	3400	4000
1319A	1319AK		200	45	3	133	51	3000	3600
1319ATN	1319AKTN		200	45	3	133	51	3000	3600
2319A	2319AK		200	67	3	165	64	2600	3200
2319ATN	2319AKTN		200	67	3	165	64	2600	3200
1220A	1220AK		180	34	2.1	68.9	30	3400	4000
1220ATN	1220AKTN	100	180	34	2.1	68.9	30	3400	4000
2220A	2220AK		180	46	2.1	97.5	40.5	3200	3800
2220ATN	2220AKTN		180	46	2.1	97.5	40.5	3200	3800
1320A	1320AK		215	47	3	143	57	2800	3400
1320ATN	1320AKTN		215	47	3	143	57	2800	3400
2320A	2320AK		215	73	3	190	80	2400	3000
2320ATN	2320AKTN	105	215	73	3	190	80	2400	3000
1221A	1221AK		190	36	2.1	74.1	32.5	3200	3800
1221ATN	1221AKTN		190	36	2.1	74.1	32.5	3200	3800
2221A	2221AK		190	50	2.1	108	45	3000	3600
2221ATN	2221AKTN		190	50	2.1	108	45	3000	3600
1222A	1222AK		200	38	2.1	88.4	39	3000	3600
1222ATN	1222AKTN	110	200	38	2.1	88.4	39	3000	3600
2222A	2222AK		200	53	2.1	124	52	2800	3400
2222ATN	2222AKTN		200	53	2.1	124	52	2800	3400
1322A	1322AK		240	50	3	163	72	2400	3000
1322ATN	1322AKTN		240	50	3	163	72	2400	3000
2322A	2322AK		240	80	3	216	95	2200	2800
2322ATN	2322AKTN		240	80	3	216	95	2200	2800
10001224		120	215	42	2.1	91.9	52.5	2000	2600
1001224K			215	42	2.1	88.8	49.9	2000	2600
1111224K			215	42	2.1	88.8	49.9	2000	2600
1001228		140	250	50	3	119	72.1	1900	2500
1730		150	235	36	3	79.7	52.8	2000	2600

Abutment and fillet dimensions			Calculation factors				Mass
d _a min	D _a max	r _a max	e	Y ₁	Y ₂	Y ₀	
mm							kg
106	159	2	0.17	3.7	5.7	4	3.1
106	159	2	0.27	2.3	3.6	2.5	4.1
106	159	2	0.27	2.3	3.6	2.5	4.1
108	187	2.5	0.23	2.7	4.2	2.8	6.7
108	187	2.5	0.23	2.7	4.2	2.8	6.7
108	187	2.5	0.37	1.7	2.6	1.8	9.8
108	187	2.5	0.37	1.7	2.6	1.8	9.8
111	169	2	0.17	3.7	5.7	4	3.7
111	169	2	0.17	3.7	5.7	4	3.7
111	169	2	0.27	2.3	3.6	2.5	5
111	169	2	0.27	2.3	3.6	2.5	5
113	202	2.5	0.23	2.7	4.2	2.8	8.3
113	202	2.5	0.23	2.7	4.2	2.8	8.3
113	202	2.5	0.37	1.7	2.6	1.8	12.5
113	202	2.5	0.37	1.7	2.6	1.8	12.5
116	179	2	0.17	3.7	5.7	4	4.35
116	179	2	0.17	3.7	5.7	4	4.35
116	179	2	0.28	2.2	3.5	2.5	6.1
116	179	2	0.28	2.2	3.5	2.5	6.1
121	189	2	0.17	3.7	5.7	4	5.15
121	189	2	0.17	3.7	5.7	4	5.15
121	189	2	0.28	2.2	3.5	2.5	7.1
121	189	2	0.28	2.2	3.5	2.5	7.1
123	227	2.5	0.22	2.9	4.5	2.8	12
123	227	2.5	0.22	2.9	4.5	2.8	12
123	227	2.5	0.37	1.7	2.6	1.8	17.5
123	227	2.5	0.37	1.7	2.6	1.8	17.5
131	204	2	0.2	3.21	4.97	3.36	7.04
131	204	2	0.2	3.21	4.97	3.36	5.96
131	204	2	0.2	3.21	4.97	3.36	5.96
153	237	2	0.2	3.12	4.83	3.27	11.3
163	222	2	0.15	4.18	6.46	4.38	6.25

