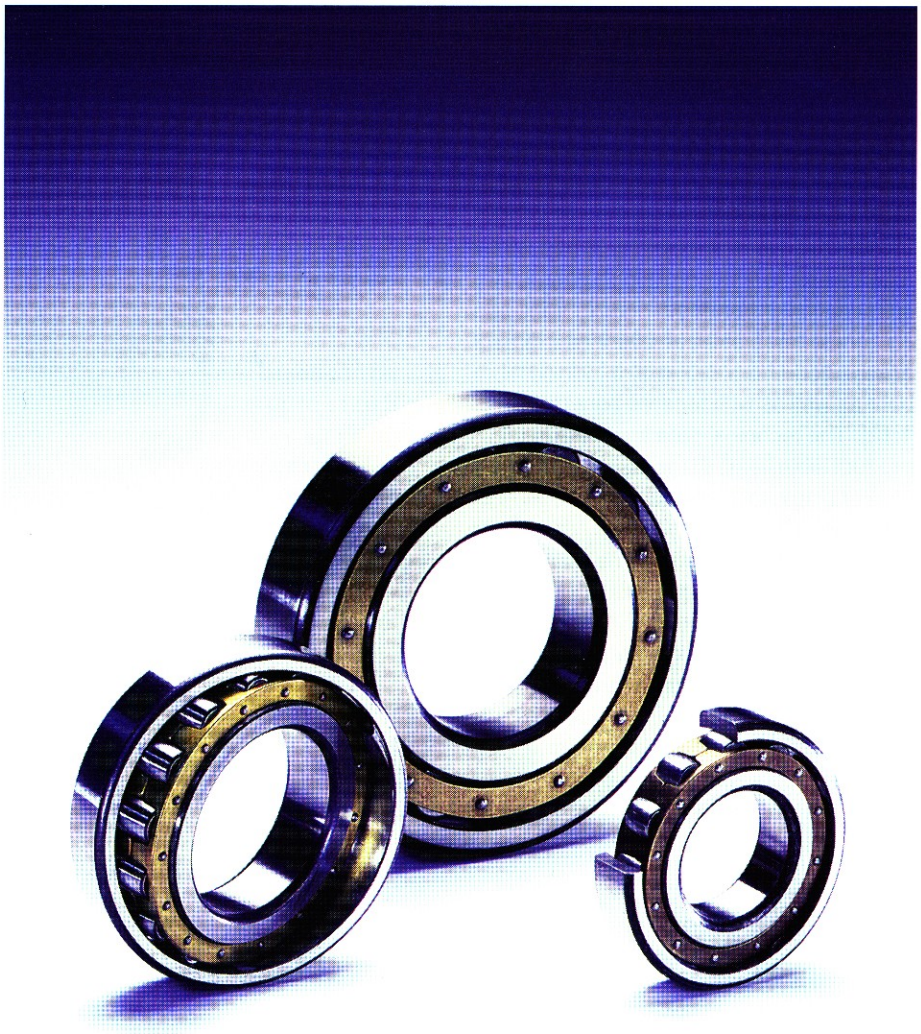
SKF

Product information

Single row spherical roller bearings



Single row spherical roller bearings

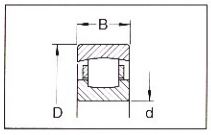
Single row spherical roller bearings are self-aligning roller bearings of robust design. The symmetrical barrel-shaped rollers are guided between two integral flanges on the inner ring and the sphered outer ring provides the self-aligning property. They are therefore particularly suitable for applications where misalignment can arise from errors in mounting or from shaft deflection.

Single row spherical roller bearings can carry heavy radial loads and also withstand considerable shock loads. However, their ability to withstand axial loads is relatively low. This is the main reason why SKF favours the use of double row spherical roller bearings instead of single row spherical roller bearings.

Single row spherical roller bearings are available from SKF with a cylindrical bore as well as with tapered bore (taper 1:12). The technical data are listed in the product table.

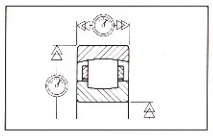
For single row spherical roller bearings with tapered bore, SKF supplies appropriate adapter sleeves with which the bearings can be secured simply and rapidly to smooth or stepped shafts. The adapter sleeves are supplied complete with nut and locking device; additional information can be found in the "SKF General Catalogue".

