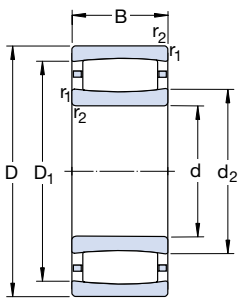


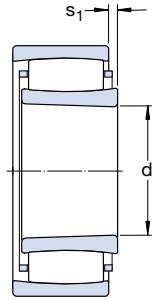
Dimensions						Abutment and fillet dimensions						Calculation factors	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1 [1] ~	s_2 [1] ~	d_a min	d_a max	D_a min	D_a max	C_a [2] min	r_a max	k_1	k_2
mm						mm						–	
140	163	194	2	11	–	149	161	195	201	4,7	2	0,102	0,116
	161	193	2	11,4	5,9	149	–	–	201	–	2	0,115	0,097
	167	203	2,1	12	5,2	151	–	–	214	–	2	0,111	0,097
	173	223	3	13,7	–	154	190	210	236	2,3	2,5	0,109	0,108
150	173	204	2,1	2,8	–	161	172	200	214	1,3	2	–	0,108
	173	204	2,1	17,4	10,6	161	–	–	214	–	2	0,107	0,106
	182	226	2,1	13,9	–	162	195	215	238	2,3	2	0,12	0,092
	179	222	2,1	20	10,1	162	–	–	228	–	2	0,103	0,103
	177	236	3	11,2	–	164	200	215	256	2,5	2,5	0,119	0,096
160	187	218	2,1	15	–	171	186	220	229	5,1	2	0,115	0,106
	181	217	2,1	18,1	–	171	190	210	229	2,2	2	0,109	0,103
	181	217	2,1	18,1	8,2	171	–	–	229	–	2	0,109	0,103
	191	240	2,1	19	–	172	190	242	258	7,5	2	0,099	0,111
	190	241	2,1	21	11,1	172	–	–	258	–	2	0,101	0,105
	194	256	3	19,3	–	174	215	245	276	2,6	2,5	0,112	0,096
170	200	237	2,1	12,5	–	181	200	238	249	5,8	2	0,105	0,112
	195	235	2,1	17,1	7,2	181	–	–	249	–	2	0,108	0,103
	200	249	2,1	21	–	182	200	250	268	7,6	2	0,101	0,109
	200	251	2,1	21	11,1	182	–	–	268	–	2	0,101	0,106
	209	274	4	16,4	–	187	230	255	293	3	3	0,114	0,1
180	209	251	2,1	15,1	–	191	220	240	269	2	2	0,112	0,105
	203	247	2,1	20,1	10,2	191	–	–	269	–	2	0,107	0,103
	210	266	3	23,2	–	194	230	255	286	2,2	2,5	0,102	0,111
	211	265	3	20	10,1	194	–	–	286	–	2,5	0,095	0,11
	228	289	4	27,3	–	197	245	275	303	3,2	3	0,107	0,104
190	225	266	2,1	16,1	–	201	235	255	279	1,9	2	0,113	0,107
	220	263	2,1	20	10,1	201	–	–	279	–	2	0,103	0,106
	228	289	3	19	–	204	227	290	306	9,1	2,5	0,096	0,113
	222	284	3	20	10,1	204	–	–	306	–	2,5	0,094	0,111
	224	296	4	22,5	–	207	250	275	323	1,6	3	0,108	0,108

[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

CARB toroidal roller bearings
d **200 – 380** mm



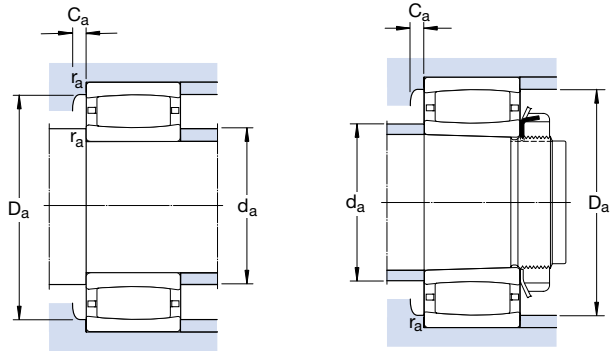
Cylindrical bore



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	–	
200	310	82	1 120	1 730	153	1 700	2 400	22,0	∗ **C 3040**	∗ **C 3040 K**[2]
	310	109	1 630	2 650	232	–	260	30.5	∗ **C 4040 V**[1]	∗ **C 4040 K30V**[1]
	340	112	1 560	2 320	200	1 500	2 000	40,0	∗ **C 3140**	∗ **C 3140 K**[2]
	340	140	2 360	3 650	315	–	80	54,0	∗ **C 4140 V**[1]	∗ **C 4140 K30V**[1]
220	340	90	1 320	2 040	176	1 600	2 200	29,0	∗ **C 3044**	∗ **C 3044 K**[2]
	340	118	1 930	3 250	275	–	200	40,0	∗ **C 4044 V**[1]	∗ **C 4044 K30V**[1]
	370	120	1 900	2 900	245	1 400	1 900	51,0	∗ **C 3144**	∗ **C 3144 K**[2]
	400	108	2 000	2 500	208	1 500	2 000	56,5	∗ **C 2244**	∗ **C 2244 K**[2]
240	360	92	1 340	2 160	183	1 400	2 000	31,5	∗ **C 3048**	∗ **C 3048 K**[2]
	400	128	2 320	3 450	285	1 300	1 700	63,0	∗ **C 3148**	∗ **C 3148 K**[2]
260	400	104	1 760	2 850	232	1 300	1 800	46,0	∗ **C 3052**	∗ **C 3052 K**[2]
	440	144	2 650	4 050	325	1 100	1 500	87,0	∗ **C 3152**	∗ **C 3152 K**[2]
280	420	106	1 860	3 100	250	1 200	1 600	50,0	∗ **C 3056**	∗ **C 3056 K**[2]
	460	146	2 850	4 500	355	1 100	1 400	93,0	∗ **C 3156**	∗ **C 3156 K**[2]
300	460	118	2 240	3 650	285	1 100	1 500	71,0	∗ **C 3060 M**	∗ **C 3060 KM**
	460	160	2 900	4 900	380	850	1 200	95,0	∗ **C 4060 M**	∗ **C 4060 K30M**
	500	160	3 250	5 200	400	1 000	1 300	120	∗ **C 3160**	∗ **C 3160 K**[2]
320	480	121	2 280	4 000	305	1 000	1 400	76,5	∗ **C 3064 M**	∗ **C 3064 KM**
	540	176	4 150	6 300	480	950	1 300	160	∗ **C 3164 M**	∗ **C 3164 KM**
340	520	133	2 900	5 000	375	950	1 300	100	∗ **C 3068 M**	∗ **C 3068 KM**
	580	190	4 900	7 500	560	850	1 200	205	∗ **C 3168 M**	∗ **C 3168 KM**[2]
360	480	90	1 760	3 250	245	1 000	1 400	44,0	∗ **C 3972 M**	∗ **C 3972 KM**
	540	134	2 900	5 000	375	900	1 200	105	∗ **C 3072 M**	∗ **C 3072 KM**[2]
	600	192	5 000	8 000	585	800	1 100	215	∗ **C 3172 M**	∗ **C 3172 KM**[2]
380	520	106	2 120	4 000	300	950	1 300	65,5	∗ **C 3976 MB**[1]	∗ **C 3976 KMB**[1]
	560	135	3 000	5 200	390	900	1 200	110	∗ **C 3076 M**	∗ **C 3076 KM**
	620	194	4 550	7 500	540	750	1 000	230	∗ **C 3176 MB**[1]	∗ **C 3176 KMB**[1]

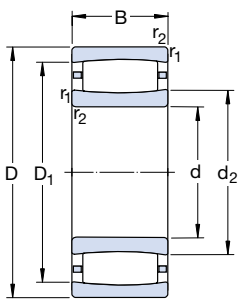
∗ SKF Explorer bearing
[1] Please check availability of the bearing before incorporating it in a bearing arrangement design
[2] Also available in designs K/HA3C4 or KM/HA3C4



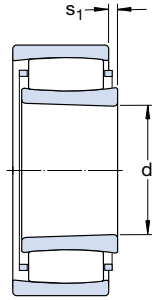
Dimensions						Abutment and fillet dimensions						Calculation factors	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1 [1] ~	s_2 [1] ~	d_a min	d_a max	D_a min	D_a max	C_a [2] min	r_a max	k_1	k_2
mm						mm						–	
200	235	285	2,1	15,2	–	211	250	275	299	2,9	2	0,123	0,095
	229	280	2,1	21	11,1	211	–	–	299	–	2	0,101	0,108
	245	305	3	27,3	–	214	260	307	326	0,6	2,5	0,108	0,104
	237	302	3	22	12,1	214	–	–	326	–	2,5	0,092	0,112
220	257	310	3	17,2	–	233	270	295	327	3,1	2,5	0,114	0,104
	251	306	3	20	10,1	233	–	–	327	–	2,5	0,095	0,113
	268	333	4	22,3	–	237	290	315	353	3,5	3	0,114	0,097
	259	350	4	20,5	–	237	295	320	383	1,7	3	0,113	0,101
240	276	329	3	19,2	–	253	290	315	347	1,3	2,5	0,113	0,106
	281	357	4	20,4	–	257	305	335	383	3,7	3	0,116	0,095
260	305	367	4	19,3	–	275	325	350	385	3,4	3	0,122	0,096
	314	394	4	26,4	–	277	340	375	423	4,1	3	0,115	0,096
280	328	389	4	21,3	–	295	350	375	405	1,8	3	0,121	0,098
	336	416	5	28,4	–	300	360	395	440	4,1	4	0,115	0,097
300	352	417	4	20	–	315	375	405	445	1,7	3	0,123	0,095
	338	409	4	30,4	–	315	360	400	445	2,8	3	0,105	0,106
	362	448	5	30,5	–	320	390	425	480	4,9	4	0,106	0,106
320	376	440	4	23,3	–	335	395	430	465	1,8	3	0,121	0,098
	372	476	5	26,7	–	340	410	455	520	3,9	4	0,114	0,096
340	402	482	5	25,4	–	358	430	465	502	1,9	4	0,12	0,099
	405	517	5	25,9	–	360	445	490	560	4,2	4	0,118	0,093
360	394	450	3	17,2	–	373	405	440	467	1,6	2,5	0,127	0,104
	417	497	5	26,4	–	378	445	480	522	2	4	0,12	0,099
	423	537	5	27,9	–	380	460	510	522	3,9	4	0,117	0,094
380	429	489	4	10	–	395	425	490	505	9,7	3	–	0,128
	431	511	5	27	–	398	460	495	542	2	4	0,12	0,1
	450	550	5	19	–	400	445	555	600	16,4	4	–	0,106

[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

CARB toroidal roller bearings
d **400 – 600** mm



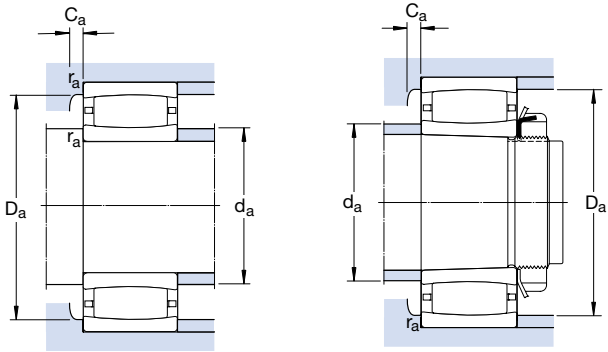
Cylindrical bore



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	–	
400	540	106	2 160	4 150	305	900	1 300	69,0	∗ **C 3980 MB**[1]	∗ **C 3980 KMB**[1]
	600	148	3 650	6 200	450	800	1 100	140	∗ **C 3080 M**	∗ **C 3080 KM**
	650	200	4 200	8 300	585	700	950	275	∗ **C 3180 MB**	∗ **C 3180 KMB**
420	560	106	2 160	4 250	310	850	1 200	71,0	∗ **C 3984 M**	∗ **C 3984 KM**
	620	150	3 800	6 400	465	800	1 100	150	∗ **C 3084 M**	∗ **C 3084 KM**
	700	224	6 000	10 400	720	670	900	340	∗ **C 3184 M**	∗ **C 3184 KM**[2]
440	600	118	2 750	5 300	375	800	1 100	98,0	∗ **C 3988 MB**[1]	∗ **C 3988 KMB**[1]
	650	157	3 900	6 700	480	750	1 000	185	∗ **C 3088 MB**	∗ **C 3088 KMB**
	720	226	5 700	9 300	655	670	900	360	∗ **C 3188 MB**[1]	∗ **C 3188 KMB**[1]
460	620	118	2 700	5 300	375	800	1 100	100	∗ **C 3992 MB**[1]	∗ **C 3992 KMB**[1]
	680	163	4 000	7 500	510	700	950	200	∗ **C 3092 M**	∗ **C 3092 KM**[2]
	760	240	6 800	12 000	815	600	800	430	∗ **C 3192 M**	∗ **C 3192 KM**
	760	240	8 300	14 300	950	480	630	535	∗ **C 4192 M**	∗ **C 4192 K30M**
480	650	128	3 100	6 100	430	750	1 000	120	∗ **C 3996 M**	∗ **C 3996 KM**
	700	165	4 050	7 800	530	670	900	210	∗ **C 3096 M**	∗ **C 3096 KM**
	790	248	6 950	12 500	830	560	750	490	∗ **C 3196 MB**[1]	∗ **C 3196 KMB**[1]
500	670	128	3 150	6 300	440	700	950	125	∗ **C 39/500 M**	∗ **C 39/500 KM**
	720	167	4 250	8 300	560	630	900	225	∗ **C 30/500 M**	∗ **C 30/500 KM**[2]
	830	264	7 500	12 700	850	530	750	550	∗ **C 31/500 M**	∗ **C 31/500 KM**[2]
	830	325	9 800	17 600	1 140	400	560	720	∗ **C 41/500 MB**	∗ **C 41/500 K30MB**
530	710	136	3 560	7 100	480	670	900	150	∗ **C 39/530 M**	∗ **C 39/530 KM**
	780	185	5 100	9 500	640	600	800	295	∗ **C 30/530 M**	∗ **C 30/530 KM**[2]
	870	272	8 800	15 600	1 000	500	670	630	∗ **C 31/530 M**	∗ **C 31/530 KM**[2]
560	750	140	3 600	7 350	490	600	850	170	∗ **C 39/560 M**	∗ **C 39/560 KM**
	820	195	5 600	11 000	720	530	750	345	∗ **C 30/560 M**	∗ **C 30/560 KM**[2]
	920	280	9 500	17 000	1 100	480	670	750	∗ **C 31/560 MB**[1]	∗ **C 31/560 KMB**[1]
600	800	150	4 000	8 800	570	560	750	210	∗ **C 39/600 M**	∗ **C 39/600 KM**
	870	200	6 300	12 200	780	500	700	390	∗ **C 30/600 M**	∗ **C 30/600 KM**[2]
	980	300	10 200	18 000	1120	430	600	870	∗ **C 31/600 MB**[1]	∗ **C 31/600 KMB**[1]

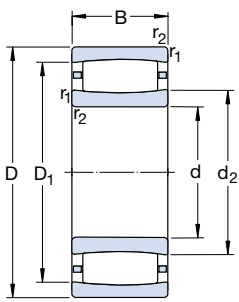
∗ SKF Explorer bearing
[1] Please check availability of the bearing before incorporating it in a bearing arrangement design
[2] Also available in design KM/HA3C4



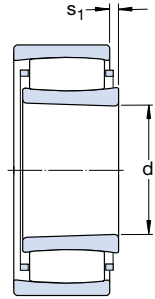
Dimensions					Abutment and fillet dimensions						Calculation factors	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1 [1] ~	d_a min	d_a max	D_a min	D_a max	C_a [2] min	r_a max	k_1 max	k_2 max
mm					mm						–	
400	440	500	4	10	415	435	505	525	9,7	3	–	0,128
	458	553	5	30,6	418	480	525	582	2,1	4	0,121	0,099
	485	589	6	10,1	426	480	565	624	4,4	5	–	0,109
420	462	522	4	21,3	435	480	515	545	1,8	3	0,132	0,098
	475	570	5	32,6	438	510	550	602	2,2	4	0,12	0,1
	508	618	6	34,8	446	540	595	674	3,8	5	0,113	0,098
440	495	564	4	11	455	490	565	585	10,5	3	–	0,119
	491	587	6	19,7	463	490	565	627	1,7	5	–	0,105
	514	633	6	22	466	510	635	694	19,1	5	–	0,102
460	508	577	4	11	475	505	580	605	10,4	3	–	0,12
	539	624	6	33,5	486	565	605	654	2,3	5	0,114	0,108
	559	679	7,5	51	492	570	655	728	4,2	6	0,108	0,105
	540	670	7,5	46,2	492	570	655	728	5,6	6	0,111	0,097
480	529	604	5	20,4	498	550	590	632	2	4	0,133	0,095
	555	640	6	35,5	503	580	625	677	2,3	5	0,113	0,11
	583	700	7,5	24	512	580	705	758	20,6	6	–	0,104
500	556	631	5	20,4	518	580	615	652	2	4	0,135	0,095
	572	656	6	37,5	523	600	640	697	2,3	5	0,113	0,111
	605	738	7,5	75,3	532	655	705	798	–	6	0,099	0,116
	598	740	7,5	16,3	532	595	705	798	5,9	6	–	0,093
530	578	657	5	28,4	548	600	640	692	2,2	4	0,129	0,101
	601	704	6	35,7	553	635	685	757	2,5	5	0,12	0,101
	635	781	7,5	44,4	562	680	745	838	4,8	6	0,115	0,097
560	622	701	5	32,4	578	645	685	732	2,3	4	0,128	0,104
	660	761	6	45,7	583	695	740	793	2,7	5	0,116	0,106
	664	808	7,5	28	592	660	810	888	23,8	6	–	0,111
600	666	744	5	32,4	618	685	725	782	2,4	4	0,131	0,1
	692	805	6	35,9	623	725	775	847	2,7	5	0,125	0,098
	710	870	7,5	30	632	705	875	948	25,4	6	–	0,105

[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

CARB toroidal roller bearings
d **630 – 1 250** mm



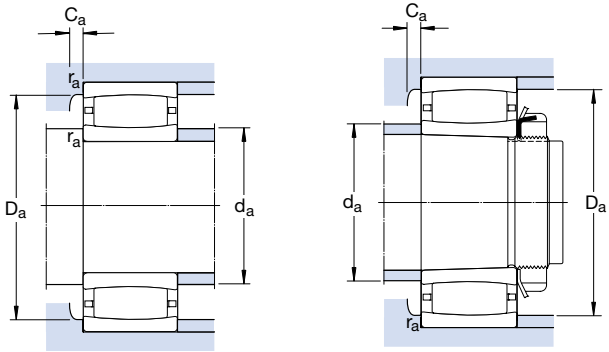
Cylindrical bore



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	–	
630	850	165	4 650	10 000	640	530	700	270	∗ **C 39/630 M**	∗ **C 39/630 KM**
	920	212	6 800	12 900	830	480	670	465	∗ **C 30/630 M**	∗ **C 30/630 KM**[2]
	1 030	315	12 200	22 000	1 370	400	560	1 040	∗ **C 31/630 MB**[1]	∗ **C 31/630 KMB**[1]
670	900	170	4 900	11 200	695	480	630	310	∗ **C 39/670 M**	∗ **C 39/670 KM**
	980	230	8 150	16 300	1 000	430	600	580	∗ **C 30/670 M**	∗ **C 30/670 KM**[2]
	1 090	336	12 000	22 000	1 320	380	530	1 230	∗ **C 31/670 MB**[1]	∗ **C 31/670 KMB**[1]
710	950	180	6 000	12 500	780	450	630	355	∗ **C 39/710 M**	∗ **C 39/710 KM**
	1 030	236	8 800	17 300	1 060	400	560	645	∗ **C 30/710 M**	∗ **C 30/710 KM**
	1 030	315	10 600	21 600	1 290	320	430	860	∗ **C 40/710 M**	∗ **C 40/710 K30M**
	1 150	345	12 700	24 000	1 430	360	480	1 410	∗ **C 31/710 MB**[1]	∗ **C 31/710 KMB**[1]
750	1 000	185	6 100	13 400	815	430	560	405	∗ **C 39/750 M**	∗ **C 39/750 KM**
	1 090	250	9 000	18 000	1 100	380	530	770	∗ **C 30/750 MB**[1]	∗ **C 30/750 KMB**[1]
	1 220	365	16 000	30 500	1 800	320	450	1 700	∗ **C 31/750 MB**[1]	∗ **C 31/750 KMB**[1]
800	1 060	195	6 400	14 600	865	380	530	470	∗ **C 39/800 M**	∗ **C 39/800 KM**
	1 150	258	9 150	18 600	1 120	360	480	860	∗ **C 30/800 MB**[1]	∗ **C 30/800 KMB**[1]
	1 280	375	15 600	30 500	1 760	300	400	1 870	∗ **C 31/800 MB**[1]	∗ **C 31/800 KMB**[1]
850	1 120	200	7 350	16 300	965	360	480	530	∗ **C 39/850 M**	∗ **C 39/850 KM**
	1 220	272	11 200	24 000	1 370	320	430	1 050	∗ **C 30/850 MB**[1]	∗ **C 30/850 KMB**[1]
	1 360	400	16 000	32 000	1 830	280	380	2 260	∗ **C 31/850 MB**[1]	∗ **C 31/850 KMB**[1]
900	1 180	206	8 150	18 000	1 060	340	450	580	∗ **C 39/900 MB**[1]	∗ **C 39/900 KMB**[1]
	1 280	280	12 700	26 500	1 530	300	400	1 150	∗ **C 30/900 M**	∗ **C 30/900 KM**
950	1 250	224	9 300	22 000	1 250	300	430	745	∗ **C 39/950 M**	∗ **C 39/950 KM**
	1 360	300	12 900	27 500	1 560	280	380	1 410	∗ **C 30/950 MB**[1]	∗ **C 30/950 KMB**[1]
1 000	1 420	308	13 400	29 000	1 830	260	340	1 570	∗ **C 30/1000 MB**[1]	∗ **C 30/1000 KMB**[1]
	1 580	462	22 800	45 500	2 500	220	300	3 470	∗ **C 31/1000 MB**[1]	∗ **C 31/1000 KMB**[1]
1 060	1 400	250	12 500	29 000	1 600	260	340	1 040	∗ **C 39/1060 MB**[1]	∗ **C 39/1060 KMB**[1]
1 180	1 540	272	12 900	31 500	1 660	220	300	1 340	∗ **C 39/1180 M**	∗ **C 39/1180 KM**
1 250	1 750	375	20 400	45 000	2 320	180	240	2 740	∗ **C 30/1250 MB**[1]	∗ **C 30/1250 KMB**[1]

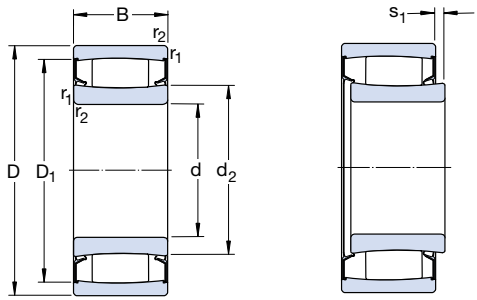
∗ SKF Explorer bearing
[1] Please check availability of the bearing before incorporating it in a bearing arrangement design
[2] Also available in design KM/HA3C4



Dimensions					Abutment and fillet dimensions						Calculation factors	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1 [1] ~	d_a min	d_a max	D_a min	D_a max	C_a [2] min	r_a max	k_1	k_2
mm					mm						–	
630	700	784	6	35,5	653	720	770	827	2,4	5	0,121	0,11
	717	840	7,5	48,1	658	755	810	892	2,9	6	0,118	0,104
	749	919	7,5	31	662	745	920	998	26,8	6	–	0,109
670	764	848	6	40,5	693	765	830	877	2,5	5	0,121	0,113
	775	904	7,5	41,1	698	820	875	952	2,9	6	0,121	0,101
	797	963	7,5	33	702	795	965	1 058	28	6	–	0,104
710	773	877	6	30,7	733	795	850	927	2,7	5	0,131	0,098
	807	945	7,5	47,3	738	850	910	1 002	3,2	6	0,119	0,104
	803	935	7,5	51,2	738	840	915	1 002	4,4	6	0,113	0,101
	848	1 012	9,5	34	750	845	1 015	1 100	28,6	8	–	0,102
750	830	933	6	35,7	773	855	910	977	2,7	5	0,131	0,101
	858	993	7,5	25	778	855	995	1 062	21,8	6	–	0,112
	888	1 076	9,5	36	790	885	1 080	1 180	31,5	8	–	0,117
800	889	990	6	45,7	823	915	970	1 037	2,9	5	0,126	0,106
	913	1 047	7,5	25	828	910	1 050	1 122	22,3	6	–	0,111
	947	1 133	9,5	37	840	945	1 135	1 240	32,1	8	–	0,115
850	940	1 053	6	35,9	873	960	1 025	1 097	2,9	5	0,135	0,098
	968	1 113	7,5	27	878	965	1 115	1 192	24,1	6	–	0,124
	1 020	1 200	12	40	898	1 015	1 205	1 312	33,5	10	–	0,11
900	989	1 113	6	20	923	985	1 115	1 157	18,4	5	–	0,132
	1 008	1 172	7,5	45,8	928	1 050	1 130	1 252	3,4	6	0,124	0,1
950	1 044	1 167	7,5	35	978	1 080	1 145	1 222	3,1	6	0,134	0,098
	1 080	1 240	7,5	30	978	1 075	1 245	1 322	26,2	6	–	0,116
1 000	1 136	1 294	7,5	30	1 028	1 135	1 295	1 392	26,7	6	–	0,114
	1 179	1 401	12	46	1 048	1 175	1 405	1 532	38,6	10	–	0,105
1 060	1 175	1 323	7,5	25	1 088	1 170	1 325	1 372	23,4	6	–	0,142
1 180	1311	1457	7,5	44,4	1 208	1 335	1 425	1 512	4,1	6	0,137	0,097
1 250	1 397	1 613	9,5	37	1 284	1 395	1 615	1 716	33,9	8	–	0,126

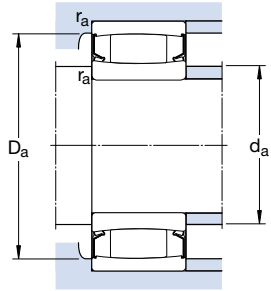
[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

Sealed CARB toroidal roller bearings
d **50 – 180** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u			
mm			kN		kN	r/min	kg	–
50	72	40	140	224	24,5	200	0,56	∗ **C 6910-2CS5V**[1)]
60	85	45	150	240	26,5	170	0,83	∗ **C 6912-2CS5V**[1)]
65	100	35	102	173	20,4	150	1,10	∗ **C 4013-2CS5V**
75	105	54	204	325	37,5	140	1,40	∗ **C 6915-2CS5V**
	115	40	143	193	22	130	1,40	∗ **C 4015-2CS5V**[1)]
90	125	46	224	400	44	110	1,75	∗ **C 5918-2CS5V**
100	150	50	310	450	50	95	2,90	∗ **C 4020-2CS5V**[1)]
	165	65	475	655	69,5	90	5,20	∗ **C 4120-2CS5V**
110	170	60	415	585	62	85	4,60	∗ **C 4022-2CS5V**[1)]
	180	69	500	710	75	85	6,60	∗ **C 4122-2CS5V**
120	180	60	430	640	67	80	5,10	∗ **C 4024-2CS5V**
	200	80	710	1 000	102	75	9,70	∗ **C 4124-2CS5V**[1)]
130	200	69	550	830	85	70	7,50	∗ **C 4026-2CS5V**
	210	80	750	1 100	108	70	10,5	∗ **C 4126-2CS5V**
140	210	69	570	900	88	67	7,90	∗ **C 4028-2CS5V**[1)]
	225	85	780	1 200	116	63	12,5	∗ **C 4128-2CS5V**
150	225	75	585	965	93	63	10,0	∗ **C 4030-2CS5V**
	250	100	1 220	1 860	176	60	20,5	∗ **C 4130-2CS5V**[1)]
160	240	80	655	1 100	104	60	12,0	∗ **C 4032-2CS5V**[1)]
	270	109	1 460	2 160	204	53	26,0	∗ **C 4132-2CS5V**[1)]
170	260	90	965	1 630	153	53	17,0	∗ **C 4034-2CS5V**[1)]
	280	109	1 530	2 280	212	53	27,0	∗ **C 4134-2CS5V**[1)]
180	280	100	1 320	2 120	196	53	23,5	∗ **C 4036-2CS5V**[1)]
	300	118	1 760	2 700	245	48	35,0	∗ **C 4136-2CS5V**[1)]

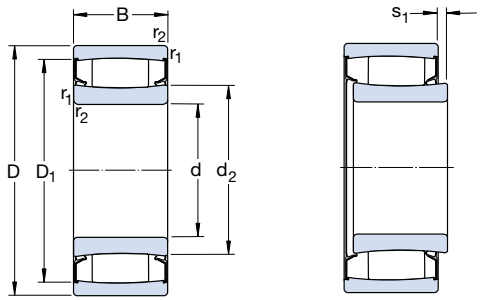
∗ SKF Explorer bearing
[1)] Please check availability of the bearing before incorporating it in a bearing arrangement design



Dimensions					Abutment and fillet dimensions				Calculation factors	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1 [1] ~	d_a min	d_a max	D_a max	r_a max	k_1	k_2
mm					mm				–	
50	57,6	64,9	0,6	2,8	53,2	57	68,8	0,6	0,113	0,091
60	68	75,3	1	5,4	64,6	67	80,4	1	0,128	0,083
65	78,6	87,5	1,1	5,9	71	78	94	1	0,071	0,181
75	83,6	95,5	1	7,1	79,6	83	100	1	0,073	0,154
	88,5	104	1,1	7,3	81	88	111	1	0,210	0,063
90	102	113	1,1	4,5	96	101	119	1	0,089	0,131
100	114	136	1,5	6,2	107	113	143	1,5	0,145	0,083
	120	148	2	7,3	111	119	154	2	0,09	0,125
110	128	155	2	7,9	119	127	161	2	0,142	0,083
	130	160	2	8,2	121	129	169	2	0,086	0,133
120	140	164	2	7,5	129	139	171	2	0,085	0,142
	140	176	2	8,2	131	139	189	2	0,126	0,087
130	152	182	2	8,2	139	151	191	2	0,089	0,133
	153	190	2	7,5	141	152	199	2	0,09	0,126
140	163	193	2	8,7	149	162	201	2	0,133	0,089
	167	204	2,1	8,9	152	166	213	2	0,086	0,134
150	175	204	2,1	10,8	161	174	214	2	0,084	0,144
	179	221	2,1	6,4	162	178	238	2	0,103	0,103
160	188	218	2,1	11,4	170	187	230	2	0,154	0,079
	190	241	2,1	6,7	172	189	258	2	0,101	0,105
170	201	237	2,1	9	180	199	250	2	0,116	0.097
	200	251	2,1	6,7	182	198	268	2	0,101	0,106
180	204	246	2,1	6,4	190	202	270	2	0,103	0,105
	211	265	3	6,4	194	209	286	2,5	0,095	0,11

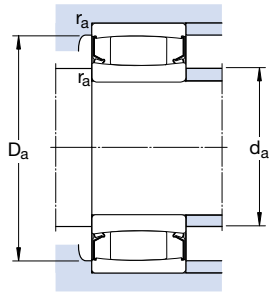
[1] Permissible axial displacement (→ **page 783**)

Sealed CARB toroidal roller bearings
d **190 – 200** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u			
mm			kN		kN	r/min	kg	–
190	290	100	1 370	2 320	208	48	24,5	∗ **C 4038-2CS5V**[1)]
	320	128	2 040	3 150	280	45	43,5	∗ **C 4138-2CS5V**[1)]
200	310	109	1 630	2 650	232	45	31,0	∗ **C 4040-2CS5V**[1)]
	340	140	2 360	3 650	320	43	54,5	∗ **C 4140-2CS5V**[1)]

∗ SKF Explorer bearing
[1)] Please check availability of the bearing before incorporating it in a bearing arrangement design

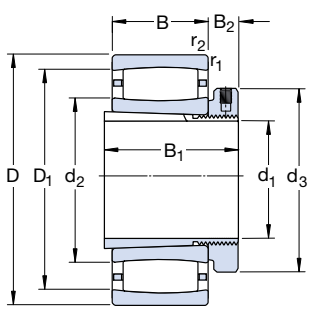


Dimensions					Abutment and fillet dimensions				Calculation factors	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1 [1] ~	d_a min	d_a max	D_a max	r_a max	k_1	k_2
mm					mm				–	
190	221	263	2,1	6,4	200	219	280	2	0,103	0,106
	222	283	3	6,4	204	220	306	2,5	0,094	0,111
200	229	280	2,1	6,7	210	227	300	2	0,101	0,108
	237	301	3	7	214	235	326	2,5	0,092	0,112

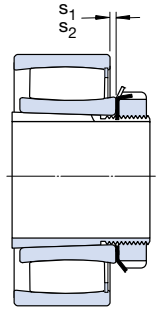
[1] Permissible axial displacement (→ **page 783**)

CARB toroidal roller bearings on adapter sleeve

d_1 **20 – 70** mm



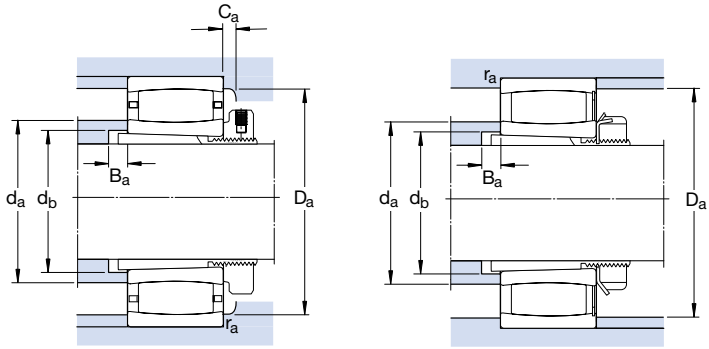
Bearing on E-design adapter sleeve



Full complement bearing on standard adapter sleeve

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
20	52	18	44	40	4,55	13 000	18 000	0,24	∗ **C 2205 KTN9**[1]	**H 305 E**
	52	18	58,5	48	5,6	–	7 000	0,25	∗ **C 2205 KV**[1]	**H 305**
25	62	20	65,5	62	7,2	11 000	15 000	0,37	∗ **C 2206 KTN9**	**H 306 E**
	62	20	76,5	71	8	–	6 000	0,39	∗ **C 2206 KV**	**H 306**
30	72	23	83	80	9, 3	9 500	13 000	0,59	∗ **C 2207 KTN9**	**H 307 E**
	72	23	95	96	11,2	–	5 000	0,59	∗ **C 2207 KV**	**H 307**
35	80	23	90	86,5	10,2	8 000	11 000	0,69	∗ **C 2208 KTN9**	**H 308 E**
	80	23	102	104	12	–	4 500	0,70	∗ **C 2208 KV**	**H 308**
40	85	23	93	93	10,8	8 000	11 000	0,76	∗ **C 2209 KTN9**	**H 309 E**
	85	23	106	110	12,9	–	4 300	0,79	∗ **C 2209 KV**	**H 309**
45	90	23	98	100	11,8	7 000	9 500	0,85	∗ **C 2210 KTN9**	**H 310 E**
	90	23	114	122	14,3	–	3 800	0,89	∗ **C 2210 KV**	**H 310**
50	100	25	116	114	13,4	6 700	9 000	1,10	∗ **C 2211 KTN9**	**H 311 E**
	100	25	132	134	15,6	–	3 400	1,15	∗ **C 2211 KV**	**H 311**
55	110	28	143	156	18,3	5 600	7 500	1,45	∗ **C 2212 KTN9**	**H 312 E**
	110	28	166	190	22,4	–	2 800	1,50	∗ **C 2212 KV**	**H 312**
60	120	31	180	180	21,2	5 300	7 500	1,80	∗ **C 2213 KTN9**	**H 313 E**
	120	31	204	216	25,5	–	2 400	1,90	∗ **C 2213 KV**	**H 313**
	125	31	186	196	22,8	5 000	7 000	2,10	∗ **C 2214 KTN9**	**H 314 E**
	125	31	212	228	26,5	–	2 400	2,20	∗ **C 2214 KV**	**H 314**
	150	51	405	430	49	3 800	5 000	5,10	∗ **C 2314 K**	**H 2314**
65	130	31	196	208	24	4 800	6 700	2,30	∗ **C 2215 K**	**H 315 E**
	130	31	220	240	28	–	2 200	2,40	∗ **C 2215 KV**	**H 315**
	160	55	425	465	52	3 600	4 800	6,20	∗ **C 2315 K**	**H 2315**
70	140	33	220	250	28,5	4 500	6 000	2,90	∗ **C 2216 K**	**H 316 E**
	140	33	255	305	34,5	–	2 000	3,00	∗ **C 2216 KV**	**H 316**
	170	58	510	550	60	3 400	4 500	7,40	∗ **C 2316 K**	**H 2316**

∗ SKF Explorer bearing
[1] Please check availability of the bearing before incorporating it in a bearing arrangement design

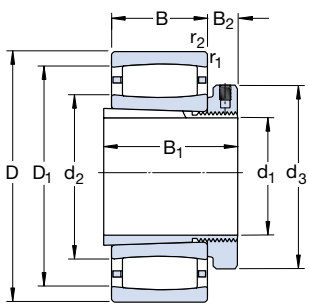


Dimensions									Abutment and fillet dimensions							Calculation factors	
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	$r_{1,2}$ min	s_1 [1] ~	s_2 [1] ~	d_a max	d_b min	D_a min	D_a max	B_a min	C_a [2] min	r_a max	k_1	k_2
mm									mm							–	
20	32,1	38	43,3	29	10,5	1	5,8	–	32	28	42	46,4	5	0,3	1	0,09	0,126
	32,1	38	43,3	29	8	1	5,8	2,8	39	28	–	46,4	5	–	1	0,09	0,126
25	37,4	45	53,1	31	10,5	1	4,5	–	37	33	51	56,4	5	0,3	1	0,101	0,111
	37,4	45	53,1	31	8	1	4,5	1,5	49	33	–	56,4	5	–	1	0,101	0,111
30	44,8	52	60,7	35	11,5	1,1	5,7	–	44,5	39	59	65	5	0,1	1	0,094	0,121
	44,8	52	60,7	35	9	1,1	5,7	2,7	57	39	–	65	5	–	1	0,094	0,121
35	52,4	58	69,9	36	13	1,1	7,1	–	52	44	68	73	5	0,3	1	0,093	0,128
	52,4	58	69,9	36	10	1,1	7,1	4,1	66	44	–	73	5	–	1	0,093	0,128
40	55,6	65	73,1	39	13	1,1	7,1	–	55,5	50	71	78	7	0,3	1	0,095	0,128
	55,6	65	73,1	39	11	1,1	7,1	4,1	69	50	–	78	7	–	1	0,095	0,128
45	61,9	70	79,4	42	14	1,1	7,1	–	61,5	55	77	83	9	0,8	1	0,097	0,128
	61,9	70	79,4	42	12	1,1	7,1	3,9	73	55	–	83	9	–	1	0,097	0,128
50	65,8	75	86,7	45	14	1,5	8,6	–	65,5	60	84	91	10	0,3	1,5	0,094	0,133
	65,8	75	86,7	45	12,5	1,5	8,6	5,4	80	60	–	91	10	–	1,5	0,094	0,133
55	77,1	80	97,9	47	14	1,5	8,5	–	77	65	95	101	9	0,3	1,5	0,1	0,123
	77,1	80	97,9	47	13	1,5	8,5	5,3	91	65	–	101	9	–	1,5	0,1	0,123
60	79	85	106	50	15	1,5	9,6	–	79	70	102	111	8	0,2	1,5	0,097	0,127
	79	85	106	50	14	1,5	9,6	5,3	97	70	–	111	8	–	1,5	0,097	0,127
	83,7	92	111	52	15	1,5	9,6	–	83,5	75	107	116	9	0,4	1,5	0.098	0,127
	83,7	92	111	52	14	1,5	9,6	5,3	102	75	–	116	9	–	1,5	0,098	0,127
	91,4	92	130	68	14	2,1	9,1	–	105	76	120	138	6	2,2	2	0,11	0,099
65	88,5	98	115	55	16	1,5	9,6	–	98	80	110	121	12	1,2	1,5	0,099	0,127
	88,5	98	115	55	15	1,5	9,6	5,3	105	80	–	121	12	–	1,5	0,099	0,127
	98,5	98	135	73	15	2,1	13,1	–	110	82	130	148	5	2,2	2	0,103	0,107
70	98,1	105	125	59	18	2	9,1	–	105	85	120	129	12	1,2	2	0,104	0,121
	98,1	105	125	59	17	2	9,1	4,8	115	85	–	129	12	–	2	0,104	0,121
	102	105	145	78	17	2,1	10,1	–	115	88	135	158	6	2,4	2	0,107	0,101

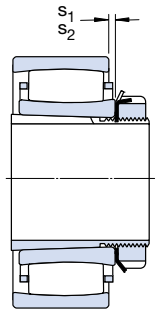
[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

CARB toroidal roller bearings on adapter sleeve

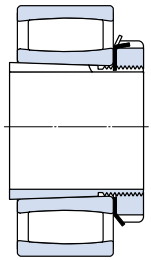
d_1 **75 – 140** mm



Bearing on E-design adapter sleeve



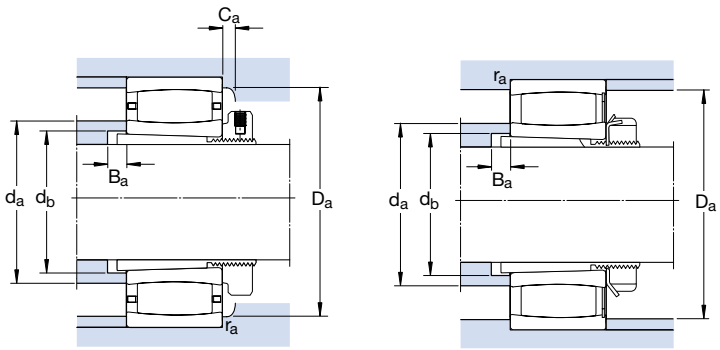
Bearing on L-design or standard adapter sleeve



Full complement bearing on standard adapter sleeve

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
75	150	36	275	320	35,5	4 300	5 600	3,70	∗ **C 2217 K**	**H 317 E**
	150	36	315	390	44	–	1 800	3,85	∗ **C 2217 KV**	**H 317**
	180	60	540	600	64	3 200	4 300	8,50	∗ **C 2317 K**	**H 2317**
80	160	40	325	380	41,5	3 800	5 300	4,50	∗ **C 2218 K**	**H 318 E**
	160	40	365	440	49	–	1 500	4,60	∗ **C 2218 KV**	**H 318**
	190	64	610	695	73,5	2 800	4 000	10,0	∗ **C 2318 K**	**H 2318**
85	170	43	360	400	44	3 800	5 000	5,30	∗ **C 2219 K**[1)]	**H 319 E**
	200	67	610	695	73,5	2 800	4 000	11,5	∗ **C 2319 K**	**H 2319**
90	165	52	415	540	58,5	3 200	4 300	6,10	∗ **C 3120 K**[1)]	**H 3120 E**
	165	52	475	655	69,5	–	1 300	6,10	∗ **C 3120 KV**	**H 3120 E**
	180	46	415	465	49	3 600	4 800	6,30	∗ **C 2220 K**	**H 320 E**
	215	73	800	880	90	2 600	3 600	14,5	∗ **C 2320 K**	**H 2320**
100	170	45	355	480	51	3 200	4 500	5,50	∗ **C 3022 K**	**H 322 E**
	200	53	530	620	64	3 200	4 300	8,80	∗ **C 2222 K**	**H 322 E**
110	180	46	375	530	55	3 000	4 000	5,70	∗ **C 3024 K**	**H 3024 E**
	180	46	430	640	65,5	–	1 400	5,85	∗ **C 3024 KV**	**H 3024**
	215	58	610	710	72	3 000	4 000	8,60	∗ **C 2224 K**[1)]	**H 3124 L**
	215	76	750	980	98	2 400	3 200	14,2	∗ **C 3224 K**	**H 2324 L**
115	200	52	390	585	58,5	2 800	3 800	8,70	∗ **C 3026 K**[1)]	**H 3026**
	230	64	735	930	91,5	2 800	3 800	14,0	∗ **C 2226 K**	**H 3126 L**
125	210	53	490	735	72	2 600	3 400	9,30	∗ **C 3028 K**[1)]	**H 3028**
	250	68	830	1 060	102	2 400	3 400	17,5	∗ **C 2228 K**	**H 3128 L**
135	225	56	540	850	83	2 400	3 200	12,0	∗ **C 3030 KMB**	**H 3030 E**
	250	80	880	1 290	122	2 000	2 800	20,0	∗ **C 3130 K**	**H 3130 L**
	270	73	980	1 220	114	2 400	3 200	23,0	∗ **C 2230 K**	**H 3130 L**
140	240	60	570	915	86,5	2 200	3 000	14,5	∗ **C 3032 K**[1)]	**H 3032**
	270	86	1 000	1 400	132	2 000	2 600	27,0	∗ **C 3132 K**[1)]	**H 3132 L**
	290	104	1 370	1 830	170	1 700	2 400	36,5	∗ **C 3232 K**	**H 2332 L**

∗ SKF Explorer bearing
[1)] Please check availability of the bearing before incorporating it in a bearing arrangement design

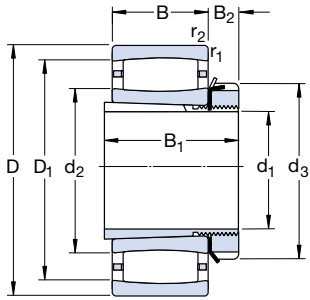


Dimensions									Abutment and fillet dimensions							Calculation factors	
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	$r_{1,2}$ min	s_1 [1] ~	s_2 [1] ~	d_a max	d_b min	D_a min	D_a max	B_a min	C_a [2] min	r_a max	k_1	k_2
mm									mm							–	
75	104	110	133	63	19	2	7,1	–	110	91	125	139	12	1,3	2	0,114	0,105
	104	110	133	63	18	2	7,1	1,7	115	91	–	139	12	–	2	0,114	0,105
	110	110	153	82	18	3	12,1	–	125	94	145	166	7	2,4	2,5	0,105	0,105
80	112	120	144	65	19	2	9,5	–	120	96	130	149	10	1,4	2	0,104	0,117
	112	120	144	65	18	2	9,5	5,4	125	96	–	149	10	–	2	0,104	0,117
	119	120	166	86	18	3	9,6	–	135	100	155	176	7	2	2,5	0,108	0,101
85	113	125	149	68	20	2,1	10,5	–	112	102	149	158	9	4,2	2	0,114	0,104
	120	125	166	90	19	3	12,6	–	135	105	155	186	7	2,1	2,5	0,103	0,106
90	119	130	150	76	21	2	10	–	119	106	150	154	6	4,5	2	0,1	0,112
	119	130	150	76	20	2	10	4,7	125	106	–	154	6	–	2	0,1	0,112
	118	130	157	71	21	2,1	10,1	–	130	108	150	168	8	0.9	2	0,108	0,11
	126	130	185	97	20	3	11.2	–	150	110	170	201	7	3,2	2,5	0,113	0,096
100	128	145	156	77	21,5	2	9,5	–	127	118	157	160	14	4	2	0,107	0,11
	132	145	176	77	21,5	2,1	11,1	–	150	118	165	188	6	1,9	2	0,113	0,103
110	138	155	166	72	26	2	10,6	–	145	127	160	170	7	0,9	2	0,111	0,109
	138	145	166	72	22	2	10,6	3,8	150	127	–	170	7	–	2	0,111	0,109
	144	145	191	88	22	2,1	13	–	143	128	192	203	11	5,4	2	0,113	0,103
	149	145	190	112	22	2,1	17,1	–	160	131	180	203	17	2,4	2	0,103	0,108
115	154	155	180	80	23	2	16,5	–	152	137	182	190	8	4,4	2	0,123	0,1
	152	155	199	92	23	3	9,6	–	170	138	185	216	8	1,1	2,5	0,113	0,101
125	163	165	194	82	24	2	11	–	161	147	195	200	8	4,7	2	0,102	0,116
	173	165	223	97	24	3	13,7	–	190	149	210	236	8	2,3	2,5	0,109	0,108
135	173	180	204	87	26	2,1	2,8	–	172	158	200	214	8	1,3	2	–	0,108
	182	180	226	111	26	2,1	13,9	–	195	160	215	238	8	2,3	2	0,12	0,092
	177	180	236	111	26	3	11,2	–	200	160	215	256	15	2,5	2,5	0,119	0,096
140	187	190	218	93	27,5	2,1	15	–	186	168	220	229	8	5,1	2	0,115	0,106
	191	190	240	119	27,5	2,1	19	–	190	170	242	258	8	7,5	2	0,099	0,111
	194	190	256	147	27,5	3	19,3	–	215	174	245	276	18	2,6	2,5	0,112	0,096

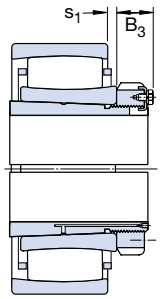
[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

CARB toroidal roller bearings on adapter sleeve

d_1 **150 – 320** mm



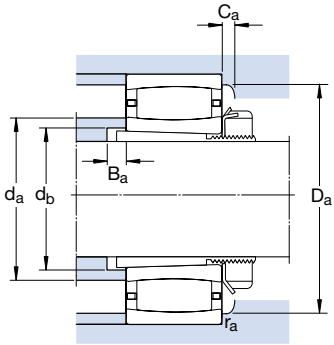
Bearing on L-design or standard adapter sleeve



Bearing on OH-design adapter sleeve

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
150	260	67	750	1 160	108	2 000	2 800	18,0	∗ **C 3034 K**[1]	**H 3034**
	280	88	1 040	1 460	137	1 900	2 600	29,0	∗ **C 3134 K**[1]	**H 3134 L**
	310	86	1 270	1 630	146	2 000	2 600	35,0	∗ **C 2234 K**	**H 3134 L**
160	280	74	880	1 340	122	1 900	2 600	23,0	∗ **C 3036 K**	**H 3036**
	300	96	1 250	1 730	156	1 800	2 400	34,0	∗ **C 3136 K**	**H 3136 L**
	320	112	1 530	2 200	193	1 500	2 000	47,0	∗ **C 3236 K**	**H 2336**
170	290	75	930	1 460	132	1 800	2 400	24,0	∗ **C 3038 K**	**H 3038**
	320	104	1 530	2 200	196	1 600	2 200	44,0	∗ **C 3138 K**[1]	**H 3138 L**
	340	92	1 370	1 730	153	1 800	2 400	43,0	∗ **C 2238 K**	**H 3138**
180	310	82	1 120	1 730	153	1 700	2 400	30,0	∗ **C 3040 K**	**H 3040**
	340	112	1 560	2 320	200	1 500	2 000	50,5	∗ **C 3140 K**	**H 3140**
200	340	90	1 320	2 040	176	1 600	2 200	37,0	∗ **C 3044 K**	**OH 3044 H**
	370	120	1 900	2 900	245	1 400	1 900	64,0	∗ **C 3144 K**	**OH 3144 HTL**
	400	108	2 000	2 500	208	1 500	2 000	69,0	∗ **C 2244 K**	**OH 3144 H**
220	360	92	1 340	2 160	183	1 400	2 000	42,5	∗ **C 3048 K**	**OH 3048 H**
	400	128	2 320	3 450	285	1 300	1 700	77,0	∗ **C 3148 K**	**OH 3148 HTL**
240	400	104	1 760	2 850	232	1 300	1 800	59,0	∗ **C 3052 K**	**OH 3052 H**
	440	144	2 650	4 050	325	1 100	1 500	105	∗ **C 3152 K**	**OH 3152 HTL**
260	420	106	1 860	3 100	250	1 200	1 600	65,0	∗ **C 3056 K**	**OH 3056 H**
	460	146	2 850	4 500	355	1 100	1 400	115	∗ **C 3156 K**	**OH 3156 HTL**
280	460	118	2 240	3 650	285	1 100	1 500	91,0	∗ **C 3060 KM**	**OH 3060 H**
	500	160	3 250	5 200	400	1 000	1 300	150	∗ **C 3160 K**	**OH 3160 H**
300	480	121	2 280	4 000	305	1 000	1 400	95,0	∗ **C 3064 KM**	**OH 3064 H**
	540	176	4 150	6 300	480	950	1 300	190	∗ **C 3164 KM**	**OH 3164 H**
320	520	133	2 900	5 000	375	950	1 300	125	∗ **C 3068 KM**	**OH 3068 H**
	580	190	4 900	7 500	560	850	1 200	235	∗ **C 3168 KM**	**OH 3168 H**

∗ SKF Explorer bearing
[1] Please check availability of the bearing before incorporating it in a bearing arrangement design

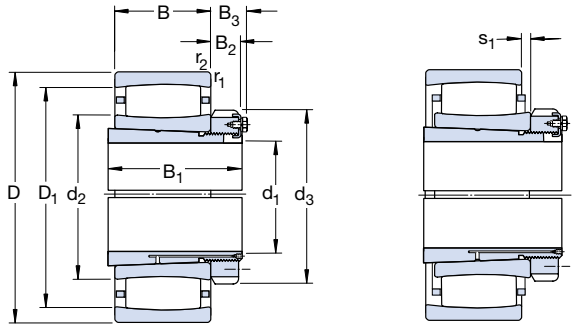


Dimensions									Abutment and fillet dimensions							Calculation factors	
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	B_3	$r_{1,2}$ min	s_1 [1] ~	d_a max	d_b min	D_a min	D_a max	B_a min	C_a [2] min	r_a max	k_1	k_2
mm									mm							–	
150	200	200	237	101	28,5	–	2,1	12,5	200	179	238	249	8	5,8	2	0,105	0,112
	200	200	249	122	28,5	–	2,1	21	200	180	250	268	8	7,6	2	0,101	0,109
	209	200	274	122	28,5	–	4	16,4	230	180	255	293	10	3	3	0,114	0,1
160	209	210	251	109	29,5	–	2,1	15,1	220	189	240	269	8	2	2	0,112	0,105
	210	210	266	131	29,5	–	3	23,2	230	191	255	286	8	2,2	2,5	0,102	0,111
	228	230	289	161	30	–	4	27,3	245	195	275	303	22	3,2	3	0,107	0,104
170	225	220	266	112	30,5	–	2,1	16,1	235	199	255	279	9	1,9	2	0,113	0,107
	228	220	289	141	30,5	–	3	19	227	202	290	306	9	9,1	2,5	0,096	0,113
	224	240	296	141	31	–	4	22,5	250	202	275	323	21	1,6	3	0,108	0,108
180	235	240	285	120	31,5	–	2,1	15,2	250	210	275	299	9	2,9	2	0,123	0,095
	245	250	305	150	32	–	3	27,3	260	212	307	326	9	0,6	2,5	0,108	0,104
200	257	260	310	126	30	41	3	17,2	270	231	295	327	9	3,1	2,5	0,114	0,104
	268	260	333	161	30	41	4	22,3	290	233	315	353	9	3,5	3	0,114	0,097
	259	280	350	161	35	–	4	20,5	295	233	320	383	21	1,7	3	0,113	0,101
220	276	290	329	133	34	46	3	19,2	290	251	315	347	11	1,3	2,5	0,113	0,106
	281	290	357	172	34	46	4	20,4	305	254	335	383	11	3,7	3	0,116	0,095
240	305	310	367	145	34	46	4	19,3	325	272	350	385	11	3,4	3	0,122	0,096
	314	310	394	190	34	46	4	26,4	340	276	375	423	11	4,1	3	0,115	0,096
260	328	330	389	152	38	50	4	21,3	350	292	375	405	12	1,8	3	0,121	0,098
	336	330	416	195	38	50	5	28,4	360	296	395	440	12	4,1	4	0,115	0,097
280	352	360	417	168	42	54	4	20	375	313	405	445	12	1,7	3	0,123	0,095
	362	380	448	208	40	53	5	30,5	390	318	425	480	12	4,9	4	0,106	0,106
300	376	380	440	171	42	55	4	23,3	395	334	430	465	13	1,8	3	0,121	0,098
	372	400	476	226	42	56	5	26,7	410	338	455	520	13	3,9	4	0,114	0,096
320	402	400	482	187	45	58	5	25,4	430	355	465	502	14	1,9	4	0,12	0,099
	405	440	517	254	55	72	5	25,9	445	360	490	560	14	4,2	4	0,118	0,093

