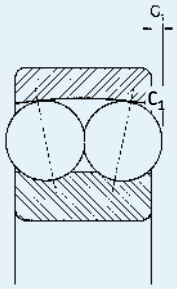
Introduction

Special feature

Self-aligning ball bearings of series 12 (K) and 13 (K) have balls which protrude somewhat from the bearing; the actual values are given in the adjacent table. This should be remembered when designing adjacent components.

Protrusion of balls from bearing side faces



Bearing	Protrusion C1	
	mm	in
1224(K)	1.3	0.0512
1226	1.4	0.0551
1318(K)	1.1	0.0433
1319(K)	1.5	0.0591
1320(K)	2.5	0.0984
1322(K)	2.6	0.1024

Clearance

Radial internal clearance

SKF self-aligning ball bearings are produced with Normal radial internal clearance (CN or C0, not marked on bearing) as standard. Radial clearance selection is based on factors such as high speed, operating temperature, shaft fits and axial movement limitations. Bearings with a tapered bore are normally supplied with a C3 radial internal clearance (marked on the bearing). Bearings having clearances that are greater than (C3 or C4) or less than (C2) Normal are available on request.

The clearance values are given in **Table 1**. They are valid for unmounted bearings without measuring load, and conform to ISO 5753-1991.

Loads

Equivalent dynamic bearing loads

$P = F_r + Y_1 F_a$ where $F_a / F_r \leq e$
$P = 0.65\ F_r + Y_2\ F_a$ when $F_a / F_r > e$

Values of factors e, Y_1 and Y_2 for each individual bearing are given in the bearing **Table 2**, page 96.

Minimum load

In order to provide satisfactory operation of all ball and roller bearings they must always be subjected to a given minimum load. This is also true of self-aligning ball bearings, particularly if they run at high speeds where the inertia forces of the balls and cage, and the friction in the lubricant can have a detrimental influence on the rolling conditions in the bearing and may cause damaging sliding movements to occur between the balls and the raceways.

The requisite minimum radial load to be applied in such cases can be determined by using the Interactive Engineering catalog on the SKF website www.skf.com or by contacting SKF Applications Engineering. However, the weight of the components supported by the bearing, together with the external forces, often exceeds the requisite minimum load. If this is not the case, an additional radial load must be applied to the bearing; for example, by increasing belt tension or similar means.

Mounting bearings with tapered bore

Bearings with a tapered bore are always mounted with an interference fit on the shaft, adapter sleeve or withdrawal sleeve. As a measure of the degree of interference of the fit, either the reduction in radial internal clearance of the bearing or the axial displacement of the inner ring on the tapered bearing seating can be used.

The mounting of self-aligning ball bearings with tapered bore calls for experience and skill as they have a relatively small internal clearance, and a reliable measurement of the clearance reduction is not always possible. There are specific mounting instructions for these bearings in the SKF Bearing Installation and Maintenance Guide (140-710) or by visiting the SKF website www.skf.com/mount for exact mounting instructions.

Frequency vibration data

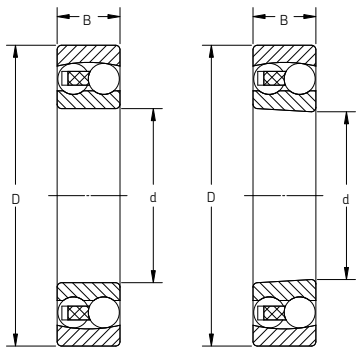
Frequency vibration data is available on the SKF website **skfusa.com.** Select Engineering Tools under the Support menu. Or contact SKF Applications Engineering.

