4 Self aligning ball bearings

Designs and variants

Self-aligning ball bearings have two rows of balls and a common sphered raceway in the outer ring. The bearings are insensitive to angular misalignment of the shaft relative to the housing. Self-aligning ball bearings generate less friction than any other type of rolling bearing, which enables them to run cooler even at high speeds.

SKF self-aligning ball bearings are available in several designs, including:

- basic design bearings (→ **fig. 1**)
- bearings with an extended inner ring (→ **fig. 2**)
- sealed bearings (→ **fig. 3**)

More information

Fig. 1

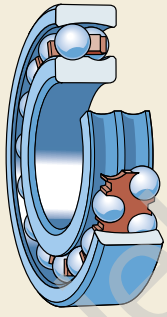


Fig. 2

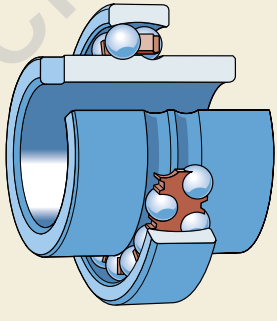
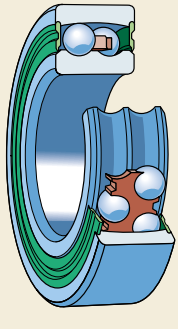


Fig. 3



Basic design bearings

Basic design self-aligning ball bearings are available with a cylindrical bore and, for certain sizes, with a 1:12 tapered bore (designation suffix K).

Large self-aligning ball bearings in the 130 and 139 series, originally developed for specific applications in the paper industry, can be used in any application where low friction is preferred over high load carrying capacity. These bearings are equipped with an annular groove and three equally spaced lubrication holes in the outer ring and six equally spaced lubrication holes in the inner ring (→ **fig. 4**).

The balls of some bearings in the 12 and 13 series protrude from the side faces of the bearing. The values of the protrusion are listed in **table 1** and should be considered when designing components in close proximity to the bearing.

Fig. 4

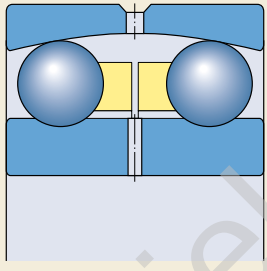
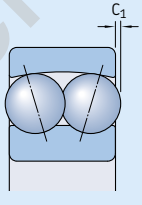


Table 1

Protrusion of balls from the bearing side faces



Bearing	Protrusion C_1
–	mm
1224 (K)	1,3
1226	1,4
1318 (K)	1,1
1319 (K)	1,5
1320 (K)	2,5
1322 (K)	2,6

Bearings with an extended inner ring

Self-aligning ball bearings with an extended inner ring are designed for less demanding applications that use commercial grade shafting. The special bore tolerance, class JS7 (→ **table 4**, **page 543**), facilitates mounting and dismounting.

Self-aligning ball bearings with an extended inner ring are located axially on the shaft by means of a slot at one end of the inner ring that engages a pin or shoulder screw (→ **fig. 5**) fitted to the shaft. The holding device also prevents the shaft from spinning in the bearing bore.

When two of these bearings are used to support a shaft, they should be positioned so that the inner ring slots either face each other, or are opposed to each other (→ **fig. 5**). If this is not the case, the shaft is located axially in one direction only.

Cages

Depending on their series and size, SKF self-aligning ball bearings are fitted with one of the cages shown in **table 2**.

The lubricants generally used for rolling bearings do not have a detrimental effect on cage properties. However, some synthetic oils and greases with a synthetic oil base and lubricants containing a high proportion of EP additives, when used at high temperatures, can have a detrimental effect on polyamide cages. For additional information about the suitability of cages, refer to *Cages* (→ **page 37**) and *Cage materials* (→ **page 152**).

Sealing solutions

Some self-aligning ball bearings in the 22 and 23 series are also available with seals (→ **fig. 6**).

Sealed bearings have a contact seal on both sides that is made of oil and wear-resistant NBR and reinforced with a sheet steel insert (designation suffix 2RS1).

Sealed bearings are lubricated for the life of the bearing and should not be washed or relubricated. The bearings are considered maintenance-free. If they are to be hot mounted, SKF does not recommend heating the bearings above 80 °C (*175 °F*).

Greases for sealed bearings

Depending on their outside diameter, sealed bearings are filled with one of the two greases listed in **table 3**. Both have good corrosion inhibiting properties.

Fig. 5

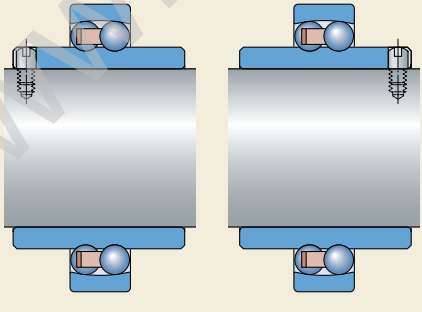


Fig. 6

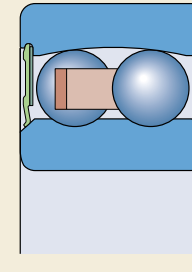
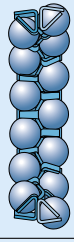
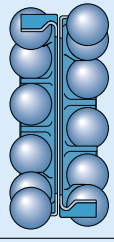
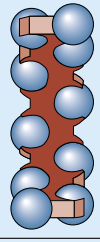
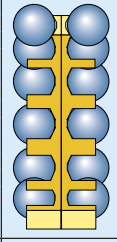


Table 2

Cages for self-aligning ball bearings

				
Cage type	One-piece, ball centred	Two-piece, ball centred	One-piece snap-type, ball centred	One- or two-piece, ball centred
Material	Stamped steel		PA66, glass fibre reinforced	Machined brass
Suffix	–	–	TN9	M – when d ≥ 150 mm

For bearings with non-standard cages, contact SKF.

Table 3

Technical specifications of SKF standard greases for sealed self-aligning ball bearings

Bearing outside diameter [mm]	**Grease**	**Temperature range**[1]	**Thickener**	**Base oil type**	**NLGI consistency class**	**Base oil viscosity** [mm²/s] at 40 °C *(105 °F)*	at 100 °C *(210 °F)*
		–50 0 50 100 150 200 250 °C					
D ≤ 62	**MT47**		Lithium soap	Mineral	2	70	7,3
D > 62	**MT33**		Lithium soap	Mineral	3	100	10
		–60 30 120 210 300 390 480 °F					

[1] Refer to the SKF traffic light concept → **page 244**

Bearing data

Dimension standards	Boundary dimensions: ISO 15 **Bearings with an extended inner ring:** DIN 630, part 2, withdrawn in 1993
Tolerances For additional information (→ **page 132**)	Normal **Bearings with an extended inner ring:** bore to tolerance class JS7 (→ **table 4**) in accordance with ISO 286-2
	Values: ISO 492, (→ **table 3**, **page 137**)
Internal clearance For additional information (→ **page 149**)	Normal, C3 Check availibility of C2 (cylindrical bore) **Bearings in the 130 and 139 series:** C3 **Bearings with an extended inner ring:** ranging from the minimum value of C2 to the maximum value of Normal
	Values: ISO 5753-1 (→ **table 5**) Values are valid for unmounted bearings under zero measuring load.
Misalignment	Guideline values for normal operating condition: (→ **table 6**). Whether these values can be fully exploited depends on the design of the bearing arrangement and the type of external seal.
Friction, starting torque, power loss	Frictional moment, starting torque and power loss can be calculated as specified under *Friction* (→ **page 97**), or using the tools available online at skf.com/bearingcalculator.
Defect frequencies	Defect frequencies can be calculated using the tools available online at skf.com/bearingcalculator.

