Double-row self-aligning ball bearings

Definition and capabilities

Definition

The spherical race in the outer ring allows angular displacement.

The variant with taper bore makes assembly easier.

Cages

Standard dimension bearings are equipped with a synthetic material cage (maximum operating temperature: 120°C or 248°F, 150°C or 302°F peak). Large dimension bearings are equipped with a pressed steel or machined brass cage.

Capabilities

Loads and speeds

This type of bearing accepts relatively high speeds of rotation. It has good ability to withstand radial loads. Its design, however, means that it can only accept very low axial loads.

Misalignment

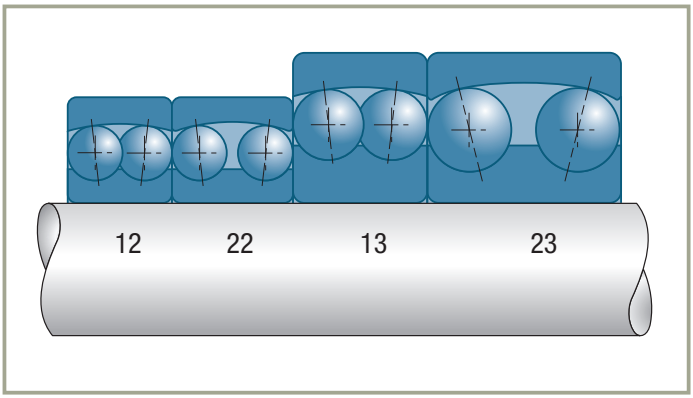
The outer ring of this type of bearing has a spherical raceway that allows angular travel rings. This means that it can accept high misalignment values, whether permanent (rotational bending of shaft) or not.

Double-row self-aligning ball bearings allow high misalignment values of the order of 2 to 4° without loss of performance.

The misalignment angle must nevertheless be limited in order to remain within values compatible with the sealing system used.

In sealed variants the permissible misalignment is limited to 0.5°.

Series



Variants

■ Bearings with tapered bore. Suffix K

Standardized 1:12 taper. They are usually fitted using a tapered adapter sleeve.

The tapered bore variant allows the use of as-rolled shafts, thanks to the characteristics of the tapered adapter sleeve. These bearings are often mounted in split pillow blocks.

■ Sealed bearings. Suffix EE. Series 22...EE - 23...EE

These bearings are pre-greased. Their seals limit angular travel possibilities to 1/20. Their basic loads are the same as the series 12 and 13 bearings of the same diameter, because they have the same internal design definition.

They therefore also have the same equivalent load factors.

■ Bearings with wide inner ring. Series 112, 113

Bearings whose inner ring extends beyond both sides of the outer ring. The inner ring has a slot for a drive screw. These bearings are mainly used in agricultural machinery.

Double-row self-aligning ball bearings *(continued)*

Tolerances and clearances

Tolerances

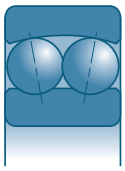
These bearings are supplied with tolerances in compliance with ISO 492 Standard, but in the normal tolerance class only.

Clearances

Internal radial clearance

This clearance is standardised (ISO 5753). The values are different for cylindrical bore and tapered bore bearings (suffix K). The latter have a significantly larger clearance to allow the reduction in clearance resulting from the adapter sleeve interference fit. The recommended residual clearance after fitting is of the range of:

$$J_{rm} = 2\ d^{1/2}\ 10^{-3}$$

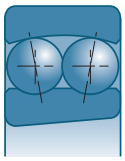


Double-row self-aligning ball bearings with cylindrical bore series 12-13-22-23-112-113

Bore diameter	Group 2		Group N		Group 3		Group 4		Group 5	
d (mm)	min	max	min	max	min	max	min	max	min	max
2,5 <d ≤ 6	1	8	5	15	10	20	15	25	21	33
6 <d≤ 10	2	9	6	17	12	25	19	33	27	42
10 <d≤ 18	2	10	6	19	13	26	21	35	30	48
14 <d≤ 18	3	12	8	21	15	28	23	37	32	50
18 <d≤ 24	4	14	10	23	17	30	25	39	34	52
24 <d≤ 30	5	16	11	24	19	35	29	46	40	58
30 <d≤ 40	6	18	13	29	23	40	34	53	46	66
40 <d≤ 50	6	19	14	31	25	44	37	57	50	71
50 <d≤ 65	7	21	16	36	30	50	45	69	62	88
65 <d≤ 80	8	24	18	40	35	60	54	83	76	108
80 <d≤ 100	9	27	22	48	42	70	64	96	89	124
100 <d≤ 120	10	31	25	56	50	83	75	114	105	145
120 <d≤ 140	10	38	30	68	60	100	90	135	125	175
140 <d≤ 160	15	44	35	80	70	120	110	161	150	210