Table 1

Radial internal clearance of self-aligning ball bearings

Bore diameter d		Radial internal clearance															
		C2				Normal				C3				C4			
over	incl.	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
mm		µm		in		µm		in		µm		in		µm		in	
Bearings with cylindrical bore																	
2.5	**6**	1	8	0.0000	0.0003	5	15	0.0002	0.0006	10	20	0.0004	0.0008	15	25	0.0006	0.0010
6	**10**	2	9	0.0001	0.0004	6	17	0.0002	0.0007	12	25	0.0005	0.0010	19	33	0.0007	0.0013
10	**14**	2	10	0.0001	0.0004	6	19	0.0002	0.0007	13	26	0.0005	0.0010	21	35	0.0008	0.0014
14	**18**	3	12	0.0001	0.0005	8	21	0.0003	0.0008	15	28	0.0006	0.0011	23	37	0.0009	0.0015
18	**24**	4	14	0.0002	0.0006	10	23	0.0004	0.0009	17	30	0.0007	0.0012	25	39	0.0010	0.0015
24	**30**	5	16	0.0002	0.0006	11	24	0.0004	0.0009	19	35	0.0007	0.0014	29	46	0.0011	0.0018
30	**40**	6	18	0.0002	0.0007	13	29	0.0005	0.0011	23	40	0.0009	0.0016	34	53	0.0013	0.0021
40	**50**	6	19	0.0002	0.0007	14	31	0.0006	0.0012	25	44	0.0010	0.0017	37	57	0.0015	0.0022
50	**65**	7	21	0.0003	0.0008	16	36	0.0006	0.0014	30	50	0.0012	0.0020	45	69	0.0018	0.0027
65	**80**	8	24	0.0003	0.0009	18	40	0.0007	0.0016	35	60	0.0014	0.0024	54	83	0.0021	0.0033
80	**100**	9	27	0.0004	0.0011	22	48	0.0009	0.0019	42	70	0.0017	0.0028	64	96	0.0025	0.0038
100	**120**	10	31	0.0004	0.0012	25	56	0.0010	0.0022	50	83	0.0020	0.0033	75	114	0.0030	0.0045
120	**140**	10	38	0.0004	0.0015	30	68	0.0012	0.0027	60	100	0.0024	0.0039	90	135	0.0035	0.0053
Bearings with tapered bore																	
18	**24**	7	17	0.0003	0.0007	13	26	0.0005	0.0010	20	33	0.0008	0.0013	28	42	0.0011	0.0017
24	**30**	9	20	0.0004	0.0008	15	28	0.0006	0.0011	23	39	0.0009	0.0015	33	50	0.0013	0.0020
30	**40**	12	24	0.0005	0.0009	19	35	0.0007	0.0014	29	46	0.0011	0.0018	40	59	0.0016	0.0023
40	**50**	14	27	0.0006	0.0011	22	39	0.0009	0.0015	33	52	0.0013	0.0020	45	65	0.0018	0.0026
50	**65**	18	32	0.0007	0.0013	27	47	0.0011	0.0019	41	61	0.0016	0.0024	56	80	0.0022	0.0031
65	**80**	23	39	0.0009	0.0015	35	57	0.0014	0.0022	50	75	0.0020	0.0030	69	98	0.0027	0.0039
80	**100**	29	47	0.0011	0.0019	42	68	0.0017	0.0027	62	90	0.0024	0.0035	84	116	0.0033	0.0046
100	**120**	35	56	0.0014	0.0022	50	81	0.0020	0.0032	75	108	0.0030	0.0043	100	139	0.0039	0.0055

Double row
Open, cylindrical and tapered bore
Series: 135 – 1322 M
Size: 5 mm – 110 mm
0.1969 in – 4.3307 in