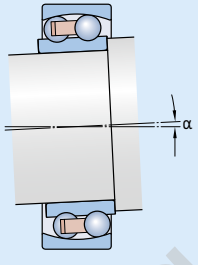
Table 4

Bore tolerance of self-aligning ball bearings with an extended inner ring

Bore diameter d		Tolerance class JS7 Deviation	
over	incl.	high	low
mm		µm	
18	30	+10,5	–10,5
30	50	+12,5	–12,5
50	80	+15	–15

Table 6

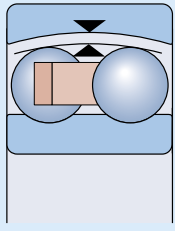
Permissible angular misalignment



Bearings/series	Misalignment α
–	°
108, 126, 127, 129, 135	3
12 (E)	2,5
13 (E)	3
22 (E)	2,5
22 E-2RS1	1,5
23 (E)	3
23 E-2RS1	1,5
112 (E)	2,5
130, 139	3

Table 5

Radial internal clearance of self-aligning ball bearings



Bore diameter d		Radial internal clearance C2		Normal		C3	
over	incl.	min.	max.	min.	max.	min.	max.
mm		µm					
Bearings with a cylindrical bore							
2,5	**6**	1	8	5	15	10	20
6	**10**	2	9	6	17	12	25
10	**14**	2	10	6	19	13	26
14	**18**	3	12	8	21	15	28
18	**24**	4	14	10	23	17	30
24	**30**	5	16	11	24	19	35
30	**40**	6	18	13	29	23	40
40	**50**	6	19	14	31	25	44
50	**65**	7	21	16	36	30	50
65	**80**	8	24	18	40	35	60
80	**100**	9	27	22	48	42	70
100	**120**	10	31	25	56	50	83
120	**140**	10	38	30	68	60	100
140	**160**	–	–	–	–	70	120
160	**180**	–	–	–	–	82	138
180	**200**	–	–	–	–	93	157
200	**225**	–	–	–	–	100	170
225	**250**	–	–	–	–	115	195
Bearings with a tapered bore							
18	**24**	–	–	13	26	20	33
24	**30**	–	–	15	28	23	39
30	**40**	–	–	19	35	29	46
40	**50**	–	–	22	39	33	52
50	**65**	–	–	27	47	41	61
65	**80**	–	–	35	57	50	75
80	**100**	–	–	42	68	62	90
100	**120**	–	–	50	81	75	108

Loads

	Self-aligning ball bearings
Minimum load For additional information (→ **page 86**)	$F_{rm} = k_r \left(\frac{\nu n}{1\,000}\right)^{2/3} \left(\frac{d_m}{100}\right)^2$ The weight of the components supported by the bearing, together with external forces, generally exceed the requisite minimum load. If this is not the case, the bearing must be subjected to an additional radial load.
Axial load carrying capacity	Bearings mounted on an adapter sleeve on smooth shafts without a fixed abutment: $F_{ap} = 0{,}003\ B\ d$ provided the bearings are correctly mounted.
Equivalent dynamic bearing load For additional information (→ **page 85**)	$F_a/F_r \leq e \rightarrow P = F_r + Y_1 F_a$ $F_a/F_r > e \rightarrow P = 0{,}65 F_r + Y_2 F_a$
Equivalent static bearing load For additional information (→ **page 88**)	$P_0 = F_r + Y_0 F_a$

Symbols

B	= bearing width [mm]
d	= bearing bore diameter [mm]
d_m	= bearing mean diameter [mm] = 0,5 (d + D)
e	= calculation factor (→ **product tables**)
F_a	= axial load [kN]
F_{ap}	= maximum permissible axial load [kN]
F_r	= radial load [kN]
F_{rm}	= minimum radial load [kN]
k_r	= minimum load factor (→ **product tables**)
n	= rotational speed [r/min]
P	= equivalent dynamic bearing load [kN]
P_0	= equivalent static bearing load [kN]
Y_0, Y_1, Y_2	= calculation factors (→ **product tables**)
ν	= actual operating viscosity of the lubricant [mm^2/s]

Temperature limits

The permissible operating temperature for self-aligning ball bearings can be limited by:

- the dimensional stability of the bearing rings and balls
- the cage
- the seals
- the lubricant

When temperatures outside the permissible range are expected, contact the SKF application engineering service.

Bearing rings and balls

SKF self-aligning ball bearings undergo a special heat treatment. The bearings are heat stabilized up to at least 120 °C *(250 °F)*.

Cages

Steel or brass cages can be used at the same operating temperatures as the bearing rings and balls. For temperature limits of polymer cages, refer to *Cage materials* (→ **page 152**).

Seals

The permissible operating temperature for NBR seals is –40 to +100 °C *(–40 to +210 °F)*. Temperatures up to 120 °C *(250 °F)* can be tolerated for brief periods.

Lubricants

Temperature limits for the greases used in sealed SKF self-aligning ball bearings are provided in **table 3** (→ **page 541**). Temperature limits for other SKF greases are provided under *Lubrication* (→ **page 239**).

When using lubricants not supplied by SKF, the temperature limits should be evaluated according to the SKF traffic light concept (→ **page 244**).

Permissible speed

The permissible speed can be estimated using the speed ratings listed in the product tables and applying the information provided under *Speeds* (→ **page 117**). If no reference speed is listed in the product tables, the limiting speed is the permissible speed.

Design of bearing arrangements

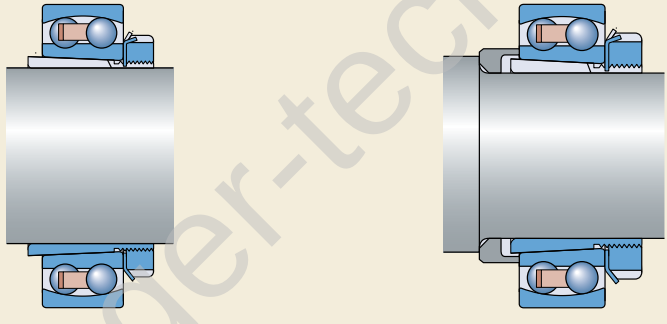
Bearings on sleeves

Self-aligning ball bearings with a tapered bore can be mounted on plain or stepped shafts with an adapter sleeve (→ **fig. 7**) or on stepped shafts with a withdrawal sleeve (→ **fig. 8**). Adapter sleeves are supplied complete with a locking device. For additional information about sleeves, refer to *Bearing accessories* (→ **page 1269**).

Adapter sleeves are more popular than withdrawal sleeves as they do not require axial locating devices on the shaft. Therefore, only adapter sleeves are listed together with the suitable bearings in this catalogue.

When using sealed self-aligning ball bearings on an adapter sleeve, the locking device must not interfere with the seal. To avoid this, use an appropriate SKF adapter sleeve assembly, as listed in the product tables (→ **page 564**). Sealed bearings use either a standard sleeve or an E design sleeve (→ **fig. 9**). Alternatively, a spacer ring can be inserted between the bearing and the lock washer.

Fig. 7



On a plain shaft

On a stepped shaft

Fig. 8

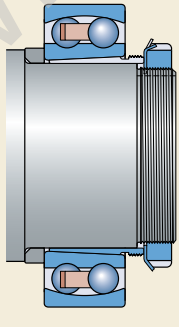
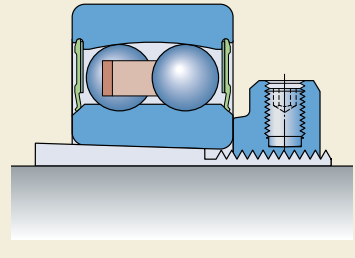


Fig. 9



On an E design sleeve

Bearing / adapter sleeve kits

To facilitate procurement and to provide the correct bearing / sleeve combination, SKF offers kits for the most popular sizes, containing the self-aligning ball bearing together with the suitable adapter sleeve assembly.

These kits are listed in **table 7**. The technical data for bearings and sleeves are listed in the relevant product tables.