Value in µm

Bearings with tapered bore series 12K-13K-22K-23K



Bore diameter	Group 2		Group N		Group 3		Group 4		Group 5	
d (mm)	min	max	min	max	min	max	min	max	min	max
18 <d≤ 24	7	17	13	26	20	33	28	42	37	55
24 <d≤ 30	9	20	15	28	23	39	33	50	44	62
30 <d≤ 40	12	24	19	35	29	46	40	59	52	72
40 <d≤ 50	14	27	22	39	33	52	45	65	58	79
50 <d≤ 65	18	32	27	47	41	61	56	80	73	99
65 <d≤ 80	23	39	35	57	50	75	69	98	91	123
80 <d≤ 100	29	47	42	68	62	90	84	116	109	144
100 <d≤ 120	35	56	50	81	75	108	100	139	130	170
120 <d≤ 140	40	68	60	98	90	130	120	165	155	205
140 <d≤ 160	45	74	65	110	100	150	140	191	180	240

Value in µm

Axial clearance

As the axial clearance J_a is a function of the radial clearance J_r, its value can be calculated using the following approximation formula:

$$J_a = 2.27\ Y_0 \cdot J_r$$

Fitting and adjustment

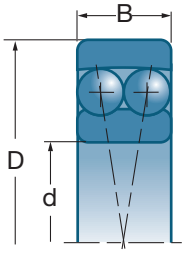
This type of bearing is very sensitive to any cancellation of clearance and the residual clearance must be checked after fitting swivelling by hand. It is particularly important to perform this check on bearings with a tapered bore.

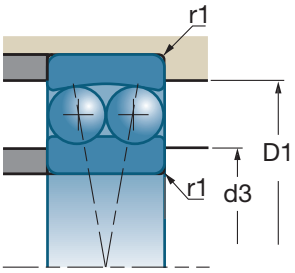
Some self-aligning ball bearings protrude slightly with respect to the faces. Example: 1320.

Suffixes

EE	Double sealing
G14, G15	Moulded polyamide cage
K	Tapered bore, 1:12 taper
M	Machined brass cage centred on the balls

Double-row self-aligning ball bearings *(continued)*

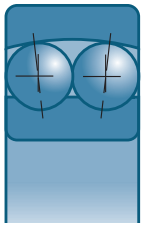




d		D	B			e	Y		Yo
				C	C_0		Fa / Fr ≤ e	Fa / Fr > e	
mm	References	mm	mm	10^3N	10^3N				
10	1200 G15	30	9	5.50	1.19	0.31	2.00	3.10	2.00
	2200 G14	30	14	7.30	1.58	0.31	2.00	3.10	2.00
12	1201 G15	32	10	5.60	1.26	0.31	2.00	3.10	2.00
	2201 G15	32	14	7.50	1.71	0.31	2.00	3.10	2.00
	1301 G14	37	12	9.40	2.14	0.33	1.90	2.90	1.90
15	1202 G15	35	11	7.50	1.75	0.31	2.00	3.10	2.00
	2202 G15	35	14	9.20	2.08	0.31	2.00	3.10	2.00
	1302 G14	42	13	9.50	2.28	0.33	1.90	2.90	1.90
	2302 G15	42	17	16.30	3.85	0.42	1.47	2.28	1.55
17	1203 G15	40	12	7.90	2.03	0.31	2.00	3.10	2.00
	2203 G15	40	16	11.50	2.75	0.46	1.40	2.10	1.40
	1303 G14	47	14	12.50	3.20	0.33	1.90	2.90	1.90
	2303 G14	47	19	14.40	3.55	0.50	1.20	2.00	1.20
20	1204	47	14	9.70	2.65	0.26	2.40	3.60	2.40
	2204 G15	47	18	14.30	3.50	0.43	1.50	2.30	1.50
	1304 G15	52	15	12.40	3.35	0.27	2.30	3.60	2.40
25	1205	52	15	11.90	3.30	0.27	2.30	3.60	2.40
	2205	52	18	12.20	3.45	0.42	1.50	2.40	1.60
	2205 G15	52	18	16.90	4.45	0.42	1.50	2.40	1.60
	1305 G15	62	17	18.00	5.00	0.27	2.30	3.60	2.40
	2305 G15	62	24	24.40	6.50	0.47	1.40	2.10	1.40
30	1206	62	16	15.40	4.70	0.24	2.60	4.00	2.70
	2206	62	20	15.00	4.60	0.36	1.80	2.70	1.80
	1306	72	19	20.90	6.30	0.24	2.60	4.00	2.70
	2306	72	27	30.50	8.70	0.43	1.40	2.30	1.50
35	1207	72	17	15.60	5.10	0.22	2.90	4.50	3.00
	2207	72	23	21.20	6.70	0.36	1.80	2.70	1.90
	1307 G15	80	21	25.00	7.90	0.24	2.60	4.00	2.70
	2307 G15	80	31	39.50	11.10	0.46	1.40	2.10	1.40
40	1208	80	18	19.00	6.50	0.21	2.90	4.60	3.10
	2208 G15	80	23	31.50	9.50	0.25	2.60	4.00	2.70
	1308	90	23	29.00	9.80	0.24	2.60	4.00	2.80
	2308 G15	90	33	45.00	13.40	0.44	1.50	2.20	1.50
45	1209	85	19	21.50	7.40	0.21	2.90	4.60	3.10
	2209	85	23	23.00	8.20	0.29	2.10	3.30	2.20
	1309	100	25	37.50	12.90	0.24	2.60	4.00	2.70
	2309 G15	100	36	54.00	16.40	0.44	1.50	2.20	1.50