[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

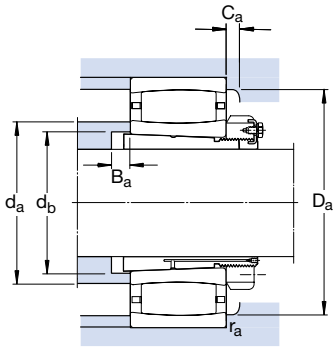
CARB toroidal roller bearings on adapter sleeve

d_1 **340 – 530** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
340	480	90	1 760	3 250	245	1 000	1 400	73,0	∗**C 3972 KM**	**OH 3972 HE**
	540	134	2 900	5 000	375	900	1 200	135	∗**C 3072 KM**	**OH 3072 H**
	600	192	5 000	8 000	585	800	1 100	250	∗**C 3172 KM**	**OH 3172 H**
360	520	106	2 120	4 000	300	950	1 300	96,0	∗**C 3976 KMB**[1)]	**OH 3976 HE**
	560	135	3 000	5 200	390	900	1 200	145	∗**C 3076 KM**	**OH 3076 H**
	620	194	4 550	7 500	540	750	1 000	290	∗**C 3176 KMB**[1)]	**OH 3176 HE**
380	540	106	2 160	4 150	305	900	1 300	105	∗**C 3980 KMB**[1)]	**OH 3980 HE**
	600	148	3 650	6 200	450	800	1 100	175	∗**C 3080 KM**	**OH 3080 H**
	650	200	4 200	8 300	585	700	950	345	∗**C 3180 KMB**	**OH 3180 HE**
400	560	106	2 160	4 250	310	850	1 200	105	∗**C 3984 KM**	**OH 3984 HE**
	620	150	3 800	6 400	465	800	1 100	180	∗**C 3084 KM**	**OH 3084 H**
	700	224	6 000	10 400	720	670	900	395	∗**C 3184 KM**	**OH 3184 H**
410	600	118	2 750	5 300	375	800	1 100	155	∗**C 3988 KMB**[1)]	**OH 3988 HE**
	650	157	3 900	6 700	480	750	1 000	250	∗**C 3088 KMB**	**OH 3088 HE**
	720	226	5 700	9 300	655	670	900	475	∗**C 3188 KMB**[1)]	**OH 3188 HE**
430	620	118	2 700	5 300	375	800	1 100	160	∗**C 3992 KMB**[1)]	**OH 3992 HE**
	680	163	4 000	7 500	510	700	950	270	∗**C 3092 KM**	**OH 3092 H**
	760	240	6 800	12 000	815	600	800	540	∗**C 3192 KM**	**OH 3192 H**
450	650	128	3 100	6 100	430	750	1 000	185	∗**C 3996 KM**	**OH 3996 H**
	700	165	4 050	7 800	530	670	900	275	∗**C 3096 KM**	**OH 3096 H**
	790	248	6 950	12 500	830	560	750	620	∗**C 3196 KMB**[1)]	**OH 3196 HE**
470	670	128	3 150	6 300	440	700	950	195	∗**C 39/500 KM**	**OH 39/500 HE**
	720	167	4 250	8 300	560	630	900	305	∗**C 30/500 KM**	**OH 30/500 H**
	830	264	7 500	12 700	850	530	750	690	∗**C 31/500 KM**	**OH 31/500 H**
500	710	136	3 560	7 100	480	670	900	230	∗**C 39/530 KM**	**OH 39/530 HE**
	780	185	5 100	9 500	640	600	800	390	∗**C 30/530 KM**	**OH 30/530 H**
	870	272	8 800	15 600	1 000	500	670	770	∗**C 31/530 KM**	**OH 31/530 H**
530	750	140	3 600	7 350	490	600	850	260	∗**C 39/560 KM**	**OH 39/560 HE**
	820	195	5 600	11 000	720	530	750	440	∗**C 30/560 KM**	**OH 30/560 H**
	920	280	9 500	17 000	1 100	480	670	930	∗**C 31/560 KMB**[1)]	**OH 31/560 HE**

∗ SKF Explorer bearing
[1)] Please check availability of the bearing before incorporating it in a bearing arrangement design

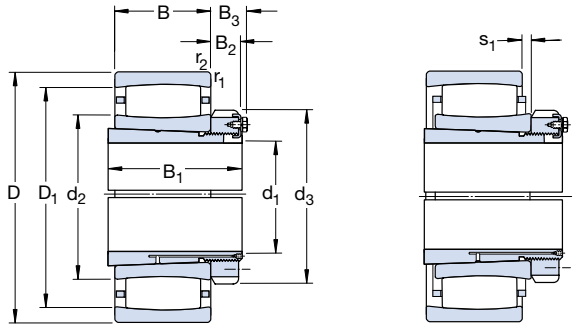


Dimensions									Abutment and fillet dimensions							Calculation factors	
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	B_3	$r_{1,2}$ min	s_1 [1] ~	d_a max	d_b min	D_a min	D_a max	B_a min	C_a [2] min	r_a max	k_1	k_2
mm									mm							–	
340	394	420	450	144	45	58	3	17,2	405	372	440	467	14	1,6	2,5	0,127	0,104
	417	420	497	188	45	58	5	26,4	445	375	480	522	14	2	4	0,12	0,099
	423	460	537	259	58	75	5	27,9	460	380	510	580	14	3,9	4	0,117	0,094
360	429	450	489	164	48	62	4	10	425	393	490	505	15	9,7	3	–	0,128
	431	450	511	193	48	62	5	27	460	396	495	542	15	2	4	0,12	0,1
	450	490	550	264	60	77	5	19	445	401	555	600	15	16,4	4	–	0,106
380	440	470	500	168	52	66	4	10	435	413	505	525	15	9,7	3	–	0,128
	458	470	553	210	52	66	5	30,6	480	417	525	582	15	2,1	4	0,121	0,099
	485	520	589	272	62	82	6	10,1	480	421	565	624	15	4,4	5	–	0,109
400	462	490	522	168	52	66	4	21,3	480	433	515	545	15	1,8	3	0,132	0,098
	475	490	570	212	52	66	5	32,6	510	437	550	602	16	2,2	4	0,12	0,1
	508	540	618	304	70	90	6	34,8	540	443	595	674	16	3,8	5	0,113	0,098
410	495	520	564	189	60	77	4	11	490	454	565	585	17	10,5	3	–	0,119
	491	520	587	228	60	77	6	19,7	490	458	565	627	17	1,7	5	–	0,105
	514	560	633	307	70	90	6	22	510	463	635	694	17	19,1	5	–	0,102
430	508	540	577	189	60	77	4	11	505	474	580	605	17	10,4	3	–	0,12
	539	540	624	234	60	77	6	33,5	565	478	605	657	17	2,3	5	0,114	0,108
	559	580	679	326	75	95	7,5	51	570	484	655	728	17	4,2	6	0,108	0,105
450	529	560	604	200	60	77	5	20,4	550	496	590	632	18	2	4	0,133	0,095
	555	560	640	237	60	77	6	35,5	580	499	625	677	18	2,3	5	0,113	0,11
	583	620	700	335	75	95	7,5	24	580	505	705	758	18	20,6	6	–	0,104
470	556	580	631	208	68	85	5	20,4	580	516	615	652	18	2	4	0,135	0,095
	572	580	656	247	68	85	6	37,5	600	519	640	697	18	2,3	5	0,113	0,111
	605	630	738	356	80	100	7,5	75,3	655	527	705	798	18	–	6	0,099	0,116
500	578	630	657	216	68	90	5	28,4	600	547	640	692	20	2,2	4	0,129	0,101
	601	630	704	265	68	90	6	35,7	635	551	685	757	20	2,5	5	0,12	0,101
	635	670	781	364	80	105	7,5	44,4	680	558	745	838	20	4,8	6	0,115	0,097
530	622	650	701	227	75	97	5	32,4	645	577	685	732	20	2,3	4	0,128	0,104
	660	650	761	282	75	97	6	45,7	695	582	740	797	20	2,7	5	0,116	0,106
	664	710	808	377	85	110	7,5	28	660	589	810	888	20	23,8	6	–	0,111

[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (→ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (→ **page 788**)

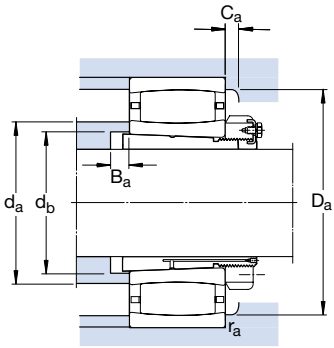
CARB toroidal roller bearings on adapter sleeve

d_1 **560 – 1 000** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
560	800	150	4 000	8 800	570	560	750	325	∗ **C 39/600 KM**	**OH 39/600 HE**
	870	200	6 300	12 200	780	500	700	520	∗ **C 30/600 KM**	**OH 30/600 H**
	980	300	10 200	18 000	1 120	430	600	1 100	∗ **C 31/600 KMB**[1)]	**OH 31/600 HE**
600	850	165	4 650	10 000	640	530	700	420	∗ **C 39/630 KM**	**OH 39/630 HE**
	920	212	6 800	12 900	830	480	670	635	∗ **C 30/630 KM**	**OH 30/630 H**
	1 030	315	12 200	22 000	1 370	400	560	1 280	∗ **C 31/630 KMB**[1)]	**OH 31/630 HE**
630	900	170	4 900	11 200	695	480	630	455	∗ **C 39/670 KM**	**OH 39/670 H**
	980	230	8 150	16 300	1 000	430	600	750	∗ **C 30/670 KM**	**OH 30/670 H**
	1 090	336	12 000	22 000	1 320	380	530	1 550	∗ **C 31/670 KMB**[1)]	**OH 31/670 HE**
670	950	180	6 000	12 500	780	450	630	520	∗ **C 39/710 KM**	**OH 39/710 HE**
	1 030	236	8 800	17 300	1 060	400	560	865	∗ **C 30/710 KM**	**OH 30/710 H**
	1 150	345	12 700	24 000	1 430	360	480	1 800	∗ **C 31/710 KMB**[1)]	**OH 31/710 HE**
710	1 000	185	6 100	13 400	815	430	560	590	∗ **C 39/750 KM**	**OH 39/750 HE**
	1 090	250	9 000	18 000	1 100	380	530	1 000	∗ **C 30/750 KMB**[1)]	**OH 30/750 HE**
	1 220	365	16 000	30 500	1 800	320	450	2 150	∗ **C 31/750 KMB**[1)]	**OH 31/750 HE**
750	1 060	195	6 400	14 600	865	380	530	715	∗ **C 39/800 KM**	**OH 39/800 HE**
	1 150	258	9 150	18 600	1 120	360	480	1 150	∗ **C 30/800 KMB**[1)]	**OH 30/800 HE**
	1 280	375	15 600	30 500	1 760	300	400	2 400	∗ **C 31/800 KMB**[1)]	**OH 31/800 HE**
800	1 120	200	7 350	16 300	965	360	480	785	∗ **C 39/850 KM**	**OH 39/850 HE**
	1 220	272	11 200	24 000	1 370	320	430	1 050	∗ **C 30/850 KMB**[1)]	**OH 30/850 HE**
	1 360	400	16 000	32 000	1 830	280	380	2 260	∗ **C 31/850 KMB**[1)]	**OH 31/850 HE**
850	1 180	206	8 150	18 000	1 060	340	450	900	∗ **C 39/900 KMB**[1)]	**OH 39/900 HE**
	1 280	280	12 700	26 500	1 530	300	400	1 520	∗ **C 30/900 KM**	**OH 30/900 H**
900	1 250	224	9 300	22 000	1 250	300	430	1 100	∗ **C 39/950 KM**	**OH 39/950 HE**
	1 360	300	12 900	27 500	1 560	280	380	1 800	∗ **C 30/950 KMB**[1)]	**OH 30/950 HE**
950	1 420	308	13 400	29 000	1 830	260	340	2 000	∗ **C 30/1000 KMB**[1)]	**OH 30/1000 HE**
	1 580	462	22 800	45 500	2 500	220	300	4 300	∗ **C 31/1000 KMB**[1)]	**OH 31/1000 HE**
1 000	1 400	250	12 500	29 000	1 600	260	340	1 500	∗ **C 39/1060 KMB**[1)]	**OH 39/1060 HE**

∗ SKF Explorer bearing
[1)] Please check availability of the bearing before incorporating it in a bearing arrangement design

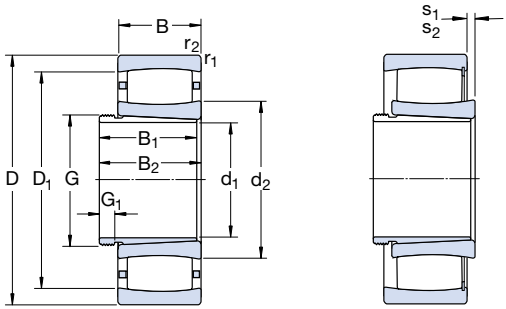


Dimensions									Abutment and fillet dimensions							Calculation factors	
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	B_3	$r_{1,2}$ min	s_1 [1] ~	d_a max	d_b min	D_a min	D_a max	B_a min	C_a [2] min	r_a max	k_1	k_2
mm									mm							–	
560	666	700	744	239	75	97	5	32,4	685	619	725	782	22	2,4	4	0,131	0,1
	692	700	805	289	75	97	6	35,9	725	623	775	847	22	2,7	5	0,125	0,098
	710	750	870	399	85	110	7,5	30	705	632	875	948	22	25,4	6	–	0,105
600	700	730	784	254	75	97	6	35,5	720	650	770	827	22	2,4	5	0,121	0,11
	717	730	840	301	75	97	7,5	48,1	755	654	810	892	22	2,9	6	0,118	0,104
	749	800	919	424	95	120	7,5	31	745	663	920	998	22	26,8	6	–	0,109
630	764	780	848	264	80	102	6	40,5	765	691	830	877	22	2,5	5	0,121	0,113
	775	780	904	324	80	102	7,5	41,1	820	696	875	952	22	2,9	6	0,121	0,101
	797	850	963	456	106	131	7,5	33	795	705	965	1 058	22	28	6	–	0,104
670	773	830	877	286	90	112	6	30,7	795	732	850	927	26	2,7	5	0,131	0,098
	807	830	945	342	90	112	7,5	47,3	850	736	910	1 002	26	3,2	6	0,119	0,104
	848	900	1 012	467	106	135	9,5	34	845	745	1 015	1 110	26	28,6	8	–	0,102
710	830	870	933	291	90	112	6	35,7	855	772	910	977	26	2,7	5	0,131	0,101
	858	870	993	356	90	112	7,5	25	855	778	995	1 062	26	21,8	6	–	0,112
	888	950	1 076	493	112	141	9,5	36	885	787	1 080	1 180	26	31,5	8	–	0,117
750	889	920	990	303	90	112	6	45,7	915	825	970	1 037	28	2,9	5	0,126	0,106
	913	920	1 047	366	90	112	7,5	25	910	829	1 050	1 122	28	22,3	6	–	0,111
	947	1 000	1 133	505	112	141	9,5	37	945	838	1 135	1 240	28	32,1	8	–	0,115
800	940	980	1 053	308	90	115	6	35,9	960	876	1 025	1 097	28	2,9	5	0,135	0,098
	968	980	1 113	380	90	115	7,5	27	965	880	1 115	1 192	28	24,1	6	–	0,124
	1 020	1 060	1 200	536	118	147	12	40	1 015	890	1 205	1 312	28	33,5	10	–	0,11
850	989	1 030	1 113	326	100	125	6	20	985	924	1 115	1 157	30	18,4	5	–	0,132
	1 008	1 030	1 172	400	100	125	7,5	45,8	1 050	931	1 130	1 252	30	3,4	6	0,124	0,1
900	1 044	1 080	1 167	344	100	125	7,5	35	1 080	976	1 145	1 222	30	3,1	6	0,134	0,098
	1 080	1 080	1 240	420	100	125	7,5	30	1 075	983	1 245	1 332	30	26,2	6	–	0,116
950	1 136	1 140	1 294	430	100	125	7,5	30	1 135	1 034	1 295	1 392	33	26,7	6	–	0,114
	1 179	1 240	1 401	609	125	154	12	46	1 175	1 047	1 405	1 532	33	38,6	10	–	0,105
1 000	1 175	1 200	1 323	372	100	125	7,5	25	1 170	1 090	1 325	1 392	33	23,4	6	–	0,142

[1] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[2] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

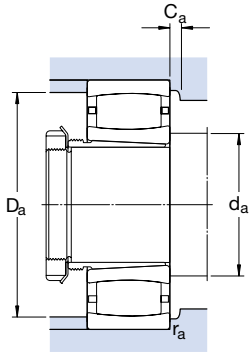
CARB toroidal roller bearings on withdrawal sleeve

d_1 **35 – 85** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
35	80	23	90	86,5	10,2	8 000	11 000	0,59	∗ **C 2208 KTN9**	**AH 308**
	80	23	102	104	12	–	4 500	0,62	∗ **C 2208 KV**	**AH 308**
40	85	23	93	93	10,8	8 000	11 000	0,67	∗ **C 2209 KTN9**	**AH 309**
	85	23	106	110	12,9	–	4 300	0,70	∗ **C 2209 KV**	**AH 309**
45	90	23	98	100	11,8	7 000	9 500	0,72	∗ **C 2210 KTN9**	**AHX 310**
	90	23	114	122	14,3	–	3 800	0,75	∗ **C 2210 KV**	**AHX 310**
50	100	25	116	114	13,4	6 700	9 000	0,95	∗ **C 2211 KTN9**	**AHX 311**
	100	25	132	134	15,6	–	3 400	0,97	∗ **C 2211 KV**	**AHX 311**
55	110	28	143	156	18,3	5 600	7 500	1,30	∗ **C 2212 KTN9**	**AHX 312**
	110	28	166	190	22,4	–	2 800	1,35	∗ **C 2212 KV**	**AHX 312**
60	120	31	180	180	21,2	5 300	7 500	1,60	∗ **C 2213 KTN9**	**AH 313 G**
	120	31	204	216	25,5	–	2 400	1,70	∗ **C 2213 KV**	**AH 313 G**
65	125	31	186	196	22,8	5 000	7 000	1,70	∗ **C 2214 KTN9**	**AH 314 G**
	125	31	212	228	26,5	–	2 400	1,75	∗ **C 2214 KV**	**AH 314 G**
	150	51	405	430	49	3 800	5 000	4,65	∗ **C 2314 K**	**AHX 2314 G**
70	130	31	196	208	24	4 800	6 700	1,90	∗ **C 2215 K**	**AH 315 G**
	130	31	220	240	28	–	2 200	1,95	∗ **C 2215 KV**	**AH 315 G**
	160	55	425	465	52	3 600	4 800	5,65	∗ **C 2315 K**	**AHX 2315 G**
75	140	33	220	250	28,5	4 500	6 000	2,35	∗ **C 2216 K**	**AH 316**
	140	33	255	305	34,5	–	2 000	2,45	∗ **C 2216 KV**	**AH 316**
	170	58	510	550	60	3 400	4 500	6,75	∗ **C 2316 K**	**AHX 2316**
80	150	36	275	320	35,5	4 300	5 600	3,00	∗ **C 2217 K**	**AHX 317**
	150	36	315	390	44	–	1 800	3,20	∗ **C 2217 KV**	**AHX 317**
	180	60	540	600	64	3 200	4 300	7,90	∗ **C 2317 K**	**AHX 2317**
85	160	40	325	380	41,5	3 800	5 300	3,75	∗ **C 2218 K**	**AHX 318**
	160	40	365	440	49	–	1 500	3,85	∗ **C 2218 KV**	**AHX 318**
	190	64	610	695	73,5	2 800	4 000	9,00	∗ **C 2318 K**	**AHX 2318**

∗ SKF Explorer bearing

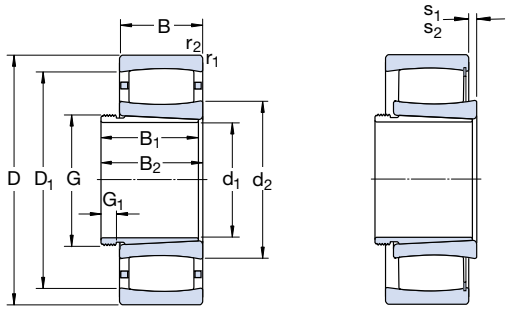


Dimensions										Abutment and fillet dimensions						Calculation factors	
d_1	d_2 ~	D_1 ~	B_1	B_2 [1] ~	G	G_1	$r_{1,2}$ min	s_1 [2] ~	s_2 [2] ~	d_a min	d_a max	D_a min	D_a max	C_a [3] min	r_a max	k_1	k_2
mm										mm						–	
35	52,4	69,9	29	32	M 45×1,5	6	1,1	7,1	–	47	52	68	73	0,3	1	0,093	0,128
	52,4	69,9	29	32	M 45×1,5	6	1,1	7,1	4,1	47	66	–	73	–	1	0,093	0,128
40	55,6	73,1	31	34	M 50×1,5	6	1,1	7,1	–	52	55	71	78	0,3	1	0,095	0,128
	55,6	73,1	31	34	M 50×1,5	6	1,1	7,1	4,1	52	69	–	78	–	1	0,095	0,128
45	61,9	79,4	35	38	M 55×2	7	1,1	7,1	–	57	61	77	83	0,8	1	0,097	0,128
	61,9	79,4	35	38	M 55×2	7	1,1	7,1	3,9	57	73	–	83	–	1	0,097	0,128
50	65,8	86,7	37	40	M 60×2	7	1,5	8,6	–	64	65	84	91	0,3	1,5	0,094	0,133
	65,8	86,7	37	40	M 60×2	7	1,5	8,6	5,4	64	80	–	91	–	1,5	0,094	0,133
55	77,1	97,9	40	43	M 65×2	8	1,5	8,5	–	69	77	95	101	0,3	1,5	0,1	0,123
	77,1	97,9	40	43	M 65×2	8	1,5	8,5	5,3	69	91	–	101	–	1,5	0,1	0,123
60	79	106	42	45	M 70×2	8	1,5	9,6	–	74	79	102	111	0,2	1,5	0,097	0,127
	79	106	42	45	M 70×2	8	1,5	9,6	5,3	74	97	–	111	–	1,5	0,097	0,127
65	83,7	111	43	47	M 75×2	8	1,5	9,6	–	79	83	107	116	0,4	1,5	0,098	0,127
	83,7	111	43	47	M 75×2	8	1,5	9,6	5,3	79	102	–	116	–	1,5	0,098	0,127
	91,4	130	64	68	M 75×2	12	2,1	9,1	–	82	115	120	138	2,2	2	0,11	0,099
70	88,5	115	45	49	M 80×2	8	1,5	9,6	–	84	98	110	121	1,2	1,5	0,099	0,127
	88,5	115	45	49	M 80×2	8	1,5	9,6	5,3	84	105	–	121	–	1,5	0,099	0,127
	98,5	135	68	72	M 80×2	12	2,1	13,1	–	87	110	130	148	2,2	2	0,103	0,107
75	98,1	125	48	52	M 90×2	8	2	9,1	–	91	105	120	129	1,2	2	0,104	0,121
	98,1	125	48	52	M 90×2	8	2	9,1	4,8	91	115	–	129	–	2	0,104	0,121
	102	145	71	75	M 90×2	12	2,1	10,1	–	92	115	135	158	2,4	2	0,107	0,101
80	104	133	52	56	M 95×2	9	2	7,1	–	96	110	125	139	1,3	2	0,114	0,105
	104	133	52	56	M 95×2	9	2	7,1	1,7	96	115	–	139	–	2	0,114	0,105
	110	153	74	78	M 95×2	13	3	12,1	–	99	125	145	166	2,4	2,5	0,105	0,105
85	112	144	53	57	M 100×2	9	2	9,5	–	101	120	130	149	1,4	2	0,104	0,117
	112	144	53	57	M 100×2	9	2	9,5	5,4	101	125	–	149	–	2	0,104	0,117
	119	166	79	83	M 100×2	14	3	9,6	–	104	135	155	176	2	2,5	0,108	0,101

[1] Width before sleeve is driven into bearing bore
[2] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[3] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

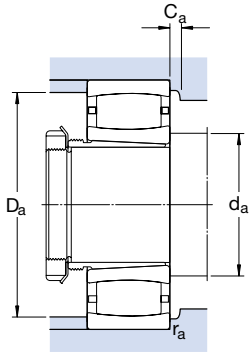
CARB toroidal roller bearings on withdrawal sleeve

d_1 **90 – 145** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
90	170	43	360	400	44	3 800	5 000	4,50	∗ **C 2219 K**[1)]	**AHX 319**
	200	67	610	695	73,5	2 800	4 000	11,0	∗ **C 2319 K**	**AHX 2319**
95	165	52	415	540	58,5	3 200	4 300	5,00	∗ **C 3120 K**[1)]	**AHX 3120**
	165	52	475	655	69,5	–	1 300	5,00	∗ **C 3120 KV**	**AHX 3120**
	180	46	415	465	49	3 600	4 800	5,30	∗ **C 2220 K**	**AHX 320**
	215	73	800	880	90	2 600	3 600	13,5	∗ **C 2320 K**	**AHX 2320**
105	170	45	355	480	51	3 200	4 500	4,25	∗ **C 3022 K**[1)]	**AHX 3122**
	180	69	670	1 000	104	–	900	7,75	∗ **C 4122 K30V**	**AH 24122**
	200	53	530	620	64	3 200	4 300	7,65	∗ **C 2222 K**	**AHX 3122**
115	180	46	375	530	55	3 000	4 000	4,60	∗ **C 3024 K**	**AHX 3024**
	180	46	430	640	65,5	–	1 400	4,75	∗ **C 3024 KV**	**AHX 3024**
	180	60	530	880	91,5	–	1 100	6,20	∗ **C 4024 K30V**	**AH 24024**
	200	80	780	1 120	114	–	750	11,5	∗ **C 4124 K30V**[1)]	**AH 24124**
	215	58	610	710	72	3 000	4 000	9,50	∗ **C 2224 K**[1)]	**AHX 3124**
	215	76	750	980	98	2 400	3 200	13,0	∗ **C 3224 K**	**AHX 3224 G**
125	200	52	390	585	58,5	2 800	3 800	6,80	∗ **C 3026 K**[1)]	**AHX 3026**
	200	69	620	930	91,5	1 900	2 800	8,70	∗ **C 4026 K30**	**AH 24026**
	200	69	720	1 120	112	–	850	8,90	∗ **C 4026 K30V**	**AH 24026**
	210	80	750	1 100	108	–	670	11,5	∗ **C 4126 K30V/VE240**	**AH 24126**
	230	64	735	930	91,5	2 800	3 800	12,0	∗ **C 2226 K**	**AHX 3126**
135	210	53	490	735	72	2 600	3 400	7,30	∗ **C 3028 K**[1)]	**AHX 3028**
	210	69	750	1 220	120	–	800	9,50	∗ **C 4028 K30V**	**AH 24028**
	225	85	1 000	1 600	153	–	630	15,5	∗ **C 4128 K30V**	**AH 24128**
	250	68	830	1 060	102	2 400	3 400	15,5	∗ **C 2228 K**	**AHX 3128**
145	225	56	540	850	83	2 400	3 200	9,40	∗ **C 3030 KMB**	**AHX 3030**
	225	75	780	1 320	127	–	750	11,5	∗ **C 4030 K30V**	**AH 24030**
	250	80	880	1 290	122	2 000	2 800	16,5	∗ **C 3130 K**	**AHX 3130 G**
	250	100	1 220	1 860	173	–	450	22,0	∗ **C 4130 K30V**[1)]	**AH 24130**
	270	73	980	1 220	114	2 400	3 200	19,0	∗ **C 2230 K**	**AHX 3130 G**

∗ SKF Explorer bearing
[1)] Please check availability of the bearing before incorporating it in a bearing arrangement design

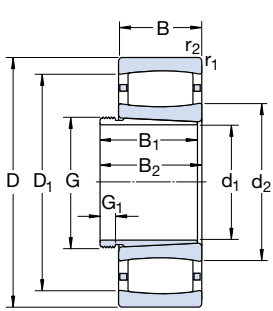


Dimensions										Abutment and fillet dimensions						Calculation factors	
d_1	d_2 ~	D_1 ~	B_1	B_2 [1] ~	G	G_1	$r_{1,2}$ min	s_1 [2] ~	s_2 [2] ~	d_a min	d_a max	D_a min	D_a max	C_a [3] min	r_a max	k_1	k_2
mm										mm						–	
90	113	149	57	61	M 105×2	10	2,1	10,5	–	107	112	149	158	4,2	2	0,114	0,104
	120	166	85	89	M 105×2	16	3	12,6	–	109	135	155	186	2,1	2,5	0,103	0,106
95	119	150	64	68	M 110×2	11	2	10	–	111	119	150	154	4,5	2	0,1	0,112
	119	150	64	68	M 110×2	11	2	10	4,7	111	125	–	154	–	2	0,1	0,112
	118	157	59	63	M 110×2	10	2,1	10,1	–	112	130	150	168	0.9	2	0,108	0,11
	126	185	90	94	M 110×2	16	3	11.2	–	114	150	170	201	3,2	2,5	0,113	0,096
105	128	156	68	72	M 120×2	11	2	9,5	–	119	127	157	161	4	2	0,107	0,11
	132	163	82	91	M 115×2	13	2	11,4	4,6	120	145	–	170	–	2	0,111	0,097
	132	176	68	72	M 120×2	11	2,1	11,1	–	122	150	165	188	1,9	2	0,113	0,103
115	138	166	60	64	M 130×2	13	2	10,6	–	129	145	160	171	0,9	2	0,111	0,109
	138	166	60	64	M 130×2	13	2	10,6	3,8	129	150	–	171	–	2	0,111	0,109
	140	164	73	82	M 125×2	13	2	12	5,2	129	150	–	171	–	2	0,109	0,103
	140	176					2	18	11,2	131	140	–	189	–	2	0,103	0,103
	144	191	75	79	M 130×2	12	2,1	13	–	132	143	192	203	5,4	2	0,113	0,103
	149	190	90	94	M 130×2	13	2,1	17,1	–	132	160	180	203	2,4	2	0,103	0,108
125	154	180	67	71	M 140×2	14	2	16,5	–	139	152	182	191	4,4	2	0,123	0,1
	149	181	83	93	M 140×2	14	2	11,4	–	139	155	175	191	1,9	2	0,113	0,097
	149	181	83	93	M 135×2	14	2	11,4	4,6	139	165	–	191	–	2	0,113	0,097
	153	190	94	104	M 140×2	14	2	9,7	9,7	141	170	–	199	–	2	0,09	0,126
	152	199	78	82	M 140×2	12	3	9,6	–	144	170	185	216	1,1	2,5	0,113	0,101
135	163	194	68	73	M 150×2	14	2	11	–	149	161	195	201	4,7	2	0,102	0,116
	161	193	83	93	M 145×2	14	2	11,4	5,9	149	175	–	201	–	2	0,115	0,097
	167	203	99	109	M 150×2	14	2,1	12	5,2	151	185	–	214	–	2	0,111	0,097
	173	223	83	88	M 150×2	14	3	13,7	–	154	190	210	236	2,3	2,5	0,109	0,108
145	173	204	72	77	M 160×3	15	2,1	2,8	–	161	172	200	214	1,3	2	–	0,108
	173	204	90	101	M 155×3	15	2,1	17,4	10,6	161	185	–	214	–	2	0,107	0,106
	182	226	96	101	M 160×3	15	2,1	13,9	–	162	195	215	238	2,3	2	0,12	0,092
	179	222	115	126	M 160×3	15	2,1	20	10,1	162	175	–	228	–	2	0,103	0,103
	177	236	96	101	M 160×3	15	3	11,2	–	164	200	215	256	2,5	2,5	0,119	0,096

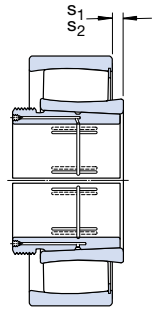
[1] Width before sleeve is driven into bearing bore
[2] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[3] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

CARB toroidal roller bearings on withdrawal sleeve

d_1 **150 – 220** mm



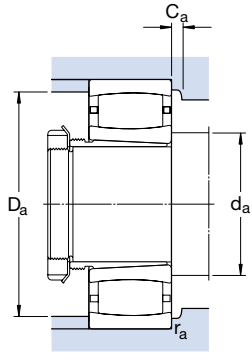
Bearing on withdrawal sleeve of AH design



Bearing on withdrawal sleeve of AOH design for oil injection

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
150	240	60	570	915	86,5	2 200	3 000	11,5	∗ **C 3032 K**[1]	**AH 3032**
	240	80	795	1 160	110	1 600	2 400	14,7	∗ **C 4032 K30**	**AH 24032**
	240	80	915	1 460	140	–	600	15,0	∗ **C 4032 K30V**	**AH 24032**
	270	86	1 000	1 400	132	2 000	2 600	23,0	∗ **C 3132 K**[1]	**AH 3132 G**
	270	109	1 460	2 160	200	–	300	29,0	∗ **C 4132 K30V**[1]	**AH 24132**
	290	104	1 370	1 830	170	1 700	2 400	31,0	∗ **C 3232 K**	**AH 3232 G**
160	260	67	750	1 160	108	2 000	2 800	15,0	∗ **C 3034 K**[1]	**AH 3034**
	260	90	1 140	1 860	173	–	480	20,0	∗ **C 4034 K30V**	**AH 24034**
	280	88	1 040	1 460	137	1 900	2 600	24,0	∗ **C 3134 K**[1]	**AH 3134 G**
	280	109	1 530	2 280	208	–	280	30,0	∗ **C 4134 K30V**[1]	**AH 24134**
	310	86	1 270	1 630	146	2 000	2 600	31,0	∗ **C 2234 K**	**AH 3134 G**
170	280	74	880	1 340	122	1 900	2 600	19,0	∗ **C 3036 K**	**AH 3036**
	280	100	1 320	2 120	196	–	430	26,0	∗ **C 4036 K30V**	**AH 24036**
	300	96	1 250	1 730	156	1 800	2 400	30,0	∗ **C 3136 K**	**AH 3136 G**
	300	118	1 760	2 700	240	–	220	38,0	∗ **C 4136 K30V**[1]	**AH 24136**
	320	112	1 530	2 200	193	1 500	2 000	41,5	∗ **C 3236 K**	**AH 3236 G**
180	290	75	930	1 460	132	1 800	2 400	20,5	∗ **C 3038 K**	**AH 3038 G**
	290	100	1 370	2 320	204	–	380	28,0	∗ **C 4038 K30V**[1]	**AH 24038**
	320	104	1 530	2 200	196	1 600	2 200	38,0	∗ **C 3138 K**[1]	**AH 3138 G**
	320	128	2 040	3 150	275	–	130	47,5	∗ **C 4138 K30V**[1]	**AH 24138**
	340	92	1 370	1 730	153	1 800	2 400	38,0	∗ **C 2238 K**	**AH 2238 G**
190	310	82	1 120	1 730	153	1 700	2 400	25,5	∗ **C 3040 K**	**AH 3040 G**
	310	109	1 630	2 650	232	–	260	34,5	∗ **C 4040 K30V**[1]	**AH 24040**
	340	112	1 560	2 320	200	1 500	2 000	45,5	∗ **C 3140 K**	**AH 3140**
	340	140	2 360	3 650	315	–	80	59,0	∗ **C 4140 K30V**[1]	**AH 24140**
200	340	90	1 320	2 040	176	1 600	2 200	36,0	∗ **C 3044 K**	**AOH 3044 G**
	340	118	1 930	3 250	275	–	200	48,0	∗ **C 4044 K30V**[1]	**AOH 24044**
	370	120	1 900	2 900	245	1 400	1 900	60,0	∗ **C 3144 K**	**AOH 3144**
	400	108	2 000	2 500	208	1 500	2 000	65,5	∗ **C 2244 K**	**AOH 2244**
220	360	92	1 340	2 160	183	1 400	2 000	39,5	∗ **C 3048 K**	**AOH 3048**
	400	128	2 320	3 450	285	1 300	1 700	75,0	∗ **C 3148 K**	**AOH 3148**

∗ SKF Explorer bearing
[1] Please check availability of the bearing before incorporating it in a bearing arrangement design

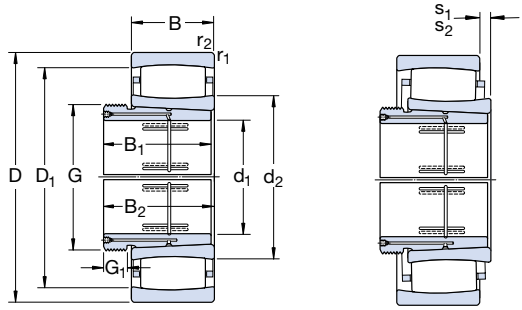


Dimensions										Abutment and fillet dimensions						Calculation factors	
d_1	d_2 ~	D_1 ~	B_1	B_2 [1] ~	G	G_1	$r_{1,2}$ min	s_1 [2] ~	s_2 [2] ~	d_a min	d_a max	D_a min	D_a max	C_a [3] min	r_a max	k_1	k_2
mm										mm						–	
150	187	218	77	82	M 170×3	16	2,1	15	–	171	186	220	229	5,1	2	0,115	0,106
	181	217	95	106	M 170×3	15	2,1	18,1	–	171	190	210	229	2,2	2	0,109	0,103
	181	217	95	106	M 170×3	15	2,1	18,1	8,2	171	195	–	229	–	2	0,109	0,103
	191	240	103	108	M 170×3	16	2,1	19	–	172	190	242	258	7,5	2	0,099	0,111
	190	241	124	135	M 170×3	15	2,1	21	11,1	172	190	–	258	–	2	0,101	0,105
	194	256	124	130	M 170×3	20	3	19,3	–	174	215	245	276	2,6	2,5	0,112	0,096
160	200	237	85	90	M 180×3	17	2,1	12,5	–	181	200	238	249	5,8	2	0,105	0,112
	195	235	106	117	M 180×3	16	2,1	17,1	7,2	181	215	–	249	–	2	0,108	0,103
	200	249	104	109	M 180×3	16	2,1	21	–	182	200	250	268	7,6	2	0,101	0,109
	200	251	125	136	M 180×3	16	2,1	21	11,1	182	200	–	268	–	2	0,101	0,106
	209	274	104	109	M 180×3	16	4	16,4	–	187	230	255	293	3	3	0,114	0,1
170	209	251	92	98	M 190×3	17	2,1	15,1	–	191	220	240	269	2	2	0,112	0,105
	203	247	116	127	M 190×3	16	2,1	20,1	10,2	191	225	–	269	–	2	0,107	0,103
	210	266	116	122	M 190×3	19	3	23,2	–	194	230	255	286	2,2	2,5	0,102	0,111
	211	265	134	145	M 190×3	16	3	20	10,1	194	210	–	286	–	2,5	0,095	0,11
	228	289	140	146	M 190×3	24	4	27,3	–	197	245	275	303	3,2	3	0,107	0,104
180	225	266	96	102	M 200×3	18	2,1	16,1	–	201	235	255	279	1,9	2	0,113	0,107
	220	263	118	131	M 200×3	18	2,1	20	10,1	201	220	–	279	–	2	0,103	0,106
	228	289	125	131	M 200×3	20	3	19	–	204	227	290	306	9,1	2,5	0,096	0,113
	222	284	146	159	M 200×3	18	3	20	10,1	204	220	–	306	–	2,5	0,094	0,111
	224	296	112	117	M 200×3	18	4	22,5	–	207	250	275	323	1,6	3	0,108	0,108
190	235	285	102	108	Tr 210×4	19	2,1	15,2	–	211	250	275	299	2,9	2	0,123	0,095
	229	280	127	140	Tr 210×4	18	2,1	21	11,1	211	225	–	299	–	2	0,101	0,108
	245	305	134	140	Tr 220×4	21	3	27,3	–	214	260	307	326	0,6	2,5	0,108	0,104
	237	302	158	171	Tr 210×4	18	3	22	12,1	214	235	–	326	–	2,5	0,092	0,112
200	257	310	111	117	Tr 230×4	20	3	17,2	–	233	270	295	327	3,1	2,5	0,114	0,104
	251	306	138	152	Tr 230×4	20	3	20	10,1	233	250	–	327	–	2,5	0,095	0,113
	268	333	145	151	Tr 240×4	23	4	22,3	–	237	290	315	353	3,5	3	0,114	0,097
	259	350	145	151	Tr 240×4	23	4	20,5	–	237	295	320	383	1,7	3	0,113	0,101
220	276	329	116	123	Tr 260×4	21	3	19,2	–	253	290	315	347	1,3	2,5	0,113	0,106
	281	357	154	161	Tr 260×4	25	4	20,4	–	257	305	335	383	3,7	3	0,116	0,095

[1] Width before sleeve is driven into bearing bore
[2] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[3] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

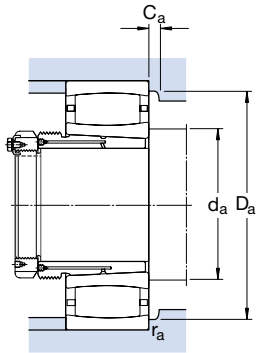
CARB toroidal roller bearings on withdrawal sleeve

d_1 **240 – 460** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
240	400	104	1 760	2 850	232	1 300	1 800	55,5	∗ **C 3052 K**	**AOH 3052**
	440	144	2 650	4 050	325	1 100	1 500	102	∗ **C 3152 K**	**AOH 3152 G**
260	420	106	1 860	3 100	250	1 200	1 600	61,0	∗ **C 3056 K**	**AOH 3056**
	460	146	2 850	4 500	355	1 100	1 400	110	∗ **C 3156 K**	**AOH 3156 G**
280	460	118	2 240	3 650	285	1 100	1 500	84,0	∗ **C 3060 KM**	**AOH 3060**
	460	160	2 900	4 900	380	850	1 200	110	∗ **C 4060 K30M**	**AOH 24060 G**
	500	160	3 250	5 200	400	1 000	1 300	140	∗ **C 3160 K**	**AOH 3160 G**
300	480	121	2 280	4 000	305	1 000	1 400	93,0	∗ **C 3064 KM**	**AOH 3064 G**
	540	176	4 150	6 300	480	950	1 300	185	∗ **C 3164 KM**	**AOH 3164 G**
320	520	133	2 900	5 000	375	950	1 300	120	∗ **C 3068 KM**	**AOH 3068 G**
	580	190	4 900	7 500	560	850	1 200	230	∗ **C 3168 KM**	**AOH 3168 G**
340	540	134	2 900	5 000	375	900	1 200	125	∗ **C 3072 KM**	**AOH 3072 G**
	600	192	5 000	8 000	585	800	1 100	245	∗ **C 3172 KM**	**AOH 3172 G**
360	560	135	3 000	5 200	390	900	1 200	130	∗ **C 3076 KM**	**AOH 3076 G**
	620	194	4 550	7 500	540	750	1 000	260	∗ **C 3176 KMB**[1)]	**AOH 3176 G**
380	600	148	3 650	6 200	450	800	1 100	165	∗ **C 3080 KM**	**AOH 3080 G**
	650	200	4 200	8 300	585	700	950	310	∗ **C 3180 KMB**	**AOH 3180 G**
400	620	150	3 800	6 400	465	850	1 200	175	∗ **C 3084 KM**	**AOH 3084 G**
	700	224	6 000	10 400	720	800	1 100	380	∗ **C 3184 KM**	**AOH 3184 G**
420	650	157	3 900	6 700	480	800	1 100	215	∗ **C 3088 KMB**	**AOHX 3088 G**
	720	226	5 700	9 300	655	670	900	405	∗ **C 3188 KMB**[1)]	**AOHX 3188 G**
440	680	163	4 000	7 500	510	700	950	230	∗ **C 3092 KM**	**AOHX 3092 G**
	760	240	6 800	12 000	815	600	800	480	∗ **C 3192 KM**	**AOHX 3192 G**
	760	300	8 300	14 300	950	480	630	585	∗ **C 4192 K30M**	**AOH 24192**
460	700	165	4 050	7 800	530	670	900	245	∗ **C 3096 KM**	**AOHX 3096 G**
	790	248	6 950	12 500	830	560	750	545	∗ **C 3196 KMB**[1)]	**AOHX 3196 G**

∗ SKF Explorer bearing
[1)] Please check availability of the bearing before incorporating it in a bearing arrangement design

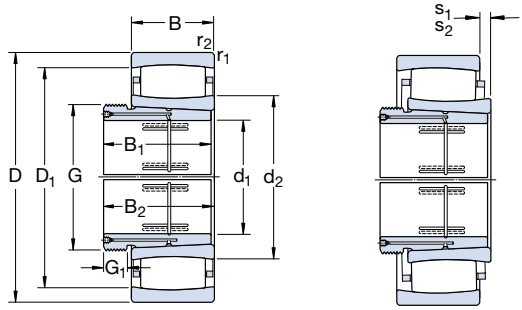


Dimensions									Abutment and fillet dimensions						Calculation factors	
d_1	d_2 ~	D_1 ~	B_1	B_2 [1] ~	G	G_1	$r_{1,2}$ min	s_1 [2] ~	d_a min	d_a max	D_a min	D_a max	C_a [3] min	r_a max	k_1	k_2
mm									mm						–	
240	305	367	128	135	Tr 280×4	23	4	19,3	275	325	350	385	3,4	3	0,122	0,096
	314	394	172	179	Tr 280×4	26	4	26,4	277	340	375	423	4,1	3	0,115	0,096
260	328	389	131	139	Tr 300×4	24	4	21,3	295	350	375	405	1,8	3	0,121	0,098
	336	416	175	183	Tr 300×5	28	5	28,4	300	360	395	440	4,1	4	0,115	0,097
280	352	417	145	153	Tr 320×5	26	4	20	315	375	405	445	1,7	3	0,123	0,095
	338	409	184	202	Tr 320×5	24	4	30,4	315	360	400	445	2,8	3	0,105	0,106
	362	448	192	200	Tr 320×5	30	5	30,5	320	390	425	480	4,9	4	0,106	0,106
300	376	440	149	157	Tr 340×5	27	4	23,3	335	395	430	465	1,8	3	0,121	0,098
	372	476	209	217	Tr 340×5	31	5	26,7	340	410	455	520	3,9	4	0,114	0,096
320	402	482	162	171	Tr 360×5	28	5	25,4	358	430	465	502	1,9	4	0,12	0,099
	405	517	225	234	Tr 360×5	33	5	25,9	360	445	490	560	4,2	4	0,118	0,093
340	417	497	167	176	Tr 380×5	30	5	26,4	378	445	480	522	2	4	0,12	0,099
	423	537	229	238	Tr 380×5	35	5	27,9	380	460	510	522	3,9	4	0,117	0,094
360	431	511	170	180	Tr 400×5	31	5	27	398	460	495	542	2	4	0,12	0,1
	450	550	232	242	Tr 400×5	36	5	19	400	445	555	600	16,4	4	–	0,106
380	458	553	183	193	Tr 420×5	33	5	30,6	418	480	525	582	2,1	4	0,121	0,099
	485	589	240	250	Tr 420×5	38	6	10,1	426	480	565	624	4,4	5	–	0,109
400	475	570	186	196	Tr 440×5	34	5	32,6	438	510	550	602	2,2	4	0,12	0,1
	508	618	266	276	Tr 440×5	40	6	34,8	446	540	595	674	3,8	5	0,113	0,098
420	491	587	194	205	Tr 460×5	35	6	19,7	463	490	565	627	1,7	5	–	0,105
	514	633	270	281	Tr 460×5	48	6	22	466	510	635	694	19,1	5	–	0,102
440	539	624	202	213	Tr 480×5	37	6	33,5	486	565	605	654	2,3	5	0,114	0,108
	559	679	285	296	Tr 480×6	43	7,5	51	492	570	655	728	4,2	6	0,108	0,105
	540	670	332	355	Tr 480×5	32	7,5	46,2	492	570	655	728	5,6	6	0,111	0,097
460	555	640	205	217	Tr 500×6	38	6	35,5	503	580	625	677	2,3	5	0,113	0,11
	583	700	295	307	Tr 500×6	45	7,5	24	512	580	705	758	20,6	6	–	0,104

[1] Width before sleeve is driven into bearing bore
[2] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[3] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)

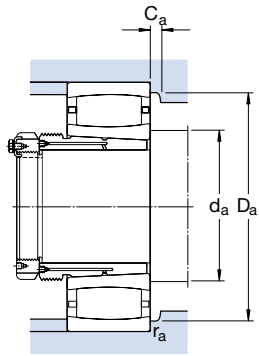
CARB toroidal roller bearings on withdrawal sleeve

d_1 **480 – 950** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing + sleeve	Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
480	720	167	4 250	8 300	560	630	900	265	∗ **C 30/500 KM**	**AOHX 30/500 G**
	830	264	7 500	12 700	850	530	750	615	∗ **C 31/500 KM**	**AOHX 31/500 G**
	830	325	9 800	17 600	1 140	400	560	775	∗ **C 41/500 K30MB**	**AOH 241/500**
500	780	185	5 100	9 500	640	600	800	355	∗ **C 30/530 KM**	**AOH 30/530**
	870	272	8 800	15 600	1 000	500	670	720	∗ **C 31/530 KM**	**AOH 31/530**
530	820	195	5 600	11 000	720	600	850	415	∗ **C 30/560 KM**	**AOHX 30/560**
	920	280	9 500	17 000	1 100	530	750	855	∗ **C 31/560 KMB**[1]	**AOH 31/560**
570	870	200	6 300	12 200	780	500	700	460	∗ **C 30/600 KM**	**AOHX 30/600**
	980	300	10 200	18 000	1 120	430	600	990	∗ **C 31/600 KMB**[1]	**AOHX 31/600**
600	920	212	6 800	12 900	830	480	670	555	∗ **C 30/630 KM**	**AOH 30/630**
	1 030	315	12 200	22 000	1 370	400	560	1 180	∗ **C 31/630 KMB**[1]	**AOH 31/630**
630	980	230	8 150	16 300	1 000	430	600	705	∗ **C 30/670 KM**	**AOH 30/670**
	1 090	336	12 000	22 000	1 320	380	530	1 410	∗ **C 31/670 KMB**[1]	**AOHX 31/670**
670	1 030	236	8 800	17 300	1 060	450	630	780	∗ **C 30/710 KM**	**AOHX 30/710**
	1 030	315	10 600	21 600	1 290	400	560	1 010	∗ **C 40/710 K30M**	**AOH 240/710 G**
	1 150	345	12 700	24 000	1 430	360	480	1 600	∗ **C 31/710 KMB**[1]	**AOHX 31/710**
710	1 090	250	9 000	18 000	1 100	380	530	920	∗ **C 30/750 KMB**[1]	**AOH 30/750**
	1 220	365	16 000	30 500	1 800	320	450	1 930	∗ **C 31/750 KMB**[1]	**AOH 31/750**
750	1 150	258	9 150	18 600	1 120	360	480	1 060	∗ **C 30/800 KMB**[1]	**AOH 30/800**
	1 280	375	15 600	30 500	1 760	300	400	2 170	∗ **C 31/800 KMB**[1]	**AOH 31/800**
800	1 220	272	11 200	24 000	1 370	320	430	1 280	∗ **C 30/850 KMB**[1]	**AOH 30/850**
	1 360	400	16 000	32 000	1 830	280	380	2 600	∗ **C 31/850 KMB**[1]	**AOH 31/850**
850	1 280	280	12 700	26 500	1 530	300	400	1 400	∗ **C 30/900 KM**	**AOH 30/900**
900	1 360	300	12 900	27 500	1 560	280	380	1 700	∗ **C 30/950 KMB**[1]	**AOH 30/950**
950	1 420	308	13 400	29 000	1 830	260	340	1 880	∗ **C 30/1000 KMB**[1]	**AOH 30/1000**
	1 580	462	22 800	45 500	2 500	220	300	3 950	∗ **C 31/1000 KMB**[1]	**AOH 31/1000**

∗ SKF Explorer bearing
[1] Please check availability of the bearing before incorporating it in a bearing arrangement design



Dimensions									Abutment and fillet dimensions						Calculation factors	
d_1	d_2 ~	D_1 ~	B_1	B_2 [1] ~	G	G_1	$r_{1,2}$ min	s_1 [2] ~	d_a min	d_a max	D_a min	D_a max	C_a [3] min	r_a max	k_1	k_2
mm									mm						–	
480	572	656	209	221	Tr 530×6	40	6	37,5	523	600	640	697	2,3	5	0,113	0,111
	605	738	313	325	Tr 530×6	47	7,5	75,3	532	655	705	798	–	6	0,099	0,116
	598	740	360	383	Tr 530×6	35	7,5	16,3	532	595	705	798	5,9	6	–	0,093
500	601	704	230	242	Tr 560×6	45	6	35,7	553	635	685	757	2,5	5	0,12	0,101
	635	781	325	337	Tr 560×6	53	7,5	44,4	562	680	745	838	4,8	6	0,115	0,097
530	660	761	240	252	Tr 600×6	45	6	45,7	583	695	740	793	2,7	5	0,116	0,106
	664	808	335	347	Tr 600×6	55	7,5	28	592	660	810	888	23,8	6	–	0,111
570	692	805	245	259	Tr 630×6	45	6	35,9	623	725	775	847	2,7	5	0,125	0,098
	710	870	355	369	Tr 630×6	55	7,5	30	632	705	875	948	25,4	6	–	0,105
600	717	840	258	272	Tr 670×6	46	7,5	48,1	658	755	810	892	2,9	6	0,118	0,104
	749	919	375	389	Tr 670×6	60	7,5	31	662	745	920	998	26,8	6	–	0,109
630	775	904	280	294	Tr 710×7	50	7,5	41,1	698	820	875	952	2,9	6	0,121	0,101
	797	963	395	409	Tr 710×7	59	7,5	33	702	795	965	1 058	28	6	–	0,104
670	807	945	286	302	Tr 750×7	50	7,5	47,3	738	850	910	1 002	3,2	6	0,119	0,104
	803	935	360	389	Tr 750×7	45	7,5	51,2	738	840	915	1 002	4,4	6	0,113	0,101
	848	1 012	405	421	Tr 750×7	60	9,5	34	750	845	1 015	1 100	28,6	8	–	0,102
710	858	993	300	316	Tr 800×7	50	7,5	25	778	855	995	1 062	21,8	6	–	0,112
	888	1 076	425	441	Tr 800×7	60	9,5	36	790	885	1 080	1 180	31,5	8	–	0,117
750	913	1 047	308	326	Tr 850×7	50	7,5	25	828	910	1 050	1 122	22,3	6	–	0,111
	947	1 133	438	456	Tr 850×7	63	9,5	37	840	945	1 135	1 240	32,1	8	–	0,115
800	968	1 113	325	343	Tr 900×7	53	7,5	27	878	965	1 115	1 192	24,1	6	–	0,124
	1 020	1 200	462	480	Tr 900×7	62	12	40	898	1 015	1 205	1 312	33,5	10	–	0,11
850	1 008	1 172	335	355	Tr 950×8	55	7,5	45,8	928	1 050	1 130	1 252	3,4	6	0,124	0,1
900	1 080	1 240	355	375	Tr 1000×8	55	7,5	30	978	1 075	1 245	1 322	26,2	6	–	0,116
950	1 136	1 294	365	387	Tr 1060×8	57	7,5	30	1 028	1 135	1 295	1 392	26,7	6	–	0,114
	1 179	1 401	525	547	Tr 1060×8	63	12	46	1 048	1 175	1 405	1 532	38,6	10	–	0,105

[1] Width before sleeve is driven into bearing bore
[2] Permissible axial displacement from normal position of one bearing ring in relation to the other (➔ **page 783**)
[3] Minimum width of free space for bearings with cage in normal position (➔ **page 788**)


SKF

Thrust ball bearings

Single direction thrust ball bearings **834**

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Single direction thrust ball bearings

SKF single direction thrust ball bearings consist of a shaft washer, a housing washer and a ball and cage thrust assembly. The bearings are separable so that mounting is simple as the washers and the ball and cage assembly can be mounted separately.

Smaller sizes are available with either a flat seating surface on the housing washer (→ **fig** 1) or a sphered seating surface (→ **fig** 2). Bearings with a sphered housing washer can be used together with a sphered seating washer (→ **fig** 3) to compensate for misalignment between the support surface in the housing and the shaft. Sphered seating washers are available from SKF but must be ordered separately.

Single direction thrust ball bearings, as their name suggests, can accommodate axial loads in one direction and thus locate a shaft axially in one direction. They must not be subjected to any radial load.

Fig 1

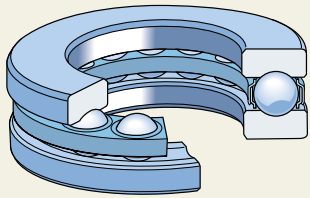


Fig 2

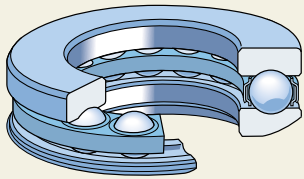
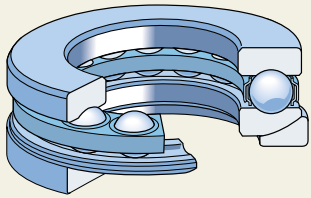


Fig 3



Double direction thrust ball bearings

SKF double direction thrust ball bearings consist of one shaft washer, two housing washers and two ball and cage thrust assemblies. The bearings are separable so that mounting is simple. The various parts can be mounted separately. The housing washers and ball and cage thrust assemblies are identical to those of the single direction bearings.

Smaller bearings are available with either a flat seating surface on the housing washers (→ **fig** 4) or with a sphered seating surface (→ **fig** 5). Bearings with sphered housing washers can be used together with sphered seating washers (→ **fig** 6) to compensate for misalignment between the housing and shaft. The sphered seating washers are available from SKF, but must be ordered separately.

Double direction thrust ball bearings can accommodate axial loads acting in both directions and can thus serve to axially locate a shaft in both directions. They must not be subjected to any radial load.