Table 7

SKF self-aligning ball bearing / adapter sleeve kits

Bearing kit Designation	**Parts** Designation Bearing	Sleeve	**Shaft diameter** mm
KAM 1206	1206 EKTN9/C3	H 206	25
KAM 1207	1207 EKTN9/C3	H 207	30
KAM 1208	1208 EKTN9/C3	H 208	35
KAM 1209	1209 EKTN9/C3	H 209	40
KAM 1210	1210 EKTN9/C3	H 210	45
KAM 1211	1211 EKTN9/C3	H 211	50

Appropriate bearing housings

The combination of an SKF self-aligning ball bearing, adapter sleeve, where needed, and an appropriate SKF bearing housing provides a cost-effective, interchangeable and reliable solution that fulfils the demand for easy maintenance. Appropriate SKF housings are available in a variety of designs and sizes for a wide range of applications. The designs include:

- SNL, SE plummer (pillow) block housings in the 2, 3, 5 and 6 series
- FNL flanged housings
- SAF plummer (pillow) block housings for inch shafts

Additional information about SKF bearing housings is available online at skf.com/housings.

Mounting bearings with a tapered bore

Bearings with a tapered bore are always mounted with an interference fit. To obtain the proper degree of interference, one of the following methods can be used:

1 feeling the clearance reduction by swivelling the outer ring
2 measuring the lock nut tightening angle
3 measuring the axial drive-up
4 applying the SKF Drive-up Method

For additional information about these mounting methods, refer to *Mounting, dismounting and bearing care* (→ **page 271**), or the *SKF bearing maintenance handbook*.

The most suitable method for bearings mounted on shafts with a diameter ≥ 50 mm is the SKF Drive-up Method, which is a fast, reliable and safe method to achieve the appropriate interference fit. Additional information is available online at skf.com/drive-up.

Recommended values to apply methods 2 and 3 are listed in **table 8**.

Feeling the clearance reduction by swivelling the outer ring

When mounting self-aligning ball bearings with Normal radial clearance, it is generally sufficient to check clearance reduction during axial drive-up by turning and swivelling the outer ring (→ **fig. 10**). The clearance reduction in the bearing is sufficient when the outer ring can be turned easily, but a slight resistance is felt when it is swivelled out.

Fig. 10

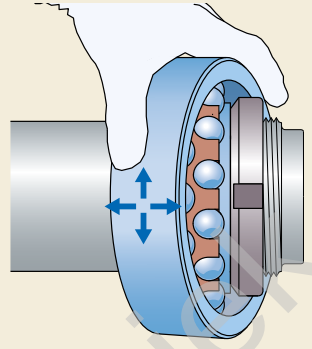
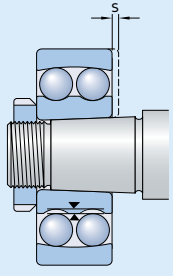
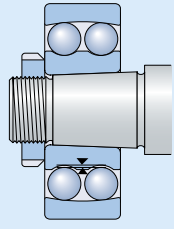
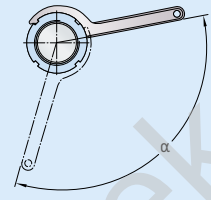


Table 8

Drive-up data for self-aligning ball bearings with a tapered bore





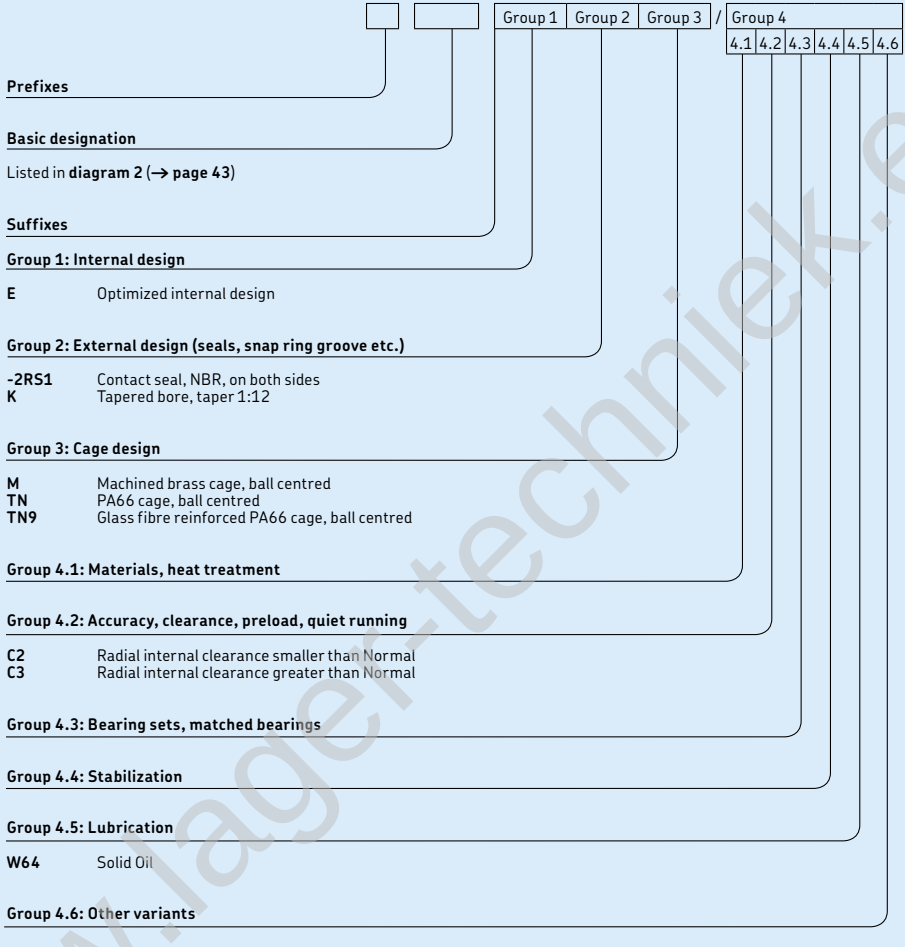


Bore diameter d	Axial drive-up s[1)]	Lock nut tightening angle α
mm	mm	°
20	0,22	80
25	0,22	55
30	0,22	55
35	0,30	70
40	0,30	70
45	0,35	80
50	0,35	80
55	0,40	75
60	0,40	75
65	0,40	80
70	0,40	80
75	0,45	85
80	0,45	85
85	0,60	110
90	0,60	110
95	0,60	110
100	0,60	110
110	0,70	125
120	0,70	125

Valid only for solid steel shafts and general applications. The listed values are to be used as guideline values only, as it is difficult to establish an exact starting position. Also, the axial drive-up s differs slightly between the different bearings series.

[1)] Not valid for the SKF Drive-up Method.

Designation system



Prefixes

Basic designation

Listed in **diagram 2** (→ **page 43**)

Suffixes

Group 1: Internal design

E	Optimized internal design

Group 2: External design (seals, snap ring groove etc.)

-2RS1	Contact seal, NBR, on both sides
K	Tapered bore, taper 1:12

Group 3: Cage design

M	Machined brass cage, ball centred
TN	PA66 cage, ball centred
TN9	Glass fibre reinforced PA66 cage, ball centred

Group 4.1: Materials, heat treatment

Group 4.2: Accuracy, clearance, preload, quiet running

C2	Radial internal clearance smaller than Normal
C3	Radial internal clearance greater than Normal

Group 4.3: Bearing sets, matched bearings

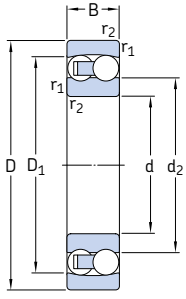
Group 4.4: Stabilization

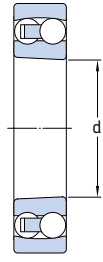
Group 4.5: Lubrication

W64	Solid Oil

Group 4.6: Other variants

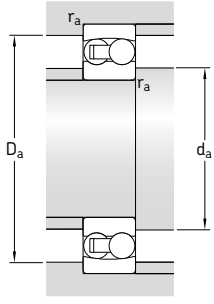
4.1 Self-aligning ball bearings
d **5 – 30** mm