Characteristics

Double-row self-aligning ball bearings with cylindrical bore



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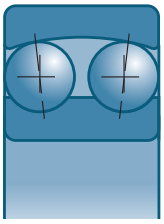

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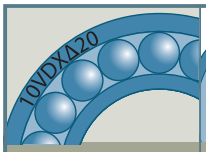
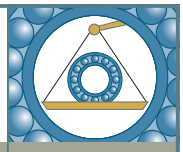
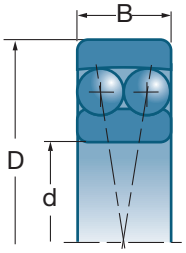
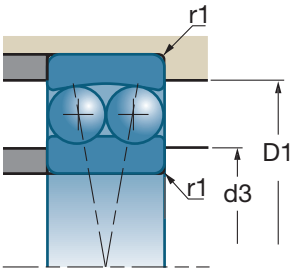
			d3 min	D1 max	r1 max	
References	rpm*	rpm*	mm	mm	mm	kg
1200 G15 2200 G14	24000 24000	29000 29000	14.0 14.0	26.0 27.0	0.6 0.6	0.032 0.048
1201 G15 2201 G15 1301 G14	23000 22000 18000	27000 26000 22000	16.0 16.0 17.0	28.0 28.0 31.0	0.6 0.6 1.0	0.041 0.055 0.073
1202 G15 2202 G15 1302 G14 2302 G15	20000 19000 16000 15000	23000 23000 19000 17000	19.0 19.0 20.0 20.0	31.0 31.0 36.0 36.0	0.6 0.6 1.0 1.0	0.050 0.063 0.097 0.115
1203 G15 2203 G15 1303 G14 2303 G14	17000 16000 14000 13000	21000 19000 17000 16000	21.0 21.0 22.0 22.0	36.0 36.0 41.0 41.0	0.6 0.6 1.1 1.1	0.073 0.088 0.128 0.157
1204 2204 G15 1304 G15	14000 14000 12000	17000 16000 14000	25.0 25.0 26.5	42.0 42.0 47.0	1.0 1.0 1.1	0.118 0.140 0.160
1205 2205 2205 G15 1305 G15 2305 G15	12000 12000 12000 10000 9600	15000 14000 14000 12000 11000	30.0 30.0 30.0 31.5 31.5	47.0 46.0 47.0 55.0 55.0	1.0 1.0 1.0 1.1 1.1	0.138 0.163 0.160 0.280 0.340
1206 2206 1306 2306	10000 10000 8500 8100	12000 12000 10000 9000	35.0 35.0 36.5 36.5	57.0 56.0 65.0 65.0	1.0 1.0 1.1 1.1	0.221 0.260 0.387 0.500
1207 2207 1307 G15 2307 G15	9000 8800 7400 7200	10000 10000 9000 8600	41.5 41.5 43.0 43.0	65.0 65.0 72.0 71.0	1.1 1.1 1.5 1.5	0.323 0.403 0.510 0.680
1208 2208 G15 1308 2308 G15	7900 7700 6600 6400	9400 9200 8000 7700	46.5 46.5 48.0 48.0	73.0 73.0 82.0 81.0	1.1 1.1 1.5 1.5	0.417 0.550 0.715 0.919
1209 2209 1309 2309 G15	7400 7200 6000 5700	8800 8600 7000 6800	51.5 51.5 53.0 53.0	78.0 78.0 92.0 91.0	1.1 1.1 1.5 1.5	0.465 0.550 0.957 1.229

* These are the speed limits according to the SNR concept (see pages 85 to 87).

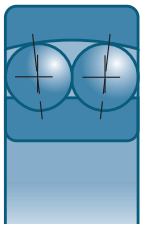
Double-row self-aligning ball bearings *(continued)*