Fig 4

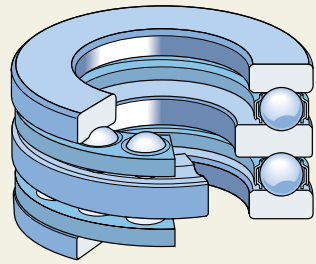


Fig 5

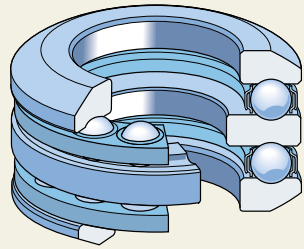
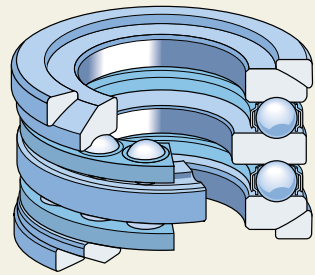


Fig 6



Bearing data – general

Dimensions
The boundary dimensions of SKF thrust ball bearings with flat or sphered housing washers conform to DIN 711:1988 and DIN 715:1987. The dimensions of the bearings with flat housing washers conform to ISO 104:2002.

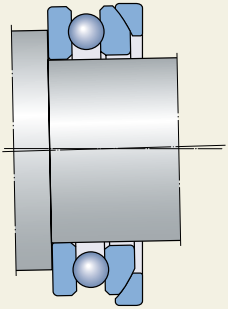
Tolerances
SKF thrust ball bearings are made to Normal tolerances as standard. Some single direction bearings with flat housing washer are also available with increased accuracy to tolerance class P6 or tolerance class P5 specifications. Contact SKF for availability before ordering.

Normal, P6 and P5 tolerances are in accordance with ISO 199:1997. The values can be found in **table** 10 on **page 132**.

Misalignment
Thrust ball bearings with flat housing washers cannot accommodate any misalignment between the shaft and housing or angular misalignment between the support surfaces in the housing and on the shaft.

The bearings with sphered housing washers are generally used with sphered seating washers and can compensate for initial misalignment between the support surfaces in the housing and on the shaft (→ **fig** 7).

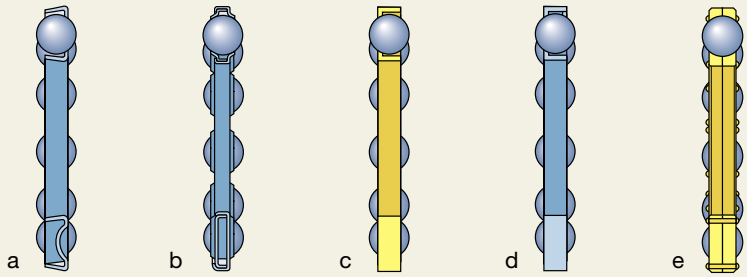
Fig 7



Cages
SKF thrust ball bearings are fitted with different standard cages (→ **fig** 8) depending on the bearing series and size as follows:

- pressed steel cage (**a** and **b**), no designation suffix,
- one-piece machined brass cage (**c**), designation suffix M,
- one-piece machined steel cage (**d**), designation suffix F,
- two-piece machined brass cage (**e**), designation suffix M.

Fig 8



Minimum load
In order to provide satisfactory operation, thrust ball bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly 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 balls and cage(s), and the friction in the lubricant, can have a detrimental influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the balls and raceways.

The requisite minimum axial load to be applied to thrust ball bearings can be estimated using

$$F_{am} = A \left(\frac{n}{1\,000} \right)^2$$

where
F_{am} = minimum axial load, kN
A = minimum load factor
(→ product tables)
n = rotational speed, r/min

When starting up at low temperatures or when the lubricant is highly viscous, even greater minimum loads may be required. The weight of the components supported by the bearing, particularly when the shaft is vertical, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the thrust ball bearing must be preloaded, e.g. by springs.

Equivalent dynamic bearing load
For dynamically loaded thrust ball bearings

$$P = F_a$$

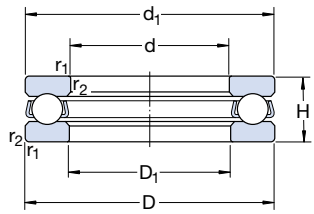
Equivalent static bearing load
For statically loaded thrust ball bearings

$$P_0 = F_a$$

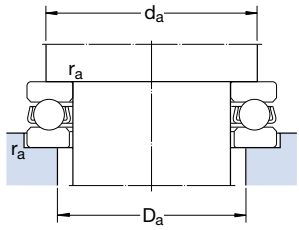
Supplementary designations
The designation suffixes used to identify certain features of SKF thrust ball bearings are explained in the following.

F Machined steel cage
JR Cage comprising two flat pressed steel washers
M Machined brass cage
P5 Increased dimensional and running accuracy to ISO tolerance class 5
P6 Increased dimensional and running accuracy to ISO tolerance class 6

Single direction thrust ball bearings
d **3 – 30** mm

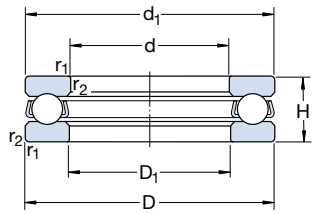


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
3	8	3,5	0,85	0,77	0,028	0,000003	26 000	36 000	0,0030	**BA 3**
4	10	4	1,25	1,20	0,044	0,000008	22 000	30 000	0,0030	**BA 4**
5	12	4	1,43	1,60	0,060	0,000013	20 000	28 000	0,0040	**BA 5**
6	14	5	1,99	2,28	0,085	0,000027	17 000	24 000	0,0040	**BA 6**
7	17	6	2,60	3,10	0,12	0,000050	14 000	19 000	0,0050	**BA 7**
8	19	7	3,32	4,05	0,15	0,000085	12 000	17 000	0,0070	**BA 8**
9	20	7	3,51	4,55	0,17	0,00011	12 000	16 000	0,010	**BA 9**
10	24	9	9,95	15,3	0,56	0,0012	9 500	13 000	0,020	**51100**
	26	11	12,7	18,6	0,70	0,0018	8 000	11 000	0,030	**51200**
12	26	9	10,4	16,6	0,62	0,0014	9 000	13 000	0,022	**51101**
	28	11	13,3	20,8	0,77	0,0022	8 000	11 000	0,034	**51201**
15	28	9	9,36	15,3	0,56	0,0012	8 500	12 000	0,023	**51102**
	32	12	16,5	27	1	0,0038	7 000	10 000	0,046	**51202**
17	30	9	9,75	16,6	0,62	0,0014	8 500	12 000	0,025	**51103**
	35	12	17,2	30	1,1	0,0047	6 700	9 500	0,053	**51203**
20	35	10	13,5	25	0,92	0,0033	7 500	10 000	0,037	**51104**
	40	14	22,5	40,5	1,53	0,0085	6 000	8 000	0,083	**51204**
25	42	11	15,9	31,5	0,92	0,0033	6 300	9 000	0,056	**51105**
	47	15	27,6	55	2,04	0,015	5 300	7 500	0,11	**51205**
	52	18	34,5	60	2,24	0,018	4 500	6 300	0,17	**51305**
	60	24	55,3	96,5	3,6	0,048	3 600	5 000	0,34	**51405**
30	47	11	16,8	36	1,34	0,0067	6 000	8 500	0,063	**51106**
	52	16	25,5	51	1,9	0,013	4 800	6 700	0,13	**51206**
	60	21	37,7	71	2,65	0,026	3 800	5 300	0,26	**51306**
	70	28	72,8	137	5,1	0,097	3 000	4 300	0,52	**51406**

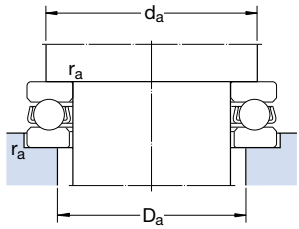


Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
3	7,8	3,2	0,15	5,8	5	0,15
4	9,8	4,2	0,15	7,5	6,5	0,15
5	11,8	5,2	0,15	8	9	0,15
6	13,8	6,2	0,2	11	9,5	0,2
7	16,8	7,2	0,2	12,5	11	0,2
8	18,8	8,2	0,3	14,5	12,5	0,3
9	19,8	9,2	0,3	15,5	13,5	0,3
10	24	11	0,3	19	15	0,3
	26	12	0,6	20	16	0,6
12	26	13	0,3	21	17	0,3
	28	14	0,6	22	18	0,6
15	28	16	0,3	23	20	0,3
	32	17	0,6	25	22	0,6
17	30	18	0,3	25	22	0,3
	35	19	0,6	28	24	0,6
20	35	21	0,3	29	26	0,3
	40	22	0,6	32	28	0,6
25	42	26	0,6	35	32	0,6
	47	27	0,6	38	34	0,6
	52	27	1	41	36	1
	60	27	1	46	39	1
30	47	32	0,6	40	37	0,6
	52	32	0,6	43	39	0,6
	60	32	1	48	42	1
	70	32	1	54	46	1

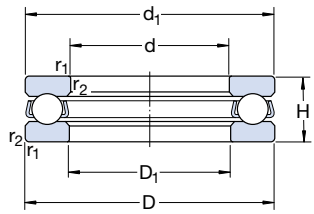
Single direction thrust ball bearings
d **35 – 70** mm



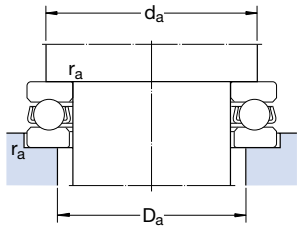
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference	Limiting	Mass	Designation
d	D	H	C	C_0	P_u	A	speed	speed		
mm			kN		kN	–	r/min		kg	–
35	52	12	17,4	40,5	1,53	0,0086	5 600	7 500	0,080	**51107**
	62	18	35,1	73,5	2,7	0,028	4 000	5 600	0,22	**51207**
	68	24	49,4	96,5	3,55	0,048	3 400	4 800	0,39	**51307**
	80	32	87,1	170	6,2	0,15	2 600	3 800	0,79	**51407**
40	60	13	23,4	55	2,04	0,015	5 000	7 000	0,12	**51108**
	68	19	46,8	106	4	0,058	3 800	5 300	0,28	**51208**
	78	26	61,8	122	4,5	0,077	3 000	4 300	0,53	**51308**
	90	36	112	224	8,3	0,26	2 400	3 400	1,10	**51408**
45	65	14	24,2	61	2,28	0,019	4 500	6 300	0,14	**51109**
	73	20	39	86,5	3,2	0,038	3 600	5 000	0,30	**51209**
	85	28	76,1	153	5,6	0,12	2 800	4 000	0,66	**51309**
	100	39	130	265	9,8	0,37	2 200	3 000	1,40	**51409**
50	70	14	25,5	68	2,55	0,024	4 300	6 300	0,16	**51110**
	78	22	49,4	116	4,3	0,069	3 400	4 500	0,37	**51210**
	95	31	88,4	190	6,95	0,19	2 600	3 600	0,94	**51310**
	110	43	159	340	12,5	0,60	2 000	2 800	2,00	**51410**
55	78	16	30,7	85	3,1	0,039	3 800	5 300	0,23	**51111**
	90	25	61,8	146	5,4	0,11	2 800	4 000	0,59	**51211**
	105	35	104	224	8,3	0,26	2 200	3 200	1,30	**51311**
	120	48	178	390	14,3	0,79	1 800	2 400	2,55	**51411**
60	85	17	36,4	102	3,8	0,054	3 600	5 000	0,20	**51112**
	95	26	62,4	150	5,6	0,12	2 800	3 800	0,65	**51212**
	110	35	101	224	8,3	0,26	2 200	3 000	1,35	**51312**
	130	51	199	430	16	0,96	1 600	2 200	3,10	**51412 M**
65	90	18	37,1	108	4	0,06	3 400	4 800	0,33	**51113**
	100	27	63,7	163	6	0,14	2 600	3 600	0,78	**51213**
	115	36	106	240	8,8	0,30	2 000	3 000	1,50	**51313**
	140	56	216	490	18	1,2	1 500	2 200	4,00	**51413 M**
70	95	18	37,7	112	4,15	0,068	3 400	4 500	0,35	**51114**
	105	27	65	173	6,4	0,16	2 600	3 600	0,79	**51214**
	125	40	135	320	11,8	0,53	1 900	2 600	2,00	**51314**
	150	60	234	550	19,3	1,6	1 400	2 000	5,00	**51414 M**



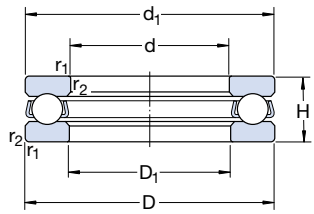
Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
35	52	37	0,6	45	42	0,6
	62	37	1	51	46	1
	68	37	1	55	48	1
	80	37	1,1	62	53	1
40	60	42	0,6	52	48	0,6
	68	42	1	57	51	1
	78	42	1	63	55	1
	90	42	1,1	70	60	1
45	65	47	0,6	57	53	0,6
	73	47	1	62	56	1
	85	47	1	69	61	1
	100	47	1,1	78	67	1
50	70	52	0,6	62	58	0,6
	78	52	1	67	61	1
	95	52	1,1	77	68	1
	110	52	1,5	86	74	1,5
55	78	57	0,6	69	64	0,6
	90	57	1	76	69	1
	105	57	1,1	85	75	1
	120	57	1,5	94	81	1,5
60	85	62	1	75	70	1
	95	62	1	81	74	1
	110	62	1,1	90	80	1
	130	62	1,5	102	88	1,5
65	90	67	1	80	75	1
	100	67	1	86	79	1
	115	67	1,1	95	85	1
	140	68	2	110	95	2
70	95	72	1	85	80	1
	105	72	1	91	84	1
	125	72	1,1	103	92	1
	150	73	2	118	102	2



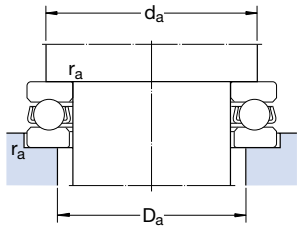
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference	Limiting	Mass	Designation
d	D	H	C	C_0	P_u	A	speed	speed		
mm			kN		kN	–	r/min		kg	–
75	100	19	44,2	146	5,5	0,11	3 200	4 300	0,40	**51115**
	110	27	67,6	183	6,8	0,17	2 400	3 400	0,83	**51215**
	135	44	163	390	14	0,79	1 700	2 400	2,60	**51315**
	160	65	251	610	20,8	1,9	1 300	1 800	6,75	**51415 M**
80	105	19	44,9	153	5,7	0,12	3 000	4 300	0,42	**51116**
	115	28	76,1	208	7,65	0,22	2 400	3 400	0,91	**51216**
	140	44	159	390	13,7	0,79	1 700	2 400	2,70	**51316**
	170	68	270	670	22,4	2,3	1 200	1 700	7,95	**51416 M**
85	110	19	46,2	163	6	0,14	3 000	4 300	0,44	**51117**
	125	31	97,5	275	9,8	0,39	2 200	3 000	1,20	**51217**
	150	49	190	465	16	1,1	1 600	2 200	3,55	**51317**
	180	72	286	750	24	2,9	1 200	1 600	9,45	**51417 M**
90	120	22	59,2	208	7,5	0,22	2 600	3 800	0,67	**51118**
	135	35	119	325	11,4	0,55	2 000	2 800	1,70	**51218**
	155	50	195	500	16,6	1,3	1 500	2 200	3,80	**51318**
	190	77	307	815	25,5	3,5	1 100	1 500	11,0	**51418 M**
100	135	25	85,2	290	10	0,44	2 400	3 200	0,97	**51120**
	150	38	124	345	11,4	0,62	1 800	2 400	2,20	**51220**
	170	55	229	610	19,6	1,9	1 400	1 900	4,95	**51320**
	210	85	371	1 060	31,5	5,8	950	1 400	15,0	**51420 M**
110	145	25	87,1	315	10,2	0,52	2 200	3 200	1,05	**51122**
	160	38	130	390	12,5	0,79	1 700	2 400	2,40	**51222**
	190	63	276	780	24	3 2	1 200	1 700	7,85	**51322 M**
	230	95	410	1 220	34,5	7,7	900	1 300	20,0	**51422 M**
120	155	25	88,4	335	10,6	0,58	2 200	3 000	1,15	**51124**
	170	39	140	440	13,4	1	1 600	2 200	2,65	**51224**
	210	70	325	980	28,5	5	1 100	1 500	11,0	**51324 M**
	250	102	520	1 730	45	16	800	1 100	29,5	**51424 M**
130	170	30	111	425	12,9	0,94	1 900	2 600	1,85	**51126**
	190	45	186	585	17	1,8	1 400	2 000	4,00	**51226**
	225	75	358	1 140	32	6,8	1 000	2 400	13,0	**51326 M**
	270	110	520	1 730	45	16	7 50	1 000	32,0	**51426 M**



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		
75	100	77	1	90	85	1
	110	77	1	96	89	1
	135	77	1,5	111	99	1,5
	160	78	2	126	109	2
80	105	82	1	95	90	1
	115	82	1	101	94	1
	140	82	1,5	116	104	1,5
	170	83	2,1	133	117	2
85	110	87	1	100	95	1
	125	88	1	109	101	1
	150	88	1,5	124	111	1,5
	177	88	2,1	141	124	2
90	120	92	1	108	102	1
	135	93	1,1	117	108	1
	155	93	1,5	129	116	1,5
	187	93	2,1	149	131	2
100	135	102	1	121	114	1
	150	103	1,1	130	120	1
	170	103	1,5	142	128	1,5
	205	103	3	165	145	2,5
110	145	112	1	131	124	1
	160	113	1,1	140	130	1
	187	113	2	158	142	2
	225	113	3	181	159	2,5
120	155	122	1	141	134	1
	170	123	1,1	150	140	1
	205	123	2,1	173	157	2
	245	123	4	187	173	3
130	170	132	1	154	146	1
	187	133	1,5	166	154	1,5
	220	134	2,1	186	169	2
	265	134	4	213	187	3

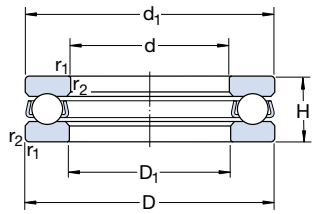


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
140	180	31	111	440	12,9	1	1 800	2 600	2,05	**51128**
	200	46	190	620	17,6	2	1 400	1 900	4,35	**51228**
	240	80	397	1 320	35,5	9,1	950	1 300	15,5	**51328 M**
	280	112	520	1 730	44	16	700	1 000	34,5	**51428 M**
150	190	31	111	440	12,5	1	1 700	2 400	2,20	**51130 M**
	215	50	238	800	22	3,3	1 300	1 800	6,10	**51230 M**
	250	80	410	1 400	36,5	10	900	1 300	16,5	**51330 M**
	300	120	559	1 960	48	20	670	950	42,5	**51430 M**
160	200	31	112	465	12,9	1,1	1 700	2 400	2,35	**51132 M**
	225	51	242	850	22,8	3,8	1 200	1 700	6,55	**51232 M**
	270	87	449	1 660	41,5	14	850	1 200	21,0	**51332 M**
170	215	34	133	540	14,3	1,5	1 600	2 200	3,30	**51134 M**
	240	55	286	1 020	26	5,4	1 100	1 800	8,15	**51234 M**
	280	87	468	1 760	43	16	800	1 100	22,0	**51334 M**
180	225	34	135	570	15	1,7	1 500	2 200	3,50	**51136 M**
	250	56	296	1 080	27,5	6,1	1 100	1 500	8,60	**51236 M**
	300	95	520	2 000	47,5	21	750	1 100	28,5	**51336 M**
190	240	37	172	710	18	2,6	1 400	2 000	4,05	**51138 M**
	270	62	332	1 270	31	8,4	1 000	1 400	12,0	**51238 M**
	320	105	592	2 400	56	30	700	950	36,5	**51338 M**
200	250	37	168	710	17,6	2,6	1 400	1 900	4,25	**51140 M**
	280	62	338	1 320	31,5	9,1	1 000	1 400	12,0	**51240 M**
	340	110	624	2 600	58,5	35	630	900	44,5	**51340 M**
220	270	37	178	800	19	3,3	1 300	1 900	4,60	**51144 M**
	300	63	351	1 460	33,5	11	950	1 300	13,0	**51244 M**
240	300	45	234	1 040	23,6	5,6	1 100	1 600	7,55	**51148 M**
	340	78	462	2 000	44	21	800	1 100	23,0	**51248 M**
260	320	45	238	1 100	24	6,3	1 100	1 500	8,10	**51152 M**
	360	79	475	2 160	45,5	24	750	1 100	25,0	**51252 M**
280	350	53	319	1 460	30,5	11	950	1 300	12,0	**51156 M**
	380	80	494	2 320	47,5	28	750	1 000	26,5	**51256 M**

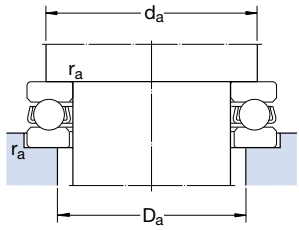


Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
140	178	142	1	164	156	1
	197	143	1,5	176	164	1,5
	235	144	2,1	199	181	2
	275	144	4	223	197	3
150	188	152	1	174	166	1
	212	153	1,5	189	176	1,5
	245	154	2,1	209	191	2
	295	154	4	239	211	3
160	198	162	1	184	176	1
	222	163	1,5	199	186	1,5
	265	164	3	225	205	2,5
170	213	172	1,1	197	188	1
	237	173	1,5	212	198	1,5
	275	174	3	235	215	2,5
180	222	183	1,1	207	198	1
	245	183	1,5	222	208	1,5
	295	184	3	251	229	2,5
190	237	193	1,1	220	210	1
	265	194	2	238	222	2
	315	195	4	267	243	3
200	247	203	1,1	230	220	1
	275	204	2	248	232	2
	335	205	4	283	257	3
220	267	223	1,1	250	240	1
	295	224	2	268	252	2
240	297	243	1,5	276	264	1,5
	335	244	2,1	299	281	2
260	317	263	1,5	296	284	1,5
	355	264	2,1	319	301	2
280	347	283	1,5	322	308	1,5
	375	284	2,1	339	321	2

Single direction thrust ball bearings
d **300 – 670** mm



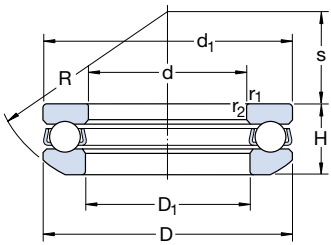
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
300	380	62	364	1 760	35,5	16	850	1 200	17,5	**51160 M**
	420	95	605	3 000	58,5	47	630	850	42,0	**51260 M**
320	400	63	371	1 860	36,5	18	800	1 100	19,0	**51164 M**
	440	95	572	3 000	56	47	600	850	45,5	**51264 F**
340	420	64	377	1 960	37,5	20	800	1 100	20,5	**51168 M**
	460	96	605	3 200	58,5	53	600	800	48,5	**51268 F**
360	440	65	390	2 080	38	22	750	1 100	22,0	**51172 F**
	500	110	741	4 150	73,5	90	530	750	70,0	**51272 F**
380	460	65	397	2 200	40	25	750	1 000	23,0	**51176 F**
	520	112	728	4 150	72	90	500	700	73,0	**51276 F**
400	480	65	403	2 280	40,5	27	700	1 000	24,0	**51180 F**
420	500	65	410	2 400	41,5	30	700	1 000	25,5	**51184 F**
440	540	80	527	3 250	55	55	600	850	42,0	**51188 F**
460	560	80	527	3 250	54	55	600	800	43,5	**51192 F**
480	580	80	540	3 550	56	66	560	800	45,5	**51196 F**
500	600	80	553	3 600	57	67	560	800	47,0	**511/500 F**
530	640	85	650	4 400	68	100	530	750	58,5	**511/530 F**
560	670	85	663	4 650	69,5	110	500	700	61,0	**511/560 F**
600	710	85	663	4 800	69,5	120	500	700	65,0	**511/600 F**
630	750	95	728	5 400	76,5	150	450	630	84,0	**511/630 F**
670	800	105	852	6 700	91,5	230	400	560	105	**511/670 F**

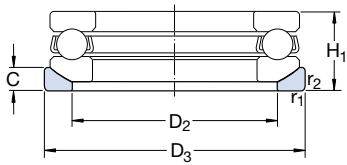


Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
300	376	304	2	348	332	2
	415	304	3	371	349	2,5
320	396	324	2	368	352	2
	435	325	3	391	369	2,5
340	416	344	2	388	372	2
	455	345	3	411	389	2,5
360	436	364	2	408	392	2
	495	365	4	443	417	3
380	456	384	2	428	412	2
	515	385	4	463	437	3
400	476	404	2	448	432	2
420	496	424	2	468	452	2
440	536	444	2,1	499	481	2
460	556	464	2,1	519	501	2
480	576	484	2,1	539	521	2
500	596	504	2,1	559	541	2
530	636	534	3	595	575	2,5
560	666	564	3	625	606	2,5
600	706	604	3	665	645	2,5
630	746	634	3	701	679	2,5
670	795	675	4	747	723	3

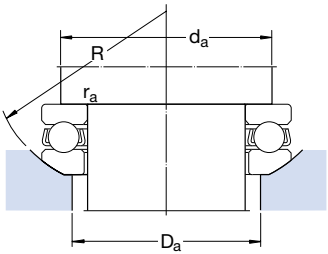
Single direction thrust ball bearings with sphered housing washer

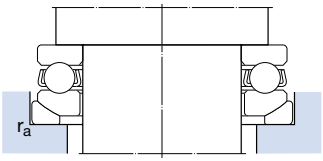
d **12 – 70** mm





Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass Bearing + washer	Designations Bearing	Seating washer
d	D	H_1	C	C_0	P_u	A					
mm			kN		kN	–	r/min		kg	–	
12	28	13	13,3	20,8	0,77	0,0022	8 000	11 000	0,045	**53201**	**U 201**
15	32	15	16,5	27	1	0,0038	7 000	10 000	0,063	**53202**	**U 202**
17	35	15	17,2	30	1,1	0,0047	6 700	9 500	0,071	**53203**	**U 203**
20	40	17	22,5	40,5	1,53	0,0085	6 000	8 000	0,10	**53204**	**U 204**
25	47	19	27,6	55	2,04	0,015	5 300	7 500	0,15	**53205**	**U 205**
30	52	20	25,5	51	1,9	0,013	4 800	6 700	0,18	**53206**	**U 206**
	60	25	37,7	71	2,65	0,026	3 800	5 300	0,33	**53306**	**U 306**
35	62	22	35,1	73,5	2,7	0,028	4 000	5 600	0,28	**53207**	**U 207**
	68	28	49,4	96,5	3,55	0,048	3 400	4 800	0,46	**53307**	**U 307**
40	68	23	46,8	106	4	0,058	3 800	5 300	0,35	**53208**	**U 208**
	78	31	61,8	122	4,5	0,077	3 000	4 300	0,67	**53308**	**U 308**
	90	42	112	224	8,3	0,26	2 400	3 400	1,35	**53408**	**U 408**
45	73	24	39	86,5	3,2	0,038	3 600	5 000	0,39	**53209**	**U 209**
	85	33	76,1	153	5,6	0,12	2 800	4 000	0,83	**53309**	**U 309**
50	78	26	49,4	116	4,3	0,069	3 400	4 500	0,47	**53210**	**U 210**
	95	37	88,4	190	6,95	0,19	2 600	3 600	1,20	**53310**	**U 310**
	110	50	159	340	12,5	0,60	2 000	2 800	2,31	**53410**	**U 410**
55	90	30	61,8	146	5,4	0,11	2 800	4 000	0,75	**53211**	**U 211**
	105	42	104	224	8,3	0,26	2 200	3 200	1,68	**53311**	**U 311**
	120	55	178	390	14,3	0,79	1 800	2 400	3,08	**53411**	**U 411**
60	95	31	62,4	150	5,6	0,12	2 800	3 800	0,82	**53212**	**U 212**
	110	42	101	224	8,3	0,26	2 200	3 000	1,71	**53312**	**U 312**
	130	58	199	430	16	0,96	1 600	2 200	3,80	**53412 M**	**U 412**
65	100	32	63,7	163	6	0,14	2 600	3 600	0,91	**53213**	**U 213**
	115	43	106	240	8,8	0,30	2 000	3 000	1,89	**53313**	**U 313**
70	105	32	65	173	6,4	0,16	2 600	3 600	0,97	**53214**	**U 214**
	125	48	135	320	11,8	0,53	1 900	2 600	2,50	**53314**	**U 314**
	150	69	234	550	19,3	1,6	1 400	2 000	6,50	**53414 M**	**U 414**

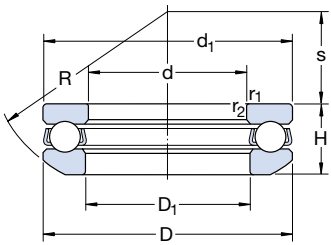


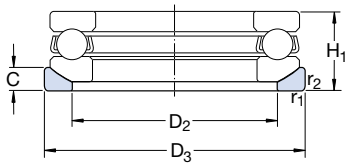


Dimensions										Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	D_2	D_3	H	C	R	s	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm										mm		
12	28	14	20	30	11,4	3,5	25	11,5	0,6	22	20	0,6
15	32	17	24	35	13,3	4	28	12	0,6	25	24	0,6
17	35	19	26	38	13,2	4	32	16	0,6	28	26	0,6
20	40	22	30	42	14,73	5	36	18	0,6	32	30	0,6
25	47	27	36	50	16,72	5,5	40	19	0,6	38	36	0,6
30	52	32	42	55	17,8	5,5	45	22	0,6	43	42	0,6
	60	32	45	62	22,6	7	50	22	1	48	45	1
35	62	37	48	65	19,87	7	50	24	1	51	48	1
	68	37	52	72	25,6	7,5	56	24	1	55	52	1
40	68	42	55	72	20,3	7	56	28,5	1	57	55	1
	78	42	60	82	28,5	8,5	64	28	1	63	60	1
	90	42	65	95	38,2	12	72	26	1,1	70	65	1
45	73	47	60	78	21,3	7,5	56	26	1	62	60	1
	85	47	65	90	30,13	10	64	25	1	69	65	1
	100	47	72	105	42,4	12,5	80	29	1,1	78	72	1
50	78	52	62	82	23,49	7,5	64	32,5	1	67	62	1
	95	52	72	100	34,3	11	72	28	1,1	77	72	1
	110	52	80	115	45,6	14	90	35	1,5	86	80	1,5
55	90	57	72	95	27,35	9	72	35	1	76	72	1
	105	57	80	110	39,3	11,5	80	30	1,1	85	80	1
	120	57	88	125	50,5	15,5	90	28	1,5	94	88	1,5
60	95	62	78	100	28,02	9	72	32,5	1	81	78	1
	110	62	85	115	38,3	11,5	90	41	1,1	90	85	1
	130	62	95	135	54	16	100	34	1,5	102	95	1,5
65	100	67	82	105	28,7	9	80	40	1	86	82	1
	115	67	90	120	39,4	12,5	90	38,5	1,1	95	90	1
70	105	72	88	110	28,8	9	80	38	1	91	88	1
	125	72	98	130	44,2	13	100	43	1,1	103	98	1
	150	73	110	155	63,6	19,5	112	34	2	118	110	2

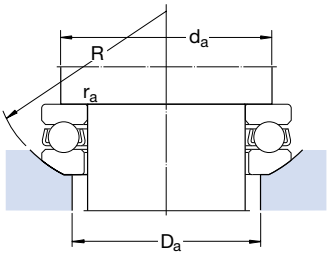
Single direction thrust ball bearings with sphered housing washer

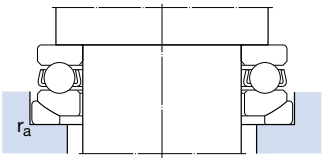
d **75 – 140** mm





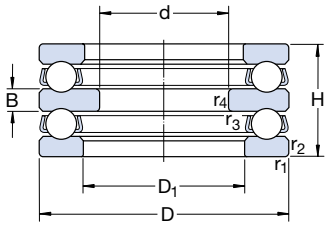
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass Bearing + washer	Designations Bearing	Seating washer
d	D	H_1	C	C_0	P_u	A					
mm			kN		kN	–	r/min		kg	–	
75	110	32	67,6	183	6,8	0,17	2 400	3 400	1,00	**53215**	**U 215**
	135	52	163	390	14	0,79	1 700	2 400	3,20	**53315**	**U 315**
	160	75	251	610	20,8	1,9	1 300	1 800	8,10	**53415 M**	**U 415**
80	115	33	76,1	208	7,65	0,22	2 400	3 400	1,10	**53216**	**U 216**
	140	52	159	390	13,7	0,79	1 700	2 400	3,30	**53316**	**U 316**
85	125	37	97,5	275	9,8	0,39	2 200	3 000	1,50	**53217**	**U 217**
	150	58	190	465	16	1,1	1 600	2 200	4,35	**53317**	**U 317**
90	135	42	119	325	11,4	0,55	2 000	2 800	2,10	**53218**	**U 218**
	155	59	195	500	16,6	1,3	1 500	2 200	4,70	**53318**	**U 318**
	190	88	307	815	25,5	3,5	1 100	1 500	13,0	**53418 M**	**U 418**
100	150	45	124	345	11,4	0,62	1 800	2 400	2,70	**53220**	**U 220**
	170	64	229	610	19,6	1,9	1 400	1 900	5,95	**53320**	**U 320**
	210	98	371	1 060	31,5	5,8	950	1 400	18,0	**53420 M**	**U 420**
110	160	45	130	390	12,5	0,79	1 700	2 400	2,91	**53222**	**U 222**
	190	72	276	780	24	3,2	1 200	1 700	9,10	**53322 M**	**U 322**
120	170	46	140	440	13,4	1	1 600	2 200	3,20	**53224**	**U 224**
	210	80	325	980	28,5	5	1 100	1 500	12,5	**53324 M**	**U 324**
130	190	53	186	585	17	1,8	1 400	2 000	4,85	**53226**	**U 226**
140	200	55	190	620	17,6	2	1 400	1 900	5,45	**53228**	**U 228**



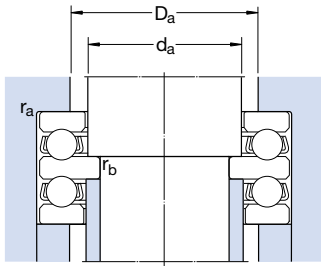


Dimensions										Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	D_2	D_3	H	C	R	s	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm										mm		
75	110	77	92	115	28,3	9,5	90	49	1	96	92	1
	135	77	105	140	48,1	15	100	37	1,5	111	105	1,5
	160	78	115	165	69	21	125	42	2	126	115	2
80	115	82	98	120	29,5	10	90	46	1	101	98	1
	140	82	110	145	47,6	15	112	50	1,5	116	110	1,5
85	125	88	105	130	33,1	11	100	52	1	109	105	1
	150	88	115	155	53,1	17,5	112	43	1,5	124	115	1,5
90	135	93	110	140	38,5	13,5	100	45	1,1	117	110	1
	155	93	120	160	54,6	18	112	40	1,5	129	120	1,5
	187	93	140	195	81,2	25,5	140	40	2,1	133	125	2
100	150	103	125	155	40,9	14	112	52	1,1	130	125	1
	170	103	135	175	59,2	18	125	46	1,5	142	135	1,5
	205	103	155	220	90	27	160	50	3	165	155	2,5
110	160	113	135	165	40,2	14	125	65	1,1	140	135	1
	187	113	150	195	67,2	20,5	140	51	2	158	150	2
120	170	123	145	175	40,8	15	125	61	1,1	150	145	1
	205	123	165	220	74,1	22	160	63	2,1	173	165	2
130	187	133	160	195	47,9	17	140	67	1,5	166	160	1,5
140	197	143	170	210	48,6	17	160	87	1,5	176	170	1,5

Double direction thrust ball bearings
d **10 – 55** mm

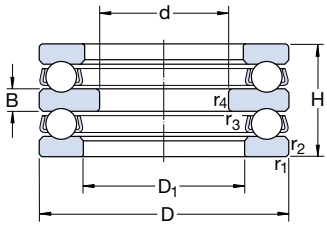


Principal dimensions			Basic load ratings		Fatigue load limit	Minimum load factor	Speed ratings		Mass	Designation
			dynamic	static			Reference speed	Limiting speed		
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
10	32	22	16,5	27	1	0,0038	7 000	10 000	0,081	**52202**
15	40	26	22,5	40,5	1,53	0,0085	6 000	8 000	0,15	**52204**
20	47	28	27,6	55	2,04	0,015	5 300	7 500	0,22	**52205**
	52	34	34,5	60	2,24	0,018	4 500	6 300	0,33	**52305**
	70	52	72,8	137	5,1	0,097	3 600	5 000	1,00	**52406**
25	52	29	25,5	51	1,9	0,013	4 800	6 700	0,25	**52206**
	60	38	37,7	71	2,65	0,026	3 800	5 300	0,47	**52306**
	80	59	87,1	170	6,2	0,15	3 000	4 300	1,45	**52407**
30	62	34	35,1	73,5	2,7	0,028	4 000	5 600	0,41	**52207**
	68	36	46,8	106	4	0,058	3 800	5 300	0,55	**52208**
	68	44	49,4	96,5	3,55	0,048	3 400	4 800	0,68	**52307**
	78	49	61,8	122	4,5	0,077	3 000	4 300	1,05	**52308**
	90	65	112	224	8,3	0,26	2 400	3 400	2,05	**52408**
35	73	37	39	86,5	3,2	0,038	3 600	5 000	0,60	**52209**
	85	52	76,1	153	5,6	0,12	2 800	4 000	1,25	**52309**
	100	72	130	265	9,8	0,37	2 200	3 000	2,70	**52409**
40	78	39	49,4	116	4,3	0,069	3 400	4 500	0,71	**52210**
	95	58	88,4	190	6,95	0,19	2 600	3 600	1,75	**52310**
45	90	45	61,8	146	5,4	0,11	2 800	4 000	1,10	**52211**
	105	64	104	224	8,3	0,26	2 200	3 200	2,40	**52311**
	120	87	178	390	14,3	0,79	1 800	2 400	4,70	**52411**
50	95	46	62,4	150	5,6	0,12	2 200	3 000	1,20	**52212**
	110	64	101	224	8,3	0,26	1 600	2 200	2,55	**52312**
	130	93	199	430	16	0,96	1 600	2 200	6,35	**52412 M**
55	100	47	63,7	163	6	0,14	2 600	3 600	1,35	**52213**
	105	47	65	173	6,4	0,16	2 600	3 600	1,50	**52214**
	115	65	106	240	8,8	0,30	2 000	3 000	2,75	**52313**
	125	72	135	320	11,8	0,53	1 900	2 600	3,65	**52314**
	150	107	234	550	19,3	1,6	1 400	2 000	9,70	**52414 M**

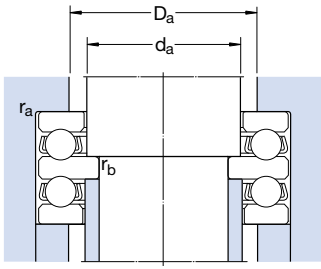


Dimensions					Abutment and fillet dimensions			
d	D_1 ~	B	$r_{1,2}$ min	$r_{3,4}$ min	d_a	D_a max	r_a max	r_b max
mm					mm			
10	17	5	0,6	0,3	15	22	0,6	0,3
15	22	6	0,6	0,3	20	28	0,6	0,3
20	27	7	0,6	0,3	25	34	0,6	0,3
	27	8	1	0,3	25	36	1	0,3
	32	12	1	0,6	30	46	1	0,6
25	32	7	0,6	0,3	30	39	0,6	0,3
	32	9	1	0,3	30	42	1	0,3
	37	14	1,1	0,6	35	53	1	0,6
30	37	8	1	0,3	35	46	1	0,3
	42	9	1	0,6	40	51	1	0,6
	37	10	1	0,3	35	48	1	0,3
	42	12	1	0,6	40	55	1	0,6
	42	15	1,1	0,6	40	60	1	0,6
35	47	9	1	0,6	45	56	1	0,6
	47	12	1	0,6	45	61	1	0,6
	47	17	1,1	0,6	45	67	1	0,6
40	52	9	1	0,6	50	61	1	0,6
	52	14	1,1	0,6	50	68	1	0,6
45	57	10	1	0,6	55	69	1	0,6
	57	15	1,1	0,6	55	75	1	0,6
	57	20	1,5	0,6	55	81	1,5	0,6
50	62	10	1	0,6	60	74	1	0,6
	62	15	1,1	0,6	60	80	1	0,6
	62	21	1,5	0,6	60	88	1,5	0,6
55	67	10	1	0,6	65	79	1	0,6
	72	10	1	1	70	84	1	1
	67	15	1,1	0,6	65	85	1	0,6
	72	16	1,1	1	70	92	1	1
	73	24	2	1	70	102	2	1

Double direction thrust ball bearings
d **60 – 150** mm



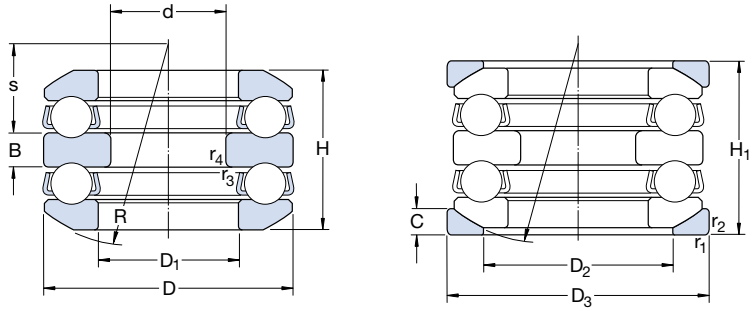
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
60	110	47	67,6	183	6,8	0,17	2 400	3 400	1,55	**52215**
	135	79	163	390	14	0,79	1 700	2 400	4,80	**52315**
65	115	48	76,1	208	7,65	0,22	2 400	3 400	1,70	**52216**
	140	79	159	390	13,7	0,79	1 700	2 400	4,94	**52316**
70	125	55	97,5	275	9,8	0,39	2 200	3 000	2,40	**52217**
75	135	62	119	325	11,4	0,55	2 000	2 800	3,20	**52218**
85	150	67	124	345	11,4	0,62	1 800	2 400	4,20	**52220**
	170	97	229	610	19,6	1,9	1 400	1 900	8,95	**52320**
95	160	67	130	390	12,5	0,79	1 700	2 400	4,65	**52222**
100	170	68	140	440	13,4	1	1 600	2 200	5,25	**52224**
110	190	80	186	585	17	1,8	1 400	2 000	8,00	**52226**
120	200	81	190	620	17,6	2	1 400	1 900	8,65	**52228**
130	215	89	238	800	22	3,3	1 300	1 800	11,5	**52230 M**
140	225	90	242	850	22,8	3,8	1 200	1 700	12,0	**52232 M**
150	240	97	286	1 020	26	5,4	1 100	1 600	15,0	**52234 M**
	250	98	296	1 080	27,5	6,1	1 100	1 500	16,0	**52236 M**



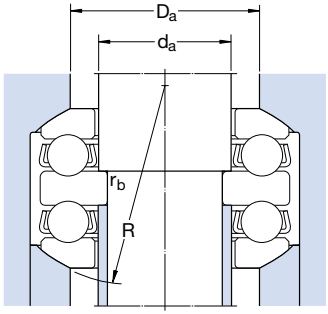
Dimensions					Abutment and fillet dimensions			
d	D_1 ~	B	$r_{1,2}$ min	$r_{3,4}$ min	d_a	D_a max	r_a max	r_b max
mm					mm			
60	77	10	1	1	75	89	1	1
	77	18	1,5	1	75	99	1,5	1
65	82	10	1	1	80	94	1	1
	82	18	1,5	1	80	104	1,5	1
70	88	12	1	1	85	101	1	1
75	93	14	1,1	1	90	108	1	1
85	103	15	1,1	1	100	120	1	1
	103	21	1,5	1	100	128	1,5	1
95	113	15	1,1	1	110	130	1	1
100	123	15	1,1	1,1	120	140	1	1
110	133	18	1,5	1,1	130	154	1,5	1
120	143	18	1,5	1,1	140	164	1,5	1
130	153	20	1,5	1,1	150	176	1,5	1
140	163	20	1,5	1,1	160	186	1,5	1
150	173	21	1,5	1,1	170	198	1,5	1
	183	21	1,5	2	180	208	1,5	2

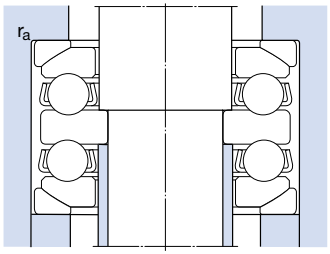
Double direction thrust ball bearings with sphered housing washers

d **25 – 80** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass Bearing + washer	Designations Bearing	Seating washer
d	D	H_1	C	C_0	P_u	A					
mm			kN		kN	–	r/min		kg	–	
25	60	46	37,7	71	2,65	0,026	3 800	5 300	0,58	**54306**	**U 306**
30	62	42	35,1	73,5	2,7	0,028	4 000	5 600	0,53	**54207**	**U 207**
	68	44	46,8	106	4	0,058	3 800	5 300	0,63	**54208**	**U 208**
	68	52	49,4	96,5	3,55	0,048	3 400	4 800	0,85	**54307**	**U 307**
	78	59	61,8	122	4,5	0,077	3 000	4 300	1,17	**54308**	**U 308**
35	73	45	39	86,5	3,2	0,038	3 600	5 000	0,78	**54209**	**U 209**
	85	62	76,1	153	5,6	0,12	2 800	4 000	1,60	**54309**	**U 309**
	100	86	130	265	9,8	0,37	2 200	3 000	3,00	**54409**	**U 409**
40	95	70	88,4	190	6,95	0,19	2 600	3 600	2,30	**54310**	**U 310**
	110	92	159	340	12,5	0,60	2 000	2 800	4,45	**54410**	**U 410**
45	90	55	61,8	146	5,4	0,11	2 800	4 000	1,30	**54211**	**U 211**
50	110	78	101	224	8,3	0,26	2 200	3 000	2,90	**54312**	**U 312**
65	140	95	159	390	13,7	0,79	1 700	2 400	0,57	**54316**	**U 316**
	170	140	270	670	22,4	2,3	1 200	1 700	1,40	**54416 M**	**U 416**
70	150	105	190	465	16	1,1	1 600	2 200	7,95	**54317**	**U 317**
80	210	176	371	1 060	31,5	5,8	950	1 400	29,0	**54420 M**	**U 420**





Dimensions											Abutment and fillet dimensions			
d	D_1 ~	D_2	D_3	H	B	C	R	s	$r_{1,2}$ min	$r_{3,4}$ min	d_a	D_a max	r_a max	r_a max
mm											mm			
25	32	45	62	41,3	9	7	50	19,5	1	0,3	30	45	1	0,3
30	37	48	65	37,73	8	7	50	21	1	0,3	35	48	1	0,3
	42	55	72	38,6	9	7	56	25	1	0,6	40	55	1	0,6
	37	52	72	47,19	10	7,5	56	21	1	0,3	35	52	1	0,3
	42	60	82	54,1	12	8,5	64	23,5	1	0,6	40	60	1	0,6
35	47	60	78	39,6	9	7,5	56	23	1	0,6	45	60	1	0,6
	47	65	90	56,2	12	10	64	21	1	0,6	45	65	1	0,6
	47	72	105	78,9	17	12,5	80	23,5	1,1	0,6	45	72	1	0,6
40	52	72	100	64,7	14	11	72	23	1,1	0,6	50	72	1	0,6
	52	80	115	83,2	18	14	90	30	1,5	0,6	50	80	1,5	0,6
45	57	72	95	49,6	10	9	72	32,5	1	0,6	55	72	1	0,6
50	62	85	115	70,7	15	11,5	90	36,5	1,1	0,6	60	85	1	0,6
65	82	110	145	86,1	18	18	112	45,5	1,5	1	80	110	1,5	1
	83	125	175	128,5	27	22	125	30,5	2,1	1	80	125	2	1
70	88	115	155	92,5	19	17,5	112	39	1,5	1	85	115	1,5	1
80	103	155	220	159,9	33	27	160	43,5	3	1,1	100	155	2,5	1


SKF

Cylindrical roller thrust bearings

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Designs

Cylindrical roller thrust bearings are suitable for arrangements that have to support heavy axial loads. Furthermore, they are insensitive to shock loads, are very stiff and require little axial space. As standard they are available as single direction bearings and can only accommodate axial loads acting in one direction.

Cylindrical roller thrust bearings are simple in form and design and are produced in single row (➔ **fig** 1) and in double row (➔ **fig** 2) designs. The bearings in the 811 and 812 series are mainly used where thrust ball bearings have insufficient load carrying capacity.

The cylindrical surface of the rollers is slightly relieved towards the ends. The resulting contact profile virtually eliminates damaging edge stresses. The bearings are of separable design; the individual components can be mounted separately.

Fig 1

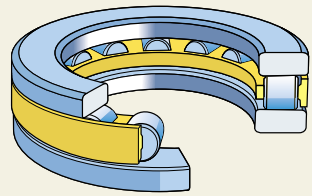
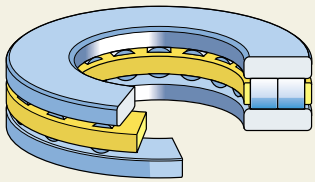


Fig 2



Components
For applications where

- the faces of adjacent machine components can serve as raceways and slim bearing arrangements are required or
- other combinations of cylindrical roller and cage thrust assembles and washers are required, e.g. with two shaft or housing washers,

it is possible to order

- cylindrical roller and cage thrust assemblies K (➔ **fig** 3),
- shaft washers WS (➔ **fig** 4) and
- housing washers GS (➔ **fig** 5)

separately.

Fig 3

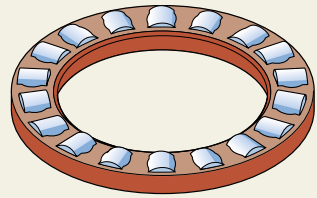


Fig 4

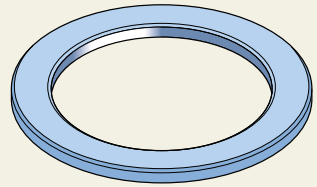
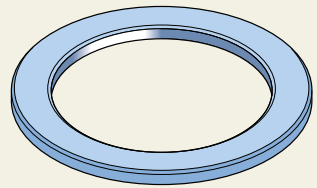


Fig 5

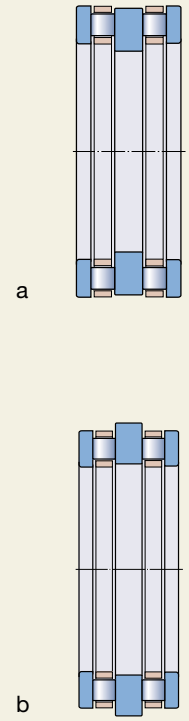


Double direction bearings

Double direction bearings (→ **fig** 6) can easily be assembled by combining appropriate shaft washers in the WS 811 series or housing washers in the GS 811 series with two cylindrical roller and cage thrust assemblies in the K 811 series and a suitable intermediate washer with internal centring (**a**) or external centring (**b**).

These intermediate washers should have the same quality and hardness as the bearing washers. Recommendations for intermediate washer dimensions will be supplied on request. Guideline values for the dimensional, form and running accuracy are given in the section “Design of associated components” on **page 865**.

Fig 6



Bearing data – general

Dimensions

The boundary dimensions of cylindrical roller thrust bearings correspond to ISO 104:2002.

Tolerances

Cylindrical roller thrust bearings are produced to Normal tolerances as standard. Larger bearings are also available with increased accuracy to tolerance class P5 specifications.

The Normal and P5 tolerances are in accordance with ISO 199:1997 and can be found in **table** 10 on **page 132**.

The cylindrical roller and cage thrust assemblies and the shaft and housing washers are produced to the tolerances listed in **table** 1. The values for the deviations of the various ISO tolerance grades are given in **table** 2. The rollers of one assembly have the same grade; the tolerance is max. 1 µm.

Table 1

Tolerances of bearing components

Bearing components Dimensions		**Tolerances**
Cylindrical roller and cage assembly, K		
Bore diameter	d	E11
Outside diameter	D	a13
Roller diameter	D_w	DIN 5402-1:1993
Shaft washer, WS		
Bore diameter	d	Normal tolerances
Outside diameter	d_1	–
Thickness	B	h11
Axial runout	S_i	Normal tolerances
Housing washer, GS		
Outside diameter	D	Normal tolerances
Bore diameter	D_1	–
Thickness	B	h11
Axial runout	S_e	Normal tolerances

Table 2

ISO tolerances

Nominal diameter d, D		**Tolerances** a13		h11		E11	
over	incl.	high	low	high	low	high	low
mm		µm					
10	**18**	–290	–560	0	–110	+142	+32
18	**30**	–300	–630	0	–130	+170	+40
30	**40**	–310	–700	0	–160	+210	+50
40	**50**	–320	–710	0	–160	+210	+50
50	**65**	–340	–800	0	–190	+250	+60
65	**80**	–360	–820	0	–190	+250	+60
80	**100**	–380	–920	0	–220	+292	+72
100	**120**	–410	–950	0	–220	+292	+72
120	**140**	–460	–1 090	0	–250	+335	+85
140	**160**	–520	–1 150	0	–250	+335	+85
160	**180**	–580	–1 210	0	–250	+335	+85
180	**200**	–660	–1 380	0	–290	+390	+100
200	**225**	–740	–1 460	0	–290	+390	+100
225	**250**	–820	–1 540	0	–290	+390	+100
250	**280**	–920	–1 730	0	–320	+430	+110
280	**315**	–1 050	–1 860	0	–320	+430	+110
315	**355**	–1 200	–2 090	0	–360	+485	+125
355	**400**	–1 350	–2 240	0	–360	+485	+125
400	**450**	–1 500	–2 470	0	–400	+535	+135
450	**500**	–1 650	–2 620	0	–400	+535	+135
500	**630**	–1 900	–3 000	0	–440	+585	+145
630	**800**	–2 100	–3 350	0	–500	+660	+150

Misalignment
Cylindrical roller thrust bearings cannot tolerate any angular misalignment between the shaft and housing, nor any errors of alignment between the support surfaces in the housing and on the shaft.

Cages
Depending on the series and size, SKF cylindrical roller thrust bearings are fitted with one of the following cages (➔ **fig 7**):

- an injection moulded cage of glass fibre reinforced polyamide 6,6 (**a**), designation suffix TN or
- a machined brass cage (**b**), designation suffix M.

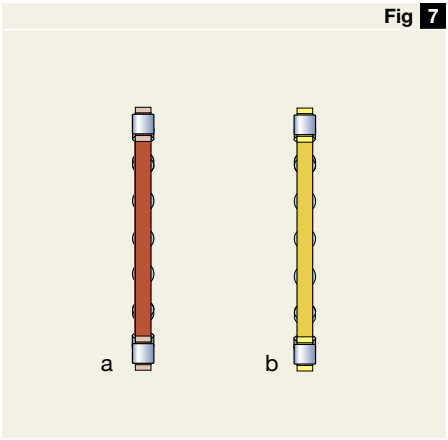
Note:
Cylindrical roller thrust bearings that incorporate a polyamide 6,6 cage can be used at operating temperatures of up to +120 °C. The cage properties will not be affected by the lubricants normally used for ball and roller bearings with the exception of some synthetic oils or greases with synthetic base oils and lubricants containing a high proportion of EP additives when used at elevated temperatures.

For bearing arrangements, which are to operate at continuously high temperatures or under otherwise difficult conditions, it is recommended that bearings fitted with metallic cages be used.

For detailed information regarding the temperature resistance and the applicability of cages, please refer to the section “Cage materials”, starting on **page 140**.

Minimum load
In order to provide satisfactory operation, cylindrical roller thrust bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly 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 influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the rollers and raceways.

Fig 7



The requisite minimum load to be applied to cylindrical roller thrust bearings can be estimated using

$$F_{am} = 0{,}0005\, C_0 + A \left(\frac{n}{1\,000}\right)^2$$

where
F_{am} = minimum axial load, kN
C_0 = basic static load rating, kN (➔ product table)
A = minimum load factor (➔ product table)
n = rotational speed, r/min

When starting up at low temperatures or when the lubricant is highly viscous, even greater minimum loads may be required. The weight of the components supported by the bearing, particularly when the shaft is vertical, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the cylindrical roller thrust bearing must be preloaded, e.g. by springs or a shaft nut.

Equivalent dynamic bearing load
For dynamically loaded cylindrical roller thrust bearings

$P = F_a$

Equivalent static bearing load
For statically loaded cylindrical roller thrust bearings

$P_0 = F_a$

Supplementary designations
The designation suffixes used to identify certain features of SKF cylindrical roller bearings are explained in the following.

HB1 Shaft and housing washers bainite hardened
M Machined brass cage
P5 Increased dimensional and running accuracy to ISO tolerance class 5
TN Injection moulded glass fibre reinforced polyamide 6,6 cage

Design of associated components

The support surfaces in the housing and on the shaft must be at right angles to the shaft axis and should provide uninterrupted support for the bearing washers across the whole extent and width of the raceways (➔ **fig** 8).