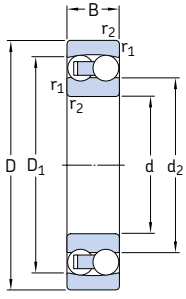
Cylindrical bore Tapered bore

Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designations Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
5	19	6	2,51	0,48	0,025	63 000	45 000	0,009	**135 TN9**	–
6	19	6	2,51	0,48	0,025	70 000	45 000	0,009	**126 TN9**	–
7	22	7	2,65	0,56	0,029	63 000	40 000	0,014	**127 TN9**	–
8	22	7	2,65	0,56	0,029	60 000	40 000	0,014	**108 TN9**	–
9	26	8	3,9	0,82	0,043	60 000	38 000	0,022	**129 TN9**	–
10	30	9	5,53	1,18	0,061	56 000	36 000	0,034	**1200 ETN9**	–
	30	14	8,06	1,73	0,09	50 000	34 000	0,047	**2200 ETN9**	–
12	32	10	6,24	1,43	0,072	50 000	32 000	0,04	**1201 ETN9**	–
	32	14	8,52	1,9	0,098	45 000	30 000	0,053	**2201 ETN9**	–
	37	12	9,36	2,16	0,12	40 000	28 000	0,067	**1301 ETN9**	–
	37	17	11,7	2,7	0,14	38 000	28 000	0,095	**2301**	–
15	35	11	7,41	1,76	0,09	45 000	28 000	0,049	**1202 ETN9**	–
	35	14	8,71	2,04	0,11	38 000	26 000	0,06	**2202 ETN9**	–
	42	13	10,8	2,6	0,14	34 000	24 000	0,094	**1302 ETN9**	–
	42	17	11,9	2,9	0,15	32 000	24 000	0,12	**2302**	–
17	40	12	8,84	2,2	0,12	38 000	24 000	0,073	**1203 ETN9**	–
	40	16	10,6	2,55	0,14	34 000	24 000	0,088	**2203 ETN9**	–
	47	14	12,7	3,4	0,18	28 000	20 000	0,12	**1303 ETN9**	–
	47	19	14,3	3,55	0,19	30 000	22 000	0,16	**2303**	–
20	47	14	12,7	3,4	0,18	32 000	20 000	0,12	**1204 ETN9**	**1204 EKTN9**
	47	18	16,8	4,15	0,22	28 000	20 000	0,14	**2204 ETN9**	–
	52	15	14,3	4	0,21	26 000	18 000	0,16	**1304 ETN9**	–
	52	21	18,2	4,75	0,24	26 000	19 000	0,22	**2304 TN9**	–
25	52	15	14,3	4	0,21	28 000	18 000	0,14	**1205 ETN9**	**1205 EKTN9**
	52	18	16,8	4,4	0,23	26 000	18 000	0,16	**2205 ETN9**	**2205 EKTN9**
	62	17	19	5,4	0,28	22 000	15 000	0,26	**1305 ETN9**	**1305 EKTN9**
	62	24	27	7,1	0,37	22 000	16 000	0,34	**2305 ETN9**	**2305 EKTN9**
30	62	16	15,6	4,65	0,24	24 000	15 000	0,22	**1206 ETN9**	**1206 EKTN9**
	62	20	23,8	6,7	0,35	22 000	15 000	0,26	**2206 ETN9**	**2206 EKTN9**
	72	19	22,5	6,8	0,36	19 000	13 000	0,39	**1306 ETN9**	**1306 EKTN9**
	72	27	31,2	8,8	0,45	18 000	13 000	0,5	**2306**	**2306 K**

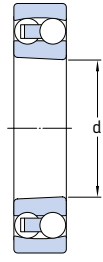


Dimensions				Abutment and fillet dimensions			Calculation factors				
d	d_2 ~	D_1 ~	$r_{1,2}$ min.	d_a min.	D_a max.	r_a max.	k_r	e	Y_1	Y_2	Y_0
mm				mm			–				
5	10,3	15,4	0,3	7,4	16,6	0,3	0,045	0,33	1,9	3	2
6	10,3	15,4	0,3	8,4	16,6	0,3	0,04	0,33	1,9	3	2
7	12,6	17,6	0,3	9,4	19,6	0,3	0,04	0,33	1,9	3	2
8	12,6	17,6	0,3	10,4	19,6	0,3	0,03	0,33	1,9	3	2
9	14,8	21,1	0,3	11,4	23,6	0,3	0,04	0,33	1,9	3	2
10	16,7	24,4	0,6	14,2	25,8	0,6	0,04	0,33	1,9	3	2
	15,3	24,3	0,6	14,2	25,8	0,6	0,045	0,54	1,15	1,8	1,3
12	18,2	26,4	0,6	16,2	27,8	0,6	0,04	0,33	1,9	3	2
	17,5	26,5	0,6	16,2	27,8	0,6	0,045	0,5	1,25	2	1,3
	20	30,8	1	17,6	31,4	1	0,04	0,35	1,8	2,8	1,8
	18,6	31	1	17,6	31,4	1	0,05	0,6	1,05	1,6	1,1
15	21,2	29,6	0,6	19,2	30,8	0,6	0,04	0,33	1,9	3	2
	20,9	30,2	0,6	19,2	30,8	0,6	0,045	0,43	1,5	2,3	1,6
	23,9	35,3	1	20,6	36,4	1	0,04	0,31	2	3,1	2,2
	23,2	35,2	1	20,6	36,4	1	0,05	0,52	1,2	1,9	1,3
17	24	33,6	0,6	21,2	35,8	0,6	0,04	0,31	2	3,1	2,2
	23,8	34,1	0,6	21,2	35,8	0,6	0,045	0,43	1,5	2,3	1,6
	28,9	41	1	22,6	41,4	1	0,04	0,3	2,1	3,3	2,2
	25,8	39,4	1	22,6	41,4	1	0,05	0,52	1,2	1,9	1,3
20	28,9	41	1	25,6	41,4	1	0,04	0,3	2,1	3,3	2,2
	27,4	41	1	25,6	41,4	1	0,045	0,4	1,6	2,4	1,6
	33,3	45,6	1,1	27	45	1	0,04	0,28	2,2	3,5	2,5
	28,8	43,7	1,1	27	45	1,1	0,05	0,52	1,2	1,9	1,3
25	33,3	45,6	1	30,6	46,4	1	0,04	0,28	2,2	3,5	2,5
	32,3	46,1	1	30,6	46,4	1	0,045	0,35	1,8	2,8	1,8
	37,8	52,5	1,1	32	55	1,1	0,04	0,28	2,2	3,5	2,5
	35,5	53,5	1,1	32	55	1,1	0,05	0,44	1,4	2,2	1,4
30	40,1	53	1	35,6	56,4	1	0,04	0,25	2,5	3,9	2,5
	38,8	55	1	35,6	56,4	1	0,045	0,33	1,9	3	2
	44,9	60,9	1,1	37	65	1,1	0,04	0,25	2,5	3,9	2,5
	41,7	60,9	1,1	37	65	1,1	0,05	0,44	1,4	2,2	1,4