d	10VDX420	D	B	C	C_0	e	Y		Yo
							Fa / Fr ≤ e	Fa / Fr > e	
mm	References	mm	mm	10^3N	10^3N				
50	1210	90	20	22.50	8.10	0.19	3.30	5.10	3.50
	2210	90	23	23.00	8.50	0.27	2.30	3.60	2.40
	1310 G15	110	27	41.50	14.30	0.24	2.60	4.10	2.80
	2310 G15	110	40	65.00	20.10	0.44	1.50	2.20	1.50
55	1211	100	21	26.50	10.00	0.19	3.40	5.20	3.50
	2211	100	25	26.50	9.90	0.27	2.30	3.60	2.30
	1311 G15	120	29	51.00	18.00	0.23	2.80	4.30	2.80
	2311 G15	120	43	75.00	23.80	0.44	1.50	2.20	1.50
60	1212 G15	110	22	30.00	11.60	0.18	3.60	5.50	3.60
	2212	110	28	34.00	12.50	0.27	2.30	3.60	2.30
	1312	130	31	57.00	20.70	0.23	2.80	4.30	2.80
	2312 G15	130	46	87.00	28.00	0.40	1.60	2.50	1.60
65	1213	120	23	31.00	12.40	0.18	3.60	5.50	3.60
	2213	120	31	43.50	16.40	0.27	2.30	3.60	2.30
	2313 G15	140	48	96.00	32.50	0.40	1.60	2.50	1.60
70	2214	125	31	44.00	17.00	0.27	2.30	3.60	2.30
	2314	150	51	109.00	37.50	0.40	1.60	2.50	1.60
75	1215	130	25	39.00	15.50	0.18	3.60	5.50	3.60
	2215	130	31	44.50	17.90	0.25	2.50	3.80	2.50
	1315	160	37	79.00	30.00	0.23	2.80	4.30	2.80
	2315	160	55	123.00	42.50	0.40	1.60	2.50	1.60
80	1216	140	26	40.00	16.90	0.18	3.60	5.50	3.60
	2216	140	33	49.00	20.00	0.25	2.50	3.80	2.50
85	1217	150	28	49.00	20.40	0.18	3.60	5.50	3.60
	1317	180	41	98.00	38.00	0.23	2.80	4.30	2.80
90	1218	160	30	57.00	23.50	0.18	3.60	5.50	3.60
	2218	160	40	69.00	28.50	0.27	2.40	3.70	2.50
	2318	190	64	149.00	58.00	0.37	1.70	2.60	1.80
95	1219	170	32	64.00	27.00	0.18	3.60	5.50	3.60
100	1220	180	34	69.00	29.50	0.18	3.60	5.50	3.60
	2220	180	46	96.00	40.50	0.26	2.40	3.60	2.50
	1320	215	47	143.00	58.00	0.23	2.80	4.30	2.80
110	1222	200	38	88.00	38.50	0.18	3.60	5.50	3.60

Double-row self-aligning ball bearings with cylindrical bore *(continued)*



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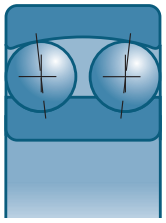

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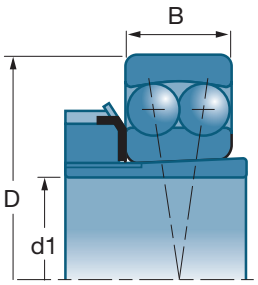
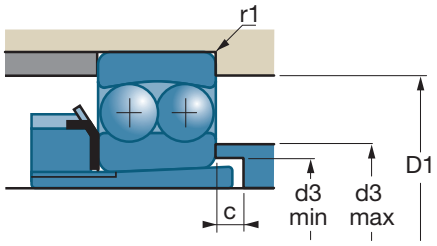
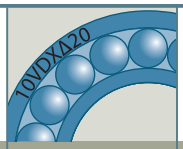
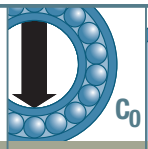
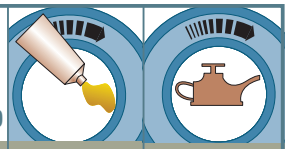
References	rpm*	rpm*	d3 min	D1 max	r1 max	
			mm	mm	mm	kg
1210	6900	8200	56.5	83.0	1.1	0.525
2210	6700	8000	56.5	83.0	1.1	0.590
1310 G15	5400	6500	59.0	99.0	2.0	1.200
2310 G15	5200	6200	59.0	99.0	2.0	1.623
1211	6100	7300	63.0	92.0	1.5	0.697
2211	6100	7200	63.0	91.0	1.5	0.788
1311 G15	5000	6000	64.0	109.0	2.0	1.640
2311 G15	4700	5600	64.0	109.0	2.0	2.070
1212 G15	5700	6700	68.0	102.0	1.5	0.890
2212	5600	6600	68.0	101.0	1.5	1.079
1312	4600	5600	71.0	117.0	2.1	1.952
2312 G15	4300	5200	71.0	117.0	2.1	2.600
1213	5200	6200	73.0	111.0	1.5	1.133
2213	5100	6000	73.0	111.0	1.5	1.470
2313 G15	4000	4800	76.0	123.0	2.1	3.171
2214	4800	5700	78.0	116.0	1.5	1.550
2314	3700	4400	81.0	137.0	2.1	4.170
1215	4700	5600	83.0	121.0	1.5	1.341
2215	4600	5400	83.0	121.0	1.5	1.630
1315	3700	4400	86.0	147.0	2.1	3.680
2315	3500	4200	86.0	147.0	2.1	4.740
1216	4400	5200	89.0	129.0	2.0	1.646
2216	4200	5000	91.0	129.0	2.0	2.100
1217	4100	4800	94.0	139.0	2.0	2.160
1317	3300	4000	98.0	166.0	3.0	5.150
1218	3800	4500	99.0	149.0	2.0	2.500
2218	3700	4400	99.0	151.0	2.0	3.190
2318	2900	3500	103.0	177.0	3.0	7.840
1219	3600	4200	106.0	157.0	2.1	3.200
1220	3400	4000	111.0	167.0	2.1	3.700
2220	3300	4000	111.0	169.0	2.1	4.680
1320	2800	3400	113.0	201.0	3.0	8.700
1222	3100	3700	121.0	187.0	2.1	5.320

* These are the speed limits according to the SNR concept (see pages 85 to 87).