Dimensions



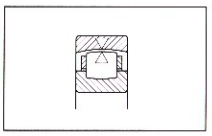
The boundary dimensions of SKF single row spherical roller bearings conform to ISO 15:1998.

Tolerances



Single row spherical roller bearings are produced as standard with normal tolerances which comply with ISO 492:1994.

Radial internal clearance



Single row spherical roller bearings are available with Normal radial internal clearance as standard. Bearings with a tapered bore are supplied as standard with C3 radial internal clearance. Bearings having clearances which are greater or less than standard manufacture are available on request.

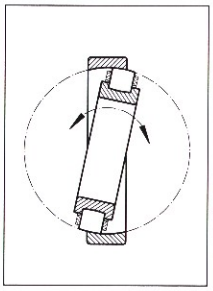
The clearance values are given in **Table 1**. They are valid for unmounted bearings without measuring load.

Radial internal clearance of single row spherical roller bearings

Table 1

Bore diameter d		Radial internal clearance			
		Normal		C3	
over	incl.	min	max	min	max
mm		µm			
Bearings with cylindrical bore					
	30	9	17	17	28
30	**40**	10	20	20	30
40	**50**	13	23	23	35
50	**65**	15	27	27	40
65	**80**	20	35	35	55
80	**100**	25	45	45	65
100	**120**	30	50	50	70
120	**140**	35	55	55	80
140	**160**	40	65	65	95
Bearings with tapered bore					
	30	17	28	28	40
30	**40**	20	30	30	45
40	**50**	23	35	35	50
50	**65**	27	40	40	55
65	**80**	35	55	55	75
80	**100**	45	65	65	90
100	**120**	50	70	70	95
120	**140**	55	80	80	110
140	**160**	65	95	95	125

Misalignment



Single row spherical roller bearings have a design such that they are inherently self-aligning, i.e. misalignment between the outer and the inner ring can be accommodated without any effect on the bearing. Under normal loads ($P \leq 0{,}12\ C$) and operating conditions, and when the inner ring rotates, the maximum permissible misalignment for all bearings is 4°. Whether this value can be fully exploited or not depends on the design of the bearing arrangement, the type of seals used etc.

Cages

Depending on bearing series and size, single row spherical roller bearings are fitted with one of the following cages:

- polyamide 6,6 cage (suffix TN9)
- pressed steel cage (no suffix)
- machined two-piece brass cage (suffix MB)

NB.

Bearings with polyamide cages can be operated at temperatures up to +120 °C. The lubricants normally used for rolling bearings will not have any detrimental effects on cage properties with the exception of a few synthetic oils and greases with a synthetic oil base as well as some lubricants containing a high proportion of EP additives when used at elevated temperatures.

Minimum load

In order to guarantee the satisfactory performance of single row spherical roller bearings, they must always be subjected to a given minimum load, especially if they are to operate at high speeds or are subjected to high accelerations or rapid changes in the direction of load. Under such conditions, the inertia forces of the rollers and cage, and the friction in the lubricant can have a detrimental effect on the rolling conditions in the bearing and may cause damaging sliding movements to occur between the rollers and raceways.

The requisite minimum load can be estimated from

$$F_{rm} = 0{,}02\ C$$

where

F_{rm} = minimum radial load, N
C = basic dynamic load rating, N

When starting up at low temperatures or when the lubricant is highly viscous even heavier loads may be required. The weights of the components supported by the bearing, together with the external forces often exceed the requisite minimum load. If this is not the case, the bearing must be subjected to an additional radial load.