4.1 Self-aligning ball bearings
d **35 – 70** mm

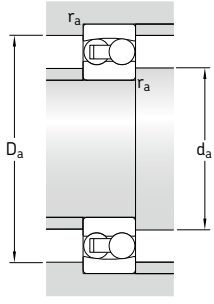


Cylindrical bore

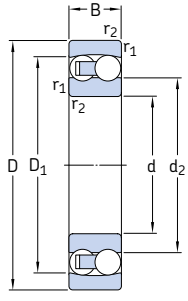


Tapered bore

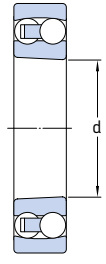
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designations Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
35	72	17	19	6	0,31	20 000	13 000	0,32	**1207 ETN9**	**1207 EKTN9**
	72	23	30,2	8,8	0,455	18 000	12 000	0,4	**2207 ETN9**	**2207 EKTN9**
	80	21	26,5	8,5	0,43	16 000	11 000	0,51	**1307 ETN9**	**1307 EKTN9**
	80	31	39,7	11,2	0,59	16 000	12 000	0,68	**2307 ETN9**	**2307 EKTN9**
40	80	18	19,9	6,95	0,36	18 000	11 000	0,42	**1208 ETN9**	**1208 EKTN9**
	80	23	31,9	10	0,51	16 000	11 000	0,51	**2208 ETN9**	**2208 EKTN9**
	90	23	33,8	11,2	0,57	14 000	9 500	0,68	**1308 ETN9**	**1308 EKTN9**
	90	33	54	16	0,82	14 000	10 000	0,93	**2308 ETN9**	**2308 EKTN9**
45	85	19	22,9	7,8	0,4	17 000	11 000	0,47	**1209 ETN9**	**1209 EKTN9**
	85	23	32,5	10,6	0,54	15 000	10 000	0,55	**2209 ETN9**	**2209 EKTN9**
	100	25	39	13,4	0,7	12 000	8 500	0,96	**1309 ETN9**	**1309 EKTN9**
	100	36	63,7	19,3	1	13 000	9 000	1,25	**2309 ETN9**	**2309 EKTN9**
50	90	20	26,5	9,15	0,48	16 000	10 000	0,53	**1210 ETN9**	**1210 EKTN9**
	90	23	33,8	11,2	0,57	14 000	9 500	0,6	**2210 ETN9**	**2210 EKTN9**
	110	27	43,6	14	0,72	12 000	8 000	1,2	**1310 ETN9**	**1310 EKTN9**
	110	40	63,7	20	1,04	14 000	9 500	1,65	**2310**	**2310 K**
55	100	21	27,6	10,6	0,54	14 000	9 000	0,71	**1211 ETN9**	**1211 EKTN9**
	100	25	39	13,4	0,7	12 000	8 500	0,81	**2211 ETN9**	**2211 EKTN9**
	120	29	50,7	18	0,92	11 000	7 500	1,6	**1311 ETN9**	**1311 EKTN9**
	120	43	76,1	24	1,25	11 000	7 500	2,1	**2311**	**2311 K**
60	110	22	31,2	12,2	0,62	12 000	8 500	0,9	**1212 ETN9**	**1212 EKTN9**
	110	28	48,8	17	0,88	11 000	8 000	1,1	**2212 ETN9**	**2212 EKTN9**
	130	31	58,5	22	1,12	9 000	6 300	1,95	**1312 ETN9**	**1312 EKTN9**
	130	46	87,1	28,5	1,46	9 500	7 000	2,6	**2312**	**2312 K**
65	120	23	35,1	14	0,72	11 000	7 000	1,15	**1213 ETN9**	**1213 EKTN9**
	120	31	57,2	20	1,02	10 000	7 000	1,45	**2213 ETN9**	**2213 EKTN9**
	140	33	65	25,5	1,25	8 500	6 000	2,45	**1313 ETN9**	**1313 EKTN9**
	140	48	95,6	32,5	1,66	9 000	6 300	3,25	**2313**	**2313 K**
70	125	24	35,8	14,6	0,75	11 000	7 000	1,25	**1214 ETN9**	–
	125	31	44,2	17	0,88	10 000	6 700	1,5	**2214**	–
	150	35	74,1	27,5	1,34	8 500	6 000	3	**1314**	–
	150	51	111	37,5	1,86	8 000	6 000	3,9	**2314**	–



Dimensions				Abutment and fillet dimensions			Calculation factors				
d	d_2 ~	D_1 ~	$r_{1,2}$ min.	d_a min.	D_a max.	r_a max.	k_r	e	Y_1	Y_2	Y_0
mm				mm			–				
35	47	62,3	1,1	42	65	1,1	0,04	0,23	2,7	4,2	2,8
	45,3	64,2	1,1	42	65	1,1	0,045	0,31	2	3,1	2,2
	51,5	69,5	1,5	44	71	1,5	0,04	0,25	2,5	3,9	2,5
	46,5	68,4	1,5	44	71	1,5	0,05	0,46	1,35	2,1	1,4
40	53,6	68,8	1,1	47	73	1,1	0,04	0,22	2,9	4,5	2,8
	52,4	71,6	1,1	47	73	1,1	0,045	0,28	2,2	3,5	2,5
	61,5	81,5	1,5	49	81	1,1	0,04	0,23	2,7	4,2	2,8
	53,7	79,2	1,5	49	81	1,5	0,05	0,4	1,6	2,4	1,6
45	57,5	73,7	1,1	52	78	1,1	0,04	0,21	3	4,6	3,2
	55,3	74,6	1,1	52	78	1,1	0,045	0,26	2,4	3,7	2,5
	67,7	89,5	1,5	54	91	1,5	0,04	0,23	2,7	4,2	2,8
	60,1	87,4	1,5	54	91	1,5	0,05	0,33	1,9	3	2
50	61,7	79,5	1,1	57	83	1,1	0,04	0,21	3	4,6	3,2
	61,5	81,5	1,1	57	83	1,1	0,045	0,23	2,7	4,2	2,8
	70,3	95	2	61	99	2	0,04	0,24	2,6	4,1	2,8
	65,8	94,4	2	61	99	2	0,05	0,43	1,5	2,3	1,6
55	70,1	88,4	1,5	64	91	1,5	0,04	0,19	3,3	5,1	3,6
	67,7	89,5	1,5	64	91	1,5	0,045	0,23	2,7	4,2	2,8
	77,7	104	2	66	109	2	0,04	0,23	2,7	4,2	2,8
	72	103	2	66	109	2	0,05	0,4	1,6	2,4	1,6
60	78	97,6	1,5	69	101	1,5	0,04	0,19	3,3	5,1	3,6
	74,5	98,6	1,5	69	101	1,5	0,045	0,24	2,6	4,1	2,8
	91,6	118	2,1	72	118	2	0,04	0,22	2,9	4,5	2,8
	76,9	112	2,1	72	118	2	0,05	0,33	1,9	3	2
65	85,3	106	1,5	74	111	1,5	0,04	0,18	3,5	5,4	3,6
	80,7	107	1,5	74	111	1,5	0,045	0,24	2,6	4,1	2,8
	99	127	2,1	77	128	2	0,04	0,22	2,9	4,5	2,8
	85,5	122	2,1	77	128	2	0,05	0,37	1,7	2,6	1,8
70	87,4	109	1,5	79	116	1,5	0,04	0,18	3,5	5,4	3,6
	87,5	111	1,5	79	116	1,5	0,04	0,27	2,3	3,6	2,5
	97,7	129	2,1	82	138	2	0,045	0,22	2,9	4,5	2,8
	91,6	130	2,1	82	138	2	0,05	0,37	1,7	2,6	1,8