Suitable tolerances for shafts and housings which are known to provide satisfactory radial guidance for the individual thrust bearing components will be found in **table** 3.

Cylindrical roller and cage thrust assemblies are generally guided radially on the shaft in order to obtain the lowest possible sliding speed against the guiding surfaces. At high speeds radial guidance must be provided on the shaft and the guiding surface must be ground.

Raceways on shafts and in housings
Raceways on the shaft and in the housing should have the same hardness and surface finish as normally used for bearing raceways, if the load carrying capacity of the cylindrical roller and cage thrust assemblies is to be fully exploited. Details regarding suitable materials as well as surface hardness and surface finish will be found in the section "Raceways on shafts and in housings", starting on **page 198**.

Fig 8

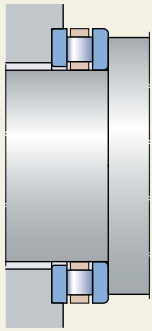
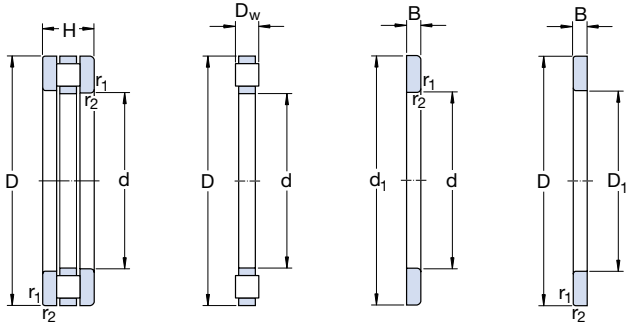


Table 3

Tolerances for shafts and housings

Bearing component Description	Prefix	Tolerances Shaft	Housing bore
Cylindrical roller and cage thrust assembly	K	h8	–
Shaft washer	WS	h8	–
Housing washer	GS	–	H9



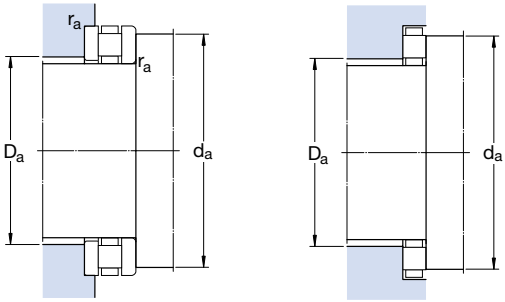
Complete bearing

Cylindrical roller and cage thrust assembly

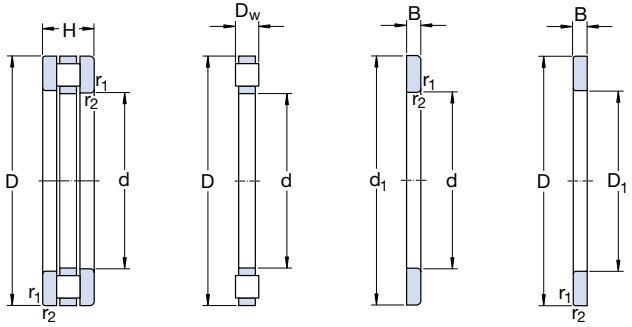
Shaft washer

Housing washer

Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Minimum load factor**	**Speed ratings** Refe-rence speed	Limiting speed	**Mass**	**Designation**
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
15	28	9	11,2	27	2,45	0,000058	4 300	8 500	0,024	**81102 TN**
17	30	9	12,2	31,5	2,85	0,000079	4 300	8 500	0,027	**81103 TN**
20	35	10	18,6	48	4,65	0,00018	3 800	7 500	0,037	**81104 TN**
25	42	11	25	69,5	6,80	0,00039	3 200	6 300	0,053	**81105 TN**
30	47	11	27	78	7,65	0,00049	3 000	6 000	0,057	**81106 TN**
	52	16	50	134	13,4	0.0014	2 400	4 800	0,12	**81206 TN**
35	52	12	29	93	9,15	0,00069	2 800	5 600	0,073	**81107 TN**
	62	18	62	190	19,3	0,0029	2 000	4 000	0,20	**81207 TN**
40	60	13	42,5	137	13,7	0,0015	2 400	5 000	0,11	**81108 TN**
	68	19	83	255	26,5	0,0052	1 900	3 800	0,25	**81208 TN**
45	65	14	45	153	15,3	0,0019	2 200	4 500	0,13	**81109 TN**
	73	20	86,5	270	28	0,0058	1 800	3 600	0,29	**81209 TN**
50	70	14	47,5	166	16,6	0,0022	2 200	4 300	0,14	**81110 TN**
	78	22	91,5	300	31	0,0072	1 700	3 400	0,36	**81210 TN**
55	78	16	69,5	285	29	0,0065	1 900	3 800	0,22	**81111 TN**
	90	25	122	390	40	0,012	1 400	2 800	0,57	**81211 TN**
60	85	17	80	300	30,5	0,0072	1 800	3 600	0,27	**81112 TN**
	95	26	137	465	47,5	0,017	1 400	2 800	0,64	**81212 TN**
65	90	18	83	320	32,5	0,0082	1 700	3 400	0,31	**81113 TN**
	100	27	140	490	50	0,019	1 300	2 600	0,72	**81213 TN**
70	95	18	86,5	345	34,5	0,0095	1 600	3 200	0,33	**81114 TN**
	105	27	146	530	55	0,022	1 300	2 600	0,77	**81214 TN**
75	100	19	75	290	29	0,0067	1 600	3 200	0,39	**81115 TN**
	110	27	125	440	45	0,015	1 200	2 400	0,80	**81215 TN**
80	105	19	76,5	300	30,5	0,0072	1 500	3 000	0,40	**81116 TN**
	115	28	160	610	63	0,029	1 200	2 400	0,90	**81216 TN**



Dimensions						Abutment and fillet dimensions			Designation of components		
									Cylindrical roller and cage thrust assembly	Shaft washer	Housing washer
d	d_1 ~	D_1 ~	B	D_w	$r_{1,2}$ min	d_a min	D_a max	r_a max			
mm						mm			–		
15	28	16	2,75	3,5	0,3	27	16	0,3	**K 81102 TN**	**WS 81102**	**GS 81102**
17	30	18	2,75	3,5	0,3	29	18	0,3	**K 81103 TN**	**WS 81103**	**GS 81103**
20	35	21	2,75	4,5	0,3	34	21	0,3	**K 81104 TN**	**WS 81104**	**GS 81104**
25	42	26	3	5	0,6	41	26	0,6	**K 81105 TN**	**WS 81105**	**GS 81105**
30	47	32	3	5	0,6	46	31	0,6	**K 81106 TN**	**WS 81106**	**GS 81106**
	52	32	4,25	7,5	0,6	50	31	0,6	**K 81206 TN**	**WS 81206**	**GS 81206**
35	52	37	3,5	5	0,6	51	36	0,6	**K 81107 TN**	**WS 81107**	**GS 81107**
	62	37	5,25	7,5	1	58	39	1	**K 81207 TN**	**WS 81207**	**GS 81207**
40	60	42	3,5	6	0,6	58	42	0,6	**K 81108 TN**	**WS 81108**	**GS 81108**
	68	42	5	9	1	66	43	1	**K 81208 TN**	**WS 81208**	**GS 81208**
45	65	47	4	6	0,6	63	47	0,6	**K 81109 TN**	**WS 81109**	**GS 81109**
	73	47	5,5	9	1	70	48	1	**K 81209 TN**	**WS 81209**	**GS 81209**
50	70	52	4	6	0,6	68	52	0,6	**K 81110 TN**	**WS 81110**	**GS 81110**
	78	52	6,5	9	1	75	53	1	**K 81210 TN**	**WS 81210**	**GS 81210**
55	78	57	5	6	0,6	77	56	0,6	**K 81111 TN**	**WS 81111**	**GS 81111**
	90	57	7	11	1	85	59	1	**K 81211 TN**	**WS 81211**	**GS 81211**
60	85	62	4,75	7,5	1	82	62	1	**K 81112 TN**	**WS 81112**	**GS 81112**
	95	62	7,5	11	1	91	64	1	**K 81212 TN**	**WS 81212**	**GS 81212**
65	90	67	5,25	7,5	1	87	67	1	**K 81113 TN**	**WS 81113**	**GS 81113**
	100	67	8	11	1	96	69	1	**K 81213 TN**	**WS 81213**	**GS 81213**
70	95	72	5,25	7,5	1	92	72	1	**K 81114 TN**	**WS 81114**	**GS 81114**
	105	72	8	11	1	102	74	1	**K 81214 TN**	**WS 81214**	**GS 81214**
75	100	77	5,75	7,5	1	97	78	1	**K 81115 TN**	**WS 81115**	**GS 81115**
	110	77	8	11	1	106	79	1	**K 81215 TN**	**WS 81215**	**GS 81215**
80	105	82	5,75	7,5	1	102	83	1	**K 81116 TN**	**WS 81116**	**GS 81116**
	115	82	8,5	11	1	112	84	1	**K 81216 TN**	**WS 81216**	**GS 81216**



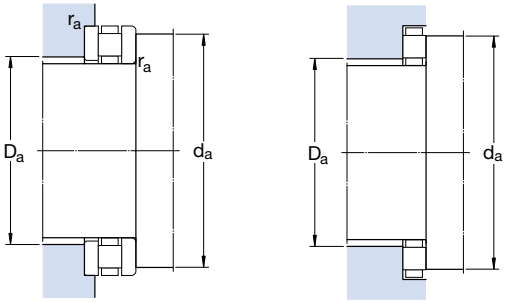
Complete bearing

Cylindrical roller and cage thrust assembly

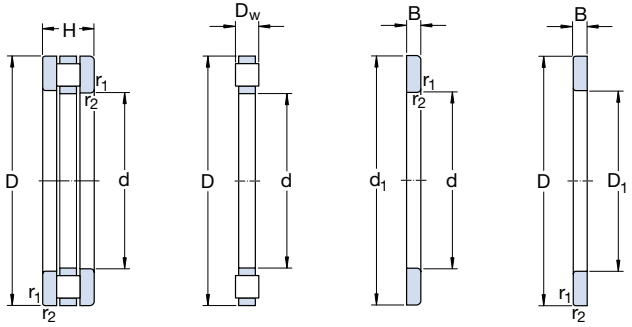
Shaft washer

Housing washer

Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Minimum load factor**	**Speed ratings** Refe-rence speed	Limiting speed	**Mass**	**Designation**
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
85	110	19	88	365	37,5	0,010	1 500	3 000	0,42	**81117 TN**
	125	31	153	550	57	0,024	1 100	2 200	1,25	**81217 TN**
90	120	22	104	415	42,5	0,013	1 300	2 600	0,62	**81118 TN**
	135	35	232	865	90	0,059	1 000	2 000	1,75	**81218 TN**
100	135	25	146	585	57	0,027	1 200	2 400	0,95	**81120 TN**
	150	38	224	830	81,5	0,055	900	1 800	2,20	**81220 TN**
110	145	25	153	630	61	0,031	1 100	2 200	1,05	**81122 TN**
	160	38	240	915	90	0,066	850	1 700	2,30	**81222 TN**
120	155	25	160	680	64	0,036	1 100	2 200	1,10	**81124 TN**
	170	39	245	965	91,5	0,074	800	1 600	2,55	**81224 TN**
130	170	30	183	780	73,5	0,048	950	1 900	1,70	**81126 TN**
	190	45	380	146	137	0,17	700	1 400	4,20	**81226 TN**
140	180	31	193	850	76,5	0,057	900	1 800	1,90	**81128 TN**
	200	46	360	1 400	129	0,16	700	1 400	4,55	**81228 M**
150	190	31	200	900	81,5	0,064	850	1 700	2,00	**81130 TN**
	215	50	465	1 900	170	0,29	630	1 300	5,90	**81230 M**
160	200	31	216	1 020	90	0,083	850	1 700	2,20	**81132 TN**
	225	51	480	2 000	176	0,32	600	1 200	6,20	**81232 M**
170	215	34	260	1 180	104	0,11	800	1 600	2,95	**81134 TN**
	240	55	540	2 280	200	0,42	560	1 100	7,70	**81234 M**
180	225	34	270	1 270	110	0,13	750	1 500	3,05	**81136 M**
	250	56	550	2 400	204	0,46	560	1 100	8,25	**81236 M**
190	240	37	310	1 460	125	0,17	700	1 400	3,85	**81138 M**
	270	62	695	2 900	250	0,67	500	1 000	10,5	**81238 M**
200	250	37	310	1 500	127	0,18	700	1 400	4,00	**81140 M**
	280	62	720	3 100	255	0,77	500	1 000	12,0	**81240 M**
220	270	37	335	1 700	137	0,23	670	1 300	4,50	**81144 M**
	300	63	750	3 350	275	0,90	480	950	13,0	**81244 M**

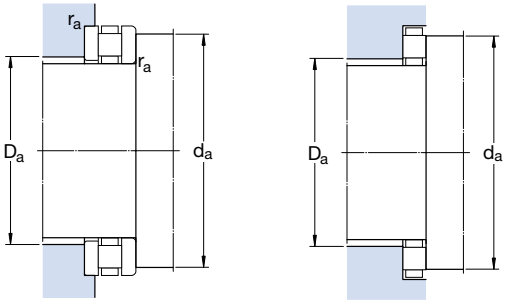


Dimensions						Abutment and fillet dimensions			Designation of components		
									Cylindrical roller and cage thrust assembly	Shaft washer	Housing washer
d	d_1 ~	D_1 ~	B	D_w	$r_{1,2}$ min	d_a min	D_a max	r_a max			
mm						mm			–		
85	110	87	5,75	7,5	1	108	87	1	**K 81117 TN**	**WS 81117**	**GS 81117**
	125	88	9,5	12	1	119	90	1	**K 81217 TN**	**WS 81217**	**GS 81217**
90	120	92	6,5	9	1	117	93	1	**K 81118 TN**	**WS 81118**	**GS 81118**
	135	93	10,5	14	1,1	129	95	1	**K 81218 TN**	**WS 81218**	**GS 81218**
100	135	102	7	11	1	131	104	1	**K 81120 TN**	**WS 81120**	**GS 81120**
	150	103	11,5	15	1,1	142	107	1	**K 81220 TN**	**WS 81220**	**GS 81220**
110	145	112	7	11	1	141	114	1	**K 81122 TN**	**WS 81122**	**GS 81122**
	160	113	11,5	15	1,1	152	117	1	**K 81222 TN**	**WS 81222**	**GS 81222**
120	155	122	7	11	1	151	124	1	**K 81124 TN**	**WS 81124**	**GS 81124**
	170	123	12	15	1,1	162	127	1	**K 81224 TN**	**WS 81224**	**GS 81224**
130	170	132	9	12	1	165	135	1	**K 81126 TN**	**WS 81126**	**GS 81126**
	187	133	13	19	1,5	181	137	1,5	**K 81226 TN**	**WS 81226**	**GS 81226**
140	178	142	9,5	12	1	175	145	1	**K 81128 TN**	**WS 81128**	**GS 81128**
	197	143	13,5	19	1,5	191	147	1,5	**K 81228 M**	**WS 81228**	**GS 81228**
150	188	152	9,5	12	1	185	155	1	**K 81130 TN**	**WS 81130**	**GS 81130**
	212	153	14,5	21	1,5	211	158	1,5	**K 81230 M**	**WS 81230**	**GS 81230**
160	198	162	9,5	12	1	195	165	1	**K 81132 TN**	**WS 81132**	**GS 81132**
	222	163	15	21	1,5	220	168	1,5	**K 81232 M**	**WS 81232**	**GS 81232**
170	213	172	10	14	1,1	209	176	1	**K 81134 TN**	**WS 81134**	**GS 81134**
	237	173	16,5	22	1,5	235	180	1,5	**K 81234 M**	**WS 81234**	**GS 81234**
180	222	183	10	14	1,1	219	185	1	**K 81136 M**	**WS 81136**	**GS 81136**
	247	183	17	22	1,5	245	190	1,5	**K 81236 M**	**WS 81236**	**GS 81236**
190	237	193	11	15	1,1	233	197	1	**K 81138 M**	**WS 81138**	**GS 81138**
	267	194	18	26	2	265	200	2	**K 81238 M**	**WS 81238**	**GS 81238**
200	247	203	11	15	1,1	243	206	1	**K 81140 M**	**WS 81140**	**GS 81140**
	277	204	18	26	2	275	210	2	**K 81240 M**	**WS 81240**	**GS 81240**
220	267	223	11	15	1,1	263	226	1	**K 81144 M**	**WS 81144**	**GS 81144**
	297	224	18,5	26	2	296	230	2	**K 81244 M**	**WS 81244**	**GS 81244**



Complete bearing | Cylindrical roller and cage thrust assembly | Shaft washer | Housing washer

Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Minimum load factor**	**Speed ratings** Refe- rence speed	Limiting speed	**Mass**	**Designation**
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
240	300	45	475	2 450	196	0,48	560	1 100	7,25	**81148 M**
	340	78	1 100	4 900	390	1,9	400	800	22,0	**81248 M**
260	320	45	490	2 600	200	0,54	530	1 100	7,85	**81152 M**
	360	79	1 140	5 300	415	2,2	380	750	24,0	**81252 M**
280	350	53	680	3 550	275	1	480	950	10,5	**81156 M**
	380	80	1 160	5 500	425	2,4	360	750	26,0	**81256 M**
300	380	62	850	4 400	335	1,5	430	850	16,5	**81160 M**
	420	95	1 530	7 200	540	4,1	320	630	40,5	**81260 M**
320	400	63	880	4 650	345	1,7	400	800	18,0	**81164 M**
	440	95	1 560	7 500	550	4,5	300	600	42,5	**81264 M**
340	420	64	900	4 900	355	1,9	380	800	19,5	**81168 M**
	460	96	1 630	8 000	585	5,1	300	600	47,0	**81268 M**
360	440	65	900	4 900	355	1,9	380	750	19,5	**81172 M**
	500	110	2 160	10 400	750	8,7	260	530	65,5	**81272 M**
380	460	65	930	5 300	375	2,2	360	750	22,0	**81176 M**
400	480	65	965	5 600	390	2,5	360	700	23,0	**81180 M**
420	500	65	980	5 850	400	2,7	340	700	24,0	**81184 M**
440	540	80	1 430	8 000	550	5,1	300	600	39,5	**81188 M**
460	560	80	1 460	8 500	570	5,8	300	600	41,0	**81192 M**
480	580	80	1 460	8 650	585	6	280	560	43,0	**81196 M**
500	600	80	1 560	9 300	620	6,9	280	560	44,0	**811/500 M**
530	640	85	1 730	10 600	680	9	260	530	55,5	**811/530 M**
560	670	85	1 760	11 100	710	9,7	260	500	58,0	**811/560 M**
600	710	85	1 800	11 600	720	11	240	500	62,0	**811/600 M**
630	750	95	2 160	13 700	865	15	220	450	80,0	**811/630 M**



Dimensions						Abutment and fillet dimensions			Designation of components		
									Cylindrical roller and cage thrust assembly	Shaft washer	Housing washer
d	d_1 ~	D_1 ~	B	D_w	$r_{1,2}$ min	d_a min	D_a max	r_a max			
mm						mm			–		
240	297	243	13,5	18	1,5	296	248	1,5	**K 81148 M**	**WS 81148**	**GS 81148**
	335	244	23	32	2,1	335	261	2	**K 81248 M**	**WS 81248**	**GS 81248**
260	317	263	13,5	18	1,5	316	268	1,5	**K 81152 M**	**WS 81152**	**GS 81152**
	355	264	23,5	32	2,1	353	280	2	**K 81252 M**	**WS 81252**	**GS 81252**
280	347	283	15,5	22	1,5	346	288	1,5	**K 81156 M**	**WS 81156**	**GS 81156**
	375	284	24	32	2	373	300	2	**K 81256 M**	**WS 81256**	**GS 81256**
300	376	304	18,5	25	2	373	315	2	**K 81160 M**	**WS 81160**	**GS 81160**
	415	304	28,5	38	3	413	328	2,5	**K 81260 M**	**WS 81260**	**GS 81260**
320	396	324	19	25	2	394	334	2	**K 81164 M**	**WS 81164**	**GS 81164**
	435	325	28,5	38	3	434	348	2,5	**K 81264 M**	**WS 81264**	**GS 81264**
340	416	344	19,5	25	2	414	354	2	**K 81168 M**	**WS 81168**	**GS 81168**
	455	345	29	38	3	452	367	2,5	**K 81268 M**	**WS 81268**	**GS 81268**
360	436	364	20	25	2	434	374	2	**K 81172 M**	**WS 81172**	**GS 81172**
	495	365	32,5	45	4	492	393	3	**K 81272 M**	**WS 81272**	**GS 81272**
380	456	384	20	25	2	453	393	2	**K 81176 M**	**WS 81176**	**GS 81176**
400	476	404	20	25	2	473	413	2	**K 81180 M**	**WS 81180**	**GS 81180**
420	495	424	20	25	2	493	433	2	**K 81184 M**	**WS 81184**	**GS 81184**
440	535	444	24	32	2,1	533	459	2	**K 81188 M**	**WS 81188**	**GS 81188**
460	555	464	24	32	2,1	553	479	2	**K 81192 M**	**WS 81192**	**GS 81192**
480	575	484	24	32	2,1	573	500	2	**K 81196 M**	**WS 81196**	**GS 81196**
500	595	505	24	32	2,1	592	519	2	**K 811/500 M**	**WS 811/500**	**GS 811/500**
530	635	535	25,5	34	3	632	554	2,5	**K 811/530 M**	**WS 811/530**	**GS 811/530**
560	665	565	25,5	34	3	662	584	2,5	**K 811/560 M**	**WS 811/560**	**GS 811/560**
600	705	605	25,5	34	3	702	624	2,5	**K 811/600 M**	**WS 811/600**	**GS 811/600**
630	746	634	28,5	38	3	732	650	2,5	**K 811/630 M**	**WS 811/630**	**GS 811/630**


SKF

Spherical roller thrust bearings

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Bearing data – general

Dimensions
The boundary dimensions of SKF spherical roller thrust bearings are in accordance with ISO 104:2002.

Tolerances
SKF spherical roller thrust bearings are produced as standard to Normal tolerances as specified in ISO 199:1997. However the tolerances for the total height of

- SKF standard bearings are more than 50 % and for
- SKF Explorer bearings are 75 %

tighter than specified by ISO.

The tolerance values can be found in **table** 10 on **page 132**.

Misalignment
By virtue of their design, spherical roller thrust bearings are self-aligning, i.e. they tolerate misalignment of the shaft relative to the housing, and shaft deflections during operation (➔ **fig** 4).

The permissible misalignment is reduced as the load increases. The values indicated in **table** 1 can be permitted provided there is constant misalignment and a rotating shaft washer. In applications where there are shaft deflections or where the housing washer rotates, it is advisable to contact the SKF application engineering service.

Whether the permissible misalignment can be fully exploited depends on the design of the bearing arrangement, the type of seal etc. When designing bearing arrangements where the housing washer is to rotate, or where the shaft washer will wobble, it is also advisable to contact the SKF application engineering service.

Influence of operating temperatures on bearing material
All SKF spherical roller thrust bearings undergo a special heat treatment so that they can be operated at higher temperatures for longer periods, without the occurrence of inadmissible dimensional changes. For example, a temperature of +200 °C for 2 500 h, or for shorter periods at even higher temperatures, is permitted.

Fig 4

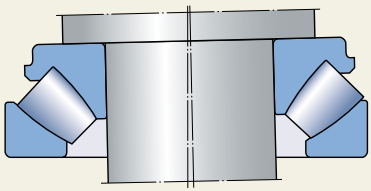


Table 1

Permissible angular misalignment

Bearing series	Permissible misalignment when bearing load P_0 [1]		
	$< 0{,}05\ C_0$	$> 0{,}05\ C_0$	$> 0{,}3\ C_0$
–	degrees		
292 (E)	2	1,5	1
293 (E)	2,5	1,5	0,3
294 (E)	3	1,5	0,3

[1] $P_0 = F_a + 2{,}7\ F_r$

Minimum load

In order to provide satisfactory operation, spherical roller thrust bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly if they are to operate at high speeds or are subjected to high accelerations or rapid changes in the direction of the load. Under such conditions, the inertia forces of the rollers and cage, and the friction in the lubricant, can have a detrimental influence on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the rollers and raceways.

The requisite minimum axial load to be applied to spherical roller thrust bearings can be estimated using

$$F_{am} = 1{,}8\, F_r + A \left(\frac{n}{1\,000}\right)^2$$

where

F_{am} = minimum axial load, kN
F_r = radial component of the load for bearings subjected to combined load, kN
C_0 = basic static load rating, kN (→ product table)
A = minimum load factor (→ product table)
n = rotational speed, r/min

If $1{,}8\, F_r < 0{,}0005\, C_0$ then $0{,}0005\, C_0$ should be used in the above equation instead of $1{,}8\, F_r$.

At speeds higher than the reference speed or when starting up at low temperatures, or when the lubricant is highly viscous, even greater minimum loads may be required. The weight of the components supported by the bearing, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the spherical roller thrust bearing must be preloaded, e.g. by springs. For additional information, contact the SKF application engineering service.

Equivalent dynamic bearing load

For dynamically loaded spherical roller thrust bearings, provided $F_r \leq 0{,}55\, F_a$

$$P = F_a + 1{,}2\, F_r$$

If, however, the bearing is arranged so that it can compensate for radial and axial runouts by relative movements between the washers, and provided $F_r \leq 0{,}55\, F_a$, then

$$P = 0{,}88\, (F_a + 1{,}2\, F_r)$$

If $F_r > 0{,}55\, F_a$, the SKF application engineering service should be contacted.

Equivalent static bearing load

For statically loaded spherical roller thrust bearings, provided $F_r \leq 0{,}55\, F_a$

$$P_0 = F_a + 2{,}7\, F_r$$

If $F_r > 0{,}55\, F_a$, the SKF application engineering service should be contacted.

Supplementary designations

The designation suffixes used to identify certain features of SKF spherical roller thrust bearings are explained in the following.

E	Optimized internal design and steel window-type cage
EF	Optimized internal design and machined steel cage
EM	Optimized internal design and machined brass cage
N1	One locating slot in the housing washer
N2	Two locating slots at 180° to each other in the housing washer
VE447	Shaft washer with three equally spaced threaded holes in one side face to take hoisting tackle
VE447E	Shaft washer with three equally spaced threaded holes in one side face to take hoisting tackle and three appropriate eye bolts
VE632	Housing washer with three equally spaced threaded holes in one side face to take hoisting tackle

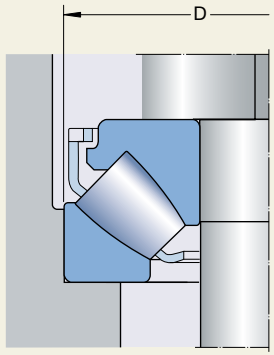
Design of associated components

The abutment dimensions d_a and D_a in the product table apply for bearing loads up to approximately $F_a = 0{,}1\ C_0$. Where bearings are to be subjected to heavier loads it may be necessary for both shaft and housing washers to be fully supported ($d_a = d_1$ and $D_a = D_1$) and for radial support to be provided for the housing washer. For additional information, contact the SKF application engineering service.

For E-design bearings with a pressed steel cage, the housing bore must be recessed (→ **fig** 5) to prevent the cage from rubbing against the housing if the shaft should become misaligned. Recommended guideline values for the diameter of this recess are

- D + 15 mm for bearings with outside diameter up to and including 380 mm and
- D + 20 mm for larger bearings.

Fig 5



Lubrication

Generally lubrication with oil or grease containing EP additives is recommended for spherical roller thrust bearings.

When lubricating with grease the roller end/flange contacts must be supplied with an adequate amount of lubricant. Depending on the application, this can best be done by completely filling the bearing and its housing with grease, or by regular relubrication.

Because of their internal design, spherical roller thrust bearings have a pumping action that can be taken advantage of, in order to provide circulation of the lubricating oil when

- the shaft is vertical (➔ **fig** 6) or
- the shaft is horizontal (➔ **fig** 7).

The pumping action must be considered when selecting lubricants and seals.

For more detailed information regarding the lubrication of spherical roller thrust bearings contact the SKF application engineering service.

Fig 6

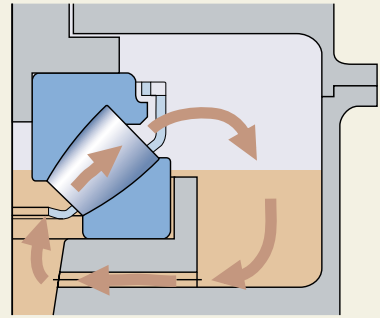
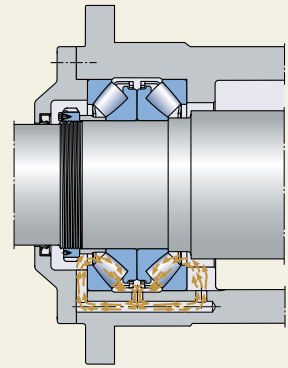


Fig 7



Mounting

SKF spherical roller thrust bearings are of separable design, i.e. the shaft washer with cage and roller assembly can be mounted separately from the housing washer.

If bearings of earlier design with a machined cage, where the cage-guiding sleeve also served as spacer sleeve, are to be replaced by E-design bearings, a spacer sleeve is needed between the shaft washer and shaft shoulder (➔ **fig** 8).

If earlier B-design bearings, which were mounted with a spacer sleeve, are to be replaced, the sleeve must be checked and re-machined if necessary (➔ **fig** 9). The sleeves must be hardened and should have ground end faces; the recommended sleeve outside diameter is given for each bearing in the product table.

Fig 8

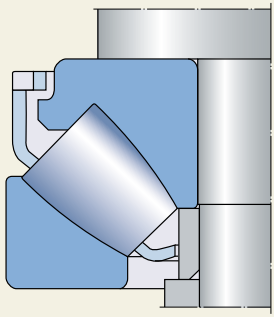
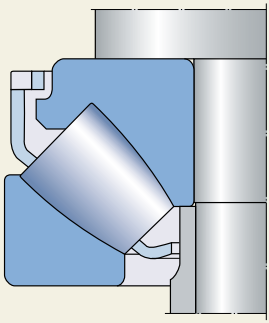


Fig 9



Designs

In spherical roller thrust bearings the load is transmitted from one raceway to the other at an angle to the bearing axis (➔ **fig** 1). The bearings are therefore suitable for the accommodation of radial loads in addition to simultaneously acting axial loads. Another important characteristic of spherical roller thrust bearings is their self-aligning capability. This makes the bearings insensitive to shaft deflection and misalignment of the shaft relative to the housing.

SKF spherical roller thrust bearings incorporate a large number of asymmetrical rollers and have specially designed raceways with an optimum conformity. They can therefore support very heavy axial loads and permit relatively high speed operation.

SKF spherical roller thrust bearings are produced in two designs depending on the size and series. Bearings up to and including size 68 identified by the designation suffix E have a pressed steel window-type cage which, with the rollers, forms a non-separable assembly with the shaft washer (➔ **fig** 2). All other bearings have a machined brass or steel cage which is guided by a sleeve held in the shaft washer bore (➔ **fig** 3). The shaft washer and cage with rollers form a non-separable unit.

Fig 1

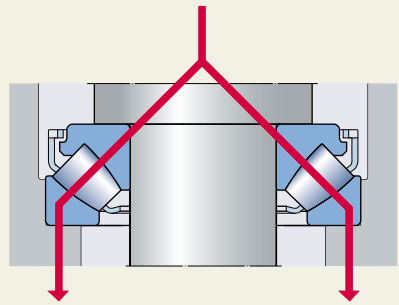


Fig 2

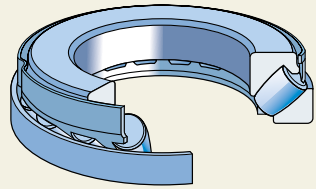
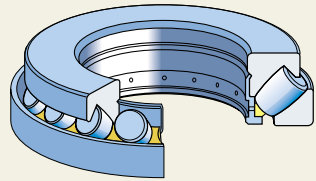
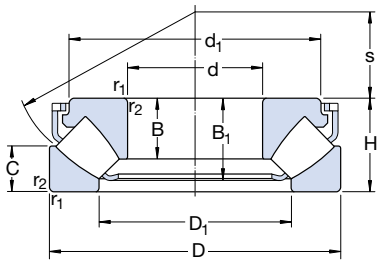


Fig 3



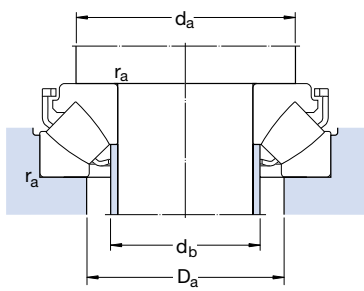
SKF Explorer class bearings

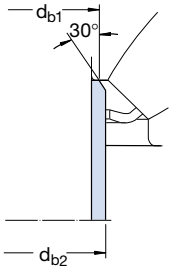
High performance SKF Explorer spherical roller thrust bearings are shown with an asterisk in the product table. SKF Explorer bearings retain the designation of the earlier standard bearings, e. g. 29330 E. However, each bearing and its box are marked with the name “EXPLORER”.

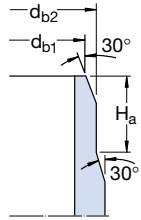


Principal dimensions			Basic load ratings		Fatigue load limit	Minimum load factor	Speed ratings		Mass	Designation
			dynamic	static			Reference speed	Limiting speed		
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
60	130	42	390	915	114	0,080	2 800	5 000	2,60	⋆ **29412 E**
65	140	45	455	1 080	137	0,11	2 600	4 800	3,20	⋆ **29413 E**
70	150	48	520	1 250	153	0,15	2 400	4 300	3,90	⋆ **29414 E**
75	160	51	600	1 430	173	0,19	2 400	4 000	4,70	⋆ **29415 E**
80	170	54	670	1 630	193	0,25	2 200	3 800	5,60	⋆ **29416 E**
85	150	39	380	1 060	129	0,11	2 400	4 000	2,75	⋆ **29317 E**
	180	58	735	1 800	212	0,31	2 000	3 600	6,75	⋆ **29417 E**
90	155	39	400	1 080	132	0,11	2 400	4 000	2,85	⋆ **29318 E**
	190	60	815	2 000	232	0,38	1 900	3 400	7,75	⋆ **29418 E**
100	170	42	465	1 290	156	0,16	2 200	3 600	3,65	⋆ **29320 E**
	210	67	980	2 500	275	0,59	1 700	3 000	10,5	⋆ **29420 E**
110	190	48	610	1 730	204	0,28	1 900	3 200	5,30	⋆ **29322 E**
	230	73	1 180	3 000	325	0,86	1 600	2 800	13,5	⋆ **29422 E**
120	210	54	765	2 120	245	0,43	1 700	2 800	7,35	⋆ **29324 E**
	250	78	1 370	3 450	375	1,1	1 500	2 600	17,5	⋆ **29424 E**
130	225	58	865	2 500	280	0,59	1 600	2 600	9,00	⋆ **29326 E**
	270	85	1 560	4 050	430	1,6	1 300	2 400	22,0	⋆ **29426 E**
140	240	60	980	2 850	315	0,77	1 500	2 600	10,5	⋆ **29328 E**
	280	85	1 630	4 300	455	1,8	1 300	2 400	23,0	⋆ **29428 E**
150	215	39	408	1 600	180	0,24	1 800	2 800	4,30	**29230 E**
	250	60	1 000	2 850	315	0,77	1 500	2 400	11,0	⋆ **29330 E**
	300	90	1 860	5 100	520	2,5	1 200	2 200	28,0	⋆ **29430 E**
160	270	67	1 180	3 450	375	1,1	1 300	2 200	14,5	⋆ **29332 E**
	320	95	2 080	5 600	570	3	1 100	2 000	33,5	⋆ **29432 E**
170	280	67	1 200	3 550	365	1,2	1 300	2 200	15,0	⋆ **29334 E**
	340	103	2 360	6 550	640	4,1	1 100	1 900	44,5	⋆ **29434 E**

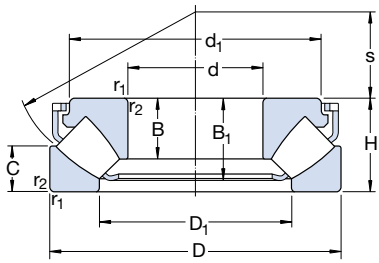
⋆ SKF Explorer bearing

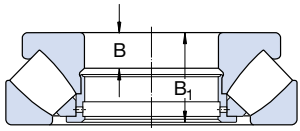






Dimensions								Abutment and fillet dimensions					
d	d_1 ~	D_1 ~	B	B_1	C	$r_{1,2}$ min	s	d_a min	d_{b1} max	d_{b2} max	H_a min	D_a max	r_a max
mm								mm					
60	112,2	85,5	27	36,7	21	1,5	38	90	67	67	–	107	1,5
65	120,6	91,5	29,5	39,8	22	2	42	100	72	72	–	117	2
70	129,7	99	31	41	23,8	2	44,8	105	77,5	77,5	–	125	2
75	138,3	105,5	33,5	45,7	24,5	2	47	115	82,5	82,5	–	133	2
80	147,2	112,5	35	48,1	26,5	2,1	50	120	88	88	–	141	2
85	134,8	109,5	24,5	33,8	20	1,5	50	115	90	90	–	129	1,5
	155,8	121	37	51,1	28	2,1	54	130	94	94	–	151	2
90	138,6	115	24,5	34,5	19,5	1,5	53	120	95	95	–	134	1,5
	164,6	127,5	39	54	28,5	2,1	56	135	99	99	–	158	2
100	152,3	127,5	26,2	36,3	20,5	1,5	58	130	107	107	–	147	1,5
	182,2	141,5	43	57,3	32	3	62	150	110	110	–	175	2,5
110	171,1	140	30,3	41,7	24,8	2	63,8	145	117	117	–	164	2
	199,4	155,5	47	64,7	34,7	3	69	165	120,5	129	–	193	2,5
120	188,1	154	34	48,2	27	2,1	70	160	128	128	–	181	2
	216,8	171	50,5	70,3	36,5	4	74	180	132	142	–	209	3
130	203,4	165,5	36,7	50,6	30,1	2,1	75,6	175	138	143	–	194	2
	234,4	184,5	54	76	40,9	4	81	195	142,5	153	–	227	3
140	216,1	177	38,5	54	30	2,1	82	185	148	154	–	208	2
	245,4	194,5	54	75,6	41	4	86	205	153	162	–	236	3
150	200,4	176	24	34,3	20,5	1,5	82	180	154	154	14	193	1,5
	223,9	190	38	54,9	28	2,1	87	195	158	163	–	219	2
	262,9	207,5	58	80,8	43,4	4	92	220	163	175	–	253	3
160	243,5	203	42	60	33	3	92	210	169	176	–	235	2,5
	279,3	223,5	60,5	84,3	45,5	5	99	235	175	189	–	270	4
170	251,2	215	42,2	61	30,5	3	96	220	178	188	–	245	2,5
	297,7	236	65,5	91,2	50	5	104	250	185	199	–	286	4

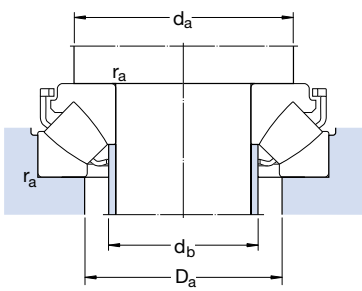


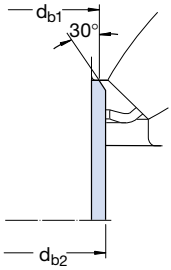


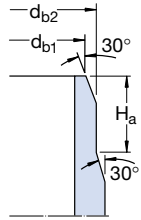
E design

Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
180	250	42	495	2 040	212	0,40	1 600	2 600	5,80	**29236 E**
	300	73	1 430	4 300	440	1,8	1 200	2 000	19,5	★ **29336 E**
	360	109	2 600	7 350	710	5,1	1 000	1 800	52,5	★ **29436 E**
190	320	78	1 630	4 750	490	2,1	1 100	1 900	23,5	★ **29338 E**
	380	115	2 850	8 000	765	6,1	950	1 700	60,5	★ **29438 E**
200	280	48	656	2 650	285	0,67	1 400	2 200	9,30	**29240 E**
	340	85	1 860	5 500	550	2,9	1 000	1 700	29,5	★ **29340 E**
	400	122	3 200	9 000	850	7,7	850	1 600	72,0	★ **29440 E**
220	300	48	690	3 000	310	0,86	1 300	2 200	10,0	**29244 E**
	360	85	2 000	6 300	610	3,8	1 000	1 700	33,5	★ **29344 E**
	420	122	3 350	9 650	900	8,8	850	1 500	75,0	★ **29444 E**
240	340	60	799	3 450	335	1,1	1 100	1 800	16,5	**29248**
	380	85	2 040	6 550	630	4,1	1 000	1 600	35,5	★ **29348 E**
	440	122	3 400	10 200	930	9,9	850	1 500	80,0	★ **29448 E**
260	360	60	817	3 650	345	1,3	1 100	1 700	18,5	**29252**
	420	95	2 550	8 300	780	6,5	850	1 400	49,0	★ **29352 E**
	480	132	4 050	12 900	1 080	16	750	1 300	105	★ **29452 E**
280	380	60	863	4 000	375	1,5	1 000	1 700	19,5	**29256**
	440	95	2 550	8 650	800	7,1	850	1 400	53,0	★ **29356 E**
	520	145	4 900	15 300	1 320	22	670	1 200	135	★ **29456 E**
300	420	73	1 070	4 800	465	2,2	900	1 400	30,5	**29260**
	480	109	3 100	10 600	930	11	750	1 200	75,0	★ **29360 E**
	540	145	4 310	16 600	1 340	26	600	1 200	140	**29460 E**
320	440	73	1 110	5 100	465	2,5	850	1 400	33,0	**29264**
	500	109	3 350	11 200	1 000	12	750	1 200	78,0	★ **29364 E**
	580	155	4 950	19 000	1 530	34	560	1 100	175	**29464 E**
340	460	73	1 130	5 400	480	2,8	850	1 300	33,5	**29268**
	540	122	2 710	11 000	950	11	600	1 100	105	**29368**
	620	170	5 750	22 400	1 760	48	500	1 000	220	**29468 E**

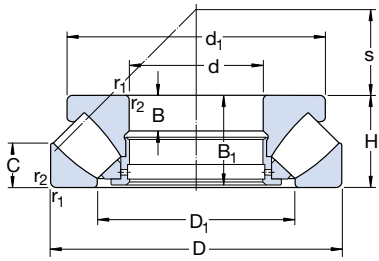
★ SKF Explorer bearing



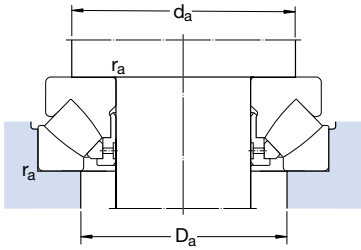




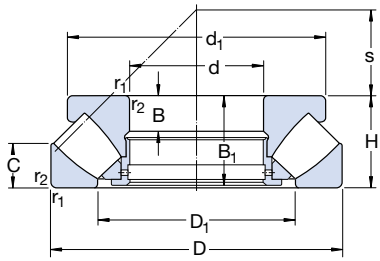
Dimensions								Abutment and fillet dimensions					
d	d_1 ~	D_1 ~	B	B_1	C	$r_{1,2}$ min	s	d_a min	d_{b1} max	d_{b2} max	H_a min	D_a max	r_a max
mm								mm					
180	234,4	208	26	36,9	22	1,5	97	210	187	187	14	226	1,5
	270	227	46	66,2	35,5	3	103	235	189	195	–	262	2,5
	315,9	250	69,5	96,4	53	5	110	265	196	210	–	304	4
190	285,6	243,5	49	71,3	36	4	110	250	200	211	–	280	3
	332,9	264,5	73	101	55,5	5	117	280	207	223	–	321	4
200	260,5	232,5	30	43,4	24	2	108	235	206	207	17	253	2
	304,3	257	53,5	76,7	40	4	116	265	211	224	–	297	3
	350,7	277,5	77	107,1	59,4	5	122	295	217,5	234	–	337	4
220	280,5	251,5	30	43,4	24,5	2	117	255	224,5	227	17	271	2
	326,3	275,5	55	77,7	41	4	125	285	229	240	–	316	3
	371,6	300	77	107,4	58,5	6	132	315	238	254	–	358	5
240	330	283	19	57	30	2,1	130	290	–	–	–	308	2
	345,1	295,5	54	77,8	40,5	4	135	305	249	259	–	336	3
	391,6	322	76	107,1	59	6	142	335	258	276	–	378	5
260	350	302	19	57	30	2,1	139	310	–	–	–	326	2
	382,2	324	61	86,6	46	5	148	335	273	286	–	370	4
	427,9	346	86	119	63	6	154	365	278	296	–	412	5
280	370	323	19	57	30,5	2,1	150	325	–	–	–	347	2
	401	343	62	86,7	45,5	5	158	355	293	305	–	390	4
	464,3	372	95	129,9	70	6	166	395	300	320	–	446	5
300	405	353	21	69	38	3	162	360	–	–	–	380	2,5
	434,1	372	70	98,9	51	5	168	385	313	329	–	423	4
	485	392	95	130,3	70,5	6	175	415	319	340	–	465	5
320	430	372	21	69	38	3	172	380	–	–	–	400	2,5
	454,5	391	68	97,8	53	5	180	405	332	347	–	442	4
	520,3	422	102	139,4	74,5	7,5	191	450	344	367	–	500	6
340	445	395	21	69	37,5	3	183	400	–	–	–	422	2,5
	520	428	40,6	117	59,5	5	192	440	–	–	–	479	4
	557,9	445	112	151,4	84	7,5	201	475	363	386	–	530	6



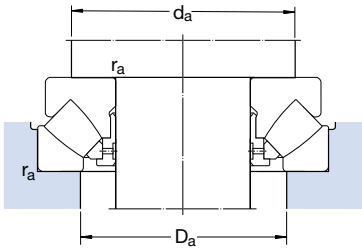
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
360	500	85	1 460	6 800	585	4,4	750	1 200	52,0	**29272**
	560	122	2 760	11 600	980	13	600	1 100	110	**29372**
	640	170	5 350	21 200	1 630	43	500	950	230	**29472 EM**
380	520	85	1 580	7 650	655	5,6	700	1 100	53,0	**29276**
	600	132	3 340	14 000	1 160	19	530	1 000	140	**29376**
	670	175	5 870	24 000	1 860	55	480	900	260	**29476 EM**
400	540	85	1 610	8 000	695	6,1	700	1 100	55,5	**29280**
	620	132	3 450	14 600	1 200	20	530	950	150	**29380**
	710	185	6 560	26 500	1 960	67	450	850	310	**29480 EM**
420	580	95	1 990	9 800	815	9,1	630	1 000	75,5	**29284**
	650	140	3 740	16 000	1 290	24	500	900	170	**29384**
	730	185	6 730	27 500	2 080	72	430	850	325	**29484 EM**
440	600	95	2 070	10 400	850	10	630	1 000	78,0	**29288**
	680	145	4 490	19 300	1 560	35	480	850	180	**29388 EM**
	780	206	7 820	32 000	2 320	87	380	750	410	**29488 EM**
460	620	95	2 070	10 600	865	11	600	950	81,0	**29292**
	710	150	4 310	19 000	1 500	34	450	800	215	**29392**
	800	206	7 990	33 500	2 450	110	380	750	425	**29492 EM**
480	650	103	2 350	11 800	950	13	560	900	98,0	**29296**
	730	150	4 370	19 600	1 530	36	450	800	220	**29396**
	850	224	9 550	39 000	2 800	140	340	670	550	**29496 EM**
500	670	103	2 390	12 500	1 000	15	560	900	100	**292/500**
	750	150	4 490	20 400	1 560	40	430	800	235	**293/500**
	870	224	9 370	40 000	2 850	150	340	670	560	**294/500 EM**
530	710	109	3 110	15 300	1 220	22	530	850	115	**292/530 EM**
	800	160	5 230	23 600	1 800	53	400	750	270	**293/530**
	920	236	10 500	44 000	3 100	180	320	630	650	**294/530 EM**
560	750	115	2 990	16 000	1 220	24	480	800	140	**292/560**
	980	250	12 000	51 000	3 550	250	300	560	810	**294/560 EM**



Dimensions								Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	B	B_1	C	$r_{1,2}$ min	s	d_a min	D_a max	r_a max
mm								mm		
360	485	423	25	81	44	4	194,5	430	453	3
	540	448	40,5	117	59,5	5	202	460	500	4
	580	474	63	164	83,5	7,5	210	495	550	6
380	505	441	27	81	42	4	202	450	473	3
	580	477	45	127	63,5	6	216	495	535	5
	610	494	67	168	87,5	7,5	222	525	580	6
400	526	460	27	81	42,2	4	212	470	493	3
	596	494	43	127	64	6	225	510	550	5
	645	525	69	178	89,5	7,5	234	550	615	6
420	564	489	30	91	46	5	225	500	525	4
	626	520	49	135	67,5	6	235	535	580	5
	665	545	70	178	90,5	7,5	244	575	635	6
440	585	508	30	91	46,5	5	235	520	545	4
	626	540	49	140	70,5	6	249	560	605	5
	710	577	77	199	101	9,5	257	605	675	8
460	605	530	30	91	46	5	245	540	565	4
	685	567	50	144	72,5	6	257	585	630	5
	730	596	77	199	101,5	9,5	268	630	695	8
480	635	556	33	99	53,5	5	259	570	595	4
	705	591	50	144	73,5	6	270	610	655	5
	770	625	88	216	108	9,5	280	660	735	8
500	654	574	33	99	53,5	5	268	585	615	4
	725	611	50	144	74	6	280	630	675	5
	795	648	86	216	110	9,5	290	685	755	8
530	675	608	32	105	56	5	285	620	655	4
	772	648	53	154	76	7,5	295	670	715	6
	840	686	89	228	116	9,5	308	725	800	8
560	732	644	37	111	61	5	302	655	685	4
	890	727	99	241	122	12	328	770	850	10



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
600	800	122	3 740	18 600	1 460	33	450	700	170	**292/600 EM**
	900	180	7 530	34 500	2 600	110	340	630	405	**293/600**
	1 030	258	13 100	56 000	4 000	300	280	530	845	**294/600 EM**
630	850	132	4 770	23 600	1 800	53	400	670	210	**292/630 EM**
	950	190	8 450	38 000	2 900	140	320	600	485	**293/630 EM**
	1 090	280	14 400	62 000	4 150	370	260	500	1 040	**294/630 EM**
670	900	140	4 200	22 800	1 660	49	380	630	255	**292/670**
	1 150	290	15 400	68 000	4 500	440	240	450	1 210	**294/670 EM**
710	1 060	212	9 950	45 500	3 400	200	280	500	660	**293/710 EM**
	1 220	308	17 600	76 500	5 000	560	220	430	1 500	**294/710 EF**
750	1 000	150	6 100	31 000	2 320	91	340	560	325	**292/750 EM**
	1 120	224	9 370	45 000	3 050	190	260	480	770	**293/750**
	1 280	315	18 700	85 000	5 500	690	200	400	1 650	**294/750 EF**
800	1 060	155	6 560	34 500	2 550	110	320	530	380	**292/800 EM**
	1 180	230	9 950	49 000	3 250	230	240	450	865	**293/800**
	1 360	335	20 200	93 000	5 850	820	190	360	2 025	**294/800 EF**
850	1 120	160	6 730	36 000	2 550	120	300	500	425	**292/850 EM**
	1 440	354	23 900	108 000	7 100	1 100	170	340	2 390	**294/850 EF**
900	1 520	372	26 700	122 000	7 200	1 400	160	300	2 650	**294/900 EF**
950	1 250	180	8 280	45 500	3 100	200	260	430	600	**292/950 EM**
	1 600	390	28 200	132 000	7 800	1 700	140	280	3 065	**294/950 EF**
1 060	1 400	206	10 500	58 500	3 750	330	220	360	860	**292/1060 EF**
	1 770	426	33 400	156 000	8 500	2 300	120	240	4 280	**294/1060 EF**
1 180	1 520	206	10 900	64 000	3 750	390	220	340	950	**292/1180 EF**
1 250	1 800	330	24 800	129 000	7 500	1 600	130	240	2 770	**293/1250 EF**
1 600	2 280	408	36 800	200 000	11 800	3 800	90	160	5 375	**293/1600 EF**



Dimensions								Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	B	B_1	C	$r_{1,2}$ min	s	d_a min	D_a max	r_a max
mm								mm		
600	760	688	39	117	60	5	321	700	735	4
	840	720	65	174	89	7,5	340	755	810	6
	940	769	99	249	128	12	349	815	900	10
630	810	723	50	127	62	6	338	740	780	5
	880	761	68	183	92	9,5	359	795	860	8
	995	815	107	270	137	12	365	860	950	10
670	880	773	45	135	73	6	361	790	825	5
	1 045	864	110	280	141	15	387	905	1 000	12
710	985	855	74	205	103	9,5	404	890	960	8
	1 110	917	117	298	149	15	415	965	1 070	12
750	950	858	50	144	74	6	409	880	925	5
	1 086	910	76	216	109	9,5	415	935	1 000	8
	1 170	964	121	305	153	15	436	1 015	1 120	12
800	1 010	911	52	149	77	7,5	434	935	980	6
	1 146	965	77	222	111	9,5	440	995	1 060	8
	1 250	1 034	123	324	165	15	462	1 080	1 185	12
850	1 060	967	47	154	82	7,5	455	980	1 030	6
	1 315	1 077	142	342	172	15	507	1 160	1 270	12
900	1 394	1 137	147	360	186	15	518	1 215	1 320	12
950	1 185	1 081	58	174	88	7,5	507	1 095	1 155	6
	1 470	1 209	153	377	191	15	546	1 275	1 400	12
1 060	1 325	1 211	66	199	100	9,5	566	1 225	1 290	8
	1 615	1 349	192	412	207	15	610	1 410	1 555	12
1 180	1 450	1 331	83	199	101	9,5	625	1 345	1 410	8
1 250	1 685	1 474	148	319	161	12	698	1 540	1 640	10
1 600	2 130	1 885	166	395	195	19	894	1 955	2 090	15


SKF

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Hybrid bearings

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Hybrid bearings

Hybrid bearings have rings of bearing steel and rolling elements of bearing grade silicon nitride (Si_3N_4). In addition to being excellent electric insulators, hybrid bearings have a higher speed capability and will provide longer service life than all-steel bearings in most applications.

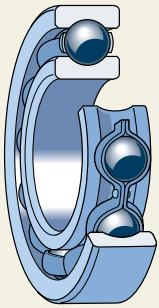
The very good electrical insulating property is one of the essential features of the silicon nitride. This protects the rings from electric current damage and thus increases bearing service life.

The density of silicon nitride is only 40 % of the density of bearing steel. Thus the rolling elements weigh less and have lower inertia. This means less cage stresses during rapid starts and stops and also significantly lower friction at high speeds as explained in the section “Friction” on **page 102**. Lower friction means cooler running and longer lubricant service life. Hybrid bearings are thus suitable for high rotational speeds.

Under insufficient lubrication conditions there is no smearing between silicon nitride and steel. This enables hybrid bearings to last much longer in applications operating under severe dynamic conditions or lubrication conditions with low operating viscosity ($\kappa < 1$). For hybrid bearings it is common to apply $\kappa = 1$ for running conditions with $\kappa < 1$ to estimate life under such conditions. Hybrid bearings may perform well, when lubricated with ultra thin film forming media, such as refrigerants, enabling oil-free designs but care needs to be taken in design and material selection. In such cases it is recommended, to consult the SKF application engineering service before deciding upon design and ordering.

Silicon nitride has a higher hardness and higher modulus of elasticity than steel, resulting in increased bearing stiffness and longer bearing service life in contaminated environments.

Fig 1



Silicon nitride rolling elements have a lower thermal expansion than steel rolling elements of similar size. This means less sensitivity to temperature gradients within the bearing and more accurate preload control. When designing bearing arrangements for very low temperature and as to estimate reductions in bearing clearance of hybrid bearings, please contact the SKF application engineering service.

SKF hybrid deep groove ball bearings

The SKF standard range of hybrid bearings essentially comprises hybrid single row deep groove ball bearings (➔ **fig** 1). The reason for it is clear: deep groove ball bearings are the most widely used bearing type, especially in electric motors, and are very useful for simple designs utilizing greased-for-life bearings. Deep raceway grooves and the close conformity between the raceways and the balls enable the accommodation of radial loads as well as of axial loads in both directions.

SKF hybrid deep groove ball bearings are available from 5 up to 110 mm bore diameter and meet most application needs. Bearings up to 45 mm bore diameter, for example, are most suitable for electrical motors in the power range of 0,15 up to 15 kW as well as generators, power tools and high-speed drives.

There is a wide application field for hybrid deep groove ball bearings, consequently SKF produces

- sealed and greased-for-life bearings and
- open design bearings.