Cylindrical bore Tapered bore

Designation	Principal dimensions						Basic load ratings				Speed rating		Mass		Designation		Mass	
	Bore d		Outside diameter D		Width B		Dynamic C		Static C_0		Reference speed	Limiting speed			Tapered bore	Adapter sleeve		
	mm	in	mm	in	mm	in	N	lbf	N	lbf	r/min	r/min	kg	lb			kg	lb
135	5	0.1969	19	0.7480	6	0.2362	2 510	560	480	110	63 000	45 000	0.01	0.02	–	–	–	–
1301 E	12	0.4724	37	1.4567	12	0.4724	9 360	2 100	2 160	490	40 000	28 000	0.07	0.15	–	–	–	–
1302 E	15	0.5906	42	1.6535	13	0.5118	10 800	2 430	2 600	580	34 000	24 000	0.09	0.21	–	–	–	–
1303 E	17	0.6693	47	1.8504	14	0.5512	12 700	2 850	3 400	760	28 000	20 000	0.12	0.26	–	–	–	–
1304 E	20	0.7874	52	2.0472	15	0.5906	14 300	3 210	4 000	900	26 000	18 000	0.16	0.35	–	–	–	–
1305 E	25	0.9843	62	2.4409	17	0.6693	19 000	4 270	5 400	1 210	22 000	15 000	0.26	0.57	1305 EK	H 305	0.1	0.2
1306 E	30	1.1811	72	2.8346	19	0.7480	22 500	5 060	6 800	1 530	19 000	13 000	0.39	0.86	1306 EK	H 306	0.1	0.2
1307 E	35	1.3780	80	3.1496	21	0.8268	26 500	5 960	8 500	1 910	16 000	11 000	0.51	1.12	1307 EK	H 307	0.1	0.3
1308 E	40	1.5748	90	3.5433	23	0.9055	33 800	7 600	11 200	2 520	14 000	9 500	0.68	1.50	1308 EK	H 308	0.2	0.4
1309 E	45	1.7717	100	3.9370	25	0.9843	39 000	8 760	13 400	3 010	12 000	8 500	0.96	2.12	1309 EK	H 309	0.2	0.5
1310 E	50	1.9685	110	4.3307	27	1.0630	43 600	9 800	14 000	3 150	12 000	8 000	1.20	2.65	1310 EK	H 310	0.3	0.6
1311 E	55	2.1654	120	4.7244	29	1.1417	50 700	11 390	18 000	4 040	11 000	7 500	1.60	3.53	1311 EK	H 311	0.3	0.7
1312 E	60	2.3622	130	5.1181	31	1.2205	58 500	13 150	22 000	4 940	9 000	6 300	1.95	4.30	1312 EK	H 312	0.4	0.8
1313 E	65	2.5591	140	5.5118	33	1.2992	65 000	14 610	25 500	5 730	8 500	6 000	2.45	5.40	1313 EK	H 313	0.4	0.9
1314	70	2.7559	150	5.9055	35	1.3780	74 100	16 650	27 500	6 180	8 500	6 000	3.00	6.62	–	–	–	–
1315	75	2.9528	160	6.2992	37	1.4567	79 300	17 820	30 000	6 740	8 000	5 600	3.55	7.83	1315 K	H 315	0.8	1.8
1316	80	3.1496	170	6.6929	39	1.5354	88 400	19 870	33 500	7 530	7 500	5 300	4.20	9.26	1316 K	H 316	1.0	2.2
1317	85	3.3465	180	7.0866	41	1.6142	97 500	21 910	38 000	8 540	7 000	4 800	5.00	11.03	1317 K	H 317	1.1	2.5
1318	90	3.5433	190	7.4803	43	1.6929	117 000	26 290	44 000	9 890	6 700	4 500	5.80	12.79	1318 K	H 318	1.3	3.0
1319	95	3.7402	200	7.8740	45	1.7717	133 000	29 890	51 000	11 460	6 300	4 300	6.70	14.77	1319 K	H 319	1.4	3.1
1320	100	3.9370	215	8.4646	47	1.8504	143 000	32 130	57 000	12 810	6 000	4 000	8.30	18.30	1320 K	H 320	1.7	3.7
1322 M	110	4.3307	240	9.4488	50	1.9685	163 000	36 630	72 000	16 180	5 300	3 600	12.00	26.46	1322 KM	H 322	2.2	4.8

Consult SKF USA Inc. prior to design change or order placement.