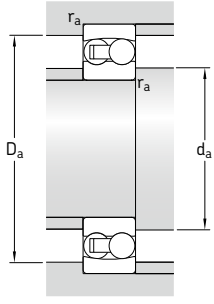


Cylindrical bore



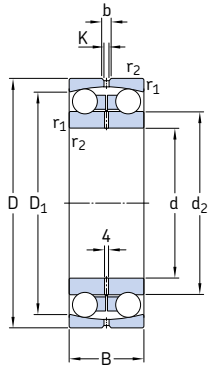
Tapered bore

Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designations Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
75	130	25	39	15,6	0,8	10 000	6 700	1,35	**1215**	**1215 K**
	130	31	58,5	22	1,12	9 000	6 300	1,6	**2215 ETN9**	**2215 EKTN9**
	160	37	79,3	30	1,43	8 000	5 600	3,55	**1315**	**1315 K**
	160	55	124	43	2,04	7 500	5 600	4,7	**2315**	**2315 K**
80	140	26	39,7	17	0,83	9 500	6 000	1,65	**1216**	**1216 K**
	140	33	65	25,5	1,25	8 500	6 000	2	**2216 ETN9**	**2216 EKTN9**
	170	39	88,4	33,5	1,5	7 500	5 300	4,2	**1316**	**1316 K**
	170	58	135	49	2,24	7 000	5 300	6,1	**2316**	**2316 K**
85	150	28	48,8	20,8	0,98	9 000	5 600	2,05	**1217**	**1217 K**
	150	36	58,5	23,6	1,12	8 000	5 600	2,5	**2217**	**2217 K**
	180	41	97,5	38	1,7	7 000	4 800	5	**1317**	**1317 K**
	180	60	140	51	2,28	6 700	4 800	7,05	**2317**	**2317 K**
90	160	30	57,2	23,6	1,08	8 500	5 300	2,5	**1218**	**1218 K**
	160	40	70,2	28,5	1,32	7 500	5 300	3,4	**2218**	**2218 K**
	190	43	117	44	1,93	6 700	4 500	5,8	**1318**	**1318 K**
	190	64	151	57	2,5	6 300	4 500	8,45	**2318**	**2318 K**
95	170	32	63,7	27	1,2	8 000	5 000	3,1	**1219**	**1219 K**
	170	43	83,2	34,5	1,53	7 000	5 000	4,1	**2219**	**2219 K**
	200	45	133	51	2,16	6 300	4 300	6,7	**1319**	**1319 K**
	200	67	165	64	2,75	6 000	4 500	9,8	**2319 M**	**2319 KM**
100	180	34	68,9	30	1,29	7 500	4 800	3,7	**1220**	**1220 K**
	180	46	97,5	40,5	1,76	6 700	4 800	5	**2220**	**2220 K**
	215	47	143	57	2,36	6 000	4 000	8,3	**1320**	**1320 K**
	215	73	190	80	3,25	5 600	4 000	12,5	**2320**	**2320 K**
110	200	38	88,4	39	1,6	6 700	4 300	5,15	**1222**	**1222 K**
	200	53	124	52	2,12	6 000	4 300	7,1	**2222**	**2222 K**
	240	50	163	72	2,75	5 300	3 600	12	**1322 M**	**1322 KM**
120	215	42	119	53	2,12	6 300	4 000	6,75	**1224 M**	**1224 KM**
130	230	46	127	58,5	2,24	5 600	3 600	8,3	**1226 M**	**1226 KM**

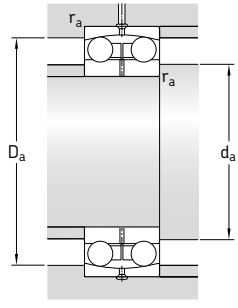


Dimensions				Abutment and fillet dimensions			Calculation factors				
d	d_2 ~	D_1 ~	$r_{1,2}$ min.	d_a min.	D_a max.	r_a max.	k_r	e	Y_1	Y_2	Y_0
mm				mm			–				
75	93	116	1,5	84	121	1,5	0,04	0,17	3,7	5,7	4
	91,6	118	1,5	84	121	1,5	0,045	0,22	2,9	4,5	2,8
	104	138	2,1	87	148	2	0,045	0,22	2,9	4,5	2,8
	97,8	139	2,1	87	148	2	0,05	0,37	1,7	2,6	1,8
80	101	125	2	91	129	2	0,04	0,16	3,9	6,1	4
	99	127	2	91	129	2	0,045	0,22	2,9	4,5	2,8
	109	147	2,1	92	158	2	0,045	0,22	2,9	4,5	2,8
	104	148	2,1	92	158	2	0,05	0,37	1,7	2,6	1,8
85	107	134	2	96	139	2	0,04	0,17	3,7	5,7	4
	105	133	2	96	139	2	0,04	0,25	2,5	3,9	2,5
	117	155	3	99	166	3	0,045	0,22	2,9	4,5	2,8
	115	157	3	99	166	3	0,05	0,37	1,7	2,6	1,8
90	112	142	2	101	149	2	0,04	0,17	3,7	5,7	4
	112	142	2	101	149	2	0,04	0,27	2,3	3,6	2,5
	122	165	3	104	176	3	0,045	0,22	2,9	4,5	2,8
	121	164	3	104	176	3	0,05	0,37	1,7	2,6	1,8
95	120	151	2,1	107	158	2	0,04	0,17	3,7	5,7	4
	118	151	2,1	107	158	2	0,04	0,27	2,3	3,6	2,5
	127	174	3	109	186	3	0,045	0,23	2,7	4,2	2,8
	128	172	3	109	186	3	0,05	0,37	1,7	2,6	1,8
100	127	159	2,1	112	168	2	0,04	0,17	3,7	5,7	4
	124	160	2,1	112	168	2	0,04	0,27	2,3	3,6	2,5
	136	185	3	114	201	3	0,045	0,23	2,7	4,2	2,8
	135	186	3	114	201	3	0,05	0,37	1,7	2,6	1,8
110	140	176	2,1	122	188	2	0,04	0,17	3,7	5,7	4
	137	177	2,1	122	188	2	0,04	0,28	2,2	3,5	2,5
	154	206	3	124	226	3	0,045	0,22	2,9	4,5	2,8
120	149	190	2,1	132	203	2	0,04	0,19	3,3	5,1	3,6
130	163	204	3	144	216	3	0,04	0,19	3,3	5,1	3,6

4.1 Self-aligning ball bearings
d **150 – 240** mm

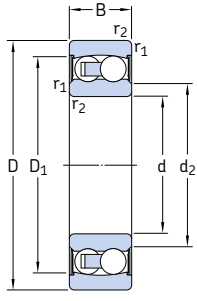


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
150	225	56	57,2	23,6	0,88	5 600	3 400	7,5	**13030**
180	280	74	95,6	40	1,34	4 500	2 800	16	**13036**
200	280	60	60,5	29	0,97	4 300	2 600	10,7	**13940**
220	300	60	60,5	30,5	0,97	3 800	2 400	11	**13944**
240	320	60	60,5	32	0,98	3 800	2 200	11,3	**13948**

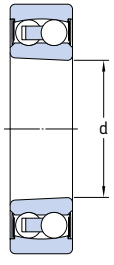


Dimensions						Abutment and fillet dimensions			Calculation factors				
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min.	d_a min.	D_a max.	r_a max.	k_r	e	Y_1	Y_2	Y_0
mm						mm			–				
150	175	203	8,3	4,5	2,1	161	214	2	0,02	0,24	2,6	4,1	2,8
180	212	249	13,9	7,5	2,1	191	269	2	0,02	0,25	2,5	3,9	2,5
200	229	258	8,3	4,5	2,1	211	269	2	0,015	0,19	3,3	5,1	3,6
220	249	278	8,3	4,5	2,1	231	289	2	0,015	0,18	3,5	5,4	3,6
240	269	298	8,3	4,5	2,1	251	309	2	0,015	0,16	3,9	6,1	4