Double-row self-aligning ball bearings *(continued)*

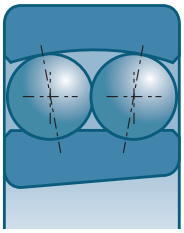




d1		Sleeves	d	D	B	C1				
mm	References	References	mm	mm	mm	mm	10^3N	10^3N	rpm*	rpm*
20	1205 K	H205	25	52	15		11.90	3.30	12000	15000
	2205 K	H305	25	52	18		12.20	3.45	12000	14000
	1305 KG15	H305	25	62	17		18.00	5.00	10000	12000
	2305 KG15	H2305	25	62	24		24.40	6.50	9400	11000
25	1206 K	H206	30	62	16		15.40	4.70	10000	12000
	2206 K	H306	30	62	20		15.00	4.60	10000	12000
	1306 K	H306	30	72	19		21.30	6.30	8600	10000
	2306 K	H2306	30	72	27		30.50	8.70	8100	9000
30	1207 K	H207	35	72	17		15.60	5.10	9000	10000
	2207 K	H307	35	72	23		21.20	6.70	8800	10000
	1307 KG15	H307	35	80	21		25.00	7.90	7400	9000
	2307 KG15	H2307	35	80	31		39.50	11.10	7200	8600
35	1208 K	H208	40	80	18		19.00	6.50	7900	9400
	2208 KG15	H308	40	80	23		31.50	9.50	7700	9200
	1308 K	H308	40	90	23		29.00	9.80	6600	8000
	2308 K	H2308	40	90	33		45.00	13.40	6400	7700
40	1209 K	H209	45	85	19		21.50	7.40	7400	8800
	2209 K	H309	45	85	23		23.00	8.20	7200	8000
	1309 K	H309	45	100	25		37.50	12.90	6000	7000
	2309 K	H2309	45	100	36		54.00	16.40	5700	6800
45	1210 K	H210	50	90	20		22.50	8.10	6900	8200
	2210 K	H310	50	90	23		23.00	8.50	6700	8000
	1310 KG15	H310	50	110	27		41.50	14.30	5400	6500
	2310 K	H2310	50	110	40		65.00	20.10	5200	6200
50	1211 K	H211	55	100	21		26.50	10.00	6100	7300
	2211 K	H311	55	100	25		26.50	9.90	6100	7200
	1311 KG15	H311	55	120	29		51.00	18.00	5000	6000
	2311 K	H2311	55	120	43		75.00	23.80	4700	5600
55	1212 KG15	H212	60	110	22		30.00	11.60	5700	6700
	2212 K	H312	60	110	28		34.00	12.50	5500	6600
	1312 K	H312	60	130	31		57.00	20.70	4600	5600
	2312 K	H2312	60	130	46		87.00	28.00	4300	5200
60	1213 K	H213	65	120	23		31.00	12.40	5200	6200
	2213 K	H313	65	120	31		43.50	16.40	5100	6000
	2313 K	H2313	65	140	48		96.00	32.50	4000	4800

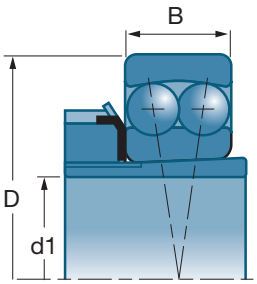
* These are the speed limits according to the SNR concept (see pages 85 to 87).

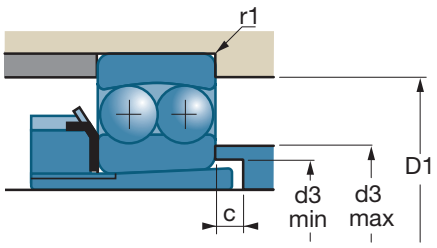
Double-row self-aligning ball bearings with tapered bore with adapter sleeve