Sealed and greased-for-life bearings

Sealed and greased-for-life SKF hybrid deep groove ball bearings (➔ **fig** 2) are protected on both sides either by

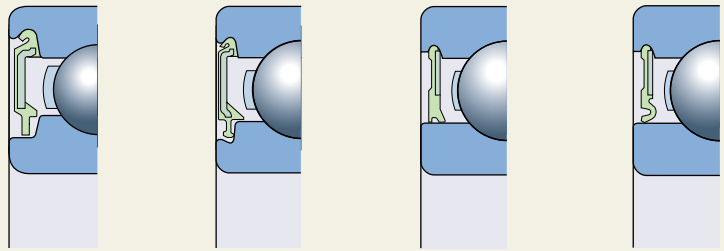
- low-friction seals of the RSL design (**a**) fitted to bearings with an outside diameter up to 25 mm, designation suffix 2RSL;
- low-friction seals of the RSL design (**b**) fitted to bearings with an outside diameter over 25 mm and up to and inclusive 52 mm, designation suffix 2RSL;
- low-friction seals of the RZ design (**c**) fitted to bearings with an outside diameter above 52 mm, designation suffix 2RZ;
- contact seals of the RS1 design (**d**), designation suffix 2RS1.

Details regarding the suitability of the different seals for various operating conditions will be found in the section “Deep groove ball bearings”, starting on **page 287**.

The seals are made of acrylonitrile butadiene rubber (NBR) with sheet steel reinforcement. The permissible operating temperature range for these seals is –40 to +100 °C and up to +120 °C for brief periods.

Sealed bearings are filled as standard with a premium quality grease, synthetic ester oil based using polyurea thickener, bearing designation suffix WT. It has excellent lubrication properties in the temperature range from about +70 °C to +120 °C, offers extremely long life unattainable with other sealed and greased-for-life bearing designs

Fig 2



and fits the needs of electrical machinery. The most important properties of the WT grease are listed in **table** 1.

Regarding the suitability for high temperatures, the permissible temperature ranges of the cage and seals have to be taken into consideration. For SKF hybrid bearings with seals of fluoro rubber, which withstand temperatures up to 180 °C please contact the SKF application engineering service.

Open design bearings

In addition to sealed and greased-for-life bearings larger SKF hybrid deep groove ball bearings are also available in open basic design without seals. If smaller open design bearings are required and the quantity is small, SKF recommends ordering sealed hybrid bearings and removing the seals, which can be done quite simply.

Table 1

Properties of WT grease

Properties	WT grease
DIN 51825 code	K2P-40
Thickener	Polyurea (Di-urea)
Base oil type	Ester
NLGI consistency class	2–3
Temperature range, °C	–40 to +160
Base oil viscosity, mm^2/s	
at 40 °C	70
at 100 °C	9,4

Other SKF hybrid bearings

Hybrid high-precision bearings

The SKF product range also includes a selection of

- hybrid high-precision angular contact ball bearings
- hybrid high-precision cylindrical roller bearings
- hybrid high-precision angular contact thrust ball bearings, single and double direction.

Detailed information about these hybrid bearings can be found in the SKF catalogue “High-precision bearings”.

In addition, hybrid single or double row angular contact ball bearings and hybrid four-point contact ball bearings can be manufactured to special order. In such cases the SKF application engineering service should be contacted for further information.

Hybrid bearings with special steel rings and coatings

SKF hybrid bearings are made as standard of the same steel as the equivalent all-steel bearing. The standard stabilization temperatures are 120 °C for deep grove ball bearings and 150 °C for angular contact ball bearings. For continuous operation above these temperatures it is recommended to use bearings with rings that are dimensionally stabilized for use at higher operating temperatures e.g.

- up to +150 °C, suffix S0, or
- up to +200 °C, suffix S1.

Hybrid deep groove ball bearings stabilized to S0 or S1 etc. are normally not stocked.

On request hybrid bearings can be manufactured with rings of through-hardening stainless bearing steels with good corrosion, wear and oxidation resistance and good high temperature properties. Such bearings can operate at temperatures up to 300 °C.

For custom-made hybrid bearings with rings of special stainless steels for cryogenic temperatures or of high temperature

tool steels please contact the SKF application engineering service.

The rings may be coated for corrosion protection e.g. with zinc chromate or thin dense chromium. Low friction coatings of molybdenum base can be applied for vacuum and gas applications.

Bearing data – general

Dimensions, tolerances, internal clearance
SKF hybrid deep groove ball bearings are standardized bearings and are manufactured with

- boundary dimensions to ISO 15:1998
- Normal tolerances to ISO 492:2002
- C3 radial internal clearance to ISO 5753:1991 as standard (➔ **table** 2).

Cages
Depending on the bearing size SKF hybrid deep groove ball bearings are fitted with a

- snap-type cage of glass fibre reinforced polyamide 6,6 (➔ **fig** 3 **a**) or
- riveted pressed steel cage (➔ **fig** 3 **b**).

Table 2

Internal clearance

Bearing bore diameter d over	incl.	Radial internal clearance C3 min	max
mm		mm	
	6	8	23
6	**10**	8	23
10	**18**	11	25
18	**24**	13	28
24	**30**	13	28
30	**40**	15	33
40	**50**	18	36
50	**65**	23	43
65	**80**	25	51
80	**100**	30	58
100	**120**	36	66

Hybrid bearings with polyamide 6,6 cages can be operated at temperatures up to +120 °C.

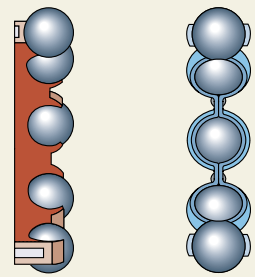
Speed capability
Hybrid deep groove ball bearings fitted with a polymeric cage can be operated at speeds in excess of the ratings given for all-steel bearings. The limiting speeds listed in the product tables are valid for bearings with the standard cage, seal and grease according to the bearing designation. Hybrid bearings fitted with PEEK cages can be operated at higher speeds and temperatures. For more information please contact the SKF application engineering service.

The values for “Reference speed” shown with the sealed bearings are valid for open basic design bearings and demonstrate the speed capability of these bearings. For sealed bearings the values listed for “Limiting speed” should not be exceeded.

Hybrid bearings perform excellently under vibrating or oscillating conditions. It is therefore not usually necessary to apply special greases or preloads for these conditions.

Silicon nitride properties
The properties of the bearing grade silicon nitride (Si_3N_4) are presented in the section “Materials for rolling bearings”, starting on **page 138**.

Fig 3



Electrical properties

Hybrid bearings provide effective protection against electric arc damage to the grease and raceways caused by both AC and DC currents. The impedance for a hybrid bearing is high, even for very high frequencies, providing extremely good protection against high frequency current and peaks through the ball/raceway contacts. For small hybrid bearings equipped with a sheet steel reinforced contact seal of NBR, the voltage level when the first arcing occurs through the seal/bearing contact is beyond 2,5 kV DC. For additional information please contact the SKF application engineering service.

Axial preloading

In order to provide good low noise and high-speed operation it is normal to apply an axial preload to a bearing arrangement comprising two hybrid deep groove ball bearings. A particular simple method to apply the axial preload is by using spring washers, as described in the section "Preloading by springs", starting on **page 216**. The recommended axial preloads can be calculated as given in this section. For additional information please refer to the section "Bearing preload", starting on **page 206**.

Equivalent bearing loads

The equivalent dynamic and static bearing loads of hybrid deep groove ball bearings are calculated using the equations for all-steel deep groove ball bearings shown on **page 299**.

Supplementary designations

The designation suffixes used to identify certain features of SKF hybrid deep groove ball bearings are explained in the following.

C3 Radial internal clearance greater than Normal

F1 Grease filling grade: 10–15 % of the free space in the bearing

HC5 Rolling elements of silicon nitride

TNH Injection moulded cage of PEEK

TN9 Injection moulded cage of glass fibre reinforced polyamide 6,6

WT Polyurea base grease of consistency 2–3 to the NLGI Scale for temperature range –40 to +160 °C (normal filling grade)

2RS1 Acrylonitrile butadiene rubber (NBR) seal with sheet steel reinforcement on both sides of the bearing

2RSH2 Fluoro rubber (FKM) seal with sheet steel reinforcement on both sides of the bearing

2RSL Low-friction, acrylonitrile butadiene rubber (NBR) seal with sheet steel reinforcement on both sides of the bearing

2RZ Low-friction, acrylonitrile butadiene rubber (NBR) seal with sheet steel reinforcement on both sides of the bearing

Selection of bearing size

When selecting the necessary bearing size of hybrid deep groove ball bearings please follow the procedure for all-steel bearings in the section “Selection of bearing size”, starting on **page 49**. Due to the higher modulus of elasticity of ceramic balls the static safety factor s_0 should be increased by

$$s_{0\ hybrid} = 1{,}1\ s_{0\ all\text{-}steel}$$

The recommended values of s_0 for all-steel bearings can be found in **table** 10 on **page 77**.

Lubrication

Most of the SKF hybrid deep groove ball bearings are sealed and greased-for-life. In the case of open bearings and grease lubrication SKF recommends the SKF grease LGHP 2 for electrical motors. For very high-speed applications at temperatures below +70 °C the use of either SKF grease LGLC 2 or SKF grease LGLT 2 is recommended. More about the SKF greases can be found in the section “Lubrication”, starting on **page 229**.

Applications requiring long service life at extremely high speeds have to be oil-lubricated. The two recommended lubrication methods in this case are

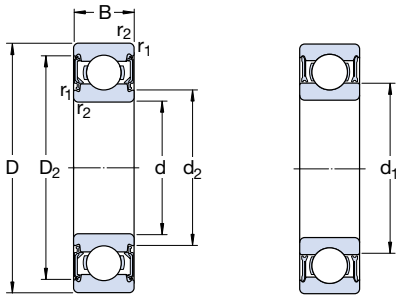
- oil jet lubrication and
- oil spot lubrication.

Oil spot lubrication, e.g. by the SKF TOS-EX2 system, enables reliable lubrication to be achieved with extremely small quantities of oil, which lowers the operating temperatures, enables higher speeds and reduces oil emission to the environment.

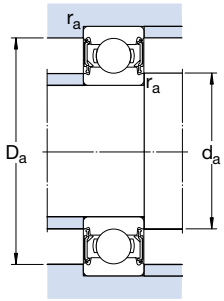
For more information about the design of these lubrication arrangements, please refer to the section “Oil lubrication”, starting on **page 248**, and the SKF catalogue “High-precision bearings”.

Sealed and greased-for-life hybrid deep groove ball bearings

d **5 – 45** mm



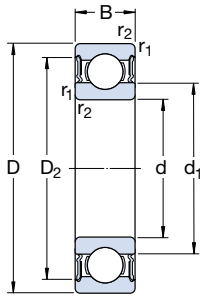
Principal dimensions			Basic load ratings		Fatique load limit	Speed ratings		Mass	Designation
			dynamic	static		Refer-	Limiting		
d	D	B	C	C_0	P_u	ence speed	speed		
mm			kN		kN	r/min		kg	–
5	16	5	1,14	0,38	0,016	130 000	85 000	0,0050	**625-2RZTN9/HC5C3WTF1**
6	19	6	2,34	0,95	0,04	110 000	70 000	0,0080	**626-2RSLTN9/HC5C3WTF1**
7	19	6	2,34	0,95	0,04	110 000	70 000	0,0070	**607-2RSLTN9/HC5C3WTF1**
	22	7	3,45	1,37	0,057	95 000	63 000	0,012	**627-2RSLTN9/HC5C3WTF1**
8	22	7	3,45	1,37	0,057	95 000	63 000	0,012	**608-2RSLTN9/HC5C3WTF1**
10	26	8	4,75	1,96	0,083	85 000	56 000	0,018	**6000-2RSLTN9/HC5C3WT**
	30	9	5,4	2,36	0,1	75 000	50 000	0,032	**6200-2RSLTN9/HC5C3WT**
12	28	8	5,4	2,36	0,1	75 000	50 000	0,022	**6001-2RSLTN9/HC5C3WT**
	32	10	7,28	3,1	0,132	67 000	45 000	0,037	**6201-2RSLTN9/HC5C3WT**
15	32	9	5,85	2,85	0,12	63 000	43 000	0,030	**6002-2RSLTN9/HC5C3WT**
	35	11	8,06	3,75	0,16	60 000	40 000	0,044	**6202-2RSLTN9/HC5C3WT**
17	35	10	6,37	3,25	0,137	56 000	38 000	0,038	**6003-2RSLTN9/HC5C3WT**
	40	12	9,95	4,75	0,2	53 000	34 000	0,059	**6203-2RSLTN9/HC5C3WT**
20	42	12	9,95	5	0,212	48 000	32 000	0,062	**6004-2RSLTN9/HC5C3WT**
	47	14	13,5	6,55	0,28	45 000	30 000	0,097	**6204-2RSLTN9/HC5C3WT**
25	47	12	11,9	6,55	0,275	40 000	28 000	0,073	**6005-2RSLTN9/HC5C3WT**
	52	15	14,8	7,8	0,335	38 000	26 000	0,12	**6205-2RSLTN9/HC5C3WT**
30	55	13	13,8	8,3	0,355	34 000	24 000	0,11	**6006-2RZTN9/HC5C3WT**
	62	16	20,3	11,2	0,475	32 000	22 000	0,18	**6206-2RZTN9/HC5C3WT**
35	62	14	16,8	10,2	0,44	30 000	20 000	0,15	**6007-2RZTN9/HC5C3WT**
	72	17	27	15,3	0,655	28 000	18 000	0,26	**6207-2RZTN9/HC5C3WT**
40	68	15	17,8	11,6	0,49	28 000	18 000	0,19	**6008-2RZTN9/HC5C3WT**
	80	18	32,5	19	0,8	24 000	16 000	0,34	**6208-2RZTN9/HC5C3WT**
45	85	19	35,1	21,6	0,915	22 000	14 000	0,42	**6209-2RZTN9/HC5C3WT**
	100	25	55,3	31,5	1,34	20 000	4 500	0,77	**6309-2RS1TN9/HC5C3WT**



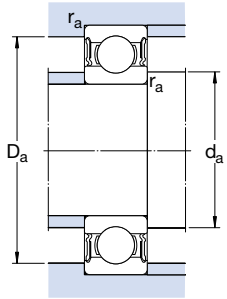
Dimensions					Abutment and fillet dimensions				Calculation factor
d	d_1 ~	d_2 ~	D_2 ~	$r_{1,2}$ min	d_a min	d_a max	D_a max	r_a max	f_0
mm					mm				–
5	8,4	–	13,3	0,3	7,4	–	13,6	0,3	8,4
6	–	9,5	16,5	0,3	8,4	9,4	16,6	0,3	13
7	–	9,5	16,5	0,3	9	9,4	17	0,3	13
	–	10,6	19,2	0,3	9,4	10,5	19,6	0,3	12
8	–	10,6	19,2	0,3	10	10,5	20	0,3	12
10	–	13	22,6	0,3	12	12,5	24	0,3	12
	–	15,2	24,8	0,6	14,2	15	25,8	0,6	13
12	–	15,2	24,8	0,3	14	15	26	0,3	13
	–	16,6	27,4	0,6	16,2	16,5	27,8	0,6	12
15	–	18,7	28,2	0,3	17	18,5	30	0,3	14
	–	19,4	30,4	0,6	19,2	19,4	30,8	0,6	13
17	–	20,7	31,4	0,3	19	20,5	33	0,3	14
	–	22,2	35	0,6	21,2	22	35,8	0,6	13
20	–	24,9	37,2	0,6	23,2	24,5	38,8	0,6	14
	–	26,3	40,6	1	25,6	26	41,4	1	13
25	–	29,7	42,2	0,6	28,2	29,5	43,8	0,6	14
	–	31,8	46,3	1	30,6	31,5	46,4	1	14
30	38,2	–	49	1	34,6	–	50,4	1	15
	40,4	–	54,1	1	35,6	–	56,4	1	14
35	43,8	–	55,6	1	39,6	–	57,4	1	15
	46,9	–	62,7	1,1	42	–	65	1	14
40	49,3	–	61,1	1	44,6	–	63,4	1	15
	52,6	–	69,8	1,1	47	–	73	1	14
45	57,6	–	75,2	1,1	52	–	78	1	14
	62,2	–	86,7	1,5	54	–	91	1,5	13

Sealed and greased-for-life hybrid deep groove ball bearings

d **50 – 60** mm

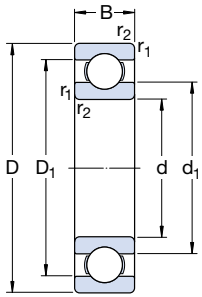


Principal dimensions			Basic load ratings		Fatique load limit	Speed ratings		Mass	Designation
			dynamic	static		Refer-ence	Limiting speed		
d	D	B	C	C_0	P_u	speed			
mm			kN		kN	r/min		kg	–
50	80	16	22,9	16	0,71	22 000	5 000	0,25	**6010-2RS1/HC5C3WT**
	90	20	37,1	23,2	0,98	20 000	4 800	0,44	**6210-2RS1/HC5C3WT**
55	90	18	29,6	21,2	0,9	20 000	4 500	0,37	**6011-2RS1/HC5C3WT**
	100	21	46,2	29	1,25	19 000	4 300	0,59	**6211-2RS1/HC5C3WT**
60	95	18	30,7	23,2	0,98	19 000	4 300	0,39	**6012-2RS1/HC5C3WT**
	110	22	55,3	36	1,53	17 000	4 000	0,71	**6212-2RS1/HC5C3WT**

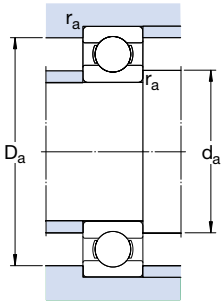


Dimensions				Abutment and fillet dimensions			Calculation factor
d	d_1 ~	D_2 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	f_0
mm				mm			–
50	59,8	72,8	1	54,6	75,4	1	15
	62,5	81,6	1,1	57	83	1	14
55	66,3	81,5	1,1	61	84	1	15
	69,1	89,4	1,5	64	91	1,5	14
60	71,3	86,5	1,1	66	89	1	16
	75,5	98	1,5	69	101	1,5	14

Hybrid deep groove ball bearings
d **65 – 110** mm



Principal dimensions			**Basic load ratings**		**Fatique load limit**	**Speed ratings**		**Mass**	**Designation**
			dynamic	static		Refer-	Limiting		
d	D	B	C	C_0	P_u	ence speed	speed		
mm			kN		kN	r/min		kg	–
65	100	18	31,9	25	1,06	18 000	10 000	0,41	**6013/HC5C3**
	120	23	58,5	40,5	1,73	16 000	8 500	0,92	**6213/HC5C3**
70	110	20	39,7	31	1,32	16 000	9 000	0,57	**6014/HC5C3**
	125	24	63,7	45	1,9	15 000	8 500	0,99	**6214/HC5C3**
75	160	37	119	76,5	3	12 000	6 700	2,60	**6315/HC5C3**
80	170	39	130	86,5	3,25	12 000	6 300	2,80	**6316/HC5C3**
95	200	45	159	118	4,15	9 500	5 300	4,90	**6319/HC5C3**
110	240	50	203	180	5,7	8 000	4 500	8,15	**6322/HC5C3**



Dimensions				Abutment and fillet dimensions			Calculation factor
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	f_0
mm				mm			–
65	76,3	91,5	1,1	71	94	1	16
	83,3	106	1,5	74	111	1,5	15
70	82,9	99,9	1,1	76	104	1	16
	87,1	111	1,5	79	116	1,5	15
75	101	138	2,1	87	148	2	13
80	108	147	2,1	92	158	2	13
95	121	172	3	109	186	2,5	13
110	149	205	3	124	226	2,5	13



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INSOCOAT deep groove ball bearings 910
INSOCOAT cylindrical roller bearings 914

Rolling bearings in electric motors, generators or associated equipment are at risk from the passage of electric current, which can damage the surfaces of rolling elements and raceways in the bearing and degrade the grease rapidly. The risk of damage increases greatly if a frequency converter controls the motor, which is becoming increasingly common. In a frequency controlled induction motor, an additional risk for high frequency bearing currents occurs due to the inherent stray capacitances within the motor.

To solve this problem and to protect the bearings against electric current passage, SKF has developed INSOCOAT® bearings – electrically insulated rolling bearings (**→ fig 1**). An INSOCOAT bearing is a very economical solution compared with other insulation methods that protect the bearing. By integrating the electrical insulation function into the bearing, SKF has been able to increase reliability and machine uptime by virtually eliminating this failure mode.

INSOCOAT bearings have a 100 µm thick layer of aluminium oxide on the exterior of the outer or inner ring, that can withstand voltages up to 1 000 V DC. The SKF plasma spray coating technique provides an extremely coherent coating of uniform thickness, which is further treated to make it insensitive to moisture and humidity.

SKF INSOCOAT bearings are robust and can be handled in the same way as normal non-insulated bearings.

Fig 1



INSOCOAT bearing designs

SKF INSOCOAT bearings are available from stock as

- single row deep groove ball bearings and
- single row cylindrical roller bearings

in the most frequently used sizes and variants. The performance data as well as the dimensional and running accuracy of the INSOCOAT bearings are identical to those of standard non-insulated bearings.

The SKF standard range includes bearings either with coated outer ring or inner ring of open design. Deep groove ball bearings with Z shields or with RS1 contact seals can also be supplied by SKF. Before deciding upon design and ordering, please consult the SKF application engineering service.

INSOCOAT bearings with coated outer ring
Bearings with electrically insulating coating on the external surfaces of the outer ring are the most common INSOCOAT bearings. They are identified by the suffix VL0241.

The range of outer ring coated bearings covers bearings with outside diameters of 80 mm and above. For applications where smaller bearings are needed, the use of SKF hybrid deep groove ball bearings is recommended **(→ page 893)**.

INSOCOAT bearings with coated inner ring
Bearings with INSOCOAT coating on the external surfaces of the inner ring (**→ fig 2**) provide enhanced protection against electric current damage due to the increased impedance because of the smaller coated surface area. They are identified by the suffix VL2071. The range of inner ring coated bearings covers bearings with bore diameters of 70 mm and above.

Other INSOCOAT bearings

If the standard range of INSOCOAT deep groove ball bearings and cylindrical roller bearings is inadequate please contact the SKF application engineering service for information about the complete manufacturing programme of INSOCOAT bearings. Other types and sizes of INSOCOAT bearings that are not listed in the standard range and INSOCOAT bearings with an aluminium-oxide layer up to 300 µm thickness on the bearing outer ring are available on request.

Fig 2



Bearing data – general

Dimensions
The boundary dimensions of INSOCOAT deep groove ball bearings as well as cylindrical roller bearings are in accordance with ISO 15:1998.

Tolerances
The INSOCOAT bearings are produced to Normal tolerances. Some deep groove ball bearings are also available with higher accuracy to tolerance class P5. The values of the tolerances conform to ISO 492:2002 and are shown in **tables** 3 and 5 on **pages 125** and **127**.

The aluminium-oxide layer of nominal 100 µm thickness applied either to the outer ring surfaces or the inner ring surfaces does not influence the accuracy.

Internal clearance
INSOCOAT deep groove ball bearings and cylindrical roller bearings are manufactured as standard with radial internal clearance shown within the bearing designation. The availability of bearings with clearance other than standard should be checked before ordering.

The clearance limits will be found for

- the deep groove ball bearings in **table** 3 on **page 297** and for
- the cylindrical roller bearings in **table** 2 on **page 507**.

The values are valid before mounting under zero measuring load.

Cages
Depending on the bearing type and size, INSOCOAT bearings are equipped with one of the following cages:

- an injection moulded cage of glass fibre reinforced polyamide 6,6, designation suffix P,
- an unhardened pressed steel cage, no designation suffix, or
- a two-piece machined brass rolling element centred cage, designation suffix M.

For more detailed information on these cages please refer to the sections “Deep groove ball bearings”, starting on **page 287,** and “Single row cylindrical roller bearings”, starting on **page 501**.

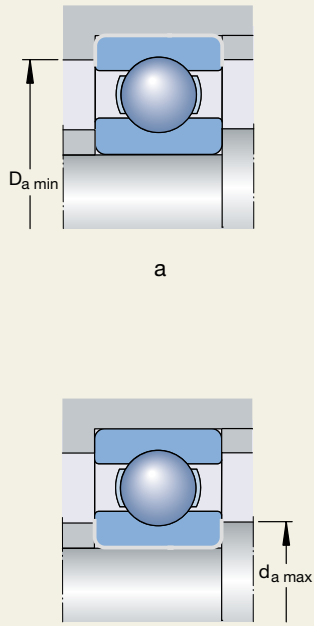
Electrical properties
The INSOCOAT layer provides effective protection against AC and DC currents. The minimum ohmic resistance is 50 MΩ at 1 000 V DC. Tests at SKF have shown that electrical breakdown of the insulating layer occurs above 3 000 V DC.

Design of associated components

For insulation reasons it is recommended that for

- bearings with coated outer ring, type VL0241, the housing shoulder or spacer sleeve should not have a smaller diameter than the abutment dimension $D_{a\,min}$ (→ **fig** 3 **a**) listed in the product tables.
- bearings with coated inner ring, type VL2071, the shaft shoulder or spacer sleeve should not have a larger diameter than the abutment dimension $d_{a\,max}$ (→ **fig** 3 **b**) listed in the product tables.

Fig 3



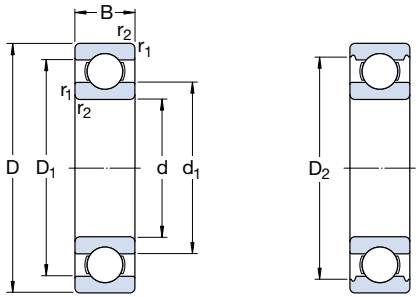
Mounting and maintenance

During mounting INSOCOAT bearings can be handled as standard bearings. Proper lubrication is important to utilize fully the service life of INSOCOAT bearings. The best method is frequent re-greasing.

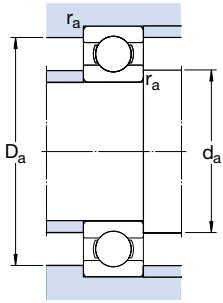
Additional information

For additional information concerning INSOCOAT bearings, please contact the SKF application engineering service.

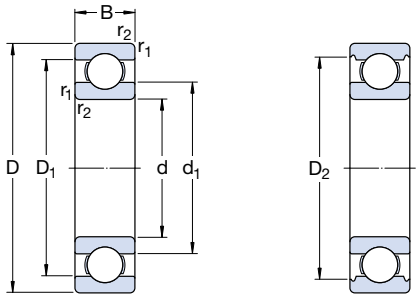
INSOCOAT deep groove ball bearings
d **40 – 100** mm



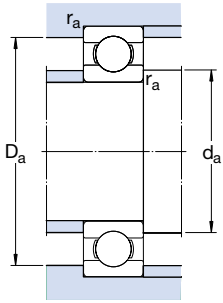
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
40	90	23	41	24	1,02	17 000	15 000	0,75	**6308 M/C4VL0241**
50	110	27	61,8	38	1,6	13 000	12 000	1,25	**6310 M/C3VL0241**
60	130	31	81,9	52	2,2	11 000	10 000	2,00	**6312 M/C3VL0241**
65	140	33	92,3	60	2,5	10 000	9 500	2,50	**6313 M/C3VL0241**
70	125	24	60,5	45	1,9	11 000	10 000	1,25	**6214 M/C4VL0241**
	150	35	104	68	2,75	9 500	6 300	2,50	**6314/C3VL0241**
	150	35	104	68	2,75	9 500	9 000	3,05	**6314 M/C3VL0241**
	150	35	104	68	2,75	9 500	9 000	3,05	**6314 M/C4VL0241**
75	130	25	66,3	49	2,04	10 000	9 500	1,40	**6215 M/C4VL0241**
	160	37	114	76,5	3	9 000	5 600	3,05	**6315/C3VL0241**
	160	37	114	76,5	3	9 000	8 000	3,70	**6315 M/C3VL0241**
80	170	39	124	86,5	3,25	8 500	5 300	3,55	**6316/C3VL0241**
	170	39	124	86,5	3,25	8 500	7 500	4,35	**6316 M/C3VL0241**
	170	39	124	86,5	3,25	8 500	7 500	4,35	**6316 M/C4VL0241**
	170	39	124	86,5	3,25	8 500	5 300	3,55	**6316/C3VL2071**
85	180	41	133	96,5	3,55	8 000	7 500	5,15	**6317 M/C3VL0241**
90	160	30	95,8	73,5	2,8	8 500	7 500	2,60	**6218 M/C3VL0241**
	190	43	143	108	3,8	7 500	4 800	4,90	**6318/C3VL0241**
	190	43	143	108	3,8	7 500	7 000	5,70	**6318 M/C3VL0241**
	190	43	143	108	3,8	7 500	7 000	5,70	**6318 M/P64VL0241**
	190	43	143	108	3,8	7 500	7 000	5,70	**6318 M/C3VL2071**
95	200	45	153	118	4,15	7 000	6 300	6,75	**6319 M/C3VL0241**
	200	45	153	118	4,15	7 000	6 300	6,75	**6319 M/C4VL0241**
	200	45	153	118	4,15	7 000	4 500	5,65	**6319/C3VL2071**
100	215	47	174	140	4,75	6 700	4 300	7,00	**6320/C3VL0241**
	215	47	174	140	4,75	6 700	6 000	8,55	**6320 M/C3VL0241**



Dimensions					Abutment and fillet dimensions					Calculation factors	
d	d_1 ~	D_1 ~	D_2 ~	$r_{1,2}$ min	d_a min	d_a max	D_a min	D_a max	r_a max	k_r	f_0
mm					mm					–	
40	56,1	74,2	79,8	1,5	49	–	81	81	1,5	0,03	13
50	68,7	91,6	96,8	2	61	–	99	99	2	0,03	13
60	81,6	109	114	2,1	72	–	118	118	2	0,03	13
65	88,3	117	124	2,1	77	–	128	128	2	0,03	13
70	87	108	113	1,5	79	–	116	116	1,5	0,025	15
	95	126	132	2,1	82	–	136	138	2	0,03	13
	95	126	132	2,1	82	–	136	138	2	0,03	13
	95	126	132	2,1	82	–	136	138	2	0,03	13
75	92	114	118	1,5	84	–	121	121	1,5	0,025	15
	101	134	141	2,1	87	–	146	148	2	0,03	13
	101	134	141	2,1	87	–	146	148	2	0,03	13
80	108	143	149	2,1	92	–	154	158	2	0,03	13
	108	143	149	2,1	92	–	154	158	2	0,03	13
	108	143	149	2,1	92	–	154	158	2	0,03	13
	108	143	149	2,1	92	103	–	158	2	0,03	13
85	115	152	158	3	99	–	163	166	2,5	0,03	13
90	112	139	145	2	101	–	149	149	2	0,025	15
	121	160	166	3	104	–	171	176	2,5	0,03	13
	121	160	166	3	104	–	171	176	2,5	0,03	13
	121	160	166	3	104	–	171	176	2,5	0,03	13
	121	160	166	3	104	116	–	176	2,5	0,03	13
95	127	169	174	3	109	–	179	186	2,5	0,03	13
	127	169	174	3	109	–	179	186	2,5	0,03	13
	127	169	174	3	109	122	–	186	2,5	0,03	13
100	135	181	186	3	114	–	191	201	2,5	0,03	13
	135	181	186	3	114	–	191	201	2,5	0,03	13

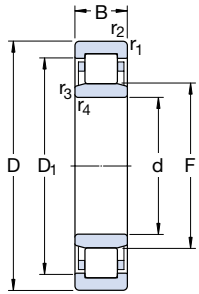


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
110	200	38	143	118	4	6 700	6 300	5,30	**6222 M/C3VL0241**
	240	50	203	180	5,7	6 000	3 800	9,65	**6322/C3VL0241**
	240	50	203	180	5,7	6 000	5 300	11,5	**6322 M/C3VL0241**
	240	50	203	180	5,7	6 000	5 300	11,5	**6322 M/C4VL0241**
	240	50	203	180	5,7	6 000	3 800	9,65	**6322/C3VL2071**
120	260	55	208	186	5,7	5 600	3 400	12,2	**6324/C3VL0241**
	260	55	208	186	5,7	5 600	3 400	12,2	**6324/P63VL0241**
	260	55	208	186	5,7	5 600	5 000	15,2	**6324 M/C3VL0241**
	260	55	208	186	5,7	5 600	3 400	12,2	**6324/C3VL2071**
130	230	40	156	132	4,15	5 600	3 600	5,75	**6226/C3VL0241**
	280	58	229	216	6,3	5 000	3 200	14,7	**6326/C3VL0241**
	280	58	229	216	6,3	5 000	4 500	17,7	**6326 M/C3VL0241**
	280	58	229	216	6,3	5 000	3 200	14,7	**6326/C3VL2071**
140	300	62	251	245	7,1	4 800	4 300	21,3	**6328 M/C3VL0241**
150	270	45	174	166	4,9	5 000	3 200	10,1	**6230/P53VL0241**
	320	65	276	285	7,8	4 300	4 000	26,0	**6330 M/C3VL0241**
	320	65	276	285	7,8	4 300	4 000	26,0	**6330 M/C3VL2071**



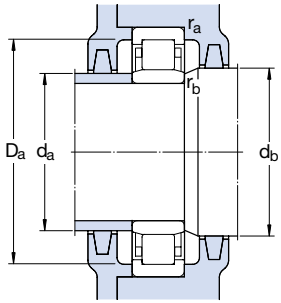
Dimensions					Abutment and fillet dimensions					Calculation factors	
d	d_1 ~	D_1 ~	D_2 ~	$r_{1,2}$ min	d_a min	d_a max	D_a min	D_a max	r_a max	k_r	f_0
mm					mm					–	
110	138	173	179	2,1	122	–	184	188	2	0,025	14
	149	201	207	3	124	–	213	226	2,5	0,03	13
	149	201	207	3	124	–	213	226	2,5	0,03	13
	149	201	207	3	124	–	213	226	2,5	0,03	13
	149	201	207	3	124	143	–	226	2,5	0,03	13
120	164	216	–	3	134	–	222	246	2,5	0,03	14
	164	216	–	3	134	–	222	246	2,5	0,03	14
	164	216	–	3	134	–	222	246	2,5	0,03	14
	164	216	–	3	134	158	–	246	2,5	0,03	14
130	160	199	205	3	144	–	211	216	2,5	0,025	15
	177	233	–	4	147	–	239	263	3	0,03	14
	177	233	–	4	147	–	239	263	3	0,03	14
	177	233	–	4	147	171	–	263	3	0,03	14
140	190	250	–	4	157	–	256	283	3	0,03	14
150	190	229	–	3	164	–	235	256	2,5	0,025	15
	206	265	–	4	167	–	271	303	3	0,03	14
	206	265	–	4	167	200	–	303	3	0,03	14

INSOCOAT cylindrical roller bearings
d **75 – 120** 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	–
75	160	37	280	265	33,5	4 500	5 300	3,30	* **NU 315 ECP/VL0241**
85	180	41	340	335	41,5	4 000	4 800	5,25	* **NU 317 ECM/C3VL0241**
90	160	30	208	220	27	4 500	5 000	2,75	* **NU 218 ECM/C3VL0241**
95	200	45	390	390	46,5	3 600	4 300	7,25	* **NU 319 ECM/C3VL0241**
110	240	50	530	540	61	3 000	3 400	12,0	* **NU 322 ECM/C3VL0241**
120	260	55	610	620	69,5	2 800	3 200	15,2	* **NU 324 ECM/C3VL0241**

* SKF Explorer bearing



Dimensions						Abutment and fillet dimensions							Calculation factor
d	D_1 ~	F	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b min	D_a min	D_a max	r_a max	r_b max	k_r
mm						mm							–
75	136	95	2,1	2,1	1,8	87	92	97	141	148	2	2	0,15
85	153	108	3	3	2,3	99	105	111	158	166	2,5	2,5	0,15
90	139	107	2	2	1,8	101	104	110	144	149	2	2	0,15
95	170	121,5	3	3	2,9	109	118	124	175	186	2,5	2,5	0,15
110	201	143	3	3	3	124	139	146	207	226	2,5	2,5	0,15
120	219	154	3	3	3,7	134	150	157	225	246	2,5	2,5	0,15

[1] Permissible axial displacement from normal position of one bearing ring in relation to the other



Bearings and bearing units for high temperatures

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Fig 1

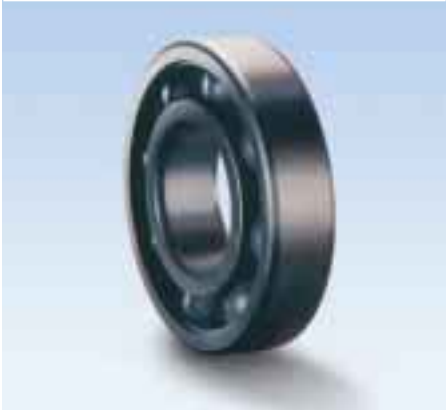


Fig 2



Fig 3



For bearing arrangements which have to operate at extreme temperatures in the range –150 to +350 °C, or which have to withstand very large temperature differences, e.g. in kiln trucks, furnaces or the conveyor systems of lacquering equipment, normal rolling bearings are unsuitable. SKF has therefore developed high-temperature

- deep groove ball bearings (→ **fig** 1),
- Y-bearings (→ **fig** 2),
- Y-bearing plummer block units (→ **fig** 3)
- and Y-bearing flanged units

to meet the widely differing engineering demands for

- reduced machine operating costs,
- extended maintenance-free service life
- and high operational reliability

in this wide temperature range, even in a severe environment. The bearings and units for high temperature belonging to the SKF standard assortment are described in the following and listed in the relevant product tables. To special order SKF can produce bearings for extreme low or high temperatures, which are engineered to meet specific needs. If such engineering products are required, the SKF application engineering service should be contacted.

Deep groove ball bearings for high temperatures

SKF deep groove ball bearings for high as well low temperatures correspond in design to the appropriate standard single row deep groove ball bearings. They have no filling slots and are able to accommodate moderate axial loads in addition to radial loads. The characteristic features of these bearings include large radial internal clearance and special cages. The large clearance is four times the C5 clearance and prevents the bearings from seizing even when they are rapidly cooled. All surfaces of the bearings and the shields are manganese phosphated. This provides protection against corrosion and improves running properties.

SKF deep groove ball bearings for high temperatures have a cylindrical bore and are available in five different designs as described in the following.

VA201 design for the most common applications

Bearings of the VA201 design (→ **fig 4 a**) are not sealed and have a pressed steel cage. They are lubricated with a polyalkylene glycol/graphite mixture which can be used at temperatures between –40 and +250 °C. At temperatures above +200 °C, dry lubrication pertains.

2Z/VA201 design with protective shields

The bearings of the 2Z/VA201 design (→ **fig 4 b**) are of the same design as the VA201 bearings but have protective shields on both sides to prevent the ingress of solid contaminants. Additionally, these bearings have twice the amount of the polyalkylene glycol/graphite mixture as the open VA201 design bearings.

2Z/VA208 design for high demands

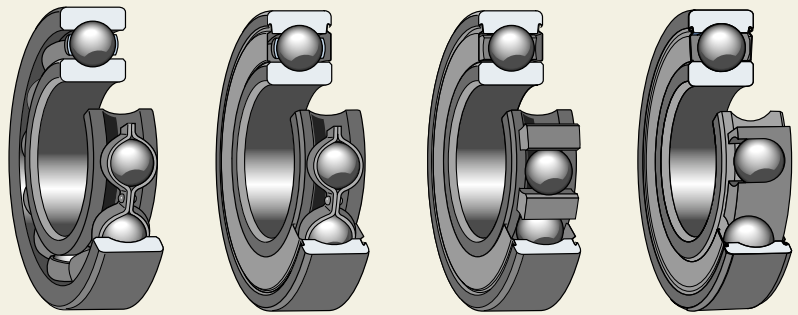
These bearings (→ **fig 4 c**) have a segmented cage of graphite and can be used at temperatures between –150 and +350 °C. The segments separate the balls and also provide the necessary lubrication. The bearings are fitted with two shields, which axially guide the cage segments and prevent the entry of solid contaminants. The minute quantities of graphite powder released by the cage during rotation provide adequate lubrication for the bearing.

An additional advantage of these bearings is that they are environmentally friendly. Even at maximum temperatures, no dangerous gases or vapours are emitted.

2Z/VA228 design for top requirements

The 2Z/VA228 design bearings (→ **fig 4 d**) are the "top-of-the-range" among SKF products for high temperatures. They are fitted with a "coronet" cage of pure graphite, which opens up additional application areas for these high-temperature bearings. The coronet cage is a unique SKF development and permits operating speeds of up to 100 r/min.

Fig 4



In all other respects the bearings are the same as the VA208 bearings.

2Z/VA216 design for aggressive environments

For bearing arrangements where the environment is particularly aggressive, bearings of the 2Z/VA216 design are recommended. These bearings are charged with a creamy-white multi-purpose grease based on a fluorized polyether oil mixed with PTFE, for operating temperatures from –40 to +230 °C. Otherwise the bearings have the same design as 2Z/VA201.

For normal cases, the lubricant fill is between 25 and 35 % of the free space in the bearing. On request other filling grades can be supplied.

Y-bearings for high temperatures

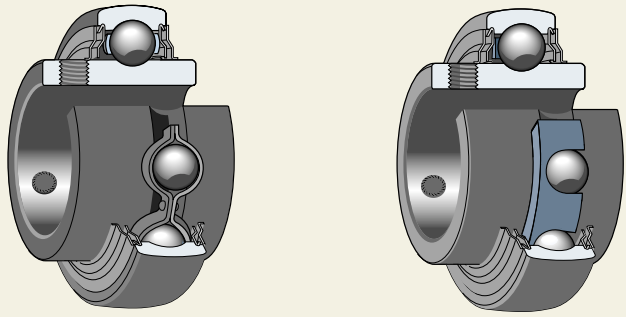
SKF Y-bearings for high temperatures correspond in design to the appropriate Y-bearings in the YAR 2-2FW series with grub screw locking. The characteristic features of these bearings for extreme temperatures include large radial internal clearance and special cages and shields. As for the high-temperature deep groove ball bearings all surfaces of the Y-bearings are manganese phosphated. This provides protection against corrosion and improves running properties.

SKF Y-bearings for high as well as low temperatures are available in two different designs.

Y-bearings of the VA201 and VA228 designs

Y-bearings of the VA201 (→ **fig 5 a**) and the VA228 (→ **fig 5 b**) designs have the same features as the deep groove ball bearing designs having the same V-number identification with the exception of the bearing clearance, which is only twice the C5 clearance. The Y-bearings are fitted with pressed steel shields and flingers at both sides, which protect the bearings from solid contaminants.

Fig 5



a b

Fig 6



Fig 7



Fig 8



Y-bearing units for high temperatures

Y-bearing units for high temperatures have a grey cast iron housing and are available in three different designs

- plummer (pillow) block units (➔ **fig** 6),
- flanged units with square housing with four bolt holes (➔ **fig** 7) and
- flanged units with oval housing with two bolt holes (➔ **fig** 8)

The Y-bearings incorporated are described above. The cast housings of the units are interchangeable with those of the standard Y-bearing units except for a few sizes where some dimensions differ slightly. The housings are zinc coated and yellow chromated to provide better protection against corrosion.

The housings do not have a grease nipple as the incorporated bearings are lubricated for life. The housing bore is coated with a lubricating paste and the tolerances are such that alignment is maintained at all times and at all temperatures.

Bearing data – general

Dimensions
The boundary dimensions of

- the deep groove ball bearings are in accordance with ISO 15:1998,
- the Y- bearings are in accordance with ISO 9628:1992,
- the Y- bearing units are in accordance with ISO 3228:1993.

Tolerances
The deep groove ball bearings and the Y-bearings are produced to Normal tolerances in accordance with

- ISO 492:2002 (→ **table** 3, **page 125**) and
- ISO 9628:1992 (→ **table** 1), respectively

However, because the bearings have been especially surface treated to protect against corrosion and improve running properties, there may be slight deviations from the standard tolerances. Any such deviations will have no influence on mounting or bearing operation.

The Y-bearings for inch shafts are made to the same tolerances as the corresponding basic bearing for metric shafts.

The tolerances for the height of the shaft axis above the support surface, dimension H_1 of the plummer block units are 0/–0,25 mm.

Internal clearance
SKF deep groove ball bearings for high temperatures are manufactured with four times the standard C5 clearance. The Y-bearings and the corresponding Y-bearing units have twice the standard C5 clearance according to ISO 5753:1991.

The clearance limits for the various bearings will be found in **table** 2 and are valid before mounting under zero measuring load.

Misalignment
Because of their large internal clearance, the deep groove ball bearings for high temperatures can tolerate angular misalignments of the outer ring in relation to the inner ring of 20 to 30 minutes of arc. This applies only when the bearings rotate slowly as the rolling conditions in the bearing under such misalignments are unfavourable.

During mounting Y-bearing units are able to compensate for errors of alignment up to 5°.

Table 1

Tolerances of Y-bearings

Nominal diameter		Bore diameter Deviation		Outside diameter Deviation	
over	incl	high.	low	high	low
mm		µm		µm	
18	**30**	+18	0	–	–
30	**50**	+21	0	0	–10
50	**80**	+24	0	0	–10
80	**120**	+28	0	0	–15

Table 2

Radial internal clearance

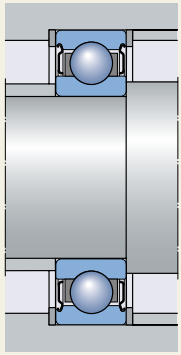
Bore diameter d		Radial internal clearance Deep groove ball bearings		Y-bearings Y-bearing units	
over	incl.	min	max	min	max
mm		µm		µm	
	10	80	148	–	–
10	**18**	100	180	–	–
18	**24**	112	192	56	96
24	**30**	120	212	60	106
30	**40**	160	256	80	128
40	**50**	180	292	90	146
50	**65**	220	360	110	180
65	**80**	260	420	130	210
80	**100**	300	480	150	240

Speeds
SKF deep groove ball bearings as well as Y-bearings for high temperatures in the VA201, VA208 and VA228 design are developed for bearing arrangements where they rotate slowly, i.e. a few revolutions per minute. Experience has shown, however, that it is possible to run bearings for long periods at speeds up to 100 r/min without maintenance. It is recommended to contact the SKF application engineering service if the bearings are to be used at higher speeds.

Design of associated components

It is advisable to provide support to the shields of deep groove ball bearings of the 2Z/VA228 and 2Z/VA208 design because of the axial guidance they have to provide for the graphite cage (→ **fig 9**). Therefore, it is recommended that the housing shoulder or spacer sleeve should have a smaller diameter than the outer ring shoulder diameter D_2 given in the product table. If this is not possible a support washer with the appropriate housing bore diameter should be inserted between the bearing and housing shoulder or spacer sleeve.

Fig 9



Selection of bearing size

The requisite size is determined based on the basic static load rating C_0 as these bearings and Y-bearing units rotate at very slow speeds.

At high temperatures, the load carrying capacity of a bearing is reduced. This is taken into account by multiplying the basic static load rating C_0 by a temperature factor f_T.

The requisite basic static load rating can be determined using

$$C_{0\,req} = 2\,P_0/f_T$$

where
$C_{0\,req}$ = requisite basic static load rating, kN
P_0 = equivalent static bearing load, kN
f_T = temperature factor (➔ **table** 3)

The equivalent static bearing load P_0 is obtained from

$$P_0 = 0{,}6\,F_r + 0{,}5\,F_a$$

where
F_r = actual radial bearing load, kN
F_a = actual axial bearing load, kN

When calculating P_0 the maximum load that can occur should be used and its radial and axial components inserted in the equation above. If $P_0 < F_r$, then $P_0 = F_r$ should be used.

Table 3

Temperature factor f_T

Operating temperature	Factor f_T
°C	–
150	1
200	0,95
250	0,9
300	0,8
350	0,64

For different loads and temperatures the requisite basic static load rating $C_{0\,req}$ is shown in **table** 4. Using the requisite basic static load rating calculated from the above, or taken from **table** 4, a suitable bearing or Y-bearing unit can be selected from the product tables.

The bearing or Y-bearing unit selected should have a C_0 value that is equal to or greater than the requisite value.

Table 4

Requisite basic static load rating for different loads and temperatures

Bearing load	Requisite basic static load rating C_0 for operating temperatures up to				
	150 °C	200 °C	250 °C	300 °C	350 °C
kN	kN				
0,5	1	1,05	1,11	1,2	1,56
1	2	2,1	2,22	2,5	3,12
2	4	4,2	4,44	5	6,25
3	6	6,3	6,67	7,5	9,4
4	8	8,4	8,9	10	12,5
5	10	10,5	11,1	12,5	15,6
6	12	12,6	13,3	15	18,8
7	14	14,7	15,5	17,5	21,9
8	16	16,8	17,8	20	25
9	18	18,9	19,9	22,5	28,1
10	20	21	22,2	25	31,3
11	22	23,1	24,5	27,5	34,4
12	24	25,2	26,7	30	37,5
13	26	27,3	29	32,5	40,5
14	28	29,4	31,1	35	44
15	30	31,5	33,3	37,5	47
16	32	33,6	35	40	50
17	34	35,7	37,8	42,5	53
18	36	37,8	40	45	56
19	38	40	42	47,5	60
20	40	42	44,5	50	62,5
22	44	46	49	55	69
24	48	50,5	53	60	75
26	52	54,5	58	65	81
28	56	59	62	70	87,5
30	60	63	66,5	75	94
32	64	67	71	80	–
34	68	71,5	75,5	85	–
36	72	75,5	80	90	–
38	76	80	84,5	85	–
40	80	84	89	–	–
42	84	88,5	9,5	–	–
44	88	92,5	–	–	–

Maintenance

SKF bearings and Y-bearing units for high temperatures are lubricated for life and are therefore without any relubrication facility. The open deep groove ball bearings of the VA201 design however should be inspected after some six months of operation. It is sufficient to open the housing or in case of kiln trucks to withdraw the wheel with the bearing from the journal and to remove contaminants using bellows.

If there is no longer a film of dry lubricant on the raceways, indicated by a bright metallic shiny track, the bearing should be re-lubricated using the original black, high-temperature paste, which is a mixture of polyalkylene glycol and graphite.

Additional information

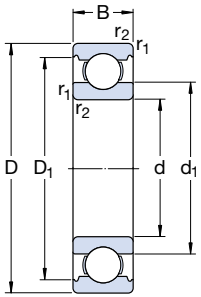
For additional information about

- selection of bearing type,
- selection of bearing size,
- arrangement design,
- mounting and dismounting or
- maintenance,

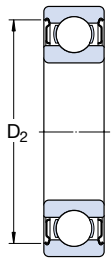
please ask for appropriate information material or contact the SKF application engineering service.