Equivalent bearing load

Equivalent dynamic bearing load:

$$P = F_r + 9{,}5\ F_a$$

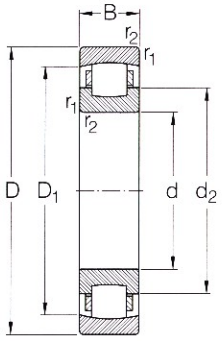
Equivalent static bearing load:

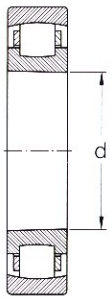
$$P_0 = F_r + 5\ F_a$$

where

P = equivalent dynamic bearing load, N
P_0 = equivalent static bearing load, N
F_r = actual radial bearing load, N
F_a = actual axial bearing load, N

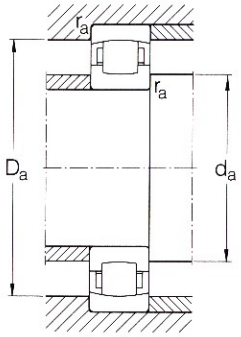
Single row spherical roller bearings
d **20 – 80** mm





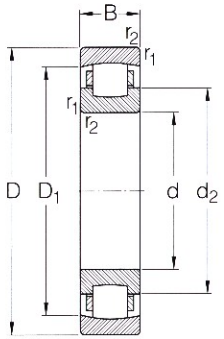
Design K

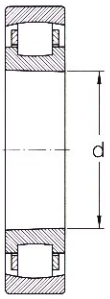
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Lubrication grease	oil	Mass	Designation
d	D	B	C	C_0	P_u				
mm			N		N	r/min		kg	–
20	47	14	21 900	18 300	2 120	6 300	7 500	0,11	**20204 TN9**
	52	15	29 300	23 600	2 700	6 000	7 000	0,15	**20304 TN9**
25	52	15	23 500	20 800	2 450	5 600	6 700	0,16	**20205 TN9**
	62	17	39 700	33 500	3 750	4 800	5 600	0,27	**20305**
	62	17	39 700	33 500	3 750	4 800	5 600	0,27	**20305 MB**
30	62	16	29 900	27 500	3 200	4 800	5 600	0,21	**20206 TN9**
	72	19	52 300	47 500	5 400	4 300	5 000	0,37	**20306 TN9**
35	72	17	43 700	41 500	4 900	4 000	4 800	0,30	**20207 TN9**
	72	17	43 700	41 500	4 900	4 000	4 800	0,30	**20207 KTN9/C3**
	80	21	63 300	60 000	6 800	3 600	4 300	0,50	**20307 TN9**
40	80	18	53 500	51 000	6 000	3 600	4 300	0,38	**20208 TN9**
	90	23	84 500	78 000	8 800	3 200	3 800	0,67	**20308 TN9**
45	85	19	56 400	56 000	6 550	3 200	3 800	0,48	**20209 TN9**
	85	19	56 400	56 000	6 550	3 200	3 800	0,47	**20209 KTN9/C3**
	100	25	95 500	91 500	10 400	2 800	3 400	0,90	**20309 TN9**
50	90	20	59 800	67 000	7 800	3 000	3 600	0,49	**20210 TN9**
	90	20	59 800	67 000	7 800	3 000	3 600	0,48	**20210 KTN9/C3**
	110	27	111 000	116 000	12 900	2 600	3 200	1,15	**20310 TN9**
55	100	21	81 700	81 500	9 650	2 600	3 200	0,64	**20211 TN9**
	100	21	81 700	81 500	9 650	2 600	3 200	0,63	**20211 KTN9/C3**
	120	29	136 000	134 000	15 300	2 200	2 800	1,50	**20311 TN9**
60	110	22	93 700	96 500	11 400	2 400	3 000	0,82	**20212 TN9**
	130	31	164 000	166 000	19 000	2 000	2 600	1,90	**20312 TN9**
65	120	23	104 000	112 000	13 200	2 200	2 800	1,10	**20213 TN9**
	120	23	104 000	112 000	13 200	2 200	2 800	1,08	**20213 KTN9/C3**
	140	33	191 000	190 000	21 200	1 900	2 400	2,60	**20313 MB**
70	125	24	117 000	129 000	15 300	2 000	2 600	1,15	**20214 TN9**
	150	35	207 000	208 000	23 200	1 800	2 200	3,10	**20314 MB**
75	130	25	122 000	140 000	16 300	1 900	2 400	1,25	**20215 TN9**
	160	37	244 000	250 000	27 000	1 800	2 200	3,70	**20315 MB**
80	140	26	138 000	160 000	18 000	1 800	2 200	1,55	**20216 TN9**
	170	39	271 000	280 000	30 000	1 700	2 000	4,55	**20316 MB**