10VDX020	Sleeves	e	Y		Yo	d3 max	d3 min	c	D1 max	r1 max	
			Fa/Fr ≤ e	Fa/Fr > e							
References	References					mm	mm	mm	mm	mm	kg
1205 K	H205	0.27	2.3	3.6	2.4	32	28	5	47	1.0	0.139
2205 K	H305	0.42	1.5	2.4	1.6	33	28	5	46	1.0	0.164
1305 KG15	H305	0.27	2.3	3.6	2.4	37	28	6	55	1.1	0.280
2305 KG15	H2305	0.48	1.3	2.0	1.4	36	30	5	55	1.1	0.328
1206 K	H206	0.24	2.6	4.0	2.7	39	33	5	57	1.0	0.220
2206 K	H306	0.38	1.7	2.6	1.7	40	33	5	56	1.0	0.260
1306 K	H306	0.26	2.4	3.8	2.4	43	33	6	65	1.5	0.408
2306 K	H2306	0.43	1.4	2.3	1.5	43	35	5	65	1.1	0.500
1207 K	H207	0.22	2.9	4.5	3.0	46	38	5	65	1.1	0.322
2207 K	H307	0.36	1.8	2.7	1.9	47	39	5	65	1.1	0.401
1307 KG15	H307	0.24	2.6	4.0	2.7	51	39	8	72	1.5	0.510
2307 KG15	H2307	0.46	1.4	2.1	1.4	48	40	5	71	1.5	0.680
1208 K	H208	0.21	2.9	4.6	3.1	53	43	5	73	1.1	0.417
2208 KG15	H308	0.25	2.6	4.0	2.7	53	44	5	73	1.1	0.550
1308 K	H308	0.24	2.6	4.0	2.8	57	44	5	82	1.5	0.715
2308 K	H2308	0.44	1.5	2.2	1.5	55	45	5	81	1.5	0.930
1209 K	H209	0.21	2.9	4.6	3.1	57	48	5	78	1.1	0.465
2209 K	H309	0.29	2.1	3.3	2.2	58	50	8	78	1.1	0.550
1309 K	H309	0.24	2.6	4.0	2.7	63	50	5	92	1.5	0.959
2309 K	H2309	0.44	1.5	2.2	1.5	62	50	5	91	1.5	1.250
1210 K	H210	0.19	3.3	5.1	3.5	61	53	5	83	1.1	0.525
2210 K	H310	0.27	2.3	3.6	2.4	63	55	10	83	1.1	0.584
1310 KG15	H310	0.24	2.6	4.1	2.8	69	55	5	99	2.0	1.200
2310 K	H2310	0.44	1.5	2.2	1.5	67	56	5	99	2.0	1.650
1211 K	H211	0.19	3.4	5.2	3.5	68	60	6	92	1.5	0.697
2211 K	H311	0.27	2.3	3.6	2.3	70	60	10	91	1.5	0.773
1311 KG15	H311	0.23	2.8	4.3	2.8	76	60	6	109	2.0	1.550
2311 K	H2311	0.44	1.5	2.2	1.5	74	61	6	109	2.0	2.260
1212 KG15	H212	0.18	3.6	5.5	3.6	76	64	5	102	1.5	0.890
2212 K	H312	0.27	2.3	3.6	2.3	77	65	8	101	1.5	1.079
1312 K	H312	0.23	2.8	4.3	2.8	85	65	5	117	2.1	1.952
2312 K	H2312	0.4	1.6	2.5	1.6	75	66	5	117	2.1	2.600
1213 K	H213	0.18	3.6	5.5	3.6	84	70	5	111	1.5	1.124
2213 K	H313	0.27	2.3	3.6	2.3	83	70	8	111	1.5	1.419
2313 K	H2313	0.4	1.6	2.5	1.6	88	72	5	127	2.1	3.170

Double-row self-aligning ball bearings *(continued)*

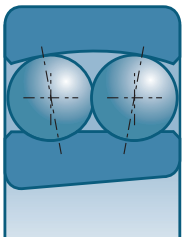




d1	16VDX20	Sleeves	d	D	B	C1	C	C_0		
mm	References	References	mm	mm	mm	mm	10^3N	10^3N	rpm*	rpm*
65	1215K	H215	75	130	25		39.00	15.50	4700	5600
	2215K	H315	75	130	31		44.50	17.90	4500	5400
	1315K	H315	75	160	37		79.00	30.00	3800	4500
	2315K	H2315	75	160	55		123.00	42.50	3500	4200
70	1216K	H216	80	140	26		40.00	16.90	4400	5200
	2216K	H316	80	140	33		49.00	20.00	4200	5100
75	1217K	H217	85	150	28		49.00	20.40	4100	4800
	1317K	H317	85	180	41		94.00	37.00	3300	4000
80	1218K	H218	90	160	30		57.00	23.50	3800	4600
	2218K	H318	90	160	40		69.00	28.50	3700	4000
	2318K	H2318	90	190	64		149.00	58.00	2900	3000
85	1219K	H219	95	170	32		64.00	27.00	3600	4300
90	1220K	H220	100	180	34		69.00	29.50	3400	4000
	2220K	H320	100	180	46		96.00	40.50	3300	4000
	1320K	H320	100	215	47	2.5	143.00	58.00	2800	3400
100	1222K	H222	110	200	38		88.00	38.50	3100	3700

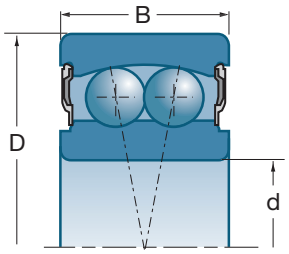
* These are the speed limits according to the SNR concept (see pages 85 to 87).