Single row deep groove ball bearings for high temperatures

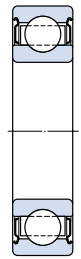
d **10 – 45** mm



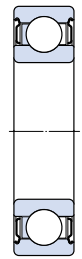
VA201



2Z/VA201



2Z/VA208



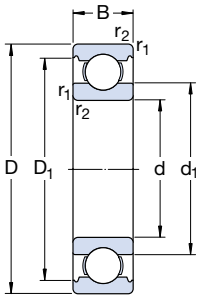
2Z/VA228

Dimensions							Basic static load rating	Mass	Designation
d	D	B	d_1 ~	D_1 ~	D_2 ~	$r_{1,2}$ min	C_0		
mm							kN	kg	–
10	35	11	17,5	27,1	28,7	0,6	3,4	0,053	**6300-2Z/VA201**
12	32	10	18,2	25,9	27,4	0,6	3,1	0,037	**6201/VA201**
	32	10	18,2	25,9	27,4	0,6	3,1	0,037	**6201-2Z/VA201**
	32	10	18,2	25,9	27,4	0,6	3,1	0,037	**6201-2Z/VA228**
15	35	11	21,5	29,2	30,4	0,6	3,75	0,045	**6202/VA201**
	35	11	21,5	29,2	30,4	0,6	3,75	0,045	**6202-2Z/VA201**
	35	11	21,5	29,2	30,4	0,6	3,75	0,043	**6202-2Z/VA228**
	35	10	22,7	29,5	31,2	0,3	3,25	0,039	**6003/VA201**
17	40	12	24,2	32,9	35	0,6	4,75	0,065	**6203/VA201**
	40	12	24,2	32,9	35	0,6	4,75	0,065	**6203-2Z/VA201**
	40	12	24,2	32,9	35	0,6	4,75	0,060	**6203-2Z/VA228**
20	42	12	27,2	35,1	37,2	0,6	5	0,068	**6004-2Z/VA208**
	47	14	28,5	38,7	40,6	1	6,55	0,11	**6204/VA201**
	47	14	28,5	38,7	40,6	1	6,55	0,11	**6204-2Z/VA201**
	47	14	28,5	38,7	40,6	1	6,55	0,10	**6204-2Z/VA228**
	52	15	30,3	42,1	44,8	1,1	7,8	0,13	**6304/VA201**
	52	15	30,3	42,1	44,8	1,1	7,8	0,13	**6304-2Z/VA201**
	52	15	30,3	42,1	44,8	1,1	7,8	0,13	**6304-2Z/VA208**
25	47	12	32	40,3	42,2	0,6	6,55	0,08	**6005/VA201**
	47	12	32	40,3	42,2	0,6	6,55	0,08	**6005-2Z/VA201**
	47	12	32	40,3	42,2	0,6	6,55	0,08	**6005-2Z/VA208**
	52	15	34	44,2	46,3	1	7,8	0,13	**6205/VA201**
	52	15	34	44,2	46,3	1	7,8	0,13	**6205-2Z/VA201**
	52	15	34	44,2	46,3	1	7,8	0,12	**6205-2Z/VA228**
	62	17	36,6	50,9	52,7	1,1	11,6	0,23	**6305/VA201**
	62	17	36,6	50,9	52,7	1,1	11,6	0,22	**6305-2Z/VA228**

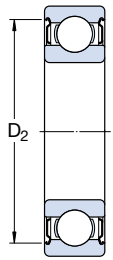
Dimensions							Basic static load rating	Mass	Designation
d	D	B	d_1 ~	D_1 ~	D_2 ~	$r_{1,2}$ min	C_0		
mm							kN	kg	–
30	55	13	38,2	47,1	49	1	8,3	0,11	**6006-2Z/VA208**
	62	16	40,3	52,1	54,1	1	11,2	0,20	**6206/VA201**
	62	16	40,3	52,1	54,1	1	11,2	0,20	**6206-2Z/VA201**
	62	16	40,3	52,1	54,1	1	11,2	0,19	**6206-2Z/VA208**
	62	16	40,3	52,1	54,1	1	11,2	0,19	**6206-2Z/VA228**
	72	19	44,6	59,9	61,9	1,1	16	0,35	**6306/VA201**
	72	19	44,6	59,9	61,9	1,1	16	0,34	**6306-2Z/VA208**
	72	19	44,6	59,9	61,9	1,1	16	0,34	**6306-2Z/VA228**
35	72	17	46,9	60,6	62,7	1,1	15,3	0,29	**6207/VA201**
	72	17	46,9	60,6	62,7	1,1	15,3	0,29	**6207-2Z/VA201**
	72	17	46,9	60,6	62,7	1,1	15,3	0,28	**6207-2Z/VA208**
	72	17	46,9	60,6	62,7	1,1	15,3	0,28	**6207-2Z/VA228**
	80	21	49,5	66,1	69,2	1,5	19	0,46	**6307/VA201**
	80	21	49,5	66,1	69,2	1,5	19	0,44	**6307-2Z/VA208**
40	68	15	49,2	59,1	61,1	1	11,6	0,17	**6008-2Z/VA208**
	80	18	52,6	67,9	69,8	1,1	19	0,37	**6208/VA201**
	80	18	52,6	67,9	69,8	1,1	19	0,37	**6208-2Z/VA201**
	80	18	52,6	67,9	69,8	1,1	19	0,35	**6208-2Z/VA208**
	80	18	52,6	67,9	69,8	1,1	19	0,35	**6208-2Z/VA228**
	90	23	56,1	74,7	77,7	1,5	24	0,63	**6308/VA201**
	90	23	56,1	74,7	77,7	1,5	24	0,63	**6308-2Z/V201**
	90	23	56,1	74,7	77,7	1,5	24	0,61	**6308-2Z/VA208**
	90	23	56,1	74,7	77,7	1,5	24	0,61	**6308-2Z/VA228**
45	85	19	57,6	72,9	75,2	1,1	21,6	0,41	**6209/VA201**
	85	19	57,6	72,9	75,2	1,1	21,6	0,41	**6209-2Z/VA201**
	85	19	57,6	72,9	75,2	1,1	21,6	0,39	**6209-2Z/VA208**
	85	19	57,6	72,9	75,2	1,1	21,6	0,39	**6209-2Z/VA228**
	100	25	62,1	83,7	86,7	1,5	31,5	0,83	**6309/VA201**
	100	25	62,1	83,7	86,7	1,5	31,5	0,79	**6309-2Z/VA208**

Single row deep groove ball bearings for high temperatures

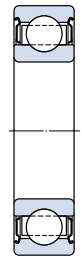
d **50 – 120** mm



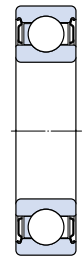
VA201



2Z/VA201



2Z/VA208



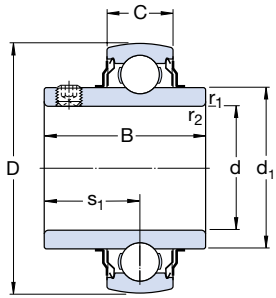
2Z/VA228

Dimensions							Basic static load rating	Mass	Designation
d	D	B	d_1 ~	D_1 ~	D_2 ~	$r_{1,2}$ min	C_0		
mm							kN	kg	–
50	90	20	62,5	78,1	81,7	1,1	23,2	0,46	**6210/VA201**
	90	20	62,5	78,1	81,7	1,1	23,2	0,46	**6210-2Z/VA201**
	90	20	62,5	78,1	81,7	1,1	23,2	0,45	**6210-2Z/VA208**
	90	20	62,5	78,1	81,7	1,1	23,2	0,45	**6210-2Z/VA228**
	110	27	68,7	92,1	95,2	2	38	1,05	**6310/VA201**
	110	27	68,7	92,1	95,2	2	38	1,05	**6310-2Z/VA201**
	110	27	68,7	92,1	95,2	2	38	1,04	**6310-2Z/VA208**
	110	27	68,7	92,1	95,2	2	38	1,04	**6310-2Z/VA228**
55	90	18	66,3	79,1	81,5	1,1	21,2	0,38	**6011-2Z/VA208**
	100	21	69	86,6	89,4	1,5	29	0,61	**6211/VA201**
	100	21	69	86,6	89,4	1,5	29	0,61	**6211-2Z/VA201**
	100	21	69	86,6	89,4	1,5	29	0,59	**6211-2Z/VA208**
	100	21	69	86,6	89,4	1,5	29	0,59	**6211-2Z/VA228**
	120	29	75,3	101	104	2	45	1,35	**6311/VA201**
	120	29	75,3	101	104	2	45	1,33	**6311-2Z/VA208**
60	110	22	75,5	94,2	97	1,5	36	0,78	**6212/VA201**
	110	22	75,5	94,2	97	1,5	36	0,78	**6212-2Z/VA201**
	110	22	75,5	94,2	97	1,5	36	0,74	**6212-2Z/VA208**
	110	22	75,5	94,2	97	1,5	36	0,74	**6212-2Z/VA228**
	130	31	81,8	109	113	2,1	52	1,70	**6312/VA201**
	130	31	81,8	109	113	2,1	52	1,60	**6312-2Z/VA208**
65	120	23	83,3	103	106	1,5	40,5	0,99	**6213/VA201**
	120	23	83,3	103	106	1,5	40,5	0,94	**6213-2Z/VA208**
	120	23	83,3	103	106	1,5	40,5	0,94	**6213-2Z/VA228**
	140	33	88,3	118	122	2,1	60	2,10	**6313/VA201**
	140	33	88,3	118	122	2,1	60	2,00	**6313-2Z/VA208**
70	125	24	87	109	111	1,5	45	1,05	**6214/VA201**
	125	24	87	109	111	1,5	45	1,00	**6214-2Z/VA208**
	150	35	94,9	126	130	2,1	68	2,50	**6314/VA201**
	150	35	94,9	126	130	2,1	68	2,70	**6314-2Z/VA208**

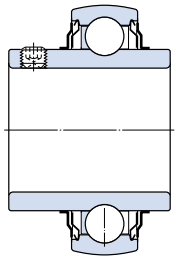
Dimensions							Basic static load rating	Mass	Designation
d	D	B	d_1 ~	D_1 ~	D_2 ~	$r_{1,2}$ min	C_0		
mm							kN	kg	–
75	130	25	92	114	117	1,5	49	1,20	**6215/VA201**
	130	25	92	114	117	1,5	49	1,20	**6215-2Z/VA201**
	130	25	92	114	117	1,5	49	1,15	**6215-2Z/VA208**
	130	25	92	114	117	1,5	49	1,15	**6215-2Z/VA228**
	160	37	101	135	139	2,1	76,5	3,00	**6315/VA201**
	160	37	101	135	139	2,1	76,5	3,00	**6315-2Z/VA208**
80	140	26	101	123	127	2	55	1,35	**6216-2Z/VA208**
	170	39	108	143	147	2,1	86,5	3.55	**6316-2Z/VA208**
85	150	28	106	131	135	2	64	1,80	**6217/VA201**
	150	28	106	131	135	2	64	1,70	**6217-2Z/VA208**
90	160	30	112	139	143	2	73,5	2,15	**6218-2Z/VA228**
95	170	32	118	148	152	2,1	81,5	2,60	**6219/VA201**
	170	32	118	148	152	2,1	81,5	2,60	**6219-2Z7VA201**
	170	32	118	148	152	2,1	81,5	2,45	**6219-2Z/VA228**
100	150	24	115	135	139	1,5	54	1,10	**6020-2Z/VA208**
	180	34	124	157	160	2,1	93	3,15	**6220/VA201**
	180	34	124	157	160	2,1	93	3,00	**6220-2Z/VA208**
	180	34	124	157	160	2,1	93	3,00	**6220-2Z/VA228**
120	180	28	139	162	166	2	80	1,90	**6024-2Z/VA208**

Y-bearings for high temperatures with grub screw locking for metric shafts

d **20 – 60** mm



VA201

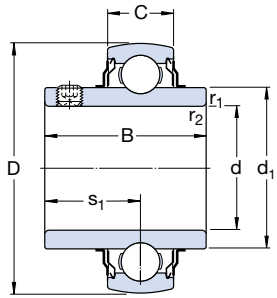


VA228

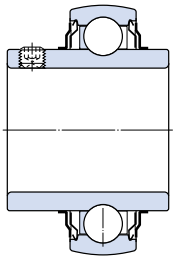
Dimensions							Basic static load rating	Mass	Designations Bearing with pressed steel cage	
d	D	B	C	d_1 ~	s_1	$r_{1,2}$ min	C_0			one-piece "coronet" cage of graphite
mm							kN	kg	–	
20	47	31	14	28,2	18,3	0,6	6,55	0,14	**YAR 204-2FW/VA201**	**YAR 204-2FW/VA228**
25	52	34,1	15	33,7	19,8	0,6	7,8	0,17	**YAR 205-2FW/VA201**	**YAR 205-2FW/VA228**
30	62	38,1	18	39,7	22,2	0,6	11,2	0,28	**YAR 206-2FW/VA201**	**YAR 206-2FW/VA228**
35	72	42,9	19	46,1	25,4	1	15,3	0,41	**YAR 207-2FW/VA201**	**YAR 207-2FW/VA228**
40	80	49,2	21	51,8	30,2	1	19	0,55	**YAR 208-2FW/VA201**	**YAR 208-2FW/VA228**
45	85	49,2	22	56,8	30,2	1	21,6	0,60	**YAR 209-2FW/VA201**	**YAR 209-2FW/VA228**
50	90	51,6	22	62,5	32,6	1	23,2	0,69	**YAR 210-2FW/VA201**	**YAR 210-2FW/VA228**
55	100	55,6	25	69,1	33,4	1	29	0,94	**YAR 211-2FW/VA201**	**YAR 211-2FW/VA228**
60	110	65,1	26	75,6	39,7	1,5	36	1,30	**YAR 212-2FW/VA201**	**YAR 212-2FW/VA228**

Y-bearings for high temperatures with grub screw locking for inch shafts

d 3/4 – 2 7/16 in



VA201

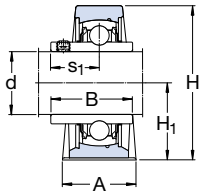


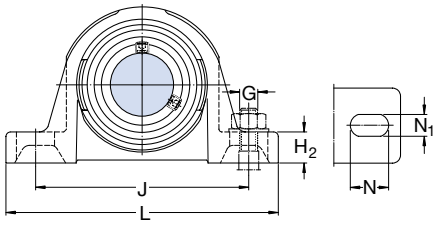
VA228

Dimensions							Basic static load rating	Mass	Designations Bearing with pressed steel cage	one-piece "coronet" cage of graphite
d	D	B	C	d_1 ~	s_1	$r_{1,2}$ min	C_0			
in	mm						kN	kg	–	
3/4	47	31	14	28,2	18,3	0,6	6,55	0,14	**YAR 204-012-2FW/VA201**	**YAR 204-012-2FW/VA228**
1	52	34,1	15	33,7	19,8	0,6	7,8	0,17	**YAR 205-100-2FW/VA201**	**YAR 205-100-2FW/VA228**
1 3/16	62	38,1	18	39,7	22,2	0,6	11,2	0,27	**YAR 206-103-2FW/VA201**	**YAR 206-103-2FW/VA228**
1 1/4	72	42,9	19	46,1	25,4	1	15,3	0,46	**YAR 207-104-2FW/VA201**	**YAR 207-104-2FW/VA228**
1 7/16	72	42,9	19	46,1	25,4	1	15,3	0,38	**YAR 207-107-2FW/VA201**	**YAR 207-107-2FW/VA228**
1 1/2	80	49,2	21	51,8	30,2	1	19	0,59	**YAR 208-108-2FW/VA201**	**YAR 208-108-2FW/VA228**
1 11/16	85	49,2	22	56,8	30,2	1	21,6	0,66	**YAR 209-111-2FW/VA201**	**YAR 209-111-2FW/VA228**
1 3/4	85	49,2	22	56,8	30,2	1	21,6	0,62	**YAR 209-112-2FW/VA201**	**YAR 209-112-2FW/VA228**
1 15/16	90	51,6	22	62,5	32,6	1	23,2	0,71	**YAR 210-115-2FW/VA201**	**YAR 210-115-2FW/VA228**
2	100	55,6	25	69,1	33,4	1	29	0,94	**YAR 211-200-2FW/VA201**	**YAR 211-200-2FW/VA228**
2 3/16	100	55,6	25	69,1	33,4	1	29	0,92	**YAR 211-203-2FW/VA201**	**YAR 211-203-2FW/VA228**
2 7/16	110	65,1	26	75,6	39,7	1,5	36	1,30	**YAR 212-207-2FW/VA201**	**YAR 212-207-2FW/VA228**

Y-bearing plummer (pillow) block units for high temperatures and metric shafts

d **20 – 60** mm

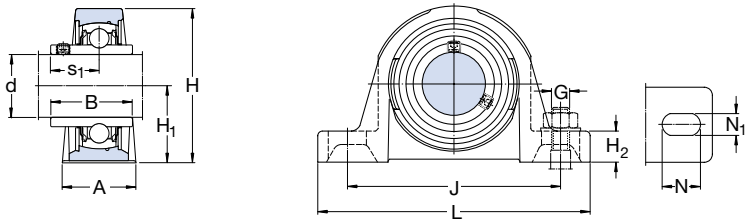




Dimensions												Basic static load rating C_0	Mass	Designations Y-bearing unit with pressed steel cage	one-piece "coronet" cage of graphite
d	A	B	H	H_1	H_2	J	L	N	N_1	G	s_1				
mm												kN	kg	–	
20	32	31	64	33,3	14	97	127	20,5	11,5	10	18,3	6,55	0,57	**SY 20 TF/VA201**	**SY 20 TF/VA228**
25	36	34,1	70	36,5	16	102	130	19,5	11,5	10	19,8	7,8	0,73	**SY 25 TF/VA201**	**SY 25 TF/VA228**
30	40	38,1	82	42,9	17	117,5	152	23,5	14	12	22,2	11,2	1,10	**SY 30 TF/VA201**	**SY 30 TF/VA228**
35	45	42,9	93	47,6	19	126	160	21	14	12	25,4	15,3	1,45	**SY 35 TF/VA201**	**SY 35 TF/VA228**
40	48	49,2	99	49,2	19	135,5	175	24,5	14	12	30,2	19	1,80	**SY 40 TF/VA201**	**SY 40 TF/VA228**
45	48	49,2	107	54	21	143,5	187	22,5	14	12	30,2	21,6	2,20	**SY 45 TF/VA201**	**SY 45 TF/VA228**
50	54	51,6	114	57,2	22	157	203	26	18	16	32,6	23,2	2,70	**SY 50 TF/VA201**	**SY 50 TF/VA228**
55	60	55,6	125	63,5	24	171,5	219	27,5	18	16	33,4	29	3,60	**SY 55 TF/VA201**	**SY 55 TF/VA228**
60	60	65,1	137	69,9	26,5	190,5	240	29,5	18	16	39,7	36	4,45	**SY 60 TF/VA201**	**SY 60 TF/VA228**

Y-bearing plummer (pillow) block units for high temperatures and inch shafts

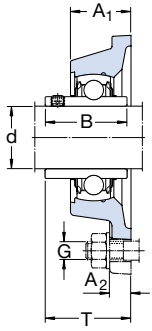
d 3/4 – 2 7/16 in

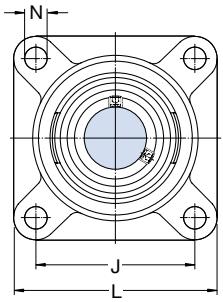


Dimensions												Basic static load rating	Mass	Designations Y-bearing unit with pressed steel cage	one-piece "coronet" cage of graphite
d	A	B	H	H_1	H_2	J	L	N	N_1	G	s_1	C_0			
in	mm											kN	kg	–	
3/4	32	31	64	33,3	14	97	127	20,5	11,5	10	18,3	6,55	0,57	**SY 3/4 TF/VA201**	**SY 3/4 TF/VA228**
1	36	34,1	70	36,5	16	102	130	19,5	11,5	10	19,8	7,8	0,73	**SY 1. TF/VA201**	**SY 1. TF/VA228**
1 3/16	40	38,1	82	42,9	17	117,5	152	23,5	14	12	22,2	11,2	1,10	**SY 1.3/16 TF/VA201**	**SY 1.3/16 TF/VA228**
1 1/4	45	42,9	93	47,6	19	126	160	21	14	12	25,4	15,3	1,45	**SY 1.1/4 TF/VA201**	**SY 1.1/4 TF/VA228**
1 7/16	45	42,9	93	47,6	19	126	160	21	14	12	25,4	15,3	1,45	**SY 1.7/16 TF/VA201**	**SY 1.7/16 TF/VA228**
1 1/2	48	49,2	99	49,2	19	135,5	175	24,5	14	12	30,2	19	1,80	**SY 1.1/2 TF/VA201**	**SY 1.1/2 TF/VA228**
1 11/16	48	49,2	107	54	21	143,5	187	22,5	14	12	30,2	21,6	2,2	**SY 1.11/16 TF/VA201**	**SY 1.11/16 TF/VA228**
1 3/4	48	49,2	107	54	21	143,5	187	22,5	14,5	12	30,2	21,6	2,20	**SY 1.3/4 TF/VA201**	**SY 1.3/4 TF/VA228**
1 15/16	54	51,6	114	57,2	22	157	203	26	18	16	32,6	23,2	2,70	**SY 1.15/16 TF/VA201**	**SY 1.15/16 TF/VA228**
2	60	55,6	125	63,5	24	171,5	219	27,5	18	16	33,4	29	3,60	**SY 2. TF/VA201**	**SY 2. TF/VA228**
2 3/16	60	55,6	125	63,5	24	171,5	219	27,5	18	16	33,4	29	3,55	**SY 2.3/16 TF/VA201**	**SY 2.3/16 TF/VA228**
2 7/16	60	65,1	137	69,9	26,5	190,5	240	29,5	18	16	39,7	36	4,45	**SY 2.7/16 TF/VA201**	**SY 2,7/16 TF/VA228**

Y-bearing flanged units with square housing for high temperatures and metric shafts

d **20 – 60** mm

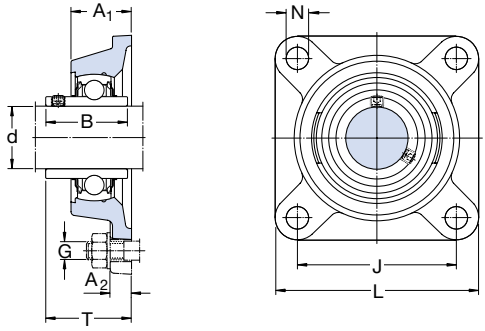




Dimensions									Basic static load rating	Mass	Designations Y-bearing unit with pressed steel cage	one-piece "coronet" cage of graphite
d	A_1	A_2	B	J	L	N	G	T	C_0			
mm									kN	kg	–	
20	29,5	11	31	63,5	86	11,5	10	37,3	6,55	0,60	**FY 20 TF/VA201**	**FY 20 TF/VA228**
25	30	12	34,1	70	95	11,5	10	38,8	7,8	0,77	**FY 25 TF/VA201**	**FY 25 TF/VA228**
30	32,5	13	38,1	82,5	108	11,5	10	42,2	11	1,10	**FY 30 TF/VA201**	**FY 30 TF/VA228**
35	34,5	13	42,9	92	118	14	12	46,4	15,3	1,40	**FY 35 TF/VA201**	**FY 35 TF/VA228**
40	38,5	14	49,2	101,5	130	14	12	54,2	19	1,90	**FY 40 TF/VA201**	**FY 40 TF/VA228**
45	39	14	49,2	105	137	16	14	54,2	21,6	2,10	**FY 45 TF/VA201**	**FY 45 TF/VA228**
50	43	15	51,6	111	143	18	16	60,6	23,2	2,50	**FY 50 TF/VA201**	**FY 50 TF/VA228**
55	47,5	16	55,6	130	162	18	16	64,4	29	3,60	**FY 55 TF/VA201**	**FY 55 TF/VA228**
60	52	17	65,1	143	175	18	16	73,7	36	4,60	**FY 60 TF/VA201**	**FY 60 TF/VA228**

Y-bearing flanged units with square housing for high temperatures and inch shafts

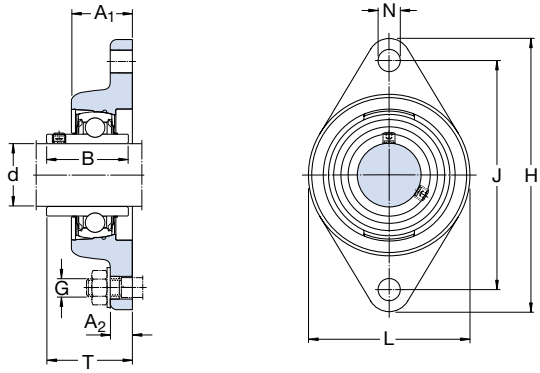
d 3/4 – 2 7/16 in



Dimensions									Basic static load rating	Mass	Designations Y-bearing unit with pressed steel cage	one-piece "coronet" cage of graphite
d	A_1	A_2	B	J	L	N	G	T	C_0			
in	mm								kN	kg	–	
3/4	29,5	11	31	63,5	86	11,5	10	37,3	6,55	0,60	**FY 3/4 TF/VA201**	**FY 3/4 TF/VA228**
1	30	12	34,1	70	95	11,5	10	38,8	7,8	0,77	**FY 1. TF/VA201**	**FY 1. TF/VA228**
1 3/16	32,5	13	38,1	82,5	108	11,5	10	42,2	11,2	1,10	**FY 1.3/16 TF/VA201**	**FY 1.3/16 TF/VA228**
1 1/4	34,5	13	42,9	92	118	14	12	46,4	15,3	1,40	**FY 1.1/4 TF/VA201**	**FY 1.1/4 TF/VA228**
1 7/16	34,5	13	42,9	92	118	14	12	46,4	15,3	1,40	**FY 1.7/16 TF/VA201**	**FY 1.7/16 TF/VA228**
1 1/2	38,5	14	49,2	101,5	130	14	12	54,2	19	1,90	**FY 1.1/2 TF/VA201**	**FY 1.1/2 TF/VA228**
1 11/16	39	14	49,2	105	137	16	14	54,2	21,6	2,10	**FY 1.11/16 TF/VA201**	**FY 1.11/16 TF/VA228**
1 3/4	39	14	49,2	105	137	16	14	54,2	21,6	2,10	**FY 1.3/4 TF/VA201**	**FY 1.3/4 TF/VA228**
1 15/16	43	15	51,6	111	143	18	16	60,6	23,2	2,50	**FY 1.15/16 TF/VA201**	**FY 1.15/16 TF/VA228**
2	47,5	16	55,6	130	162	18	16	64,4	29	3,75	**FY 2. TF/VA201**	**FY 2. TF/VA228**
2 3/16	47,5	16	55,6	130	162	18	16	64,4	29	3,55	**FY 2.3/16 TF/VA201**	**FY 2.3/16 TF/VA228**
2 7/16	52	17	65,1	143	175	18	16	73,7	36	4,50	**FY 2.7/16 TF/VA201**	**FY 2.7/16 TF/VA228**

Y-bearing flanged units with oval housing for high temperatures and metric shafts

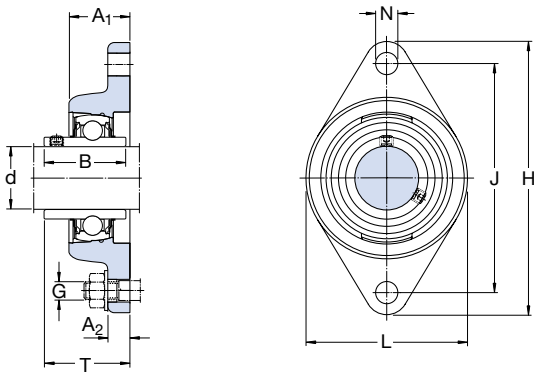
d **20 – 55** mm



Dimensions										Basic static load rating	Mass	Designations Y-bearing unit with pressed steel cage	
d	A_1	A_2	B	H	J	L	N	G	T	C_0			one-piece "coronet" cage of graphite
mm										kN	kg	–	
20	29,5	11	31	112	90	60,5	11,5	10	37,3	6,55	0,50	**FYT 20 TF/VA201**	**FYT 20 TF/VA228**
25	30	12	34,1	124	99	70	11,5	10	38,8	7,8	0,63	**FYT 25 TF/VA201**	**FYT 25 TF/VA228**
30	32,5	13	38,1	141,5	116,5	83	11,5	10	42,2	11,2	0,93	**FYT 30 TF/VA201**	**FYT 30 TF/VA228**
35	34,5	13	42,9	156	130	96	14	12	46,4	15,3	1,25	**FYT 35 TF/VA201**	**FYT 35 TF/VA228**
40	38,5	14	49,2	171,5	143,5	102	14	12	54,2	19	1,65	**FYT 40 TF/VA201**	**FYT 40 TF/VA228**
45	39	14	49,2	178,5	148,5	111	16	14	54,2	21,6	1,80	**FYT 45 TF/VA201**	**FYT 45 TF/VA228**
50	43	15	51,6	189	157	116	18	16	60,6	23,2	2,15	**FYT 50 TF/VA201**	**FYT 50 TF/VA228**
55	47,6	20,6	55,6	215,9	184,2	127	19,1	16	62,8	29	3,30	**FYT 55 TF/VA201**	**FYT 55 TF/VA228**

Y-bearing flanged units with oval housing for high temperatures and inch shafts

d 3/4 – 2 3/16 in



Dimensions										Basic static load rating	Mass	Designations Y-bearing unit with pressed steel cage	one-piece "coronet" cage of graphite
d	A_1	A_2	B	H	J	L	N	G	T	C_0			
in	mm									kN	kg	–	
3/4	29,5	11	31	112	90	60,5	11,5	10	37,3	6,55	0,50	**FYT 3/4 TF/VA201**	**FYT 3/4 TF/VA228**
1	30	12	34,1	124	99	70	11,5	10	38,8	7,8	0,63	**FYT 1. TF/VA201**	**FYT 1. TF/VA228**
1 3/16	32,5	13	38,1	141,5	116,5	83	11,5	10	42,2	11,2	0,93	**FYT 1.3/16 TF/VA201**	**FYT 1.3/16 TF/VA228**
1 1/4	34,5	13	42,9	156	130	96	14	12	46,4	15,3	1,25	**FYT 1.1/4 TF/VA201**	**FYT 1.1/4 TF/VA228**
1 7/16	34,5	13	42,9	156	130	96	14	12	46,4	15,3	1,2	**FYT 1.7/16 TF/VA201**	**FYT 1.7/16 TF/VA228**
1 1/2	38,5	14	49,2	171,5	143,5	102	14	12	54,2	19	1,65	**FYT 1.1/2 TF/VA201**	**FYT 1.1/2 TF/VA228**
1 11/16	39	14	49,2	178,5	148,5	111	16	14	54,2	21,6	1,8	**FYT 1.11/16 TF/VA201**	**FYT 1.11/16 TF/VA228**
1 3/4	39	14	49,2	178,5	148,5	111	16	14	54,2	21,6	1,80	**FYT 1.3/4 TF/VA201**	**FYT 1.3/4 TF/VA228**
1 15/16	43	15	51,6	189	157	116	18	16	60,6	23,2	2,15	**FYT 1.15/16 TF/VA201**	**FYT 1.15/16 TF/VA228**
2	47,6	20,6	55,6	215,9	184,2	127	19,1	16	62,8	29	3,3	**FYT 2. TF/VA201**	**FYT 2. TF/VA228**
2 3/16	47,6	20,6	55,6	215,9	184,2	127	19,1	16	62,8	29	2,81	**FYT 2.3/16 TF/VA201**	**FYT 2.3/16 TF/VA228**



NoWear® bearings

NoWear bearings **940**
NoWear bearings of L5DA execution 940
NoWear bearings of L7DA execution 940

Applications of NoWear bearings **942**

NoWear service life improvement **942**

Technical data **942**
Dimensions, tolerances, internal clearance 942
Load carrying capacity 942
NoWear coating material 943

NoWear bearing lubrication **943**

In this day and age where productivity means higher speeds, higher operational temperatures and reduced maintenance, bearings are expected to exceed the bounds of former possibilities. New and advanced applications are setting higher demands on bearings, especially under extreme operating conditions, where there is the risk of smearing, boundary lubrication, sudden load variations, low loads or high operational temperatures.

To withstand these types of severe operating conditions SKF bearings can be furnished with a low friction ceramic coating on the contact surfaces inside the bearing. This coating, trademarked NoWear, was developed by SKF for rolling bearings and is covered by an SKF patent.

Fig 1



Fig 2



NoWear bearings

NoWear bearings make sense whenever bearings are failing prematurely due to severe operating conditions. NoWear bearings can withstand longer periods of insufficient lubrication, sudden variations in load and rapid speed changes, vibrations and oscillations.

NoWear bearings open up new possibilities to existing applications operating under severe conditions, without introducing major design changes and allow freedom in new designs. They have already been proven in a wide range of extreme applications, including paper machines, marine and offshore applications, fans, compressors, hydraulic pumps and motors.

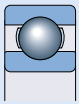
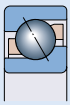
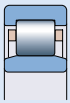
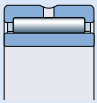
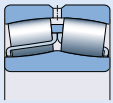
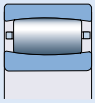
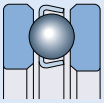
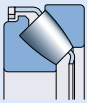
Most SKF ball and roller bearings can be obtained in a NoWear execution as described below and shown in **table** 1. Other executionts might be available on request.

NoWear bearings of L5DA execution
NoWear bearings of the L5DA execution are the most commonly used bearings. These NoWear bearings are equipped with coated rolling elements (→ **fig** 1) and are recommended for applications where the bearing load is low to medium, or where vibrations and oscillations are present.

NoWear bearings of L7DA execution
NoWear bearings of the L7DA execution have the coating applied to the rolling elements and the inner ring raceway(s) (→ **fig** 2). This execution is recommended for applications where abrasive wear resistance is crucial or load is heavy.

Table 1

NoWear bearing product range

Bearing type Symbol	Range[1]	Available bearing execution Coated rolling elements	 Coated rolling elements + inner ring raceways
	**Deep groove ball bearings** – bore diameter range d = 15 – 140 mm	L5DA	L7DA
	**Angular contact ball bearings** – bore diameter range d = 15 – 140 mm	L5DA	L7DA
	**Cylindrical roller bearings** – bore diameter range d = 15 – 220 mm – bore diameter range d over 220 mm	L5DA L5DA	L7DA –
	**Needle roller bearings** – bore diameter range d = 15 – 220 mm – bore diameter range d over 220 mm	L5DA L5DA	L7DA –
	**Spherical roller bearings** – bore diameter range d = 15 - 220 mm – bore diameter range d over 220 mm	L5DA L5DA	L7DA –
	**CARB toroidal roller bearings** – bore diameter range d = 15 – 220 mm – bore diameter range d over 220 mm	L5DA L5DA	L7DA –
	**Thrust ball bearings** – bore diameter range d = 15 – 110 mm	L5DA	–
	**Spherical roller thrust bearings** – complete bore diameter range	L5DA	–

[1] These ranges are general guidelines and may vary between dimension series. Please contact SKF for details

Applications of NoWear bearings

For highly demanding applications where NoWear bearings are to be used, normally several operating parameters must be considered and weighted against each other. As a result, NoWear coated bearings should be selected in close cooperation with the SKF application engineering service.

The following recommendations are intended to illustrate the types of application that can benefit from the NoWear executions.

When cylindrical roller, needle roller, spherical roller or toroidal roller bearings are subjected to low loads in combination with high speeds, L5DA NoWear bearings are recommended in cases where the calculated bearing life cannot be reached.

With the L5DA execution of the NoWear bearings extended relubrication intervals are possible without negatively influencing bearing service life. However, if relubrication intervals are maintained, operating speeds can be increased.

Bearings subjected to oscillations or external vibrations can fail prematurely due to insufficient lubrication. Under these conditions, SKF recommends the L5DA execution. However, in extreme cases, the L7DA execution may be preferred.

If operating conditions cause low operating viscosity ($\kappa < 1$) and no appropriate lubricants are available, NoWear bearings are an excellent way to extend bearing life and to achieve operational reliability. The L5DA execution of the NoWear bearings is normally recommended. However, for unusual lubrication conditions, for example when the bearings are to be lubricated by the process media, the more advanced L7DA execution should be used. For additional information about the NoWear bearings please consult the SKF application engineering service.

NoWear service life improvement

NoWear bearings are suitable in situations where lubricating film is insufficient for undisturbed bearing operation, i.e. when κ is below 1. To calculate life of a NoWear bearing, the traditional bearing life calculation should be used but with $\kappa = 1$.

Improvement in service life by switching to NoWear under low load and high-speed conditions depends on the application, but experience shows a multifold improvement should be expected. However, calculating service life under these conditions is difficult.

For grease lubricated bearings running at speeds near or above bearing speed rating, or at high temperatures shortening grease life, selecting NoWear execution prolong relubrication intervals up to 15 times depending on application conditions.

When extension of service life would be desirable in applications with heavy loads and marginal lubrication, NoWear can be a solution. The NoWear coating cannot protect the bearing against spalling as a result of constant heavy loads. At heavy loads the maximum shear stresses are located below the coating within the bearing steel, which still has the properties of normal steel. For such applications, contact SKF.

Technical data

Dimensions, tolerances, internal clearance
Dimensions, tolerances and internal clearance of NoWear bearings are the same as for standard bearings.

Load carrying capacity
The basic dynamic and static load ratings for NoWear bearings are the same as for standard bearings.

NoWear coating material
A physical vapour deposition process applies the low friction, ceramic coating. Bearing surfaces coated in this way have all the resilience of the underlying material, but with the hardness, low friction coefficient and wear resistance of the NoWear coating. During operation there will be some micro level transfer of the coating material to the counter surface. Such transfer plus the inertness of the material reduce friction and improve resistance against wear and smearing, even for bearings where only the rolling elements are coated.

The essential properties of the NoWear coating are listed in **table** 2.

NoWear bearing lubrication

As default, the same lubrication guidelines are valid for NoWear bearings as for standard bearings (➔ section “Lubrication”, starting on **page 229**). However, NoWear bearings will operate with high reliability, even when adequate surface separation cannot be achieved ($\kappa < 1$), by preventing direct metal-to-metal contact between rolling elements and rings. It should be noted that it might be possible to reduce EP and AW additives in the lubricant with the NoWear coating, as the coating already acts as a powerful additive.

NoWear bearings are not intended for vacuum or other completely dry running applications.

Table 2

Properties of NoWear coating

Properties	NoWear
Hardness	1 200 HV10
Coating thickness – depending on bearing size (µm)	1 ... 3
Coefficient of friction – dry sliding against steel	0,1 ... 0,2
Operating temperature range[1)] – NoWear coating	+350 °C

[1)] NoWear coating withstands temperatures up to +350 °C. However, most times the bearing steel is the limiting factor. Please contact the SKF application engineering service for more information



Bearings and bearing units with Solid Oil

Bearings and bearing units with Solid Oil **946**

Features of Solid Oil **947**

Technical data **948**
Dimensions and tolerances 948
Load carrying capacity 948
Limiting speeds 948
Oil properties 949

In most applications, ordinary greases and lubricating oils will provide satisfactory lubrication to the bearing giving it an acceptable service life. However, there may be cases where lack of accessibility means that relubrication is virtually impossible, or where very good contaminant exclusion is required. Solid Oil – the third choice of lubrication – may be the answer, as it provides "lubrication for life" and good sealing.

Solid Oil has been very beneficial in outdoor lifting equipment, cranes and traverses, and in vertical shaft arrangements or where bearing arrangements cannot be reached for relubrication.

Bearings and bearing units with Solid Oil

Most SKF ball and roller bearings (→ **fig** 1) as well as bearing units can be supplied with Solid Oil and are identified by the designation suffix W64.

Bearings fitted with large-volume cages made of polyamide or machined brass are less suitable for Solid Oil. This also is the case with CARB toroidal roller bearings, which will lose their axial displacement properties when filled with Solid Oil.

Fig 1



Features of Solid Oil

Solid Oil consists of a polymer matrix, which is saturated with lubricating oil.

The polymer material has a structure with millions of micro-pores, which hold the lubricating oil. The pores are so small that the oil is retained in the material by surface tension. Oil represents an average of 70 % by weight of the material.

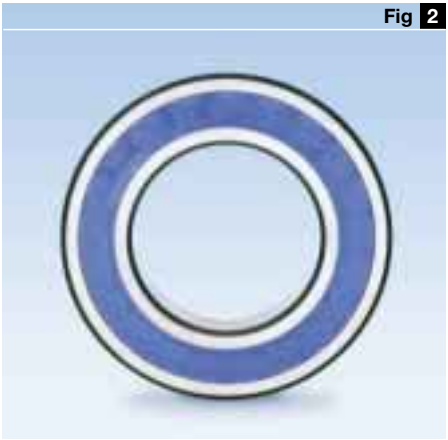
The oil used as standard is very high quality synthetic oil, which meets the needs of most applications.

The oil-filled polymer material is moulded into the bearing. A very narrow gap will form around the rolling elements and raceways during the moulding process, allowing the bearing components to rotate freely. The oil, which seeps into the gap, provides good lubrication for the bearing right from the start. Solid Oil completely fills the internal space in a bearing and encapsulates the cage and rolling elements. Solid Oil uses the cage as a reinforcement element and rotates with it.

Solid Oil keeps the oil in position and brings more oil to the bearing than grease. A metallic surface sliding against Solid Oil is provided with an even and consistent oil film. A moderate increase in temperature causes oil to be pushed towards the surface of the polymer matrix, as the thermal expansion of the oil is greater than that of the polymer matrix. The viscosity of the oil also decreases with increasing temperature. When the bearing stops running, the polymer matrix reabsorbs excess oil.

In addition Solid Oil is environmentally friendly and keeps contaminants out of the bearing even without seals (➔ **fig 2**). However, for those applications where very good contamination exclusion is needed, the use of bearings with Solid Oil and integral contact seals is recommended. But in all cases maintenance will be unnecessary because no relubrication is needed.

Fig 2



Technical data

Dimensions and tolerances
Dimensions and tolerances of bearings or units with Solid Oil are the same as for the corresponding standard products.

Load carrying capacity
The basic dynamic and static load ratings for the Solid Oil bearings are the same as for the corresponding standard bearings.

Limiting speeds
An indication of the limiting speeds for bearings with Solid Oil is given in **table** 1 by the speed factor

$A = n\, d_m$

where
A = speed factor mm/min
n = rotational speed, r/min
d_m = bearing mean diameter
= 0,5 (d + D), mm

The speed limits indicated by the factor A apply to open (unsealed) bearings. For bearings with integral seals 80 % of the quoted values should be used.

It is important to remember that the higher the speed, the higher the operating temperature. It may therefore be necessary to limit the bearing speed for high temperature operation so that the temperature limit for the Solid Oil is not exceeded.

Generally, when bearings with Solid Oil are to operate under extreme conditions, it is advisable to contact the SKF application engineering service for advice and support.

Table 1

Limiting speeds

Bearing type	Speed factor A
Deep groove ball bearings	
– single row	300 000
– double row	40 000
Angular contact ball bearings	
– with pressed steel cage	150 000
– with polyamide 6.6 cage	40 000
Self-aligning ball bearings	
– with pressed steel cage	150 000
– with polyamide 6.6 cage	40 000
Cylindrical roller bearings	
– with pressed steel cage	150 000
– with polyamide 6.6 cage	40 000
Taper roller bearings	45 000
Spherical roller bearings	
– E design	42 500
– CC design	85 000
Y-bearings, Y-bearing units	40 000

Oil properties

The standard oil normally used for Solid Oil is a very high quality synthetic oil. Its important properties are listed in **table** 2.

Oils having other viscosities can also be used successfully, e.g. special oils for the food industry, heavily loaded or low temperature applications etc. Additives, such as rust inhibitors, can be added to Solid Oil to provide extra protection.

Before deciding upon oil type and ordering, please consult the SKF application engineering service.

Table 2

Standard oil for Solid Oil

Properties	Solid Oil
Kinematic viscosity	
at 40 °C	140 mm^2/s
at 100 °C	19 mm^2/s
Permissible temperatures[1]	
– for continuous operations	+85 °C
– for intermittent operations	+95 °C
– for start-up operations	–40 °C

[1] Bearings with Solid Oil can be heated for mounting purposes up to +100 °C


SKF

Mechatronics

Sensor-Bearing Units **953**

Steer-By-Wire Modules **963**

Mast Height Control units **965**

Other sensorized units **967**





Sensor-Bearing Units

SKF Sensor-Bearing Units **954**
SKF Explorer class deep groove ball bearings 955
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Product table **960**

Exact information on the motion status of rotating or axially travelling components is decisive in many fields of engineering. Exact motion control becomes all the more important with the increasing necessity of automation of all kinds of processes. In addition, the demand to design more light-weight and simpler constructions calls for integral system solutions (➔ **fig** 1), e.g. for sensor bearing units to record

1. the number of revolutions
2. the speed
3. the direction of rotation
4. the relative position/counting
5. the acceleration or deceleration

SKF Sensor-Bearing Units

SKF Sensor-Bearing Units (➔ **fig** 2) are mechatronic machine components covering the fields of both sensor and bearing engineering. They are virtually an ideal combination of a versatile ball bearing with a sensor unit shielded from external influences. The sensor body, impulse ring and bearing are mechanically attached to each other, forming an integral ready-to-mount unit.

The SKF designed and patented Sensor-Bearing Units are simple, robust and consist of

- an SKF Explorer class deep groove ball bearing and
- an SKF active sensor unit.

The SKF Sensor-Bearing Units are specially designed to perform as incremental encoders for motor and/or machine control. They are specially adapted to fit asynchronous motors, and provide compact and reliable encoding for their most demanding control. They are intented for applications with rotating inner ring and stationary outer ring. SKF Sensor-Bearing Units for applications with stationary inner ring and rotating outer ring, e.g for the use in conveyor systems, can be manufactured on request, please contact the SKF application engineering service.

Fig 1

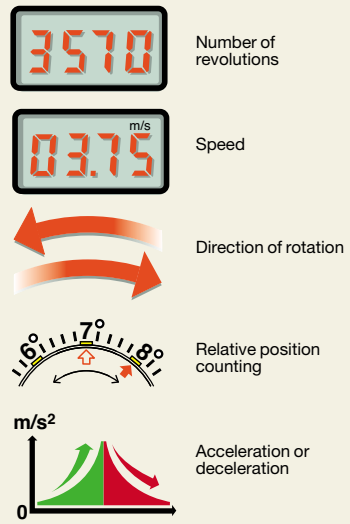


Fig 2



SKF Explorer class deep groove ball bearings

The single row SKF Explorer deep groove ball bearings are suitable for high speeds, are robust in operation and do not require any maintenance. They can accommodate not only rather high radial loads, but also axial loads and serve as locating bearings guiding the shaft axially in both directions. Furthermore they are noted for their high manufacturing accuracy, their low noise and friction levels. The efficient sealing and the grease filling provide maintenance-free operation for life.

SKF active sensor units

The SKF Sensor-Bearing Unit incorporates an active sensor designed to be compact and robust, very close to an incremental encoder function. It provides accurate measuring down to zero speed. Its main components are the impulse ring, the sensor body with the sensors and the connecting cable.

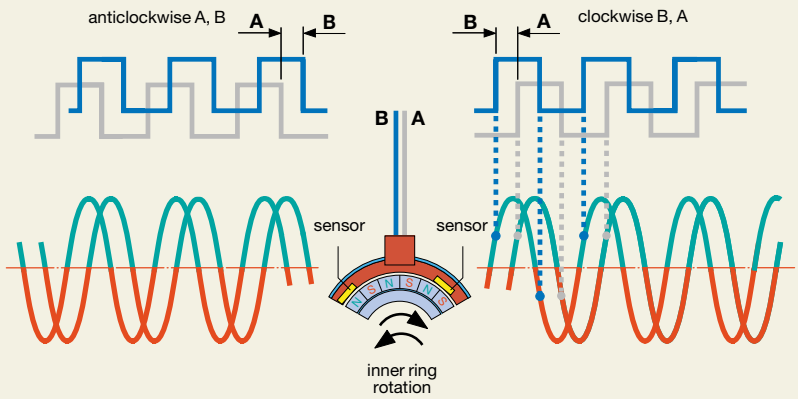
The composite magnetized impulse ring is attached to the bearing inner ring. Depending on the bearing size, it is divided into a certain number of north and south poles. The number of pulses per revolution normally ranges between 32 and 80.

The sensor body is attached to the bearing outer ring by an SKF patented solution. The sensor body has two cells, enabling the direction of rotation to be determined. The two sensors are offset to each other in the sensor body. In a small integrated circuit they contain not only the Hall generator as an active element but also the electronics for signal amplification and conversion. The analogue sinusoidal signal generated by the Hall cell is amplified and converted into a square-wave signal by a Schmitt trigger (→ **fig** 3). The leading signal determines the direction of rotation.

Furthermore two sensors provide double the number of pulses, 128 pulses per revolution compared with 64 for a standard bearing. When counting the rising and falling edges of the pulses a maximum accuracy of 256 pulses per revolution can be attained, which corresponds to a resolution of 1,4 angular degrees.

The sensor requires an external voltage supply. The signal output is fed via an open collector circuit. Speeds down to zero can be recorded.

Fig 3



Unit data – general

Design

SKF Sensor-Bearing Units (➔ **fig** 4) consist of

- an SKF Explorer deep groove ball bearing with a RS1 contact seal and a snap ring groove in the outside surface of the outer ring **(a)**
- a magnetized impulse ring **(b)**
- a sensor body **(c)**
- a connecting cable **(d)**.

At the side opposite to the seal, the impulse and sensor body form an effective labyrinth seal.

The impulse ring is a composite magnetized ring. The number of north and south poles (between 32 and 80) depends on the bearing size. The impulse ring is attached to the inner ring.

The sensor body protecting two embedded Hall cells is attached to the outer ring – a patented SKF solution. The multi-wire cable extends in the radial direction, connecting the SKF Sensor-Bearing Unit and the signal processing electronics and has a standard length of approximately 500 mm. To account for the different interface requirements between the Sensor-Bearing Unit and the customized electronic unit, SKF Sensor-Bearing Units (➔ **fig** 5) provide the choice of three versions:

- Version 1: Free cable end
- Version 2: Plug connection AMP Superseal, AMP Nos. 282106-1 and 282404-1
- Version 3: Plug connection AMP Mate-N-Lock, AMP Nos. 350779-1, 350811-1 and 350924-1

Dimensions

SKF Sensor-Bearing Units are based on SKF Explorer class deep groove ball bearings in the 62 series, which dimensionally comply with ISO 15: 1998 as regards diameter. However, the unit is slightly wider due to the integral sensor.

Fig 4

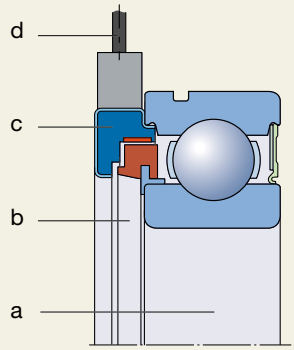
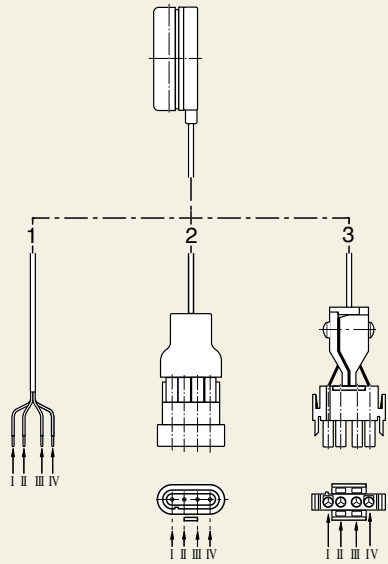


Fig 5



Bearing tolerances
The bearings used for SKF Sensor-Bearing Units are manufactured to P5 tolerances ($d \leq 25$ mm) or P6 tolerances ($d \geq 30$ mm) as standard, which conform to ISO 492:2002 and are listed in the **tables** 7 and 8 on **pages 129** and **130**.

Bearing internal clearance
SKF Sensor-Bearing Units have C3 radial internal clearance as specified for deep groove ball bearings in ISO 5753:1991. The values are listed in the product table and are valid for unmounted units under zero measuring load.

Permissible speeds
SKF Sensor-Bearing units are designed to suit the limiting speed of the appropriate sealed bearing. If Sensor-Bearing Units are to be operated at higher speeds than indicated in the product table, please contact the SKF application engineering service.

Operating temperature range
SKF Sensor-Bearing Units can be used in the temperature range between –40 and +120 °C, as extensive long-term testing has proved. For temperatures constantly exceeding +120 °C and up to +150 °C, please contact the SKF application engineering service.

Electrical interface data
Active sensor operation requires a regulated supply voltage of 5 to 24 V. Signal output is effected via an open collector (➔ **fig** 6). Loading resistors inserted between the conductor connected to the voltage supply and the conductors for the output signals limit the output current to 20 mA (➔ **table** 1, **page 958**). The signal output features are shown in **table** 2, **page 958**.

Electromagnetic compatibility
SKF Sensor-Bearing Units can be used in systems functioning under most arduous electromagnetic environment such as described in the European Standard EN 50082-2.

Fig 6

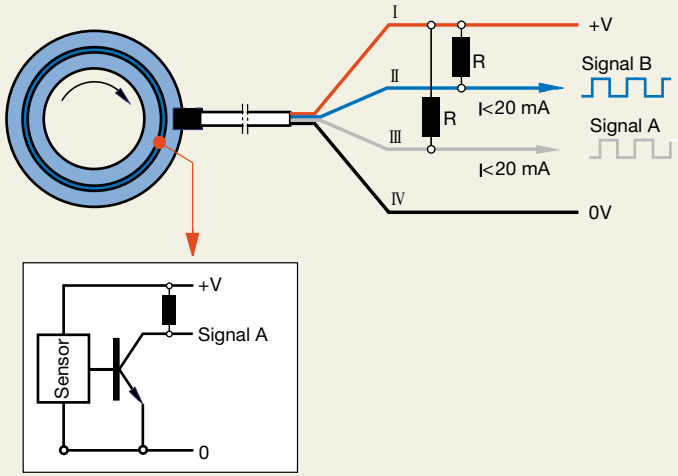


Table 1

Electrical parameters

Voltage	Recommended loading resistor R
V	Ω
5	270
9	470
12	680
24	1 500

Table 2

Signal output features

Feature	Technical data
Signal type	Digital square
Number of signals	2
Phase shift	90 electrical degrees
Duty cycle	50 % of a period

Selection of Sensor-Bearing size

As far as the bearing function is concerned, the selection of the required size of the SKF Sensor-Bearing Unit is made by using the same factors and normal methods as for standard deep groove ball bearings (➔ section “Selection of bearing size”, starting on **page 49**).

Application of Sensor-Bearing Units

Two bearings are normally required to support a shaft – a locating and a non-locating bearing. Since the SKF Sensor-Bearing Unit is mainly used as a locating bearing, the opposite shaft end may be supported by a non-locating bearing. If high axial loads act on the SKF Sensor-Bearing Unit in both directions, it should be mounted in such a way that the higher axial loads act on the bearing outer ring side face opposite the sensor unit.

Radial location

In accordance with the general recommendations, the inner ring has a tight fit on the shaft and the outer ring a loose fit in the housing bore. The sensor unit connection cable emerging radially from the bearing determines the position of the outer ring relative to the housing. A sufficiently dimensioned cable duct must be provided in the housing or housing cover (➔ **fig 7**). It is recommended that the cable protruding from the sensor body be protected against excessive rotation by a radial notch in the housing, having a circumferential width of 9 to 15 mm.

Axial location

The inner ring with tight fit is normally located in the axial direction on both sides, e.g. by a shaft shoulder, a distance sleeve or a snap ring. The axial location of the outer ring depends on the bearing size.

For bearings up to and including a 25 mm bore diameter the outer ring is located axially on the side opposite to the sensor unit by a shoulder in the housing bore.

- If the bearing is only subjected to light loads or not loaded at all in the opposite direction, a snap ring engaging a groove in the housing bore is sufficient for axial location on the sensor side (➔ **fig 7**).
- In case of higher axial loads SKF recommends to locate the bearing with an end cover bolted to the housing via a snap ring in the groove of the outer ring.

Larger bearings should abut a housing shoulder with the side face opposite the sensor unit. At the outer ring side face with the sensor the bearing can be axially located either with

- a thin-walled slotted distance sleeve, which abuts the bearing at one side and a snap ring at the other (➔ **fig** 8) or
- an end cover bolted to the housing.

The abutment dimensions can be found in the product table. For detailed information please refer to the product brochure “SKF Sensor-Bearing Units” or contact the SKF application engineering service.

Mounting

During mounting SKF Sensor-Bearing Units must be handled with great care in order to avoid damage to the sensor unit and the connection cable. On request SKF can provide customized assistance in optimizing the process of mounting and connection; please contact the SKF application engineering service.

Lubrication and maintenance

SKF Sensor-Bearing Units are supplied as sealed ready-to-mount and ready-to-operate bearing units. They are filled with a polyurea grease for the entire bearing life and suitable for the temperature range of the sensor unit – between –40 and +120 °C. The grease fill is adapted to the bearing size. Thus SKF Sensor-Bearing Units are maintenance-free.

Fig 7

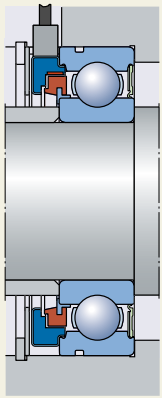
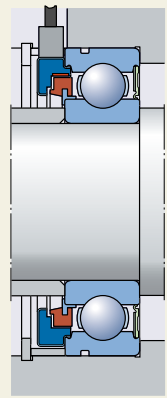
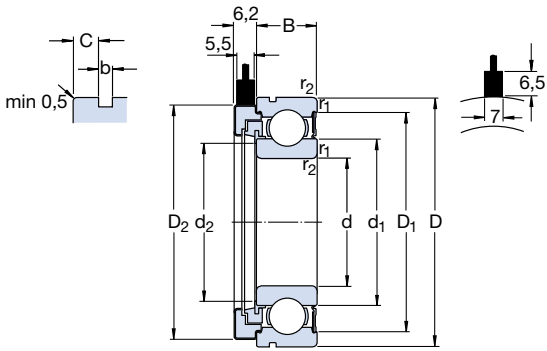


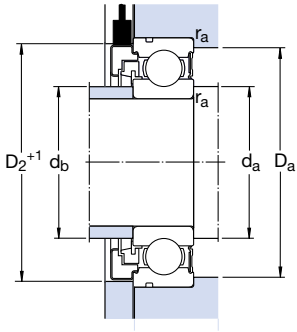
Fig 8



Sensor-Bearing Units
d **15 – 45** mm



Bearing Principal dimensions d	D	B	Basic load rating dynamic C	static C_0	Fatigue load limit P_u	Limiting speed	**Sensor unit** No. of pulses	Period accuracy	Phase shift accuracy	**Mass**	**Designation** Unit with 500 mm long cable but without connector Version 1
mm			kN		kN	r/min	–	%	Electr. °	kg	–
15	35	11	8,06	3,75	0,16	13 000	32	± 3	90 ± 30	0,050	**BMB-6202/032S2/EA002A**
20	47	14	13,5	6,55	0,28	10 000	48	± 3	90 ± 30	0,15	**BMB-6204/048S2/EA002A**
25	52	15	14,8	7,8	0,34	8 500	48	± 3	90 ± 30	0,18	**BMB-6205/048S2/EA002A**
30	62	16	20,3	11,2	0,48	7 500	64	± 4	90 ± 45	0,29	**BMB-6206/064S2/EA002A**
40	80	18	32,5	19	0,8	5 600	80	± 5	90 ± 45	0,40	**BMB-6208/080S2/EB002A**
45	85	19	35,1	21,6	0,92	5 000	80	± 5	90 ± 45	0,44	**BMB-6209/080S2/EB002A**



Bore diameter of end cover
$\geq D_2 + 1$ mm

Dimensions								Abutment and fillet dimensions					Radial internal clearance	
d	d_1 ≈	d_2	D_1 ≈	D_2	b	C	$r_{1,2}$ min	d_a min	d_b min	d_b max	D_a max	r_a max	min	max
mm								mm					μm	
15	21,5	19,5	30,4	34,4	1,35	2,06	0,6	19	19	19,4	31	0,6	11	25
20	28,5	26,4	40,6	46,4	1,35	2,06	1	25	25	26,3	42	1	13	28
25	34	31,8	46,3	51,4	1,35	2,46	1	30	30	31,5	47	1	13	28
30	40,3	37,8	54,1	58	1,9	3,28	1	35	35	37,5	57	1	13	28
40	52,6	48	69,8	75	1,9	3,28	1,1	46,5	46,5	47,5	73,5	1	15	33
45	57,6	53	75,2	78,8	1,9	3,28	1,1	51,5	51,5	52,5	78,5	1	18	36


SKF

Steer-By-Wire Modules

SKF Steer-By-Wire Modules are plug-and-play mechatronic components that combine intelligent sensing technology with operational functionality. The module provides an electronic signal that gives information on:

1. the speed and acceleration of steering.
2. the direction of steering.
3. the relative position of the steering wheel.

The plug and play module includes the following:

- an SKF Explorer deep groove ball bearing,
- an active sensor,
- a steering shaft

which are compactly integrated into a strong steel housing. The exterior surfaces are galvanically coated for protection against corrosion for severe environments. The modules perform well in the temperature range from –40 to +70 °C. They are sealed for life and maintenance-free, thus relubrication and steering torque adjustments are never needed.

Active sensor design
The SKF Steer-By-Wire Module incorporates a compact, robust active sensor, which provides the incremental encoder function. Its main components are the magnetic impulse ring and four sensor cells embedded in a body with connecting cables.

The composite magnetized impulse ring, divided into a certain number of north and south poles, is linked to the rotating inner ring of the bearing. The sensor body is attached to the bearing outer ring and equipped with four Hall cells and the connecting cable. An analogue sinusoidal signal generated by the Hall cells is amplified and converted into a square-wave signal by a Schmitt trigger. The leading signal determines the direction of rotation.

The digital output signals transmitted to the electronic processing control unit, equal to the number of pole pairs on the impulse ring, provide information about:

- the shaft's angular position,
- direction of rotation and
- speed or acceleration of the rotating shaft.

The Steer-By-Wire module electronic output is redundant, containing an identical set of sensors that operate independently. If one set of sensors fails, the other set continues working.

The active sensor requires external voltage supply. The signal output is fed via an open collector circuit.

Designed for demanding applications
SKF Steer-By-Wire Modules are designed to reduce OEM costs while providing more flexibility in cabin design, enhancing operator comfort and ultimately productivity.

SKF Steer-By-Wire Modules can provide the manufacturers of off-road vehicles, including forklift trucks, agricultural, mining, construction and forestry equipment, watercraft or electric carts with more cost effective solutions.

For detailed information about the SKF Steer-By-Wire Modules please contact the SKF application engineering service.



Mast Height Control units

SKF Mast Height Control units (MHC) are plug and play mechatronic components that combine intelligent sensing technology with operational functionality. The MHC unit provides an electronic signal that gives information on

1. the relative position of the mast,
2. the direction the mast is moving and
3. the speed and acceleration of the mast

The MHC unit includes an SKF Explorer class deep groove ball bearing with active sensors integrated in either a pulley or cam roller arrangement. These units interface directly with the vehicle controller to provide useful information to the operator.

SKF MHC units are currently available in two designs.

- A spring-loaded cam arrangement, using spring force to press the sensorized bearing against the moving part of the mast. The mechanical interface of the cam roller unit, which can be customized to meet the OEM requirements, is directly driven by the moving counter surface.
- A pulley arrangement, driven either by a wire or belt that has been incorporated into the design of the mast height positioning system.

Active sensor design
The SKF cam control unit incorporates a compact, robust active sensor, which provides the incremental encoder function. Its main components are the magnetic impulse ring and sensor cells embedded in a body with connecting cables.