4.2 Sealed self-aligning ball bearings
d **10 – 70** mm

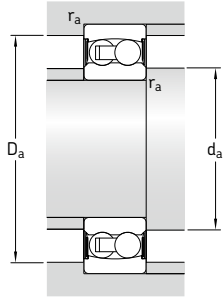


Cylindrical bore



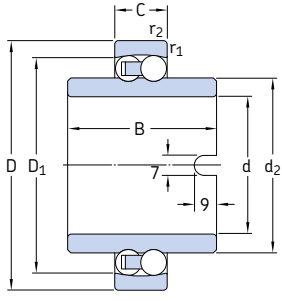
Tapered bore

Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Limiting speed	Mass	Designations Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min	kg	–	
10	30	14	5,53	1,18	0,06	17 000	0,048	**2200 E-2RS1TN9**	**–**
12	32	14	6,24	1,43	0,08	16 000	0,053	**2201 E-2RS1TN9**	**–**
15	35	14	7,41	1,76	0,09	14 000	0,058	**2202 E-2RS1TN9**	**–**
	42	17	10,8	2,6	0,14	12 000	0,11	**2302 E-2RS1TN9**	**–**
17	40	16	8,84	2,2	0,12	12 000	0,089	**2203 E-2RS1TN9**	**–**
	47	19	12,7	3,4	0,18	11 000	0,16	**2303 E-2RS1TN9**	**–**
20	47	18	12,7	3,4	0,18	10 000	0,14	**2204 E-2RS1TN9**	**–**
	52	21	14,3	4	0,21	9 000	0,21	**2304 E-2RS1TN9**	**–**
25	52	18	14,3	4	0,21	9 000	0,16	**2205 E-2RS1TN9**	**2205 E-2RS1KTN9**
	62	24	19	5,4	0,28	7 500	0,34	**2305 E-2RS1TN9**	**2305 E-2RS1KTN9**
30	62	20	15,6	4,65	0,24	7 500	0,26	**2206 E-2RS1TN9**	**2206 E-2RS1KTN9**
	72	27	22,5	6,8	0,36	6 700	0,51	**2306 E-2RS1TN9**	**2306 E-2RS1KTN9**
35	72	23	19	6	0,31	6 300	0,41	**2207 E-2RS1TN9**	**2207 E-2RS1KTN9**
	80	31	26,5	8,5	0,43	5 600	0,7	**2307 E-2RS1TN9**	**2307 E-2RS1KTN9**
40	80	23	19,9	6,95	0,36	5 600	0,5	**2208 E-2RS1TN9**	**2208 E-2RS1KTN9**
	90	33	33,8	11,2	0,57	5 000	0,96	**2308 E-2RS1TN9**	**2308 E-2RS1KTN9**
45	85	23	22,9	7,8	0,4	5 300	0,53	**2209 E-2RS1TN9**	**2209 E-2RS1KTN9**
	100	36	39	13,4	0,7	4 500	1,3	**2309 E-2RS1TN9**	**2309 E-2RS1KTN9**
50	90	23	22,9	8,15	0,42	4 800	0,57	**2210 E-2RS1TN9**	**2210 E-2RS1KTN9**
	110	40	43,6	14	0,72	4 000	1,65	**2310 E-2RS1TN9**	**2310 E-2RS1KTN9**
55	100	25	27,6	10,6	0,54	4 300	0,79	**2211 E-2RS1TN9**	**2211 E-2RS1KTN9**
60	110	28	31,2	12,2	0,62	3 800	1,05	**2212 E-2RS1TN9**	**2212 E-2RS1KTN9**
65	120	31	35,1	14	0,72	3 600	1,4	**2213 E-2RS1TN9**	**2213 E-2RS1KTN9**
70	125	31	35,8	14,6	0,75	3 400	1,45	**2214 E-2RS1TN9**	**–**

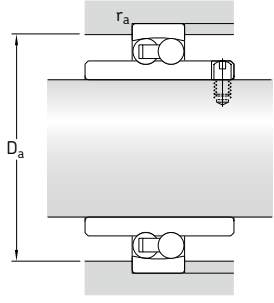


Dimensions				Abutment and fillet dimensions				Calculation factors				
d	d_2 ~	D_1 ~	$r_{1,2}$ min.	d_a min.	d_a max.	D_a max.	r_a max.	k_r	e	Y_1	Y_2	Y_0
mm				mm				–				
10	14	24,8	0,6	14	14	25,8	0,6	0,045	0,33	1,9	3	2
12	15,5	27,4	0,6	15,5	15,5	27,8	0,6	0,045	0,33	1,9	3	2
15	19,1	30,4	0,6	19	19	30,8	0,6	0,045	0,33	1,9	3	2
	20,3	36,3	1	20	20	36,4	1	0,05	0,31	2	3,1	2,2
17	21,1	35	0,6	21	21	35,8	0,6	0,045	0,31	2	3,1	2,2
	25,5	41,3	1	22	25,5	41,4	1	0,05	0,3	2,1	3,3	2,2
20	25,9	41,3	1	25	25,5	41,4	1	0,045	0,3	2,1	3,3	2,2
	28,6	46,3	1,1	26,5	28,5	45	1,1	0,05	0,28	2,2	3,5	2,5
25	31	46,3	1	30,6	31	46,4	1	0,045	0,28	2,2	3,5	2,5
	32,8	52,7	1,1	32	32,5	55	1,1	0,05	0,28	2,2	3,5	2,5
30	36,7	54,1	1	35,6	36,5	56,4	1	0,045	0,25	2,5	3,9	2,5
	40,4	61,9	1,1	37	40	65	1,1	0,05	0,25	2,5	3,9	2,5
35	42,7	62,7	1,1	42	42,5	65	1,1	0,045	0,23	2,7	4,2	2,8
	43,7	69,2	1,5	43,5	43,5	71	1,5	0,05	0,25	2,5	3,9	2,5
40	49	69,8	1,1	47	49	73	1,1	0,045	0,22	2,9	4,5	2,8
	55,4	81,8	1,5	49	55	81	1,5	0,05	0,23	2,7	4,2	2,8
45	53,1	75,3	1,1	52	53	78	1,1	0,045	0,21	3	4,6	3,2
	60,9	90	1,5	54	60,5	91	1,5	0,05	0,23	2,7	4,2	2,8
50	58,1	79,5	1,1	57	58	83	1,1	0,045	0,2	3,2	4,9	3,2
	62,9	95,2	2	61	62,5	99	2	0,05	0,24	2,6	4,1	2,8
55	65,9	88,5	1,5	64	65,5	91	1,5	0,045	0,19	3,3	5,1	3,6
60	73,2	97	1,5	69	73	101	1,5	0,045	0,19	3,3	5,1	3,6
65	79,3	106	1,5	74	79	111	1,5	0,045	0,18	3,5	5,4	3,6
70	81,4	109	1,5	79	81	116	1,5	0,045	0,18	3,5	5,4	3,6

4.3 Self-aligning ball bearings with an extended inner ring
d **20 – 60** mm

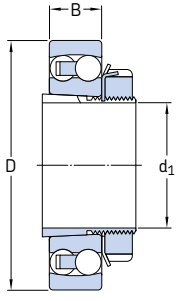


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Limiting speed	Mass	Designation
d	D	C	C	C_0	P_u			
mm			kN		kN	r/min	kg	–
20	47	14	12,7	3,4	0,18	9 000	0,18	**11204 ETN9**
25	52	15	14,3	4	0,21	8 000	0,22	**11205 ETN9**
30	62	16	15,6	4,65	0,24	6 700	0,35	**11206 TN9**
35	72	17	19	6	0,305	5 600	0,54	**11207 TN9**
40	80	18	19	6,55	0,335	5 000	0,72	**11208 TN9**
45	85	19	22,9	7,8	0,4	4 500	0,77	**11209 TN9**
50	90	20	26,5	9,15	0,475	4 300	0,85	**11210 TN9**
60	110	22	31,2	12,2	0,62	3 400	1,15	**11212 TN9**

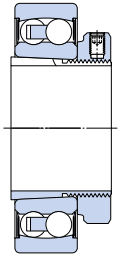


Dimensions					Abutment and fillet dimensions		Calculation factors				
d	d_2 ~	D_1 ~	B	$r_{1,2}$ min.	D_a max.	r_a max.	k_r	e	Y_1	Y_2	Y_0
mm					mm		–				
20	28,9	41	40	1	41,4	1	0,04	0,3	2,1	3,3	2,2
25	33,3	45,6	44	1	46,4	1	0,04	0,28	2,2	3,5	2,5
30	40,1	53,2	48	1	56,4	1	0,04	0,25	2,5	3,9	2,5
35	47,7	60,7	52	1,1	65	1,1	0,04	0,23	2,7	4,2	2,8
40	54	68,8	56	1,1	73	1,1	0,04	0,22	2,9	4,5	2,8
45	57,7	73,7	58	1,1	78	1,1	0,04	0,21	3	4,6	3,2
50	62,7	78,7	58	1,1	83	1,1	0,04	0,21	3	4,6	3,2
60	78	97,5	62	1,5	101	1,5	0,04	0,19	3,3	5,1	3,6