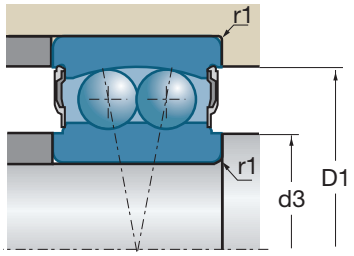
Double-row self-aligning ball bearings with tapered bore with adapter sleeve *(continued)*



	Sleeves	e	Y		Yo	d3 max	d3 min	c	D1 max	r1 max	
			Fa/Fr ≤ e	Fa/Fr > e							
References	References					mm	mm	mm	mm	mm	kg
1215K	H215	0.18	3.6	5.5	3.6	92	80	5	121	1.5	1.324
2215K	H315	0.25	2.5	3.8	2.5	93	80	12	121	1.5	1.600
1315K	H315	0.23	2.8	4.3	2.8	102	80	5	147	2.1	3.690
2315K	H2315	0.4	1.6	2.5	1.6	101	82	5	147	2.1	4.700
1216K	H216	0.18	3.6	5.5	3.6	101	85	5	129	2.0	1.630
2216K	H316	0.25	2.5	3.8	2.5	100	85	12	129	2.0	2.100
1217K	H217	0.18	3.6	5.5	3.6	105	90	6	139	2.0	2.029
1317K	H317	0.23	2.8	4.3	2.8	115	91	6	166	3.0	5.150
1218K	H218	0.18	3.6	5.5	3.6	110	95	6	149	2.0	2.500
2218K	H318	0.27	2.4	3.7	2.5	112.3	96	10	151	2.0	3.190
2318K	H2318	0.37	1.7	2.6	1.8	112	100	7	177	3.0	7.840
1219K	H219	0.18	3.6	5.5	3.6	118	100	7	157	2.1	3.200
1220K	H220	0.18	3.6	5.5	3.6	125	106	7	167	2.1	3.790
2220K	H320	0.26	2.4	3.7	2.5	120	108	8	169	2.1	4.680
1320K	H320	0.23	2.8	4.3	2.8	135	108	7	201	3.0	8.300
1222K	H222	0.18	3.6	5.5	3.6	139	116	7	187	2.1	5.320

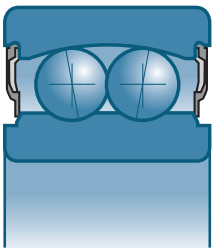
Double-row self-aligning ball bearings *(continued)*

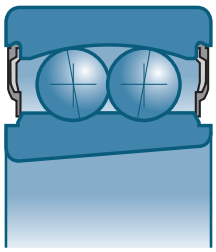


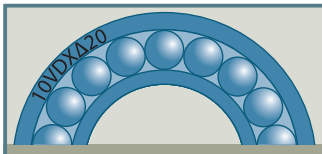
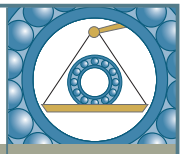


d	16VDX20	D	B	C	C_0	e	Y		Yo
							Fa / Fr ≤ e	Fa / Fr > e	
mm	References	mm	mm	10^3N	10^3N				
12	2201 EEG15	32	14	5.6	1.26	0.31	2	3.1	2
15	2202 EEG15	35	14	7.5	1.75	0.31	2	3.1	2
17	2203 EEG15 2303 EEG14	40 47	16 19	7.9 12.5	2 3.2	0.33 0.32	1.9 1.9	3 3	2 2
20	2204 EEG15 2204 KEEG15 2304 EEG15	47 52	18 21	9.9 12.4	2.7 3.4	0.28 0.29	2.2 2.2	3.5 3.3	2.3 2.3
25	2205 EEG15 2205 KEEG15 2305 EEG15	52 62	18 24	12.1 18	3.3 5	0.27 0.28	2.4 2.3	3.7 3.5	2.5 2.4
30	2206 EEG15 2206 KEEG15 2306 EEG15	62 72	20 27	15.7 21.3	4.7 6.3	0.25 0.26	2.5 2.4	3.9 3.7	2.7 2.5
35	2207 EEG15 2207 KEEG15 2307 EEG15	72 80	23 31	15.8 25	5.2 7.9	0.22 0.26	2.8 2.5	4.3 3.8	2.9 2.6
40	2208 EEG15 2208 KEEG15 2308 EEG15	80 90	23 33	19.2 29.5	6.5 9.8	0.22 0.25	2.9 2.5	4.5 3.9	3 2.6
45	2209 EEG15 2209 KEEG15 2309 EEG15	85 100	23 36	21.8 38	7.4 12.9	0.21 0.25	3 2.5	4.7 3.9	3.2 2.6
50	2210 EEG15 2210 KEEG15 2310 EEG15	90 110	23 40	22.7 41.5	8.1 14.3	0.2 0.24	3.2 2.6	4.9 4	3.3 2.7
55	2211 EEG15 2211 KEEG15	100	25	27	10	0.27	2.3	3.6	2.3
60	2212 EEG15	110	28	30	11.6	0.18	3.5	5.4	3.6