The digital output signal is equal to the number of pole pairs on the impulse ring. This is transmitted to the electronic processing control unit, and provides information about the length over which the unit has moved, speed and acceleration of the counter surface, for example that of a fork lift mast. This allows accurate mast height control, which is particularly important to those operations that demand speed and accuracy from the operator or the need of preprogrammed operating cycles. The MHC unit output signals may also be used for simple digital read-out systems or to trigger other safety systems.

Designed for demanding applications
The concept of the SKF Mast Height Control units primarily aims at increased operator efficiency. MHC also has applications well beyond fork lift trucks. They can be adapted to agricultural, forestry, mining and construction equipment and a variety of other applications.

Additional designs of MHC units can be developed based on specific requirements. For detailed information about the SKF cam control units please contact the SKF application engineering service.



Other sensorized units

The SKF range of sensorized units is not limited to deep groove ball bearings and the units described on the previous pages. In the course of the development, the sensor concept was implemented many years ago with other bearing types as well.

Several SKF publications are available with detailed information on these sensorized bearing units and can be supplied by request.

Sensorized units for road vehicles
Pioneering developments in engineering often start in vehicle construction. For reasons of both weight reduction and safety, more and more vehicles are being equipped with speed sensing devices. The optimum wheel speed sensor solution is however unique for each individual application. Depending on requirements the sensor can be either non-integrated or integrated to improve reliability, save weight and ease assembly. The sensor may also be either of

- the passive type, which is capable of providing signals down to a speed of a few km/h sufficient for ABS or of
- the active type, which can provide signals down to zero speed, necessary for systems such as traction control or navigation.

Whatever the solution, SKF can help to take advantage of these opportunities by offering a wide range of existing solutions for both car as well as truck hub units.

Sensorized bearing units for rail vehicles
Operating conditions in rail vehicles are especially arduous. The bearings must not only tolerate vibration, impact loads, heavy loads and extreme temperatures, but must ensure high operational reliability over great distances and with long maintenance intervals. The same is true for the integral sensors, which control the braking system, ensure optimum frictional engagement of the driving wheels on starting-up and detect the direction of rotation.

The SKF sensorized bearings for rail vehicles meet these requirements. They are compact, ready-to-mount and easy-to-install solutions, having a cylindrical roller bearing (CRU) or taper roller bearing (TBU) as the basic bearing.

Apart from these bearing units with speed sensors, bearing units with temperature sensors are also available from SKF. They allow immediate and permanent monitoring of bearing temperature, detecting hot-running axleboxes and bearing damage in operation.

Sensorized bearing units for traction motors
Sensorized bearing units with integral speed and temperature sensors for railway drive systems, the TMBU Traction Motor Bearing Units, are another speciality from SKF. Two standard basic versions are available:

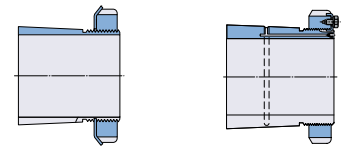
- for the non-driven side, a deep groove ball bearing unit with flanged outer or inner ring for attachment to the motor case or to the rotor shaft and
- for the drive side, a cylindrical roller/four-point contact ball bearing unit.

The SKF Traction Motor Bearing Unit concept combines in one unit all the functions important for the bearing arrangement, also including the insulation, if required.

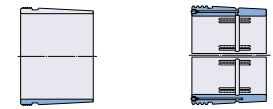

SKF

Bearing accessories

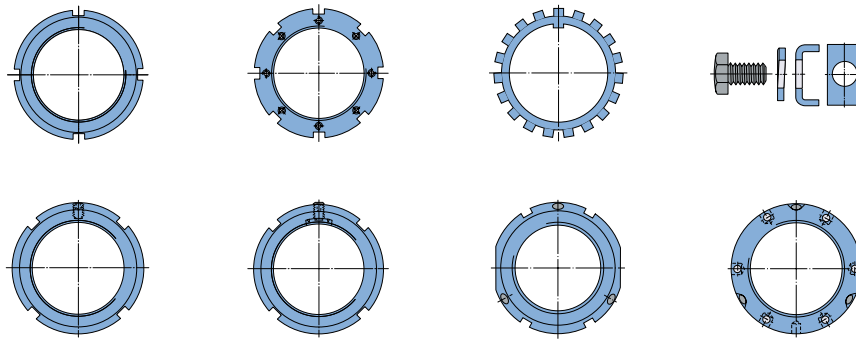
Adapter sleeves **971**



Withdrawal sleeves **991**



Lock nuts **1003**




SKF

Adapter sleeves

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Designs

Adapter sleeves are the most commonly used components for locating bearings with a tapered bore onto a cylindrical seating as they can be used on smooth or stepped shafts (➔ **fig** 1). They are easy to mount and require no additional location on the shaft.

When adapter sleeves are used on smooth shafts, the bearing can be located at any position on the shaft. When used on stepped shafts, together with a stepped ring, bearings can be accurately positioned axially and bearing dismounting is also facilitated.

Basic design

SKF adapter sleeves are supplied complete with lock nut and locking device (➔ **fig** 2). Smaller sizes use a lock nut with a locking washer (**a**), larger sizes use a nut with locking clip (**b**). The sleeves are slotted and have an external taper of 1:12. Up to size 40, the sleeves are phosphated. Larger sizes are untreated and oiled.

SKF supplies adapter sleeves for metric and inch-size shafts. This catalogue contains metric adapter sleeves that fit both metric and inch shafting. For other inch-size adapter sleeves, please refer to the SKF catalogue “Bearing accessories”.

Fig 1

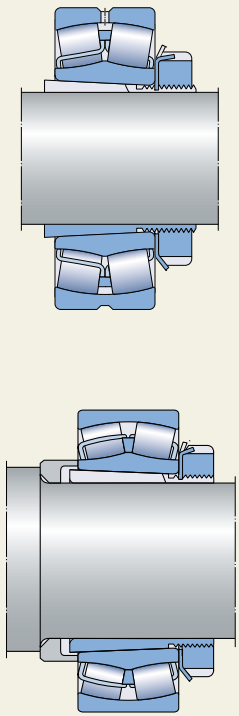
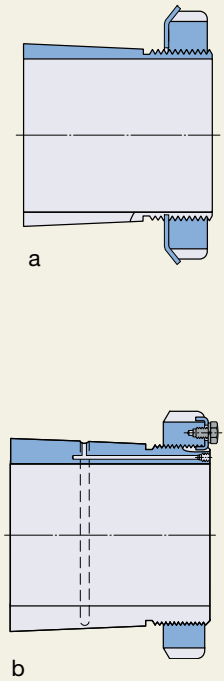


Fig 2



Designs for oil injection

To enable the oil injection method to be used to ease mounting and dismounting, SKF adapter sleeves having a bore diameter of 140 mm up to 200 mm can be supplied to special order already prepared for oil injection (➔ **fig** 3). This feature is standard for sleeves having a bore diameter of 200 mm and above. These adapter sleeves (**a**) have an oil duct at the threaded side and an oil distributor groove on the outside surface. If oil is injected through this duct and groove, an oil film is formed between the mating surfaces of the bearing and sleeve and the force required to mount the bearing is reduced considerably. Details of the thread for attaching the oil supply lead to the duct as well as of appropriate hydraulic nuts will be found in the product tables.

In addition to these standard sleeves which are designated OH .. H and shown in the product tables, SKF produces three other designs which differ in the number and arrangement of the oil ducts and distributor grooves. Details can be supplied on request.

OH design (**b**)

The oil supply duct is at the side opposite to the threaded section and there is a distributor groove in the outside surface.

OH .. B design (**c**)

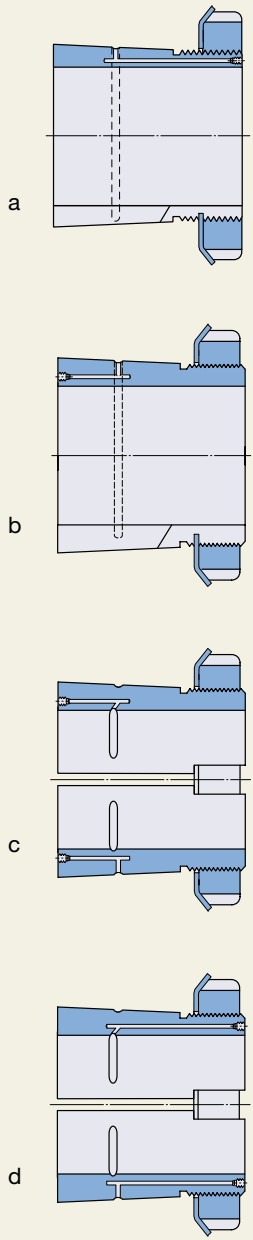
The oil supply duct (or ducts) is at the side opposite to the threaded section and there are distributor grooves in the bore as well as the outside surface. Sleeves up to and including size 40 have one supply duct, larger sleeves have two.

OH .. HB design (**d**)

These sleeves have an oil supply duct (or ducts) at the threaded side of the sleeve and distributor grooves in the bore as well as the outside surface. Sleeves up to and including size 40 have one supply duct, larger sleeves have two.

The equipment required for the oil injection method is also supplied by SKF. The use of hydraulic nuts can considerably facilitate

Fig 3



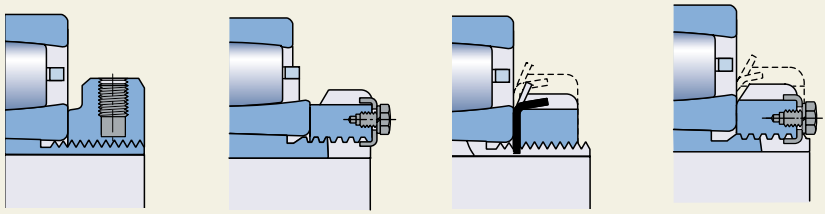
mounting and dismounting (➔ section “Maintenance and lubrication products”, starting on **page 1065**).

Designs for CARB toroidal roller bearings
Where appropriate, modified adapter sleeves of the E, L and TL designs (➔ **fig** 4) are available for CARB bearings, to prevent the locking device from chafing the cage:

- With E-design sleeves, the standard lock nut KM and locking washer MB are replaced by a KMFE nut (**a**), and the standard lock nut HM 30 is replaced by an HME nut with a recessed outside diameter (**b**).
- L-design sleeves (**c**) differ from the standard design in that the standard lock nut KM and locking washer MB have been replaced by a KML nut and MBL locking washer; these have a lower sectional height.
- With the TL-design sleeve (**d**), the standard HM .. T lock nut and MB locking washer have been replaced by the corresponding HM 30 nut and MS 30 locking clip; these have a lower sectional height.

Design for sealed bearings
When using sealed bearings on adapter sleeves, care should be taken so that the lock nut or locking washer will not damage the seal. Sleeves in the E, C, L or TL designs are suitable for sealed bearings. The locking washer used with the H 3 .. C series adapter sleeve has a protrusion on the side directed towards the bearing (➔ **fig** 5).

Fig 4



General data

Dimensions
The dimensions of SKF adapter sleeves are in accordance with ISO 2982-1:1995; except bore diameter of sleeves for inch-size shafts.

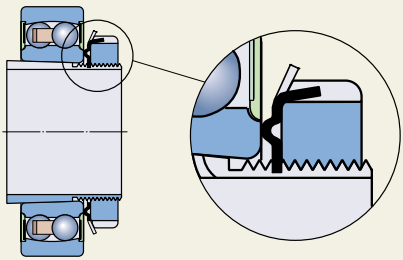
Tolerances
The bore diameter of SKF adapter sleeves is to tolerance js9, the width to h15.

Thread
SKF adapter sleeves up to size 40 have metric threads with 6g tolerances according to ISO 965-3:1998. Larger adapter sleeves have metric trapezoidal threads with 7e tolerances according to ISO 2903:1993.

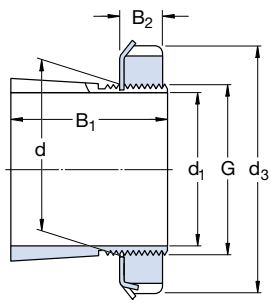
Shaft tolerances

As the name implies, adapter sleeves adapt themselves to the shaft diameter, so that wider diameter tolerances can be permitted than for the seating of a bearing with a cylindrical bore. However, the form tolerances must be kept within narrow limits as the accuracy of form directly affects the running accuracy of the bearing. Generally, shafts should be to an h9 tolerance but the cylindricity should be to IT5/2 according to ISO 1101:1983.

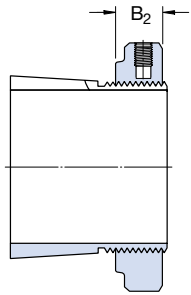
Fig 5



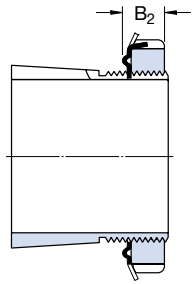
Adapter sleeves for metric shafts
d_1 **17 – 75** mm



H



H .. E

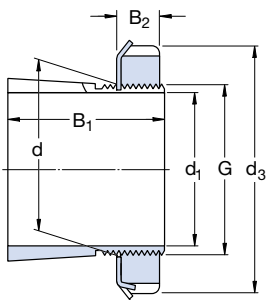


H .. C

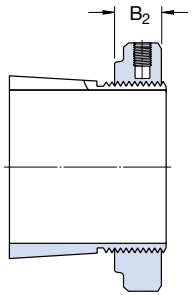
Dimensions						Mass	Designations			
d_1	d	d_3	B_1	B_2	G		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
mm						kg	–			
17	20	32	24	7	M 20×1	0,036	**H 204**	KM 4	MB 4	–
	20	32	28	7	M 20×1	0,040	**H 304**	KM 4	MB 4	–
20	25	38	26	8	M 25×1,5	0,064	**H 205**	KM 5	MB 5	–
	25	38	29	8	M 25×1,5	0,071	**H 305**	KM 5	MB 5	–
	25	38	29	8,5	M 25×1,5	0,071	**H 305 C**	KM 5	MB 5 C	–
	25	38	29	10,5	M 25×1,5	0,076	**H 305 E**	KMFE 5	–	–
25	30	45	27	8	M 30×1,5	0,086	**H 206**	KM 6	MB 6	–
	30	45	31	8	M 30×1,5	0,095	**H 306**	KM 6	MB 6	–
	30	45	31	8,5	M 30×1,5	0,095	**H 306 C**	KM 6	MB 6 C	–
	30	45	31	10,5	M 30×1,5	0,11	**H 306 E**	KMFE 6	–	–
	30	45	38	8	M 30×1,5	0,11	**H 2306**	KM 6	MB 6	–
30	35	52	29	9	M 35×1,5	0,12	**H 207**	KM 7	MB 7	–
	35	52	35	9	M 35×1,5	0,14	**H 307**	KM 7	MB 7	–
	35	52	35	9,5	M 35×1,5	0,14	**H 307 C**	KM 7	MB 7 C	–
	35	52	35	11,5	M 35×1,5	0,15	**H 307 E**	KMFE 7	–	–
	35	52	43	9	M 35×1,5	0,16	**H 2307**	KM 7	MB 7	–
35	40	58	31	10	M 40×1,5	0,16	**H 208**	KM 8	MB 8	–
	40	58	36	10	M 40×1,5	0,17	**H 308**	KM 8	MB 8	–
	40	58	36	10,5	M 40×1,5	0,17	**H 308 C**	KM 8	MB 8 C	–
	40	58	36	13	M 40×1,5	0,19	**H 308 E**	KMFE 8	–	–
	40	58	46	10	M 40×1,5	0,22	**H 2308**	KM 8	MB 8	–
40	45	65	33	11	M 45×1,5	0,21	**H 209**	KM 9	MB 9	–
	45	65	39	11	M 45×1,5	0,23	**H 309**	KM 9	MB 9	–
	45	65	39	11,5	M 45×1,5	0,23	**H 309 C**	KM 9	MB 9 C	–
	45	65	39	13	M 45×1,5	0,24	**H 309 E**	KMFE 9	–	–
	45	65	50	11	M 45×1,5	0,27	**H 2309**	KM 9	MB 9	–
45	50	70	35	12	M 50×1,5	0,24	**H 210**	KM 10	MB 10	HMV 10 E
	50	70	42	12	M 50×1,5	0,27	**H 310**	KM 10	MB 10	HMV 10 E
	50	70	42	12,5	M 50×1,5	0,27	**H 310 C**	KM 10	MB 10 C	HMV 10 E
	50	70	42	14	M 50×1,5	0,30	**H 310 E**	KMFE 10	–	HMV 10 E
	50	70	55	12	M 50×1,5	0,34	**H 2310**	KM 10	MB 10	HMV 10 E

Dimensions						Mass	Designations			
d_1	d	d_3	B_1	B_2	G		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
mm						kg	–			
50	55	75	37	12,5	M 55×2	0,28	**H 211**	KM 11	MB 11	HMV 11 E
	55	75	45	12,5	M 55×2	0,32	**H 311**	KM 11	MB 11	HMV 11 E
	55	75	45	13	M 55×2	0,32	**H 311 C**	KM 11	MB 11 C	HMV 11 E
	55	75	45	14	M 55×2	0,34	**H 311 E**	KMFE 11	–	HMV 11 E
	55	75	59	12,5	M 55×2	0,39	**H 2311**	KM 11	MB 11	HMV 11 E
55	60	80	38	13	M 60×2	0,31	**H 212**	KM 12	MB 12	HMV 12 E
	60	80	47	13	M 60×2	0,36	**H 312**	KM 12	MB 12	HMV 12 E
	60	80	47	14	M 60×2	0,40	**H 312 E**	KMFE 12	–	HMV 12 E
	60	80	62	13	M 60×2	0,45	**H 2312**	KM 12	MB 12	HMV 12 E
60	65	85	40	14	M 65×2	0,36	**H 213**	KM 13	MB 13	HMV 13 E
	65	85	50	14	M 65×2	0,42	**H 313**	KM 13	MB 13	HMV 13 E
	65	85	50	15	M 65×2	0,42	**H 313 C**	KM 13	MB 13 C	HMV 13 E
	65	85	50	15	M 65×2	0,43	**H 313 E**	KMFE 13	–	HMV 13 E
	65	85	65	14	M 65×2	0,52	**H 2313**	KM 13	MB 13	HMV 13 E
	70	92	52	14	M 70×2	0,67	**H 314**	KM 14	MB 14	HMV 14 E
	70	92	52	15	M 70×2	0,67	**H 314 E**	KMFE 14	–	HMV 14 E
	70	92	68	14	M 70×2	0,88	**H 2314**	KM 14	MB 14	HMV 14 E
65	75	98	43	15	M 75×2	0,66	**H 215**	KM 15	MB 15	HMV 15 E
	75	98	55	15	M 75×2	0,78	**H 315**	KM 15	MB 15	HMV 15 E
	75	98	55	16	M 75×2	0,80	**H 315 E**	KMFE 15	–	HMV 15 E
	75	98	73	15	M 75×2	1,10	**H 2315**	KM 15	MB 15	HMV 15 E
70	80	105	46	17	M 80×2	0,81	**H 216**	KM 16	MB 16	HMV 16 E
	80	105	59	17	M 80×2	0,95	**H 316**	KM 16	MB 16	HMV 16 E
	80	105	59	18	M 80×2	1,01	**H 316 E**	KMFE 16	–	HMV 16 E
	80	105	78	17	M 80×2	1,20	**H 2316**	KM 16	MB 16	HMV 16 E
75	85	110	50	18	M 85×2	0,94	**H 217**	KM 17	MB 17	HMV 17 E
	85	110	63	18	M 85×2	1,10	**H 317**	KM 17	MB 17	HMV 17 E
	85	110	63	19	M 85×2	1,17	**H 317 E**	KMFE 17	–	HMV 17 E
	85	110	82	18	M 85×2	1,35	**H 2317**	KM 17	MB 17	HMV 17 E

Adapter sleeves for metric shafts
d_1 **80 – 180** mm



H, H .. L

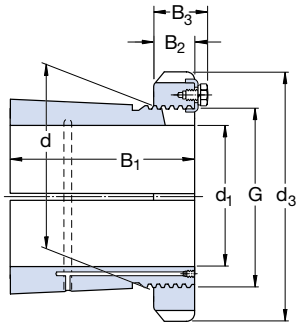


H .. E

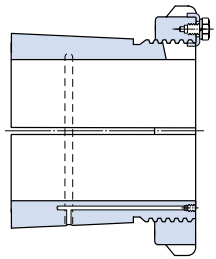
Dimensions						Mass	Designations			
							Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
d_1	d	d_3	B_1	B_2	G					
mm						kg	–			
80	90	120	52	18	M 90×2	1,10	**H 218**	KM 18	MB 18	HMV 18 E
	90	120	65	18	M 90×2	1,30	**H 318**	KM 18	MB 18	HMV 18 E
	90	120	65	19	M 90×2	1,43	**H 318 E**	KMFE 18	–	HMV 18 E
	90	120	86	18	M 90×2	1,60	**H 2318**	KM 18	MB 18	HMV 18 E
85	95	125	55	19	M 95×2	1,25	**H 219**	KM 19	MB 19	HMV 19 E
	95	125	68	19	M 95×2	1,40	**H 319**	KM 19	MB 19	HMV 19 E
	95	125	68	20	M 95×2	1,41	**H 319 E**	KMFE 19	–	HMV 19 E
	95	125	90	19	M 95×2	1,80	**H 2319**	KM 19	MB 19	HMV 19 E
90	100	130	58	20	M 100×2	1,40	**H 220**	KM 20	MB 20	HMV 20 E
	100	130	71	20	M 100×2	1,60	**H 320**	KM 20	MB 20	HMV 20 E
	100	130	71	21	M 100×2	1,72	**H 320 E**	KMFE 20	–	HMV 20 E
	100	130	76	20	M 100×2	1,80	**H 3120**	KM 20	MB 20	HMV 20 E
	100	130	97	20	M 100×2	2,00	**H 2320**	KM 20	MB 20	HMV 20 E
100	110	145	63	21	M 110×2	1,80	**H 222**	KM 22	MB 22	HMV 22 E
	110	145	77	21	M 110×2	2,04	**H 322**	KM 22	MB 22	HMV 22 E
	110	145	77	21,5	M 110×2	2,11	**H 322 E**	KMFE 22	–	HMV 22 E
	110	145	81	21	M 110×2	2,10	**H 3122**	KM 22	MB 22	HMV 22 E
	110	145	105	21	M 110×2	2,75	**H 2322**	KM 22	MB 22	HMV 22 E
110	120	145	72	22	M 120×2	1,80	**H 3024**	KML 24	MBL 24	HMV 24 E
	120	155	72	26	M 120×2	1,87	**H 3024 E**	KMFE 24	–	HMV 24 E
	120	155	88	22	M 120×2	2,50	**H 3124**	KM 24	MB 24	HMV 24 E
	120	145	88	22	M 120×2	2,50	**H 3124 L**	KML 24	MBL 24	HMV 24 E
	120	155	112	22	M 120×2	3,00	**H 2324**	KM 24	MB 24	HMV 24 E
	120	145	112	22	M 120×2	3,12	**H 2324 L**	KML 24	MBL 24	HMV 24 E
115	130	155	80	23	M 130×2	2,80	**H 3026**	KML 26	MBL 26	HMV 26 E
	130	165	92	23	M 130×2	3,45	**H 3126**	KM 26	MB 26	HMV 26 E
	130	155	92	23	M 130×2	3,65	**H 3126 L**	KML 26	MBL 26	HMV 26 E
	130	165	121	23	M 130×2	4,45	**H 2326**	KM 26	MB 26	HMV 26 E
125	140	165	82	24	M 140×2	3,05	**H 3028**	KML 28	MBL 28	HMV 28 E
	140	180	97	24	M 140×2	4,10	**H 3128**	KM 28	MB 28	HMV 28 E
	140	165	97	24	M 140×2	3,62	**H 3128 L**	KML 28	MBL 28	HMV 28 E
	140	180	131	24	M 140×2	5,40	**H 2328**	KM 28	MB 28	HMV 28 E

Dimensions						Mass	Designations			
							Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
d_1	d	d_3	B_1	B_2	G					
mm						kg	–			
135	150	180	87	26	M 150×2	3,75	**H 3030**	KML 30	MBL 30	HMV 30 E
	150	195	111	26	M 150×2	5,25	**H 3130**	KM 30	MB 30	HMV 30 E
	150	180	111	26	M 150×2	4,70	**H 3130 L**	KML 30	MBL 30	HMV 30 E
	150	195	139	26	M 150×2	6,40	**H 2330**	KM 30	MB 30	HMV 30 E
140	160	190	93	27,5	M 160×3	5,10	**H 3032**	KML 32	MBL 32	HMV 32 E
	160	210	119	27,5	M 160×3	7,25	**H 3132**	KM 32	MB 32	HMV 32 E
	160	190	119	27,5	M 160×3	6,40	**H 3132 L**	KML 32	MBL 32	HMV 32 E
	160	210	147	27,5	M 160×3	8,80	**H 2332**	KM 32	MB 32	HMV 32 E
	160	190	147	27,5	M 160×3	7,95	**H 2332 L**	KML 32	MBL 32	HMV 32 E
150	170	200	101	28,5	M 170×3	5,80	**H 3034**	KML 34	MBL 34	HMV 34 E
	170	220	122	28,5	M 170×3	8,10	**H 3134**	KM 34	MB 34	HMV 34 E
	170	200	122	28,5	M 170×3	7,15	**H 3134 L**	KML 34	MBL 34	HMV 34 E
	170	220	154	28,5	M 170×3	9,90	**H 2334**	KM 34	MB 34	HMV 34 E
160	180	210	87	29,5	M 180×3	5,70	**H 3936**	KML 36	MBL 36	HMV 36 E
	180	210	109	29,5	M 180×3	6,70	**H 3036**	KML 36	MBL 36	HMV 36 E
	180	230	131	29,5	M 180×3	9,15	**H 3136**	KM 36	MB 36	HMV 36 E
	180	210	131	29,5	M 180×3	8,15	**H 3136 L**	KML 36	MBL 36	HMV 36 E
	180	230	161	30	M 180×3	11,0	**H 2336**	KM 36	MB 36	HMV 36 E
170	190	220	89	30,5	M 190×3	6,20	**H 3938**	KML 38	MBL 38	HMV 38 E
	190	220	112	30,5	M 190×3	7,25	**H 3038**	KML 38	MBL 38	HMV 38 E
	190	240	141	30,5	M 190×3	10,5	**H 3138**	KM 38	MB 38	HMV 38 E
	190	240	169	30,5	M 190×3	12,0	**H 2338**	KM 38	MB 38	HMV 38 E
180	200	240	98	31,5	M 200×3	7,90	**H 3940**	KML 40	MBL 40	HMV 40 E
	200	240	120	31,5	M 200×3	8,90	**H 3040**	KML 40	MBL 40	HMV 40 E
	200	250	150	31,5	M 200×3	12,0	**H 3140**	KM 40	MB 40	HMV 40 E
	200	250	176	31,5	M 200×3	13,5	**H 2340**	KM 40	MB 40	HMV 40 E

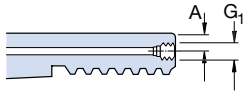
Adapter sleeves for metric shafts
d_1 **200 – 450** mm



OH .. H, OH .. HTL



OH .. HE



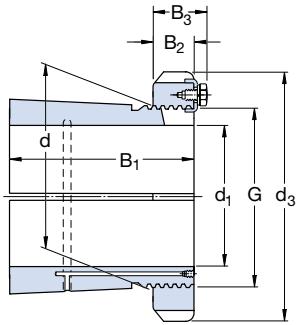
Dimensions									Mass	Designations			
d_1	d	d_3	B_1	B_2	B_3	G	G_1	A		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
mm									kg	–			
200	220	260	96	30	41	Tr 220×4	M 6	4,2	7,95	**OH 3944 H**	HM 3044	MS 3044	HMV 44 E
	220	260	126	30	41	Tr 220×4	M 6	4,2	9,90	**OH 3044 H**	HM 3044	MS 3044	HMV 44 E
	220	280	161	35	–	Tr 220×4	M 6	4,2	15,0	**OH 3144 H**	HM 44 T	MB 44	HMV 44 E
	220	260	161	30	41	Tr 220×4	M 6	4,2	14,3	**OH 3144 HTL**	HM 3044	MS 3044	HMV 44 E
	220	280	186	35	–	Tr 220×4	M 6	4,2	17,0	**OH 2344 H**	HM 44 T	MB 44	HMV 44 E
220	240	290	101	34	46	Tr 240×4	M 6	4,2	11,0	**OH 3948 H**	HM 3048	MS 3052-48	HMV 48 E
	240	290	133	34	46	Tr 240×4	M 6	4,2	12,0	**OH 3048 H**	HM 3048	MS 3052-48	HMV 48 E
	240	300	172	37	–	Tr 240×4	M 6	4,2	16,5	**OH 3148 H**	HM 48 T	MB 48	HMV 48 E
	240	290	172	34	46	Tr 240×4	M 6	4,2	15,1	**OH 3148 HTL**	HM 3048	MS 3052-48	HMV 48 E
	240	300	199	37	–	Tr 240×4	M 6	4,2	19,0	**OH 2348 H**	HM 48 T	MB 48	HMV 48 E
240	260	310	116	34	46	Tr 260×4	M 6	4,2	11,7	**OH 3952 H**	HM 3052	MS 3052-48	HMV 52 E
	260	310	145	34	46	Tr 260×4	M 6	4,2	13,5	**OH 3052 H**	HM 3052	MS 3052-48	HMV 52 E
	260	330	190	39	–	Tr 260×4	M 6	4,2	21,0	**OH 3152 H**	HM 52 T	MB 52	HMV 52 E
	260	310	190	34	46	Tr 260×4	M 6	4,2	17,7	**OH 3152 HTL**	HM 3052	MS 3052-48	HMV 52 E
	260	330	211	39	–	Tr 260×4	M 6	4,2	23,0	**OH 2352 H**	HM 52 T	MB 52	HMV 52 E
260	280	330	121	38	50	Tr 280×4	M 6	4,2	15,3	**OH 3956 H**	HM 3056	MS 3056	HMV 56 E
	280	330	152	38	50	Tr 280×4	M 6	4,2	16,0	**OH 3056 H**	HM 3056	MS 3056	HMV 56 E
	280	350	195	41	–	Tr 280×4	M 6	4,2	23,0	**OH 3156 H**	HM 56 T	MB 56	HMV 56 E
	280	330	195	38	50	Tr 280×4	M 6	4,2	19,3	**OH 3156 HTL**	HM 3056	MS 3056	HMV 56 E
	280	350	224	41	–	Tr 280×4	M 6	4,2	27,0	**OH 2356 H**	HM 56 T	MB 56	HMV 56 E
280	300	360	140	42	54	Tr 300×4	M 6	4,2	20,0	**OH 3960 H**	HM 3060	MS 3060	HMV 60 E
	300	360	168	42	54	Tr 300×4	M 6	4,2	20,5	**OH 3060 H**	HM 3060	MS 3060	HMV 60 E
	300	380	208	40	53	Tr 300×4	M 6	4,2	29,0	**OH 3160 H**	HM 3160	MS 3160	HMV 60 E
	300	380	240	40	53	Tr 300×4	M 6	4,2	32,0	**OH 3260 H**	HM 3160	MS 3160	HMV 60 E
300	320	380	140	42	55	Tr 320×5	M 6	4	21,5	**OH 3964 H**	HM 3064	MS 3068-64	HMV 64 E
	320	380	171	42	55	Tr 320×5	M 6	4	22,0	**OH 3064 H**	HM 3064	MS 3068-64	HMV 64 E
	320	400	226	42	56	Tr 320×5	M 6	4	32,0	**OH 3164 H**	HM 3164	MS 3164	HMV 64 E
	320	400	258	42	56	Tr 320×5	M 6	4	35,0	**OH 3264 H**	HM 3164	MS 3164	HMV 64 E
320	340	400	144	45	58	Tr 340×5	M 6	4	24,5	**OH 3968 H**	HM 3068	MS 3068-64	HMV 68 E
	340	400	187	45	58	Tr 340×5	M 6	4	27,0	**OH 3068 H**	HM 3068	MS 3068-64	HMV 68 E
	340	440	254	55	72	Tr 340×5	M 6	4	50,0	**OH 3168 H**	HM 3168	MS 3172-68	HMV 68 E
	340	440	288	55	72	Tr 340×5	M 6	4	51,5	**OH 3268 H**	HM 3168	MS 3172-68	HMV 68 E

For OH .. HE sleeves not listed in the table, please contact SKF

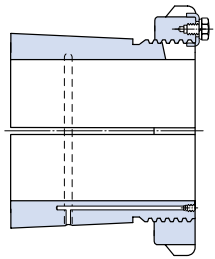
Dimensions									Mass	Designations			
d_1	d	d_3	B_1	B_2	B_3	G	G_1	A		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
mm									kg	–			
340	360	420	144	45	58	Tr 360×5	M 6	4	25,2	**OH 3972 H**	HM 3072	MS 3072	HMV 72 E
	360	420	144	45	58	Tr 360×5	M 6	4	25,2	**OH 3972 HE**	HME 3072	MS 3072	HMV 72 E
	360	420	188	45	58	Tr 360×5	M 6	4	29,0	**OH 3072 H**	HM 3072	MS 3072	HMV 72 E
	360	460	259	58	75	Tr 360×5	M 6	4	56,0	**OH 3172 H**	HM 3172	MS 3172-68	HMV 72 E
	360	460	299	58	75	Tr 360×5	M 6	4	60,5	**OH 3272 H**	HM 3172	MS 3172-68	HMV 72 E
360	380	450	164	48	62	Tr 380×5	M 6	4	31,5	**OH 3976 H**	HM 3076	MS 3080-76	HMV 76 E
	380	450	193	48	62	Tr 380×5	M 6	4	35,5	**OH 3076 H**	HM 3076	MS 3080-76	HMV 76 E
	380	490	264	60	77	Tr 380×5	M 6	4	61,5	**OH 3176 H**	HM 3176	MS 3176	HMV 76 E
	380	490	310	60	77	Tr 380×5	M 6	4	69,5	**OH 3276 H**	HM 3176	MS 3176	HMV 76 E
380	400	470	168	52	66	Tr 400×5	M 6	4	35,0	**OH 3980 H**	HM 3080	MS 3080-76	HMV 80 E
	400	470	210	52	66	Tr 400×5	M 6	4	40,0	**OH 3080 H**	HM 3080	MS 3080-76	HMV 80 E
	400	520	272	62	82	Tr 400×5	M 6	4	73,0	**OH 3180 H**	HM 3180	MS 3184-80	HMV 80 E
	400	520	328	62	82	Tr 400×5	M 6	4	87,0	**OH 3280 H**	HM 3180	MS 3184-80	HMV 80 E
400	420	490	168	52	66	Tr 420×5	M 6	4	36,0	**OH 3984 H**	HM 3084	MS 3084	HMV 84 E
	420	490	168	52	66	Tr 420×5	M 6	4	36,0	**OH 3984 HE**	HME 3084	MS 3084	HMV 84 E
	420	490	212	52	66	Tr 420×5	M 6	4	47,0	**OH 3084 H**	HM 3084	MS 3084	HMV 84 E
	420	540	304	70	90	Tr 420×5	M 6	4	80,0	**OH 3184 H**	HM 3184	MS 3184-80	HMV 84 E
	420	540	352	70	90	Tr 420×5	M 6	4	96,0	**OH 3284 H**	HM 3184	MS 3184-80	HMV 84 E
410	440	520	189	60	77	Tr 440×5	M 8	6,5	58,0	**OH 3988 H**	HM 3088	MS 3092-88	HMV 88 E
	440	520	228	60	77	Tr 440×5	M 8	6,5	65,0	**OH 3088 H**	HM 3088	MS 3092-88	HMV 88 E
	440	560	307	70	90	Tr 440×5	M 8	6,5	95,0	**OH 3188 H**	HM 3188	MS 3192-88	HMV 88 E
	440	560	361	70	90	Tr 440×5	M 8	6,5	117	**OH 3288 H**	HM 3188	MS 3192-88	HMV 88 E
430	460	540	189	60	77	Tr 460×5	M 8	6,5	60,0	**OH 3992 H**	HM 3092	MS 3092-88	HMV 92 E
	460	540	234	60	77	Tr 460×5	M 8	6,5	71,0	**OH 3092 H**	HM 3092	MS 3092-88	HMV 92 E
	460	580	326	75	95	Tr 460×5	M 8	6,5	119	**OH 3192 H**	HM 3192	MS 3192-88	HMV 92 E
	460	580	382	75	95	Tr 460×5	M 8	6,5	134	**OH 3292 H**	HM 3192	MS 3192-88	HMV 92 E
450	480	560	200	60	77	Tr 480×5	M 8	6,5	66,0	**OH 3996 H**	HM 3096	MS 30/500-96	HMV 96 E
	480	560	200	60	77	Tr 480×5	M 8	6,5	66,0	**OH 3996 HE**	HME 3096	MS 30/500-96	HMV 96 E
	480	560	237	60	77	Tr 480×5	M 8	6,5	75,0	**OH 3096 H**	HM 3096	MS 30/500-96	HMV 96 E
	480	620	335	75	95	Tr 480×5	M 8	6,5	135	**OH 3196 H**	HM 3196	MS 3196	HMV 96 E
	480	620	397	75	95	Tr 480×5	M 8	6,5	153	**OH 3296 H**	HM 3196	MS 3196	HMV 96 E

For OH .. HE sleeves not listed in the table, please contact SKF

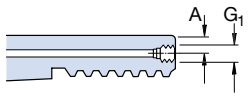
Adapter sleeves for metric shafts
d_1 **470 – 1 000** mm



OH .. H



OH .. HE



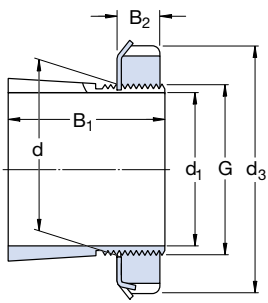
Dimensions									Mass	Designations			
d_1	d	d_3	B_1	B_2	B_3	G	G_1	A		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
mm									kg	–			
470	500	580	208	68	85	Tr 500×5	M 8	6,5	74,3	**OH 39/500 H**	HM 30/500	MS 30/500-96	HMV 100 E
	500	580	208	68	85	Tr 500×5	M 8	6,5	74,3	**OH 39/500 HE**	HME 30/500	MS 30/500-96	HMV 100 E
	500	580	247	68	85	Tr 500×5	M 8	6,5	82,0	**OH 30/500 H**	HM 30/500	MS 30/500-96	HMV 100 E
	500	630	356	80	100	Tr 500×5	M 8	6,5	145	**OH 31/500 H**	HM 31/500	MS 31/500	HMV 100 E
	500	630	428	80	100	Tr 500×5	M 8	6	170	**OH 32/500 H**	HM 31/500	MS 31/500	HMV 100 E
500	530	630	216	68	90	Tr 530×6	M 8	6	87,9	**OH 39/530 H**	HM 30/530	MS 30/600-530	HMV 106 E
	530	630	216	68	90	Tr 530×6	M 8	6	87,9	**OH 39/530 HE**	HME 30/530	MS 30/600-530	HMV 106 E
	530	630	265	68	90	Tr 530×6	M 8	6	105	**OH 30/530 H**	HM 30/530	MS 30/600-530	HMV 106 E
	530	670	364	80	105	Tr 530×6	M 8	6	161	**OH 31/530 H**	HM 31/530	MS 31/530	HMV 106 E
	530	670	447	80	105	Tr 530×6	M 8	6	192	**OH 32/530 H**	HM 31/530	MS 31/530	HMV 106 E
530	560	650	227	75	97	Tr 560×6	M 8	6	95,0	**OH 39/560 H**	HM 30/560	MS 30/560	HMV 112 E
	560	650	227	75	97	Tr 560×6	M 8	6	95,0	**OH 39/560 HE**	HME 30/560	MS 30/560	HMV 112 E
	560	650	282	75	97	Tr 560×6	M 8	6	112	**OH 30/560 H**	HM 30/560	MS 30/560	HMV 112 E
	560	710	377	85	110	Tr 560×6	M 8	6	185	**OH 31/560 H**	HM 31/560	MS 31/600–560	HMV 112 E
	560	710	462	85	110	Tr 560×6	M 8	6	219	**OH 32/560 H**	HM 31/560	MS 31/600–560	HMV 112 E
600	630	730	254	75	97	Tr 630×6	M 8	6	124	**OH 39/630 H**	HM 30/630	MS 30/630	HMV 126 E
	630	730	254	75	97	Tr 630×6	M 8	6	124	**OH 39/630 HE**	HME 30/630	MS 30/630	HMV 126 E
	630	730	301	75	97	Tr 630×6	M 8	6	138	**OH 30/630 H**	HM 30/630	MS 30/630	HMV 126 E
	630	800	424	95	120	Tr 630×6	M 8	6	254	**OH 31/630 H**	HM 31/630	MS 31/630	HMV 126 E
630	670	780	264	80	102	Tr 670×6	G 1/8	8	162	**OH 39/670 H**	HM 30/670	MS 30/670	HMV 134 E
	670	780	324	80	102	Tr 670×6	G 1/8	8	190	**OH 30/670 H**	HM 30/670	MS 30/670	HMV 134 E
	670	850	456	106	131	Tr 670×6	G 1/8	8	340	**OH 31/670 H**	HM 31/670	MS 31/670	HMV 134 E
	670	850	558	106	131	Tr 670×6	G 1/8	8	401	**OH 32/670 H**	HM 31/670	MS 31/670	HMV 134 E
670	710	830	286	90	112	Tr 710×7	G 1/8	8	183	**OH 39/710 H**	HM 30/710	MS 30/710	HMV 142 E
	710	830	286	90	112	Tr 710×7	G 1/8	8	183	**OH 39/710 HE**	HME 30/710	MS 30/710	HMV 142 E
	710	830	342	90	112	Tr 710×7	G 1/8	8	228	**OH 30/710 H**	HM 30/710	MS 30/710	HMV 142 E
	710	900	467	106	135	Tr 710×7	G 1/8	8	392	**OH 31/710 H**	HM 31/710	MS 31/710	HMV 142 E
	710	900	572	106	135	Tr 710×7	G 1/8	8	459	**OH 32/710 H**	HM 31/710	MS 31/710	HMV 142 E
710	750	870	291	90	112	Tr 750×7	G 1/8	8	211	**OH 39/750 H**	HM 30/750	MS 30/800-750	HMV 150 E
	750	870	291	90	112	Tr 750×7	G 1/8	8	211	**OH 39/750 HE**	HME 30/750	MS 30/800-750	HMV 150 E
	750	870	356	90	112	Tr 750×7	G 1/8	8	246	**OH 30/750 H**	HM 30/750	MS 30/800-750	HMV 150 E
	750	950	493	112	141	Tr 750×7	G 1/8	8	451	**OH 31/750 H**	HM 31/750	MS 31/800-750	HMV 150 E
	750	950	603	112	141	Tr 750×7	G 1/8	8	526	**OH 32/750 H**	HM 31/750	MS 31/800-750	HMV 150 E

For OH .. HE sleeves not listed in the table, please contact SKF

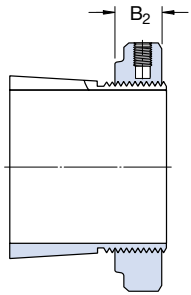
Dimensions									Mass	Designations			
d_1	d	d_3	B_1	B_2	B_3	G	G_1	A		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
mm									kg	–			
750	800	920	303	90	112	Tr 800×7	G 1/8	10	259	**OH 39/800 H**	HM 30/800	MS 30/800-750	HMV 160 E
	800	920	303	90	112	Tr 800×7	G 1/8	10	259	**OH 39/800 HE**	HME 30/800	MS 30/800-750	HMV 160 E
	800	920	366	90	112	Tr 800×7	G 1/8	10	302	**OH 30/800 H**	HM 30/800	MS 30/800-750	HMV 160 E
	800	1 000	505	112	141	Tr 800×7	G 1/8	10	535	**OH 31/800 H**	HM 31/800	MS 31/800-750	HMV 160 E
800	850	980	308	90	115	Tr 850×7	G 1/8	10	288	**OH 39/850 H**	HM 30/850	MS 30/900-850	HMV 170 E
	850	980	308	90	115	Tr 850×7	G 1/8	10	288	**OH 39/850 HE**	HME 30/850	MS 30/900-850	HMV 170 E
	850	980	380	90	115	Tr 850×7	G 1/8	10	341	**OH 30/850 H**	HM 30/850	MS 30/900-850	HMV 170 E
	850	1 060	536	118	147	Tr 850×7	G 1/8	10	616	**OH 31/850 H**	HM 31/850	MS 31/850	HMV 170 E
850	900	1 030	326	100	125	Tr 900×7	G 1/8	10	330	**OH 39/900 H**	HM 30/900	MS 30/900-850	HMV 180 E
	900	1 030	326	100	125	Tr 900×7	G 1/8	10	330	**OH 39/900 HE**	HME 30/900	MS 30/900-850	HMV 180 E
	900	1 030	400	100	125	Tr 900×7	G 1/8	10	387	**OH 30/900 H**	HM 30/900	MS 30/900-850	HMV 180 E
	900	1 120	557	125	154	Tr 900×7	G 1/8	10	677	**OH 31/900 H**	HM 31/900	MS 31/850	HMV 180 E
900	950	1 080	344	100	125	Tr 950×8	G 1/8	10	363	**OH 39/950 H**	HM 30/950	MS 30/950	HMV 190 E
	950	1 080	420	100	125	Tr 950×8	G 1/8	10	424	**OH 30/950 H**	HM 30/950	MS 30/950	HMV 190 E
	950	1 170	583	125	154	Tr 950×8	G 1/8	10	738	**OH 31/950 H**	HM 31/950	MS 31/950	HMV 190 E
950	1 000	1 140	358	100	125	Tr 1000×8	G 1/8	10	407	**OH 39/1000 H**	HM 30/1000	MS 30/1000	HMV 200 E
	1 000	1 140	430	100	125	Tr 1000×8	G 1/8	10	470	**OH 30/1000 H**	HM 30/1000	MS 30/1000	HMV 200 E
	1 000	1 240	609	100	154	Tr 1000×8	G 1/8	10	842	**OH 31/1000 H**	HM 31/1000	MS 31/1000	HMV 200 E
1 000	1 060	1 200	372	100	125	Tr 1060×8	G 1/8	12	490	**OH 39/1060 H**	HM 30/1060	MS 30/1000	HMV 212 E
	1 060	1 200	447	100	125	Tr 1060×8	G 1/8	12	571	**OH 30/1060 H**	HM 30/1060	MS 30/1000	HMV 212 E
	1 060	1 300	622	125	154	Tr 1060×8	G 1/8	12	984	**OH 31/1060 H**	HM 31/1060	MS 31/1000	HMV 212 E

For OH .. HE sleeves not listed in the table, please contact SKF

Adapter sleeves for inch shafts
d_1 **3/4 – 2 3/16** in



HA, HE, HS



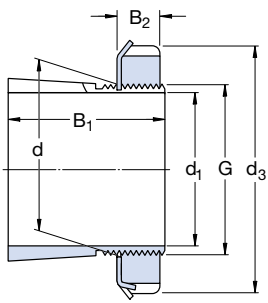
HA .. E, HE .. E, HS .. E

Dimensions							Mass	Designations		
d_1		d	d_3	B_1	B_2	G		Adapter sleeve with nut and locking device	Lock nut	Locking device
in	mm						kg	–		
3/4	**19,050**	25	38	26	8	M 25×1,5	0,070	**HE 205**	KM 5	MB 5
		25	38	29	8	M 25×1,5	0,080	**HE 305**	KM 5	MB 5
		25	38	29	10,5	M 25×1,5	0,088	**HE 305 E**	KMFE 5	–
		25	38	35	8	M 25×1,5	0,090	**HE 2305**	KM 5	MB 5
7/8	**22,225**	30	45	27	8	M 30×1,5	0,11	**HS 206**	KM 6	MB 6
		30	45	31	8	M 30×1,5	0,12	**HS 306**	KM 6	MB 6
15/16	**23,813**	30	45	27	8	M 30×1,5	0,10	**HA 206**	KM 6	MB 6
		30	45	31	8	M 30×1,5	0,12	**HA 306**	KM 6	MB 6
		30	45	31	10,5	M 30×1,5	0,13	**HA 306 E**	KMFE 6	–
		30	45	38	8	M 30×1,5	0,13	**HA 2306**	KM 6	MB 6
1	**25,400**	30	45	27	8	M 30×1,5	0,080	**HE 206**	KM 6	MB 6
		30	45	31	8	M 30×1,5	0,10	**HE 306**	KM 6	MB 6
		30	45	31	10,5	M 30×1,5	0,11	**HE 306 E**	KMFE 6	–
		30	45	38	8	M 30×1,5	0,11	**HE 2306**	KM 6	MB 6
1 1/8	**28,575**	35	52	29	9	M 35×1,5	0,14	**HS 207**	KM 7	MB 7
		35	52	35	9	M 35×1,5	0,16	**HS 307**	KM 7	MB 7
		35	52	35	11,5	M 35×1,5	0,17	**HS 307 E**	KMFE 7	–
1 3/16	**30,163**	35	52	29	9	M 35×1,5	0,12	**HA 207**	KM 7	MB 7
		35	52	35	9	M 35×1,5	0,14	**HA 307**	KM 7	MB 7
		35	52	35	11,5	M 35×1,5	0,15	**HA 307 E**	KMFE 7	–
		35	52	43	9	M 35×1,5	0,16	**HA 2307**	KM 7	MB 7
1 1/4	**31,750**	40	58	31	10	M 40×1,5	0,19	**HE 208**	KM 8	MB 8
		40	58	36	10	M 40×1,5	0,22	**HE 308**	KM 8	MB 8
		40	58	36	13	M 40×1,5	0,19	**HE 308 E**	KMFE 8	–
		40	58	46	10	M 40×1,5	0,28	**HE 2308**	KM 8	MB 8
1 3/8	**34,925**	40	58	31	10	M 40×1,5	0,16	**HS 208**	KM 8	MB 8
		40	58	36	10	M 40×1,5	0,17	**HS 308**	KM 8	MB 8
1 7/16	**36,512**	45	65	33	11	M 45×1,5	0,26	**HA 209**	KM 9	MB 9
		45	65	39	11	M 45×1,5	0,29	**HA 309**	KM 9	MB 9
		45	65	39	13	M 45×1,5	0,31	**HA 309 E**	KMFE 9	–
		45	65	50	11	M 45×1,5	0,35	**HA 2309**	KM 9	MB 9

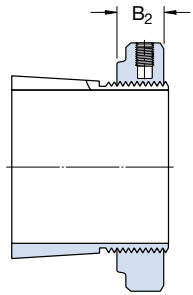
Dimensions							Mass	Designations			
d_1		d	d_3	B_1	B_2	G		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
in	mm						kg	–			
1 1/2	**38,100**	45	65	33	11	M 45×1,5	0,20	**HE 209**	KM 9	MB 9	–
		45	65	39	11	M 45×1,5	0,24	**HE 309**	KM 9	MB 9	–
		45	65	39	13	M 45×1,5	0,26	**HE 309 E**	KMFE 9	–	–
		45	65	50	11	M 45×1,5	0,31	**HE 2309**	KM 9	MB 9	–
1 5/8	**41,275**	50	70	35	12	M 50×1,5	0,31	**HS 210**	KM 10	MB 10	HMV 10 E
		50	70	42	12	M 50×1,5	0,36	**HS 310**	KM 10	MB 10	HMV 10 E
		50	70	55	12	M 50×1,5	0,40	**HS 2310**	KM 10	MB 10	HMV 10 E
1 11/16	**42,863**	50	70	35	12	M 50×1,5	0,28	**HA 210**	KM 10	MB 10	HMV 10 E
		50	70	42	12	M 50×1,5	0,32	**HA 310**	KM 10	MB 10	HMV 10 E
		50	70	42	14	M 50×1,5	0,32	**HA 310 E**	KMFE 10	–	HMV 10 E
		50	70	55	12	M 50×1,5	0,40	**HA 2310**	KM 10	MB 10	HMV 10 E
1 3/4	**44,450**	50	70	35	12	M 50×1,5	0,26	**HE 210**	KM 10	MB 10	HMV 10 E
		50	70	42	12	M 50×1,5	0,29	**HE 310**	KM 10	MB 10	HMV 10 E
		50	70	42	14	M 50×1,5	0,29	**HE 310 E**	KMFE 10	–	HMV 10 E
		50	70	55	12	M 50×1,5	0,36	**HE 2310**	KM 10	MB 10	HMV 10 E
1 7/8	**47,625**	55	75	37	12,5	M 55×2	0,33	**HS 211**	KM 11	MB 11	HMV 11 E
		55	75	45	12,5	M 55×2	0,38	**HS 311**	KM 11	MB 11	HMV 11 E
1 15/16	**49,213**	55	75	37	12,5	M 55×2	0,30	**HA 211**	KM 11	MB 11	HMV 11 E
		55	75	45	12,5	M 55×2	0,34	**HA 311**	KM 11	MB 11	HMV 11 E
		55	75	45	14	M 55×2	0,35	**HA 311 E**	KMFE 11	–	HMV 11 E
		55	75	59	12,5	M 55×2	0,42	**HA 2311**	KM 11	MB 11	HMV 11 E
2	**50,800**	55	75	37	12,5	W 55×1/19	0,26	**HE 211 B**	HM 11	MB 11	–
		55	75	45	12,5	W 55×1/19	0,29	**HE 311 B**	HM 11	MB 11	–
		55	75	45	14	W 55×1/19	0,30	**HE 311 BE**	KMFE 11 B	–	–
		55	75	59	12,5	W 55×1/19	0,36	**HE 2311 B**	HM 11	MB 11	–
2 1/8	**53,975**	60	80	38	13	M 60×2	0,35	**HS 212**	KM 12	MB 12	HMV 12 E
		60	80	47	13	M 60×2	0,40	**HS 312**	KM 12	MB 12	HMV 12 E
		60	80	47	14	M 60×2	0,41	**HS 312 E**	KMFE 12	–	HMV 12 E
		60	80	62	13	M 60×2	0,49	**HS 2312**	KM 12	MB 12	HMV 12 E
2 3/16	**55,563**	65	85	40	14	M 65×2	0,49	**HA 213**	KM 13	MB 13	HMV 13 E
		65	85	50	14	M 65×2	0,58	**HA 313**	KM 13	MB 13	HMV 13 E
		65	85	50	15	M 65×2	0,59	**HA 313 E**	KMFE 13	–	HMV 13 E
		65	85	65	14	M 65×2	0,75	**HA 2313**	KM 13	MB 13	HMV 13 E

Adapter sleeves for inch shafts

d_1 **2 1/4 – 4 3/16** in



HA, HE, HS

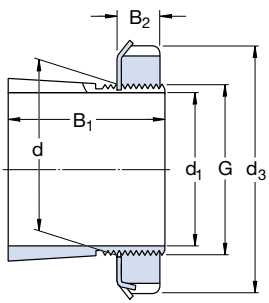


HA .. E, HE .. E

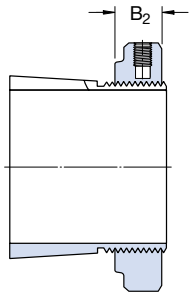
Dimensions							Mass	Designations			
								Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
d_1		d	d_3	B_1	B_2	G					
in	mm						kg	–			
2 1/4	**57,150**	65	85	40	14	M 65×2	0,44	**HE 213**	KM 13	MB 13	HMV 13 E
		65	85	50	14	M 65×2	0,52	**HE 313**	KM 13	MB 13	HMV 13 E
		65	85	50	15	M 65×2	0,53	**HE 313 E**	KMFE 13	–	HMV 13 E
		65	85	65	14	M 65×2	0,65	**HE 2313**	KM 13	MB 13	HMV 13 E
2 3/8	**60,325**	65	85	40	14	M 65×2	0,44	**HS 213**	KM 13	MB 13	HMV 13 E
		65	85	50	14	M 65×2	0,71	**HS 313**	KM 13	MB 13	HMV 13 E
		65	85	65	14	M 65×2	0,80	**HS 2313**	KM 13	MB 13	HMV 13 E
2 7/16	**61,913**	75	98	43	15	M 75×2	0,75	**HA 215**	KM 15	MB 15	HMV 15 E
		75	98	55	15	M 75×2	0,91	**HA 315**	KM 15	MB 15	HMV 15 E
		75	98	55	16	M 75×2	0,93	**HA 315 E**	KMFE 15	–	HMV 15 E
		75	98	73	15	M 75×2	1,15	**HA 2315**	KM 15	MB 15	HMV 15 E
2 1/2	**63,500**	75	98	43	15	M 75×2	0,70	**HE 215**	KM 15	MB 15	HMV 15 E
		75	98	55	15	M 75×2	0,85	**HE 315**	KM 15	MB 15	HMV 15 E
		75	98	55	16	M 75×2	0,87	**HE 315 E**	KMFE 15	–	HMV 15 E
		75	98	73	15	M 75×2	1,09	**HE 2315**	KM 15	MB 15	HMV 15 E
2 5/8	**66,675**	75	98	43	15	M 75×2	0,70	**HS 215**	KM 15	MB 15	HMV 15 E
		75	98	55	15	M 75×2	0,71	**HS 315**	KM 15	MB 15	HMV 15 E
		75	98	73	15	M 75×2	0,90	**HS 2315**	KM 15	MB 15	HMV 15 E
2 11/16	**68,263**	80	105	46	17	M 80×2	0,87	**HA 216**	KM 16	MB 16	HMV 16 E
		80	105	59	17	M 80×2	1,05	**HA 316**	KM 16	MB 16	HMV 16 E
		80	105	59	18	M 80×2	1,06	**HA 316 E**	KMFE 16	–	HMV 16 E
		80	105	78	17	M 80×2	1,30	**HA 2316**	KM 16	MB 16	HMV 16 E
2 3/4	**69,850**	80	105	46	17	M 80×2	0,81	**HE 216**	KM 16	MB 16	HMV 16 E
		80	105	59	17	M 80×2	0,97	**HE 316**	KM 16	MB 16	HMV 16 E
		80	105	59	18	M 80×2	0,98	**HE 316 E**	KMFE 16	–	HMV 16 E
		80	105	78	17	M 80×2	1,20	**HE 2316**	KM 16	MB 16	HMV 16 E
2 15/16	**74,613**	85	110	50	18	M 85×2	0,94	**HA 217**	KM 17	MB 17	HMV 17 E
		85	110	63	18	M 85×2	1,10	**HA 317**	KM 17	MB 17	HMV 17 E
		85	110	63	19	M 85×2	1,19	**HA 317 E**	KMFE 17	–	HMV 17 E
		85	110	82	18	M 85×2	1,40	**HA 2317**	KM 17	MB 17	HMV 17 E
3	**76,200**	85	110	50	18	M 85×2	0,87	**HE 217**	KM 17	MB 17	HMV 17 E
		85	110	63	18	M 85×2	1,00	**HE 317**	KM 17	MB 17	HMV 17 E
		85	110	63	19	M 85×2	0,99	**HE 317 E**	KMFE 17	–	HMV 17 E
		85	110	82	18	M 85×2	1,30	**HE 2317**	KM 17	MB 17	HMV 17 E