Self-aligning ball bearings

close

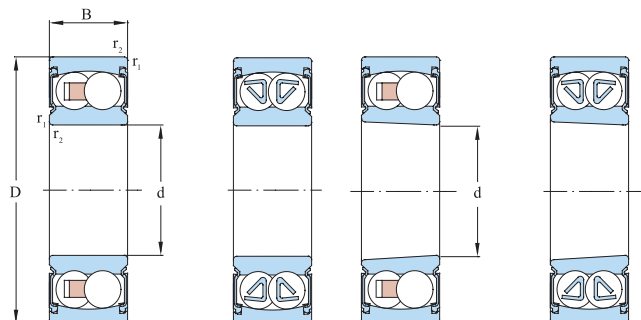


Designations		Boundary dimensions				Basic load ratings	
Cylindrical bore	Tapered bore	d	D	B	$r_{1,2min}$	Cr	Cor
		mm				kN	
2200A-2RS1TN		10	30	14	0.6	5.53	1.18
2201A-2RS1TN		12	32	14	0.6	6.24	1.43
2202A-2RS1TN		15	35	14	0.6	7.41	1.76
2302A-2RS1TN			42	17	1	10.8	2.6
2203A-2RS1TN		17	40	16	0.6	8.84	2.2
2303A-2RS1TN			47	19	1	12.7	3.4
2204A-2RS1TN	2204AK-2RS1TN	20	47	18	1	12.7	3.4
2304A-2RS1TN			52	21	1.1	14.3	4
2205A-2RS1TN	2205AK-2RS1TN	25	52	18	1	14.3	4
2305A-2RS1TN			62	24	1.1	19	5.4
2206A-2RS1	2206AK-2RS1	30	62	20	1	15.6	4.65
2206A-2RS1TN	2206AK-2RS1TN		62	20	1	15.6	4.65
2306A-2RS1			72	27	1.1	22.5	6.8
2306A-2RS1TN			72	27	1.1	22.5	6.8
2207A-2RS1	2207AK-2RS1	35	72	23	1.1	19	6
2207A-2RS1TN	2207AK-2RS1TN		72	23	1.1	19	6
2307A-2RS1			80	31	1.5	26.5	8.5
2307A-2RS1TN			80	31	1.5	26.5	8.5
2208A-2RS1	2208AK-2RS1	40	80	23	1.1	19.9	6.95
2208A-2RS1TN	2208AK-2RS1TN		80	23	1.1	19.9	6.95
2308A-2RS1			90	33	1.5	33.8	11.2
2308A-2RS1TN			90	33	1.5	33.8	11.2
2209A-2RS1	2209AK-2RS1	45	85	23	1.1	22.9	7.8
2209A-2RS1TN	2209AK-2RS1TN		85	23	1.1	22.9	7.8
2309A-2RS1			100	36	1.5	39	13.4
2309A-2RS1TN			100	36	1.5	39	13.4
2210A-2RS1	2210AK-2RS1	50	90	23	1.1	22.9	8.15
2210A-2RS1TN	2210AK-2RS1TN		90	23	1.1	22.9	8.15
2310A-2RS1			110	40	2	43.6	14
2310A-2RS1TN			110	40	2	43.6	14
2211A-2RS1	2211AK-2RS1	55	100	25	1.5	27.6	10.6
2211A-2RS1TN	2211AK-2RS1TN		100	25	1.5	27.6	10.6