Double-row self-aligning ball bearings sealed

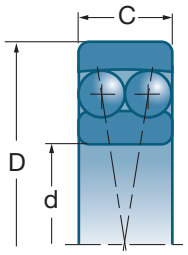


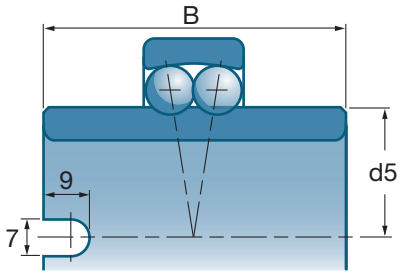


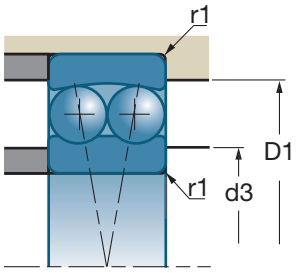
		d3 min	D1 max	r1 max	
References	rpm*	mm	mm	mm	kg
2201 EEG15	17000	15	28.0	0.6	0.060
2202 EEG15	14000	19	31.0	0.6	0.070
2203 EEG15 2303 EEG14	12000 9800	21 22	36.0 42.0	0.6 1.0	0.103 0.179
2204 EEG15 2204 KEEG15 2304 EEG15	11000 8500	25 26	42.0 45.5	1.0 1.1	0.157 0.243
2205 EEG15 2205 KEEG15 2305 EEG15	9200 7100	30 31.5	47.0 55.5	1.0 1.1	0.174 0.385
2206 EEG15 2206 KEEG15 2306 EEG15	7700 6000	35 36.5	57.0 65.5	1.0 1.1	0.282 0.540
2207 EEG15 2207 KEEG15 2307 EEG15	6600 5300	41.5 43	65.5 71.0	1.1 1.5	0.430 0.730
2208 EEG15 2208 KEEG15 2308 EEG15	5900 4800	46.5 48	73.5 82.0	1.1 1.5	0.545 0.990
2209 EEG15 2209 KEEG15 2309 EEG15	5400 4300	51.5 53	78.5 92.0	1.1 1.5	0.579 1.400
2210 EEG15 2210 KEEG15 2310 EEG15	5000 3900	56.5 59	83.5 101.0	1.1 2.0	0.630 1.780
2211 EEG15 2211 KEEG15	6000	63	91.0	1.5	0.790
2212 EEG15	3600	68	101.0	1.5	1.160

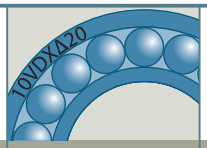
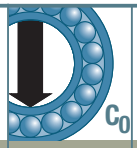
* These are the speed limits according to the SNR concept (see pages 85 to 87).

Double-row self-aligning ball bearings *(continued)*

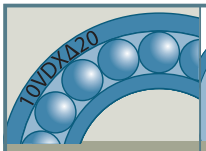
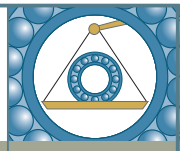






d		D	B	C	 C	 C_0	e	Y		Yo
								Fa / Fr ≤ e	Fa / Fr > e	
mm	References	mm	mm	mm	10^3N	10^3N				
20	11204 G15	47	40	14.0	9.9	2.7	0.28	2.2	3.4	2.2
25	11205 G15 11305 G15	52 62	44 48	15.0 17.0	12.1 18.0	3.3 5.0	0.28 0.28	2.2 2.2	3.4 3.4	2.2 2.2
30	11206 G15 11306 G15	62 72	48 52	16.0 19.0	15.7 21.3	4.7 6.3	0.23 0.26	2.7 2.4	4.2 3.8	2.7 2.4
35	11207 G15	72	52	17.0	15.8	5.2	0.23	2.7	4.2	2.7
40	11208 G15 11308 G15	80 90	56 58	18.0 23.0	19.2 29.5	6.5 9.8	0.21 0.26	2.9 2.4	4.5 3.8	2.9 2.4
45	11209 G15 11309	85 100	58 60	19.0 38.0	21.8 38.0	7.4 12.9	0.21 0.26	2.9 2.4	4.5 3.8	2.9 2.4
50	11210 G15 11310	90 110	58 62	20.0 43.5	22.7 42.5	8.1 14.3	0.20 0.20	3.2 2.8	4.9 4.3	3.2 2.8
55	11211 G15	100	60	21.0	27.0	10.0	0.20	3.2	4.9	3.2
60	11212 G15	110	62	22.0	30.0	11.6	0.18	3.6	5.5	3.6

Double-row self-aligning ball bearings with wide inner ring

			d5	D1 max	r1 max	
References	rpm*	rpm*	mm	mm	mm	kg
11204 G15	9400	12000	29.2	42	1	0.180
11205 G15 11305 G15	8100 6700	10000 8300	33.3 38.0	47 55	1 1	0.220 0.410
11206 G15 11306 G15	6900 5700	8600 7000	40.1 45.0	57 65	1 1	0.350 0.610
11207 G15	5900	7400	47.7	65	1	0.540
11208 G15 11308 G15	5200 4400	6500 5500	54.0 57.7	73 82	1 1	0.720 1.080
11209 G15 11309	4800 4000	6100 4900	57.7 63.9	78 92	1 1	0.770 1.380
11210 G15 11310	4500 3600	5600 4500	62.7 70.3	83 99	1 1.1	0.850 1.720
11211 G15	4000	5000	70.3	92	1.5	1.130
11212 G15	3600	4500	78.0	102	1.5	1.500

* These are the speed limits according to the SNR concept (see pages 85 to 87).