Dimensions				Abutment and fillet dimensions		
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
20	30,6	39	1	26	41	1
	32,2	43,5	1,1	27	45	1
25	36,1	44	1	31	46	1
	39,5	51,9	1,1	32	55	1
	39,5	51,9	1,1	32	55	1
30	43	52,7	1	36	56	1
	46,5	60,7	1,1	37	65	1
35	49,1	62,4	1,1	42	65	1
35	49,1	62,4	1,1	42	65	1
	52	67,4	1,5	44	71	1,5
40	55,3	69,8	1,1	47	73	1
	58,8	76,9	1,5	49	81	1,5
45	60,9	74,7	1,1	52	78	1
	60,9	74,7	1,1	52	78	1
	67	85,2	1,5	54	91	1,5
50	65,3	79,6	1,1	57	83	1
	65,3	79,6	1,1	57	83	1
	72,3	94,5	2	61	99	2
55	72,3	89,2	1,5	64	91	1,5
	72,3	89,2	1,5	64	91	1,5
	80,1	102	2	66	109	2
60	79	96,8	1,5	69	101	1,5
	86,5	111	2,1	72	118	2
65	86,5	106	1,5	74	111	1,5
	86,5	106	1,5	74	111	1,5
	93,5	106	2,1	77	128	2
70	90,3	111	1,5	79	116	1,5
	101	129	2,1	82	138	2
75	95,8	116	1,5	84	121	1,5
	107	139	2,1	87	148	2
80	103	125	2	91	129	2
	113	148	2,1	92	158	2

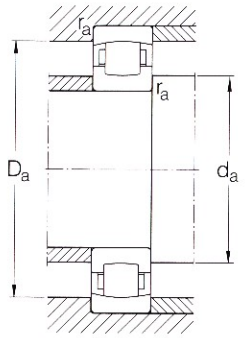
Single row spherical roller bearings
d **85 – 150** mm





Design K

Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Lubrication grease	oil	Mass	Designation
d	D	B	C	C_0	P_u				
mm			N		N	r/min		kg	–
85	150	28	173 000	196 000	21 600	1 800	2 200	2,20	**20217 MB**
	150	28	173 000	196 000	21 600	1 800	2 200	2,15	**20217 KMB/C3**
	180	41	305 000	315 000	33 500	1 600	1 900	5,25	**20317 MB**
90	160	30	191 000	216 000	23 600	1 700	2 000	2,70	**20218 MB**
	160	30	191 000	216 000	23 600	1 700	2 000	2,70	**20218 KMB/C3**
	190	43	316 000	360 000	36 500	1 500	1 800	6,10	**20318 MB**
95	170	32	230 000	255 000	27 500	1 600	1 900	3,20	**20219 MB**
100	180	34	253 000	280 000	30 000	1 500	1 800	3,90	**20220 MB**
	180	34	253 000	280 000	30 000	1 500	1 800	3,85	**20220 KMB/C3**
110	200	38	322 000	360 000	37 500	1 300	1 600	5,55	**20222 MB**
120	215	40	345 000	405 000	40 500	1 200	1 500	6,50	**20224 MB**
130	230	40	368 000	440 000	43 000	1 100	1 400	7,30	**20226 MB**
140	250	42	437 000	520 000	51 000	950	1 200	9,00	**20228 MB**
150	270	45	477 000	600 000	57 000	950	1 200	11,5	**20230 MB**



Dimensions				Abutment and fillet dimensions		
d	d_1 ≈	D_1 ≈	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
85	110	134	2	96	139	2
	110	134	2	96	139	2
	120	157	3	99	166	2,5
90	116	144	2	101	149	2
	116	144	2	101	149	2
	126	165	3	114	176	2,5
95	123	153	2,1	107	158	2
100	129	161	2,1	112	168	2
	129	161	2,1	112	168	2
110	143	179	2,1	122	188	2
120	156	191	2,1	132	203	2
130	167	206	3	144	216	2,5
140	180	224	3	154	236	2,5
150	196	239	3	164	256	2,5

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