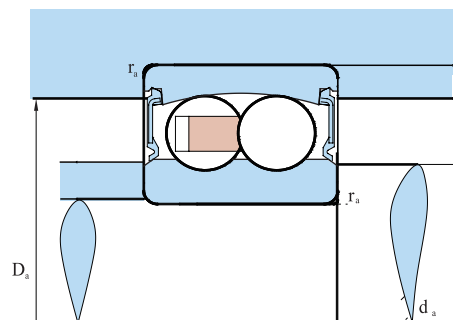
Limiting speeds	Abutment and fillet dimensions			Calculation factors				Mass
Grease	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0	
r/min	mm							kg
17000	14	26	0.6	0.33	1.9	3	2	0.048
16000	15	28	0.6	0.33	1.9	3	2	0.053
14000	19	31	0.6	0.33	1.9	3	2	0.058
12000	20	37	1	0.31	2	3.1	2.2	0.11
12000	21	36	0.6	0.31	2	3.1	2.2	0.089
11000	22	42	1	0.3	2.1	3.3	2.2	0.16
10000	25	42	1	0.3	2.1	3.3	2.2	0.14
9500	26	45	1	0.28	2.2	3.5	2.5	0.21
9000	30	47	1	0.28	2.2	3.5	2.5	0.16
7500	31.5	55.5	1.1	0.28	2.2	3.5	2.5	0.34
7500	35	57	1	0.25	2.5	3.9	2.5	0.26
7500	35	57	1	0.25	2.5	3.9	2.5	0.26
6700	36.5	65.5	1	0.25	2.5	3.9	2.5	0.51
6700	36.5	65.5	1	0.25	2.5	3.9	2.5	0.51
6300	41.5	65.5	1	0.23	2.7	4.2	2.8	0.41
6300	41.5	65.5	1	0.23	2.7	4.2	2.8	0.41
5600	43	72	1.5	0.25	2.5	3.9	2.5	0.7
5600	43	72	1.5	0.25	2.5	3.9	2.5	0.7
5600	46.5	73.5	1	0.22	2.9	4.5	2.8	0.5
5600	46.5	73.5	1	0.22	2.9	4.5	2.8	0.5
5000	48	82	1.5	0.23	2.7	4.2	2.8	0.96
5000	48	82	1.5	0.23	2.7	4.2	2.8	0.96
5300	51.5	78.5	1	0.21	3	4.6	3.2	0.53
5300	51.5	78.5	1	0.21	3	4.6	3.2	0.53
4500	53	92	1.5	0.23	2.7	4.2	2.8	1.3
4500	53	92	1.5	0.23	2.7	4.2	2.8	1.3
4800	56.5	83.5	1	0.2	3.2	4.9	3.2	0.57
4800	56.5	83.5	1	0.2	3.2	4.9	3.2	0.57
4000	59	101	2	0.24	2.6	4.1	2.8	1.65
4000	59	101	2	0.24	2.6	4.1	2.8	1.65
4300	63	92	1.5	0.19	3.3	5.1	3.6	0.79
4300	63	92	1.5	0.19	3.3	5.1	3.6	0.79

Self-aligning ball bearings

close



Designations		Boundary dimensions				Basic load ratings	
Cylindrical bore	Tapered bore	d	D	B	$r_{1,2} \text{ min}$	Cr	Cor
		mm				kN	
2212A-2RS1		60	110	28	1.5	31.2	12.2
2212A-2RS1TN			110	28	1.5	31.2	12.2
2213A-2RS1		65	120	31	1.5	35.1	14
2213A-2RS1TN			120	31	1.5	35.1	14
2214A-2RS1		70	125	31	1.5	34.5	13.7
2214A-2RS1TN			125	31	1.5	34.5	13.7



Limiting speeds	Abutment and fillet dimensions			Calculation factors				Mass
Grease r/min	$d_a \text{ min}$	$D_a \text{ max}$	$r_a \text{ max}$	e	Y_1	Y_2	Y_0	
	mm							kg
3800	68	102	1.5	0.19	3.3	5.1	3.6	1.05
3800	68	102	1.5	0.19	3.3	5.1	3.6	1.05
3600	73	112	1.5	0.18	3.5	5.4	3.6	1.4
3600	73	112	1.5	0.18	3.5	5.4	3.6	1.4
3400	78	117	1.5	0.18	3.5	5.4	3.6	1.5
3400	78	117	1.5	0.18	3.5	5.4	3.6	1.5