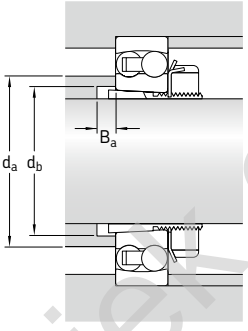
4.4 Self-aligning ball bearings on an adapter sleeve
d_1 **17 – 115** mm



Open bearing on a standard sleeve



Sealed bearing on an E design sleeve



Principal dimensions			Abutment dimensions			Mass	Designations	
						Bearing incl. sleeve	Bearing[1]	Adapter sleeve[2]
d_1	D	B	d_a max.	d_b min.	B_a min.			
mm			mm			kg	–	
17	47	14	28,5	23	5	0,16	**1204 EKTN9**	**H 204**
20	52	15	33	28	5	0,21	**1205 EKTN9**	**H 205**
	52	18	31	28	5	0,23	**2205 E-2RS1KTN9**	**H 305 E**
	52	18	32	28	5	0,23	**2205 EKTN9**	**H 305**
	62	17	37	28	6	0,33	**1305 EKTN9**	**H 305**
	62	24	32,5	29	5	0,42	**2305 E-2RS1KTN9**	**H 2305**
	62	24	35,5	29	5	0,42	**2305 EKTN9**	**H 2305**
25	62	16	40	33	5	0,32	**1206 EKTN9**[3]	**H 206**
	62	20	36,5	33	5	0,36	**2206 E-2RS1KTN9**	**H 306 E**
	62	20	38	33	5	0,36	**2206 EKTN9**	**H 306**
	72	19	44	33	6	0,49	**1306 EKTN9**	**H 306**
	72	27	40	35	5	0,62	**2306 E-2RS1KTN9**	**H 2306**
	72	27	41	35	5	0,61	**2306 K**	**H 2306**
30	72	17	47	38	5	0,44	**1207 EKTN9**[3]	**H 207**
	72	23	42,5	39	5	0,55	**2207 E-2RS1KTN9**	**H 307 E**
	72	23	45	39	5	0,54	**2207 EKTN9**	**H 307**
	80	21	51	39	7	0,65	**1307 EKTN9**	**H 307**
	80	31	43,5	40	5	0,86	**2307 E-2RS1KTN9**	**H 2307 E**
	80	31	46	40	5	0,84	**2307 EKTN9**	**H 2307**
35	80	18	53	43	6	0,58	**1208 EKTN9**[3]	**H 208**
	80	23	49	44	6	0,67	**2208 E-2RS1KTN9**	**H 308 E**
	80	23	52	44	6	0,58	**2208 EKTN9**	**H 308**
	90	23	61	44	6	0,85	**1308 EKTN9**	**H 308**
	90	33	55	45	6	1,2	**2308 E-2RS1KTN9**	**H 2308**
	90	33	53	45	6	1,1	**2308 EKTN9**	**H 2308**
40	85	19	57	48	6	0,68	**1209 EKTN9**[3]	**H 209**
	85	23	53	50	8	0,76	**2209 E-2RS1KTN9**	**H 309 E**
	85	23	55	50	8	0,78	**2209 EKTN9**	**H 309**
	100	25	67	50	6	1,2	**1309 EKTN9**	**H 309**
	100	36	60,5	50	6	1,55	**2309 E-2RS1KTN9**	**H 2309**
	100	36	60	50	6	1,4	**2309 EKTN9**	**H 2309**

[1] For additional bearing data → **product tables, page 552** (open bearings) and **page 560** (sealed bearings)
[2] For additional adapter sleeve data → **product tables, page 1290**
[3] Bearings and sleeves also available as KAM self-aligning ball bearing kits (→ **page 547**)

Principal dimensions			Abutment dimensions			Mass	Designations	
						Bearing incl. sleeve	Bearing[1]	Adapter sleeve[2]
d_1	D	B	d_a max.	d_b min.	B_a min.			
mm			mm			kg	–	
45	90	20	62	53	6	0,77	**1210 EKTN9**[3]	**H 210**
	90	23	58	55	10	0,84	**2210 E-2RS1KTN9**	**H 310 E**
	90	23	61	55	10	0,87	**2210 EKTN9**	**H 310**
	110	27	70	55	6	1,45	**1310 EKTN9**	**H 310**
	110	40	62,5	56	6	2	**2310 E-2RS1KTN9**	**H 2310**
	110	40	65	56	6	1,9	**2310 K**	**H 2310**
50	100	21	70	60	7	0,99	**1211 EKTN9**[3]	H 211
	100	25	65,5	60	11	1,1	**2211 E-2RS1KTN9**	**H 311 E**
	100	25	67	60	11	1,15	**2211 EKTN9**	**H 311**
	120	29	77	60	7	1,9	**1311 EKTN9**	**H 311**
	120	43	72	61	7	2,4	**2311 K**	**H 2311**
55	110	22	78	64	7	1,2	**1212 EKTN9**	**H 212**
	110	28	73	65	9	1,4	**2212 E-2RS1KTN9**	**H 312 E**
	110	28	74	65	9	1,45	**2212 EKTN9**	**H 312**
	130	31	87	65	7	2,15	**1312 EKTN9**	**H 312**
	130	46	76	66	7	2,95	**2312 K**	**H 2312**
60	120	23	85	70	7	1,45	**1213 EKTN9**	**H 213**
	120	31	79	70	7	1,75	**2213 E-2RS1KTN9**	**H 313 E**
	120	31	80	70	9	1,8	**2213 EKTN9**	**H 313**
	140	33	98	70	7	2,85	**1313 EKTN9**	**H 313**
	140	48	85	72	7	3,6	**2313 K**	**H 2313**
65	130	25	93	80	7	2	**1215 K**	**H 215**
	130	31	93	80	13	2,3	**2215 EKTN9**	**H 315**
	160	37	104	80	7	4,2	**1315 K**	**H 315**
	160	55	97	82	7	5,55	**2315 K**	**H 2315**
70	140	26	101	85	7	2,4	**1216 K**	**H 216**
	140	33	99	85	13	2,85	**2216 EKTN9**	**H 316**
	170	39	109	85	7	5	**1316 K**	**H 316**
	170	58	104	88	7	7,1	**2316 K**	**H 2316**
75	150	28	107	90	8	2,95	**1217 K**	**H 217**
	150	36	105	91	13	3,3	**2217 K**	**H 317**
	180	41	117	91	8	6	**1317 K**	**H 317**
	180	60	111	94	8	8,15	**2317 K**	**H 2317**
80	160	30	112	95	8	3,5	**1218 K**	**H 218**
	160	40	112	96	11	5,5	**2218 K**	**H 318**
	190	43	122	96	8	6,9	**1318 K**	**H 318**
	190	64	115	100	8	9,8	**2318 K**	**H 2318**
85	170	32	120	100	8	4,25	**1219 K**	**H 219**
	170	43	118	102	10	5,3	**2219 K**	**H 319**
	200	45	127	102	8	7,9	**1319 K**	**H 319**
	200	67	128	105	8	11,5	**2319 KM**	**H 2319**
90	180	34	127	106	8	5	**1220 K**	**H 220**
	180	46	124	108	9	6,4	**2220 K**	**H 320**
	215	47	136	108	8	9,65	**1320 K**	**H 320**
	215	73	130	110	8	14	**2320 K**	**H 2320**
100	200	38	140	116	8	6,8	**1222 K**	**H 222**
	200	53	137	118	8	8,85	**2222 K**	**H 322**
	240	50	154	118	10	13,5	**1322 KM**	**H 322**
110	215	42	150	127	12	8,3	**1224 KM**	**H 3024**
115	230	46	163	137	15	11	**1226 KM**	**H 3026**

[1] For additional bearing data → **product tables, page 552** (open bearings) and **page 560** (sealed bearings)
[2] For additional adapter sleeve data → **product tables, page 1290**
[3] Bearings and sleeves also available as KAM self-aligning ball bearing kits (→ **page 547**)