Dimensions							Mass	Designations			
d_1		d	d_3	B_1	B_2	G		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
in	mm						kg	–			
3 3/16	**80,963**	90	120	52	18	M 90×2	1,05	**HA 218**	KM 18	MB 18	HMV 18 E
		90	120	65	18	M 90×2	1,25	**HA 318**	KM 18	MB 18	HMV 18 E
		90	120	65	19	M 90×2	1,26	**HA 318 E**	KMFE 18	–	HMV 18 E
		90	120	86	18	M 90×2	1,50	**HA 2318**	KM 18	MB 18	HMV 18 E
3 1/4	**82,550**	90	120	52	18	M 90×2	0,97	**HE 218**	KM 18	MB 18	HMV 18 E
		90	120	65	18	M 90×2	1,10	**HE 318**	KM 18	MB 18	HMV 18 E
		90	120	65	19	M 90×2	1,11	**HE 318 E**	KMFE 18	–	HMV 18 E
		90	120	86	18	M 90×2	1,40	**HE 2318**	KM 18	MB 18	HMV 18 E
		95	125	55	19	M 95×2	1,35	**HE 219**	KM 19	MB 19	HMV 19 E
		95	125	68	19	M 95×2	1,60	**HE 319**	KM 19	MB 19	HMV 19 E
		95	125	68	20	M 95×2	1,61	**HE 319 E**	KMFE 19	–	HMV 19 E
		95	125	90	19	M 95×2	2,00	**HE 2319**	KM 19	MB 19	HMV 19 E
3 7/16	**87,313**	100	130	58	20	M 100×2	1,55	**HA 220**	KM 20	MB 20	HMV 20 E
		100	130	71	20	M 100×2	1,80	**HA 320**	KM 20	MB 20	HMV 20 E
		100	130	71	21	M 100×2	1,75	**HA 320 E**	KMFE 20	–	HMV 20 E
		100	130	97	20	M 100×2	2,35	**HA 2320**	KM 20	MB 20	HMV 20 E
3 1/2	**88,900**	100	130	58	20	M 100×2	1,45	**HE 220**	KM 20	MB 20	HMV 20 E
		100	130	71	20	M 100×2	1,75	**HE 320**	KM 20	MB 20	HMV 20 E
		100	130	71	21	M 100×2	1,70	**HE 320 E**	KMFE 20	–	HMV 20 E
		100	130	76	20	M 100×2	1,80	**HE 3120**	KM 20	MB 20	HMV 20 E
		100	130	97	20	M 100×2	2,20	**HE 2320**	KM 20	MB 20	HMV 20 E
4	**101,600**	110	145	63	21	M 110×2	1,65	**HE 222**	KM 22	MB 22	HMV 22 E
		110	145	77	21	M 110×2	1,90	**HE 322**	KM 22	MB 22	HMV 22 E
		110	145	77	21,5	M 110×2	1,85	**HE 322 E**	KMFE 22	–	HMV 22 E
		110	145	81	21	M 110×2	2,25	**HE 3122**	KM 22	MB 22	HMV 22 E
		110	145	105	21	M 110×2	2,40	**HE 2322**	KM 22	MB 22	HMV 22 E
4 3/16	**106,363**	120	145	72	22	M 120×2	2,25	**HA 3024**	KML 24	MBL 24	HMV 24 E
		120	155	72	26	M 120×2	2,32	**HA 3024 E**	KMFE 24	–	HMV 24 E
		120	155	88	22	M 120×2	2,90	**HA 3124**	KM 24	MB 24	HMV 24 E
		120	145	88	22	M 120×2	2,60	**HA 3124 L**	KML 24	MBL 24	HMV 24 E
		120	155	112	22	M 120×2	3,60	**HA 2324**	KM 24	MB 24	HMV 24 E
		120	145	112	22	M 120×2	3,30	**HA 2324 L**	KML 24	MBL 24	HMV 24 E

Adapter sleeves for inch shafts
d_1 **4 1/4 – 7 3/16** in



HA, HA .. L, HE, HE .. L



HA .. E, HE .. E

Dimensions							Mass	Designations			
d_1		d	d_3	B_1	B_2	G		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
in	mm						kg	–			
4 1/4	**107,950**	120	145	72	22	M 120×2	2,00	**HE 3024**	KML 24	MBL 24	HMV 24 E
		120	155	72	26	M 120×2	2,70	**HE 3024 E**	KMFE 24	–	HMV 24 E
		120	155	88	22	M 120×2	2,80	**HE 3124**	KM 24	MB 24	HMV 24 E
		120	155	112	22	M 120×2	3,35	**HE 2324**	KM 24	MB 24	HMV 24 E
		120	145	112	22	M 120×2	3,05	**HE 2324 L**	KML 24	MBL 24	HMV 24 E
4 7/16	**112,713**	130	155	80	23	M 130×2	3,05	**HA 3026**	KML 26	MBL 26	HMV 26 E
		130	165	92	23	M 130×2	3,75	**HA 3126**	KM 26	MB 26	HMV 26 E
		130	155	92	23	M 130×2	3,55	**HA 3126 L**	KML 26	MBL 26	HMV 26 E
		130	165	92	28	M 130×2	3,77	**HA 3126 E**	KMFE 26	–	HMV 26 E
		130	165	121	23	M 130×2	4,74	**HA 2326**	KM 26	MB 26	HMV 26 E
4 1/2	**114,300**	130	155	80	23	M 130×2	2,90	**HE 3026**	KML 26	MBL 26	HMV 26 E
		130	165	92	23	M 130×2	3,60	**HE 3126**	KM 26	MB 26	HMV 26 E
		130	155	92	23	M 130×2	3,40	**HE 3126 L**	KML 26	MBL 26	HMV 26 E
		130	165	121	23	M 130×2	4,55	**HE 2326**	KM 26	MB 26	HMV 26 E
4 15/16	**125,413**	140	165	82	24	M 140×2	3,00	**HA 3028**	KML 28	MBL 28	HMV 28 E
		140	180	97	24	M 140×2	4,10	**HA 3128**	KM 28	MB 28	HMV 28 E
		140	165	97	24	M 140×2	3,60	**HA 3128 L**	KML 28	MBL 28	HMV 28 E
		140	180	131	24	M 140×2	5,30	**HA 2328**	KM 28	MB 28	HMV 28 E
5	**127,000**	140	165	82	24	M 140×2	2,80	**HE 3028**	KML 28	MBL 28	HMV 28 E
		140	180	97	24	M 140×2	3,80	**HE 3128**	KM 28	MB 28	HMV 28 E
		140	165	97	24	M 140×2	3,30	**HE 3128 L**	KML 28	MBL 28	HMV 28 E
		140	180	131	24	M 140×2	5,00	**HE 2328**	KM 28	MB 28	HMV 28 E
5 3/16	**131,763**	150	180	87	26	M 150×2	4,20	**HA 3030**	KML 30	MBL 30	HMV 30 E
		150	195	111	26	M 150×2	5,80	**HA 3130**	KM 30	MB 30	HMV 30 E
		150	180	111	26	M 150×2	5,30	**HA 3130 L**	KML 30	MBL 30	HMV 30 E
		150	195	139	26	M 150×2	7,10	**HA 2330**	KM 30	MB 30	HMV 30 E
5 1/4	**133,350**	150	180	87	26	M 150×2	4,00	**HE 3030**	KML 30	MBL 30	HMV 30 E
		150	195	111	26	M 150×2	5,50	**HE 3130**	KM 30	MB 30	HMV 30 E
		150	180	111	26	M 150×2	5,00	**HE 3130 L**	KML 30	MBL 30	HMV 30 E
		150	195	139	26	M 150×2	6,80	**HE 2330**	KM 30	MB 30	HMV 30 E
5 7/16	**138,113**	160	190	93	27,5	M 160×3	5,40	**HA 3032**	KML 32	MBL 32	HMV 32 E
		160	210	119	27,5	M 160×3	7,55	**HA 3132**	KM 32	MB 32	HMV 32 E
		160	210	147	27,5	M 160×3	9,40	**HA 2332**	KM 32	MB 32	HMV 32 E
		160	190	147	27,5	M 160×3	8,55	**HA 2332 L**	KML 32	MBL 32	HMV 32 E

Dimensions							Mass	Designations			
d_1		d	d_3	B_1	B_2	G		Adapter sleeve with nut and locking device	Lock nut	Locking device	Appropriate hydraulic nut
in	mm						kg	–			
5 1/2	**139,700**	160	190	93	27,5	M 160×3	5,10	**HE 3032**	KML 32	MBL 32	HMV 32 E
		160	210	119	27,5	M 160×3	7,30	**HE 3132**	KM 32	MB 32	HMV 32 E
		160	190	119	27,5	M 160×3	6,45	**HE 3132 L**	KML 32	MBL 32	HMV 32 E
		160	210	147	27,5	M 160×3	8,80	**HE 2332**	KM 32	MB 32	HMV 32 E
		160	190	147	27,5	M 160×3	7,95	**HE 2332 L**	KML 32	MBL 32	HMV 32 E
5 15/16	**150,813**	170	200	101	28,5	M 170×3	5,70	**HA 3034**	KML 34	MBL 34	HMV 34 E
		170	220	122	28,5	M 170×3	7,80	**HA 3134**	KM 34	MB 34	HMV 34 E
		170	200	122	28,5	M 170×3	6,80	**HA 3134 L**	KML 34	MBL 34	HMV 34 E
		170	220	154	28,5	M 170×3	9,60	**HA 2334**	KM 34	MB 34	HMV 34 E
6	**152,400**	170	200	101	28,5	M 170×3	5,40	**HE 3034**	KML 34	MBL 34	HMV 34 E
		170	220	122	28,5	M 170×3	7,55	**HE 3134**	KM 34	MB 34	HMV 34 E
		170	200	122	28,5	M 170×3	6,60	**HE 3134 L**	KML 34	MBL 34	HMV 34 E
		170	220	154	28,5	M 170×3	9,20	**HE 2334**	KM 34	MB 34	HMV 34 E
6 7/16	**163,513**	180	210	109	29,5	M 180×3	6,00	**HA 3036**	KML 36	MBL 36	HMV 36 E
		180	230	131	29,5	M 180×3	8,15	**HA 3136**	KM 36	MB 36	HMV 36 E
		180	210	131	29,5	M 180×3	7,20	**HA 3136 L**	KML 36	MBL 36	HMV 36 E
		180	230	161	29,5	M 180×3	9,90	**HA 2336**	KM 36	MB 36	HMV 36 E
6 1/2	**165,100**	180	210	109	29,5	M 180×3	5,55	**HE 3036**	KML 36	MBL 36	HMV 36 E
		180	230	131	29,5	M 180×3	7,80	**HE 3136**	KM 36	MB 36	HMV 36 E
		180	210	131	29,5	M 180×3	6,85	**HE 3136 L**	KML 36	MBL 36	HMV 36 E
		180	230	161	29,5	M 180×3	9,35	**HE 2336**	KM 36	MB 36	HMV 36 E
6 3/4	**171,450**	190	220	112	30,5	M 190×3	7,20	**HE 3038**	KML 38	MBL 38	HMV 38 E
		190	240	141	30,5	M 190×3	10,2	**HE 3138**	KM 38	MB 38	HMV 38 E
		190	240	169	30,5	M 190×3	11,7	**HE 2338**	KM 38	MB 38	HMV 38 E
6 15/16	**176,213**	190	220	112	30,5	M 190×3	5,80	**HA 3038**	KML 38	MBL 38	HMV 38 E
		190	240	141	30,5	M 190×3	8,50	**HA 3138**	KM 38	MB 38	HMV 38 E
		190	240	169	30,5	M 190×3	10,0	**HA 2338**	KM 38	MB 38	HMV 38 E
7	**177,800**	200	240	120	31,5	M 200×3	9,35	**HE 3040**	KML 40	MBL 40	HMV 40 E
		200	250	150	31,5	M 200×3	12,3	**HE 3140**	KM 40	MB 40	HMV 40 E
		200	250	176	31,5	M 200×3	14,2	**HE 2340**	KM 40	MB 40	HMV 40 E
7 3/16	**182,563**	200	240	120	31,5	M 200×3	8,25	**HA 3040**	KML 40	MBL 40	HMV 40 E
		200	250	150	31,5	M 200×3	11,2	**HA 3140**	KM 40	MB 40	HMV 40 E
		200	250	176	31,5	M 200×3	12,6	**HA 2340**	KM 40	MB 40	HMV 40 E


SKF

Withdrawal sleeves

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Designs

Withdrawal sleeves can be used to mount bearings with a tapered bore on cylindrical seatings of stepped shafts (➔ **fig** 1). The sleeve is pressed into the bore of the bearing that abuts a shaft shoulder or similar fixed component. The sleeve is located on the shaft by a nut or an end plate. Lock nuts or endplates are not supplied with the withdrawal sleeves. KM or HM lock nuts (➔ **page 1006**) are suitable but must be ordered separately.

To secure the bearing to the shaft, press the withdrawal sleeve into the bearing bore. To do this, particularly where larger bearings are concerned, considerable force is required to overcome the friction between the mating surfaces of the bearing and sleeve and of the sleeve and shaft. Mounting and dismounting of bearings on withdrawal sleeves can be facilitated considerably by using a hydraulic nut (➔ **fig** 2).

Basic design

SKF withdrawal sleeves (➔ **fig** 3) are coated with a preservative. They are slotted and have an external taper of 1:12 except for those in the AH 240 and AH 241 series which have an external taper of 1:30 and are intended for use with wide bearings in the 40 and 41 Dimension Series.

The nuts required for dismounting the withdrawal sleeve are not supplied with the sleeve and must be ordered separately. Appropriate sizes are listed in the product table. Appropriate hydraulic nuts for mounting are listed there as well.

Design for oil injection

To enable the oil injection method to be used for mounting and dismounting, SKF withdrawal sleeves with bore diameters of 200 mm and above are produced as standard with oil supply ducts and distributor grooves (➔ **fig** 4). These AOH sleeves have two oil supply ducts at the threaded side as well as oil distributor grooves in the circumferential and axial directions, both in the outside surface and the sleeve bore. If oil is injected through these ducts and grooves, an oil film is formed between the mating surfaces of the bearing and sleeve and between the shaft and sleeve, and the force required to mount the bearing is considerably reduced. Details of the thread for attaching the oil supply lead to the ducts as well as of appropriate hydraulic nuts will be found in the product table.

The equipment required for the oil injection method is also supplied by SKF (➔ section “Maintenance and lubrication products”, starting on **page 1065**).

Fig 1

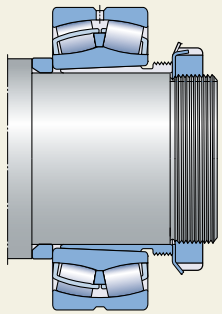
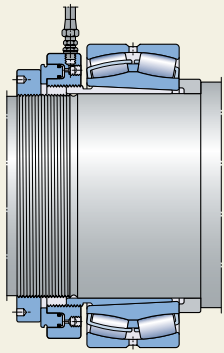


Fig 2



General data

Dimensions
The dimensions of SKF withdrawal sleeves are in accordance with ISO 2982-1:1995.

Tolerances
The bore diameter of SKF withdrawal sleeves is to tolerance js9, the width to h13.

Thread
SKF withdrawal sleeves up to size 38 have metric threads with 6g tolerances according to ISO 965-3:1998. Larger withdrawal sleeves have metric trapezoidal threads with 7e tolerance according to ISO 2903:1993.

If standard nuts are not used, the threads of nuts for withdrawal sleeves up to size 38 should correspond to tolerance 5H according to ISO 965-3:1998. The threads of nuts for larger withdrawal sleeves should correspond to tolerance 7H according to ISO 2903:1993.

Shaft tolerances

As withdrawal sleeves adapt themselves to the shaft diameter, wider diameter tolerances can be permitted than for the seating of a bearing with a cylindrical bore. However, the form tolerances must be kept within narrow limits as the accuracy of form directly affects the running accuracy of the bearing. Generally, shafts should be machined to an h9 tolerance but the cylindricity should be to IT5/2 according to ISO 1101:1983.

Fig 3

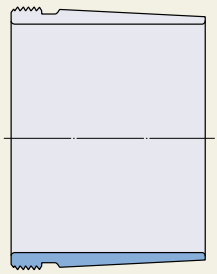
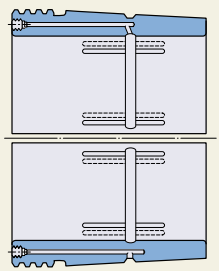
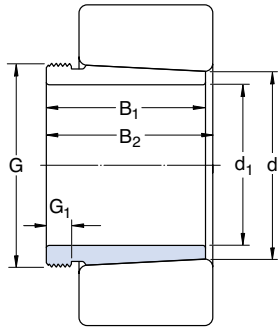


Fig 4



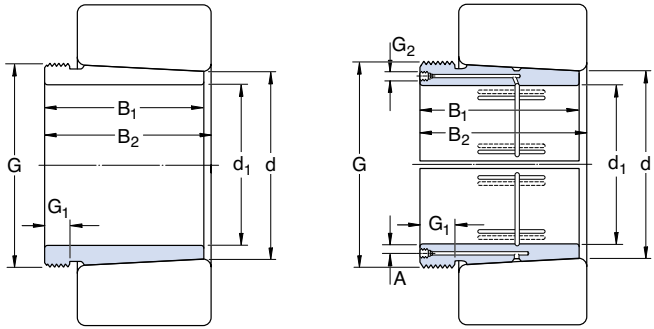
Withdrawal sleeves
d_1 **35 – 145** mm



Dimensions						Mass	Designations		
d_1	d	B_1	B_2	G	G_1		Withdrawal sleeve	Approriate nut for dismounting	hydraulic nut
mm						kg	–		
35	40	29	32	M 45×1.5	6	0,09	**AH 308**	KM 9	–
	40	40	43	M 45×1.5	7	0,13	**AH 2308**	KM 9	–
40	45	31	34	M 50×1.5	6	0,12	**AH 309**	KM 10	HMV 10 E
	45	44	47	M 50×1.5	7	0,16	**AH 2309**	KM 10	HMV 10 E
45	50	35	38	M 55×2	7	0,13	**AHX 310**	KM 11	HMV 11 E
	50	50	53	M 55×2	9	0,19	**AHX 2310**	KM 11	HMV 11 E
50	55	37	40	M 60×2	7	0,16	**AHX 311**	KM 12	HMV 12 E
	55	54	57	M 60×2	10	0,26	**AHX 2311**	KM 12	HMV 12 E
55	60	40	43	M 65×2	8	0,19	**AHX 312**	KM 13	HMV 13 E
	60	58	61	M 65×2	11	0,30	**AHX 2312**	KM 13	HMV 13 E
60	65	42	45	M 70×2	8	0,22	**AH 313 G**	KM 14	HMV 14 E
	65	61	64	M 70×2	12	0,36	**AH 2313 G**	KM 14	HMV 14 E
65	70	43	47	M 75×2	8	0,24	**AH 314 G**	KM 15	HMV 15 E
	70	64	68	M 75×2	12	0,42	**AHX 2314 G**	KM 15	HMV 15 E
70	75	45	49	M 80×2	8	0,29	**AH 315 G**	KM 16	HMV 16 E
	75	68	72	M 80×2	12	0,48	**AHX 2315 G**	KM 16	HMV 16 E
75	80	48	52	M 90×2	8	0,37	**AH 316**	KM 18	HMV 18 E
	80	71	75	M 90×2	12	0,57	**AHX 2316**	KM 18	HMV 18 E
80	85	52	56	M 95×2	9	0,43	**AHX 317**	KM 19	HMV 19 E
	85	74	78	M 95×2	13	0,65	**AHX 2317**	KM 19	HMV 19 E
85	90	53	57	M 100×2	9	0,46	**AHX 318**	KM 20	HMV 20 E
	90	63	67	M 100×2	10	0,57	**AHX 3218**	KM 20	HMV 20 E
	90	79	83	M 100×2	14	0,76	**AHX 2318**	KM 20	HMV 20 E
90	95	57	61	M 105×2	10	0,54	**AHX 319**	KM 21	HMV 21 E
	95	85	89	M 105×2	16	0,90	**AHX 2319**	KM 21	HMV 21 E
95	100	59	63	M 110×2	10	0,58	**AHX 320**	KM 22	HMV 22 E
	100	64	68	M 110×2	11	0,66	**AHX 3120**	KM 22	HMV 22 E
	100	73	77	M 110×2	11	0,76	**AHX 3220**	KM 22	HMV 22 E
	100	90	94	M 110×2	16	1,00	**AHX 2320**	KM 22	HMV 22 E

Dimensions						Mass	Designations		
d_1	d	B_1	B_2	G	G_1		Withdrawal sleeve	Approriate nut for dismounting	hydraulic nut
mm						kg	–		
105	110	63	67	M 120×2	12	0,77	**AHX 322**	KM 24	HMV 24 E
	110	68	72	M 120×2	11	0,76	**AHX 3122**	KM 24	HMV 24 E
	110	82	86	M 120×2	11	1,00	**AHX 3222 G**	KM 24	HMV 24 E
	110	98	102	M 120×2	16	1,30	**AHX 2322 G**	KM 24	HMV 24 E
	110	82	91	M 115×2	13	0,71	**AH 24122**	KM 23	HMV 23 E
115	120	60	64	M 130×2	13	0,73	**AHX 3024**	KM 26	HMV 26 E
	120	75	79	M 130×2	12	0,94	**AHX 3124**	KM 26	HMV 26 E
	120	90	94	M 130×2	13	1,30	**AHX 3224 G**	KM 26	HMV 26 E
	120	105	109	M 130×2	17	1,55	**AHX 2324 G**	KM 26	HMV 26 E
	120	73	82	M 125×2	13	0,70	**AH 24024**	KM 25	HMV 25 E
	120	93	102	M 130×2	13	1,00	**AH 24124**	KM 26	HMV 26 E
125	130	67	71	M 140×2	14	0,91	**AHX 3026**	KM 28	HMV 28 E
	130	78	82	M 140×2	12	1,10	**AHX 3126**	KM 28	HMV 28 E
	130	98	102	M 140×2	15	1,50	**AHX 3226 G**	KM 28	HMV 28 E
	130	115	119	M 140×2	19	1,85	**AHX 2326 G**	KM 28	HMV 28 E
	130	83	93	M 135×2	14	0,90	**AH 24026**	KM 27	HMV 27 E
	130	94	104	M 140×2	14	1,15	**AH 24126**	KM 28	HMV 28 E
135	140	68	73	M 150×2	14	1,00	**AHX 3028**	KM 30	HMV 30 E
	140	83	88	M 150×2	14	1,30	**AHX 3128**	KM 30	HMV 30 E
	140	104	109	M 150×2	15	1,75	**AHX 3228 G**	KM 30	HMV 30 E
	140	125	130	M 150×2	20	2,25	**AHX 2328 G**	KM 30	HMV 30 E
	140	83	93	M 145×2	14	0,95	**AH 24028**	KM 29	HMV 29 E
	140	99	109	M 150×2	14	1,30	**AH 24128**	KM 30	HMV 30 E
145	150	72	77	M 160×3	15	1,15	**AHX 3030**	KM 32	HMV 32 E
	150	96	101	M 160×3	15	1,70	**AHX 3130 G**	KM 32	HMV 32 E
	150	114	119	M 160×3	17	2,10	**AHX 3230 G**	KM 32	HMV 32 E
	150	135	140	M 160×3	24	2,75	**AHX 2330 G**	KM 32	HMV 32 E
	150	90	101	M 155×3	15	1,05	**AH 24030**	KM 31	HMV 31 E
	150	115	126	M 160×3	15	1,55	**AH 24130**	KM 32	HMV 32 E

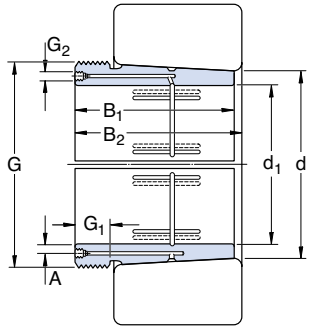
Withdrawal sleeves
d_1 **150 – 280** mm



Dimensions						Mass	Designations Withdrawal sleeve	Approriate nut for dismounting	hydraulic nut
d_1	d	B_1	B_2	G	G_1				
mm						kg	–		
150	160	77	82	M 170×3	16	2,00	**AH 3032**	KM 34	HMV 34 E
	160	103	108	M 170×3	16	3,00	**AH 3132 G**	KM 34	HMV 34 E
	160	124	130	M 170×3	20	3,70	**AH 3232 G**	KM 34	HMV 34 E
	160	140	146	M 170×3	24	4,35	**AH 2332 G**	KM 34	HMV 34 E
	160	95	106	M 170×3	15	2,30	**AH 24032**	KM 34	HMV 34 E
	160	124	135	M 170×3	15	3,00	**AH 24132**	KM 34	HMV 34 E
160	170	85	90	M 180×3	17	2,45	**AH 3034**	KM 36	HMV 36 E
	170	104	109	M 180×3	16	3,20	**AH 3134 G**	KM 36	HMV 36 E
	170	134	140	M 180×3	24	4,35	**AH 3234 G**	KM 36	HMV 36 E
	170	146	152	M 180×3	24	4,85	**AH 2334 G**	KM 36	HMV 36 E
	170	106	117	M 180×3	16	2,70	**AH 24034**	KM 36	HMV 36 E
	170	125	136	M 180×3	16	3,25	**AH 24134**	KM 36	HMV 36 E
170	180	92	98	M 190×3	17	2,80	**AH 3036**	KM 38	HMV 38 E
	180	105	110	M 190×3	17	3,40	**AH 2236 G**	KM 38	HMV 38 E
	180	116	122	M 190×3	19	3,90	**AH 3136 G**	KM 38	HMV 38 E
	180	140	146	M 190×3	24	4,85	**AH 3236 G**	KM 38	HMV 38 E
	180	154	160	M 190×3	26	5,50	**AH 2336 G**	KM 38	HMV 38 E
	180	116	127	M 190×3	16	3,20	**AH 24036**	KM 38	HMV 38 E
	180	134	145	M 190×3	16	3,75	**AH 24136**	KM 38	HMV 38 E
180	190	96	102	M 200×3	18	3,30	**AH 3038 G**	KM 40	HMV 40 E
	190	112	117	M 200×3	18	3,90	**AH 2238 G**	KM 40	HMV 40 E
	190	125	131	M 200×3	20	4,50	**AH 3138 G**	KM 40	HMV 40 E
	190	145	152	M 200×3	25	5,40	**AH 3238 G**	KM 40	HMV 40 E
	190	160	167	M 200×3	26	6,10	**AH 2338 G**	KM 40	HMV 40 E
	190	118	131	M 200×3	18	3,55	**AH 24038**	KM 40	HMV 40 E
	190	146	159	M 200×3	18	4,45	**AH 24138**	KM 40	HMV 40 E
190	200	102	108	Tr 210×4	19	3,70	**AH 3040 G**	HM 42 T	HMV 42 E
	200	134	140	Tr 220×4	21	5,65	**AH 3140**	HM 3044	HMV 44 E
	200	153	160	Tr 220×4	25	6,60	**AH 3240**	HM 3044	HMV 44 E
	200	170	177	Tr 220×4	30	7,60	**AH 2340**	HM 3044	HMV 44 E
	200	127	140	Tr 210×4	18	4,00	**AH 24040**	HM 42 T	HMV 42 E
	200	158	171	Tr 210×4	18	5,05	**AH 24140**	HM 42 T	HMV 42 E

Dimensions								Mass	Designations		
d_1	d	B_1	B_2	G	G_1	G_2	A		Withdrawal sleeve	Approriate nut for dismounting	hydraulic nut
mm								kg	–		
200	220	111	117	Tr 230×4	20	G 1/8	6,5	7,30	**AOH 3044 G**	HM 46 T	HMV 46 E
	220	145	151	Tr 240×4	23	G 1/4	9	9,30	**AOH 3144**	HM 3048	HMV 48 E
	220	181	189	Tr 240×4	30	G 1/4	9	13,5	**AOH 2344**	HM 3048	HMV 48 E
	220	138	152	Tr 230×4	20	G 1/8	6,5	8,20	**AOH 24044**	HM 46 T	HMV 46 E
	220	170	184	Tr 230×4	20	G 1/8	6,5	10,0	**AOH 24144**	HM 46 T	HMV 46 E
220	240	116	123	Tr 260×4	21	G 1/4	9	7,95	**AOH 3048**	HM 3052	HMV 52 E
	240	154	161	Tr 260×4	25	G 1/4	9	12,0	**AOH 3148**	HM 3052	HMV 52 E
	240	189	197	Tr 260×4	30	G 1/4	9	14,0	**AOH 2348**	HM 3052	HMV 52 E
	240	138	153	Tr 250×4	20	G 1/8	6,5	8,05	**AOH 24048**	HM 50 T	HMV 50 E
	240	180	195	Tr 260×4	20	G 1/4	9	11,5	**AOH 24148**	HM 3052	HMV 52 E
240	260	128	135	Tr 280×4	23	G 1/4	9	9,60	**AOH 3052**	HM 3056	HMV 56 E
	260	155	161	Tr 280×4	23	G 1/4	9	13,5	**AOH 2252 G**	HM 3056	HMV 56 E
	260	172	179	Tr 280×4	26	G 1/4	9	15,5	**AOH 3152 G**	HM 3056	HMV 56 E
	260	205	213	Tr 280×4	30	G 1/4	9	19,0	**AOH 2352 G**	HM 3056	HMV 56 E
	260	162	178	Tr 280×4	22	G 1/8	6,5	12,5	**AOH 24052 G**	HM 3056	HMV 56 E
	260	202	218	Tr 280×4	22	G 1/4	9	14,0	**AOH 24152**	HM 3056	HMV 56 E
260	280	131	139	Tr 300×4	24	G 1/4	9	11,0	**AOH 3056**	HM 3060	HMV 60 E
	280	155	163	Tr 300×4	24	G 1/4	9	15,0	**AOH 2256 G**	HM 3160	HMV 60 E
	280	175	183	Tr 300×4	28	G 1/4	9	17,0	**AOH 3156 G**	HM 3160	HMV 60 E
	280	212	220	Tr 300×4	30	G 1/4	9	21,5	**AOH 2356 G**	HM 3160	HMV 60 E
	280	162	179	Tr 300×4	22	G 1/8	6,5	13,5	**AOH 24056 G**	HM 3160	HMV 60 E
	280	202	219	Tr 300×4	22	G 1/4	9	15,0	**AOH 24156**	HM 3160	HMV 60 E
280	300	145	153	Tr 320×5	26	G 1/4	9	13,0	**AOH 3060**	HM 3064	HMV 64 E
	300	170	178	Tr 320×5	26	G 1/4	9	18,0	**AOH 2260 G**	HM 3164	HMV 64 E
	300	192	200	Tr 320×5	30	G 1/4	9	20,5	**AOH 3160 G**	HM 3164	HMV 64 E
	300	228	236	Tr 320×5	34	G 1/4	9	23,5	**AOH 3260 G**	HM 3164	HMV 64 E
	300	184	202	Tr 320×5	24	G 1/8	6,5	17,0	**AOH 24060 G**	HM 3164	HMV 64 E
	300	224	242	Tr 320×5	24	G 1/4	9	18,5	**AOH 24160**	HM 3164	HMV 64 E

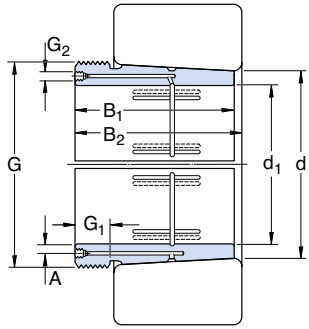
Withdrawal sleeves
d_1 **300 – 530** mm



Dimensions								Mass	Designations		
									Withdrawal sleeve	Approriate nut for dismounting	hydraulic nut
d_1	d	B_1	B_2	G	G_1	G_2	A				
mm								kg	–		
300	320	149	157	Tr 340×5	27	G 1/4	9	16,5	**AOH 3064 G**	HM 3068	HMV 68 E
	320	180	190	Tr 340×5	27	G 1/4	9	20,0	**AOH 2264 G**	HM 3168	HMV 68 E
	320	209	217	Tr 340×5	31	G 1/4	9	24,5	**AOH 3164 G**	HM 3168	HMV 68 E
	320	246	254	Tr 340×5	36	G 1/4	9	27,5	**AOH 3264 G**	HM 3168	HMV 68 E
	320	184	202	Tr 340×5	24	G 1/8	6,5	18,0	**AOH 24064 G**	HM 3168	HMV 68 E
	320	242	260	Tr 340×5	24	G 1/4	9	20,5	**AOH 24164**	HM 3168	HMV 68 E
320	340	162	171	Tr 360×5	28	G 1/4	9	19,0	**AOH 3068 G**	HM 3072	HMV 72 E
	340	225	234	Tr 360×5	33	G 1/4	9	28,5	**AOH 3168 G**	HM 3172	HMV 72 E
	340	264	273	Tr 360×5	38	G 1/4	9	32,0	**AOH 3268 G**	HM 3172	HMV 72 E
	340	206	225	Tr 360×5	26	G 1/4	9	18,0	**AOH 24068**	HM 3172	HMV 72 E
	340	269	288	Tr 360×5	26	G 1/4	9	25,5	**AOH 24168**	HM 3172	HMV 72 E
340	360	167	176	Tr 380×5	30	G 1/4	9	21,0	**AOH 3072 G**	HM 3076	HMV 76 E
	360	229	238	Tr 380×5	35	G 1/4	9	30,5	**AOH 3172 G**	HM 3176	HMV 76 E
	360	274	283	Tr 380×5	40	G 1/4	9	35,5	**AOH 3272 G**	HM 3176	HMV 76 E
	360	206	226	Tr 380×5	26	G 1/4	9	20,0	**AOH 24072**	HM 3176	HMV 76 E
	360	269	289	Tr 380×5	26	G 1/4	9	26,0	**AOH 24172**	HM 3176	HMV 76 E
360	380	170	180	Tr 400×5	31	G 1/4	9	22,5	**AOH 3076 G**	HM 3080	HMV 80 E
	380	232	242	Tr 400×5	36	G 1/4	9	33,0	**AOH 3176 G**	HM 3180	HMV 80 E
	380	284	294	Tr 400×5	42	G 1/4	9	42,0	**AOH 3276 G**	HM 3180	HMV 80 E
	380	208	228	Tr 400×5	28	G 1/4	9	23,5	**AOH 24076**	HM 3180	HMV 80 E
	380	271	291	Tr 400×5	28	G 1/4	9	31,0	**AOH 24176**	HM 3180	HMV 80 E
380	400	183	193	Tr 420×5	33	G 1/4	9	26,0	**AOH 3080 G**	HM 3080	HMV 84 E
	400	240	250	Tr 420×5	38	G 1/4	9	36,0	**AOH 3180 G**	HM 3184	HMV 84 E
	400	302	312	Tr 420×5	44	G 1/4	9	48,0	**AOH 3280 G**	HM 3184	HMV 84 E
	400	228	248	Tr 420×5	28	G 1/4	9	27,0	**AOH 24080**	HM 3184	HMV 84 E
	400	278	298	Tr 420×5	28	G 1/4	9	35,0	**AOH 24180**	HM 3184	HMV 84 E
400	420	186	196	Tr 440×5	34	G 1/4	9	28,0	**AOH 3084 G**	HM 3088	HMV 88 E
	420	266	276	Tr 440×5	40	G 1/4	9	43,0	**AOH 3184 G**	HM 3188	HMV 88 E
	420	321	331	Tr 440×5	46	G 1/4	9	54,5	**AOH 3284 G**	HM 3188	HMV 88 E
	420	230	252	Tr 440×5	30	G 1/4	9	29,0	**AOH 24084**	HM 3188	HMV 88 E
	420	310	332	Tr 440×5	30	G 1/4	9	39,0	**AOH 24184**	HM 3188	HMV 88 E

Dimensions								Mass	Designations		
d_1	d	B_1	B_2	G	G_1	G_2	A		Withdrawal sleeve	Approriate nut for dismounting	hydraulic nut
mm								kg	–		
420	440	194	205	Tr 460×5	35	G 1/4	9	31,0	**AOHX 3088 G**	HM 3092	HMV 92 E
	440	270	281	Tr 460×5	42	G 1/4	9	46,0	**AOHX 3188 G**	HM 3192	HMV 92 E
	440	330	341	Tr 460×5	48	G 1/4	9	64,5	**AOHX 3288 G**	HM 3192	HMV 92 E
	440	242	264	Tr 460×5	30	G 1/4	9	32,0	**AOH 24088**	HM 3192	HMV 92 E
	440	310	332	Tr 460×5	30	G 1/4	9	45,5	**AOH 24188**	HM 3192	HMV 92 E
440	460	202	213	Tr 480×5	37	G 1/4	9	34,0	**AOHX 3092 G**	HM 3096	HMV 96 E
	460	285	296	Tr 480×5	43	G 1/4	9	51,5	**AOHX 3192 G**	HM 3196	HMV 96 E
	460	349	360	Tr 480×5	50	G 1/4	9	80,0	**AOHX 3292 G**	HM 3196	HMV 96 E
	460	250	273	Tr 480×5	32	G 1/4	9	34,5	**AOH 24092**	HM 3196	HMV 96 E
	460	332	355	Tr 480×5	32	G 1/4	9	50,0	**AOH 24192**	HM 3196	HMV 96 E
460	480	205	217	Tr 500×5	38	G 1/4	9	34,0	**AOHX 3096 G**	HM 30/500	HMV 100 E
	480	295	307	Tr 500×5	45	G 1/4	9	63,0	**AOHX 3196 G**	HM 31/500	HMV 100 E
	480	364	376	Tr 500×5	52	G 1/4	9	81,0	**AOHX 3296 G**	HM 31/500	HMV 100 E
	480	250	273	Tr 500×5	32	G 1/4	9	36,5	**AOH 24096**	HM 31/500	HMV 100 E
	480	340	363	Tr 500×5	32	G 1/4	9	51,5	**AOH 24196**	HM 31/500	HMV 100 E
480	500	209	221	Tr 530×6	40	G 1/4	9	41,0	**AOHX 30/500 G**	HM 30/530	HMV 106 E
	500	313	325	Tr 530×6	47	G 1/4	9	66,5	**AOHX 31/500 G**	HM 31/530	HMV 106 E
	500	393	405	Tr 530×6	54	G 1/4	9	89,5	**AOHX 32/500 G**	HM 31/530	HMV 106 E
	500	253	276	Tr 530×6	35	G 1/4	9	43,0	**AOH 240/500**	HM 31/530	HMV 106 E
	500	360	383	Tr 530×6	35	G 1/4	9	63,0	**AOH 241/500**	HM 31/530	HMV 106 E
500	530	230	242	Tr 560×6	45	G 1/4	10	63,5	**AOH 30/530**	HM 30/560	HMV 112 E
	530	325	337	Tr 560×6	53	G 1/4	10	93,5	**AOH 31/530**	HM 31/560	HMV 112 E
	530	412	424	Tr 560×6	57	G 1/4	10	142	**AOH 32/530 G**	HM 31/560	HMV 112 E
	530	285	309	Tr 560×6	35	G 1/4	9	64,5	**AOH 240/530 G**	HM 31/560	HMV 112 E
	530	370	394	Tr 560×6	35	G 1/4	9	92,0	**AOH 241/530 G**	HM 31/600	HMV 112 E
530	560	240	252	Tr 600×6	45	G 1/4	11	73,5	**AOHX 30/560**	HM 30/600	HMV 120 E
	560	335	347	Tr 600×6	55	G 1/4	11	107	**AOH 31/560**	HM 31/600	HMV 120 E
	560	422	434	Tr 600×6	57	G 1/4	11	143	**AOHX 32/560**	HM 31/600	HMV 120 E
	560	296	320	Tr 600×6	38	G 1/4	9	71,0	**AOH 240/560 G**	HM 31/600	HMV 120 E
	560	393	417	Tr 600×6	38	G 1/4	9	107	**AOH 241/560 G**	HM 31/600	HMV 120 E

Withdrawal sleeves
d_1 **570 – 1 000** mm



Dimensions								Mass	Designations Withdrawal sleeve	Approriate nut for dismounting	hydraulic nut
d_1	d	B_1	B_2	G	G_1	G_2	A				
mm								kg	–		
570	600	245	259	Tr 630×6	45	G 1/4	11	77,0	**AOHX 30/600**	HM 30/630	HMV 126 E
	600	355	369	Tr 630×6	55	G 1/4	11	120	**AOHX 31/600**	HM 31/630	HMV 126 E
	600	445	459	Tr 630×6	57	G 1/4	11	159	**AOHX 32/600 G**	HM 31/630	HMV 126 E
	600	310	336	Tr 630×6	38	G 1/4	9	108	**AOHX 240/600**	HM 31/630	HMV 126 E
	600	413	439	Tr 630×6	38	G 1/4	9	120	**AOHX 241/600**	HM 31/630	HMV 126 E
600	630	258	272	Tr 670×6	46	G 1/4	11	88,5	**AOH 30/630**	HM 30/670	HMV 134 E
	630	375	389	Tr 670×6	60	G 1/4	11	139	**AOH 31/630**	HM 31/670	HMV 134 E
	630	475	489	Tr 670×6	63	G 1/4	11	188	**AOH 32/630 G**	HM 31/670	HMV 134 E
	630	330	356	Tr 670×6	40	G 1/4	9	101	**AOH 240/630 G**	HM 31/670	HMV 134 E
	630	440	466	Tr 670×6	40	G 1/4	9	139	**AOH 241/630 G**	HM 31/670	HMV 134 E
630	670	280	294	Tr 710×7	50	G 1/4	12	125	**AOH 30/670**	HM 30/710	HMV 142 E
	670	395	409	Tr 710×7	59	G 1/4	12	189	**AOHX 31/670**	HM 31/710	HMV 142 E
	670	500	514	Tr 710×7	62	G 1/4	12	252	**AOH 32/670 G**	HM 31/710	HMV 142 E
	670	348	374	Tr 710×7	40	G 1/4	12	140	**AOH 240/670 G**	HM 31/710	HMV 142 E
	670	452	478	Tr 710×7	40	G 1/4	12	180	**AOH 241/670**	HM 31/710	HMV 142 E
670	710	286	302	Tr 750×7	50	G 1/4	15	138	**AOHX 30/710**	HM 30/750	HMV 150 E
	710	405	421	Tr 750×7	60	G 1/4	15	207	**AOHX 31/710**	HM 31/750	HMV 150 E
	710	515	531	Tr 750×7	65	G 1/4	15	278	**AOH 32/710 G**	HM 31/750	HMV 150 E
	710	360	386	Tr 750×7	45	G 1/4	12	155	**AOH 240/710 G**	HM 31/750	HMV 150 E
	710	483	509	Tr 750×7	45	G 1/4	12	205	**AOH 241/710**	HM 31/750	HMV 150 E
710	750	300	316	Tr 800×7	50	G 1/4	15	145	**AOH 30/750**	HM 30/800	HMV 160 E
	750	425	441	Tr 800×7	60	G 1/4	15	238	**AOH 31/750**	HM 31/800	HMV 160 E
	750	540	556	Tr 800×7	65	G 1/4	15	320	**AOH 32/750**	HM 31/800	HMV 160 E
	750	380	408	Tr 800×7	45	G 1/4	12	178	**AOH 240/750 G**	HM 31/800	HMV 160 E
	750	520	548	Tr 800×7	45	G 1/4	12	240	**AOH 241/750 G**	HM 31/800	HMV 160 E
750	800	308	326	Tr 850×7	50	G 1/4	15	204	**AOH 30/800**	HM 30/850	HMV 170 E
	800	438	456	Tr 850×7	63	G 1/4	15	305	**AOH 31/800**	HM 31/850	HMV 170 E
	800	550	568	Tr 850×7	67	G 1/4	15	401	**AOH 32/800**	HM 31/850	HMV 170 E
	800	395	423	Tr 850×7	50	G 1/4	15	237	**AOH 240/800 G**	HM 31/850	HMV 170 E
	800	525	553	Tr 850×7	50	G 1/4	15	318	**AOH 241/800 G**	HM 31/850	HMV 170 E

Dimensions								Mass	Designations		
									Withdrawal sleeve	Approriate nut for dismounting	hydraulic nut
d_1	d	B_1	B_2	G	G_1	G_2	A				
mm								kg	–		
800	850	325	343	Tr 900×7	53	G 1/4	15	230	**AOH 30/850**	HM 30/900	HMV 180 E
	850	462	480	Tr 900×7	62	G 1/4	15	345	**AOH 31/850**	HM 31/900	HMV 180 E
	850	585	603	Tr 900×7	70	G 1/4	15	461	**AOH 32/850**	HM 31/900	HMV 180 E
	850	415	445	Tr 900×7	50	G 1/4	15	265	**AOH 240/850 G**	HM 31/900	HMV 180 E
	850	560	600	Tr 900×7	60	G 1/4	15	368	**AOH 241/850**	HM 31/900	HMV 180 E
850	900	335	355	Tr 950×8	55	G 1/4	15	250	**AOH 30/900**	HM 30/950	HMV 190 E
	900	475	495	Tr 950×8	63	G 1/4	15	379	**AOH 31/900**	HM 31/950	HMV 190 E
	900	585	605	Tr 950×8	70	G 1/4	15	489	**AOH 32/900**	HM 31/950	HMV 190 E
	900	430	475	Tr 950×8	55	G 1/4	15	296	**AOH 240/900**	HM 31/950	HMV 190 E
	900	575	620	Tr 950×8	60	G 1/4	15	402	**AOH 241/900**	HM 31/950	HMV 190 E
900	950	355	375	Tr 1000×8	55	G 1/4	15	285	**AOH 30/950**	HM 30/1000	HMV 200 E
	950	500	520	Tr 1000×8	62	G 1/4	15	426	**AOH 31/950**	HM 31/1000	HMV 200 E
	950	600	620	Tr 1000×8	70	G 1/4	15	533	**AOH 32/950**	HM 31/1000	HMV 200 E
	950	467	512	Tr 1000×8	55	G 1/4	15	340	**AOH 240/950**	HM 31/1000	HMV 200 E
	950	605	650	Tr 1000×8	60	G 1/4	15	449	**AOH 241/950**	HM 31/1000	HMV 200 E
950	1 000	365	387	Tr 1060×8	57	G 1/4	15	318	**AOH 30/1000**	HM 30/1060	HMV 212 E
	1 000	525	547	Tr 1060×8	63	G 1/4	15	485	**AOH 31/1000**	HM 31/1060	HMV 212 E
	1 000	630	652	Tr 1060×8	70	G 1/4	15	608	**AOH 32/1000**	HM 31/1060	HMV 212 E
	1 000	469	519	Tr 1060×8	57	G 1/4	15	369	**AOH 240/1000**	HM 31/1060	HMV 212 E
	1 000	645	695	Tr 1060×8	65	G 1/4	15	519	**AOH 241/1000**	HM 31/1060	HMV 212 E
1 000	1 060	385	407	Tr 1120×8	60	G 1/4	15	406	**AOH 30/1060**	HM 30/1120	HMV 224 E
	1 060	540	562	Tr 1120×8	65	G 1/4	15	599	**AOH 31/1060**	HM 30/1120	HMV 224 E
	1 060	498	548	Tr 1120×8	60	G 1/4	15	479	**AOH 240/1060**	HM 30/1120	HMV 224 E
	1 060	665	715	Tr 1120×8	65	G 1/4	15	652	**AOH 241/1060**	HM 30/1120	HMV 224 E


SKF

Lock nuts

Lock nuts with locking washer or clip **1006**

Lock nuts with integral locking device **1016**

Lock nuts with locking screw **1018**

Precision lock nuts with locking pins **1020**

Product tables **1008**
KM(L) lock nuts with locking washer 1008
HM lock nuts with locking clip 1010
MB locking washers 1012
MS locking clips 1014
KMK lock nuts with integral locking device 1017
KMFE lock nuts with locking screw 1019
KMT precision lock nuts with locking pins 1022
KMTA precision lock nuts with locking pins 1024

SKF supplies lock nuts in a wide range of sizes; they are also referred to as shaft or withdrawal nuts, depending on their use. They are used to locate bearings and other components onto a shaft as well as to facilitate mounting bearings on tapered journals and dismounting bearings from withdrawal sleeves. SKF lock nuts offer five different ways of locking on the shaft, as described below.

Locking washer
Locking washers are simple, stable and reliable fastening elements. The washer engages a keyway in the shaft and locks the nut in position if one of the tabs is bent over into one of the slots around the circumference of the nut. Locking washers are used with lock nuts in the KM and KML series (→ **fig** 1).

Locking clip
Locking clips are attached to the nut using a bolt to engage a slot in the nut and a keyway in the shaft. This locking device is used with lock nuts in the HM 30 and 31 series (→ **fig** 2).

Locking screw
A small part of the nut thread is pressed into the shaft thread by a locking screw to prevent the nut from turning. Neither additional locking washer nor a keyway in the shaft is required. Lock nuts with locking screw (→ **fig** 3) are designated KMFE.

Fig 1

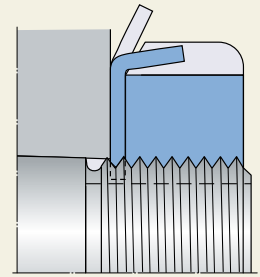


Fig 2

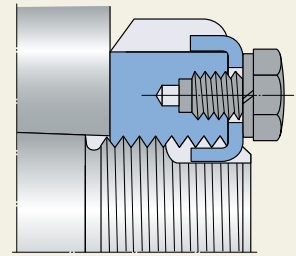
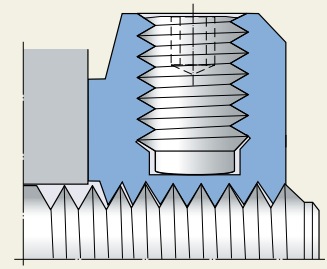


Fig 3



Locking device
A steel insert, an integral part of the nut thread, can be pressed against the shaft thread by a grub screw to prevent the nut from turning. Neither additional locking washer nor keyway in the shaft is required. Lock nuts with this kind of locking device (➔ **fig** 4) are designated KMK.

Locking pins
Three locking pins are equally spaced around the circumference of the nut. The pins are arranged at the same angle as the thread flanks and can be pressed into the shaft thread by grub screws. The pins not only lock the nut but also accurately locate it at right angles to the shaft. No keyway in the shaft is required. Locking pins are used with the precision lock nuts in the KMT and KMTA series (➔ **fig** 5).

Fig 4

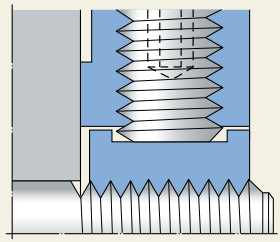
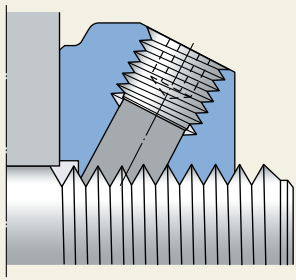


Fig 5



Lock nuts with locking washer or clip

SKF lock nuts with a locking washer or clip have four or eight equally spaced slots respectively, around the outside diameter (→ **fig** 6) to take a hook or impact spanner. The designations of the appropriate spanners are given in the product tables.

The nut and the locking device must be ordered separately. The appropriate locking washer or clip is shown in the product tables.

Besides metric lock nuts shown in this catalogue, inch-size lock nuts with an American National Form NS Class 3 or an ACME Class 3G General Purpose thread can be supplied too. Details are contained in the SKF catalogue “Bearing accessories”.

KM(L) lock nuts with locking washer
Lock nuts in the KM and KML series are available for metric ISO threads up to and including 200 mm and are locked with an MB(L) washer (→ **fig** 7) or with the stronger MB .. A design.

HM lock nuts with locking clip
Larger nuts in the HM 30 and HM 31 series with metric trapezoidal threads are locked by an MS locking clip consisting of the clip, a hexagon headed bolt to EN ISO 4017:2000 and a spring locking washer to DIN 128 (→ **fig** 8).

Fig 6

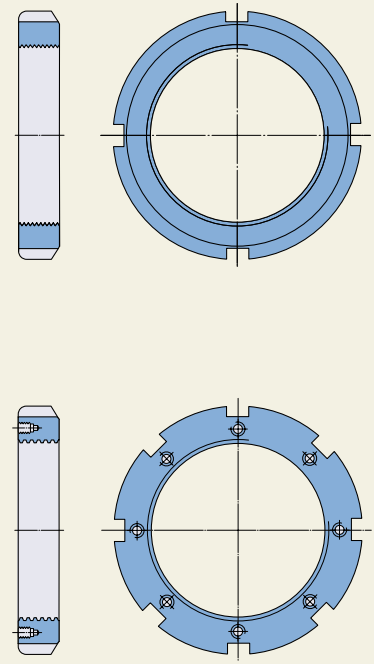


Fig 7

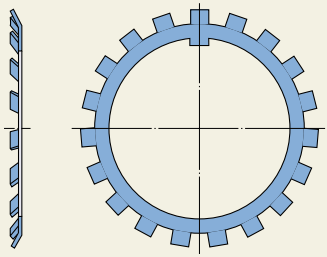
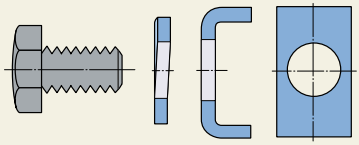


Fig 8



Dimensions
The dimensions and the thread of the nuts are in accordance with ISO 2982-2:2001. The dimensions of the locking washers and locking clips also follow this standard.

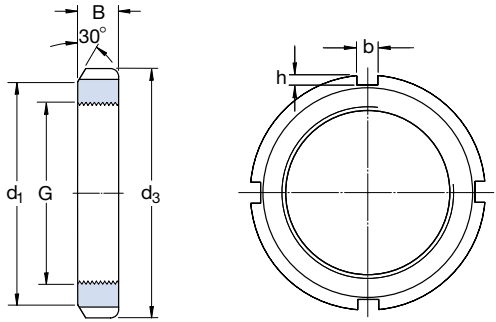
Tolerances
The metric ISO thread of KM and KML lock nuts is machined to tolerance 5H according to ISO 965-3:1998, and the metric trapezoidal thread of HM lock nuts to tolerance 7H, ISO 2903:1993.

The maximum runout between the thread and the locating face is between 0,04 and 0,06 mm depending on the size of the lock nut.

Materials
SKF lock nuts up to and including size HM 3160 and HM 3064 respectively are made of spheroidal graphite cast iron; some sizes are sintered. The larger nuts are made of steel and are oiled. The locking washers and locking clips are made of deep drawn steel strip.

Mating shaft threads
SKF recommends that the mating thread on the shaft be made to 6g according to ISO 965-3:1998 for the smaller nuts and to tolerance 7e according to ISO 2903:1993 for those with a trapezoidal thread.

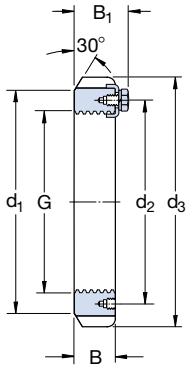
KM(L) lock nuts with locking washer
M 10×0,75 – M 200×3



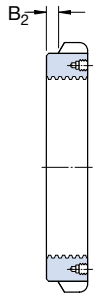
Dimensions						Axial load carrying capacity	Mass	Designations		
G	d_1	d_3	B	b	h	static		Lock nut	Appropriate locking washer	spanner
mm						kN	kg	–		
M 10×0,75	13,5	18	4	3	2	9,8	0,004	**KM 0**	MB 0	–
M 12×1	17	22	4	3	2	11,8	0,006	**KM 1**	MB 1	HN 1
M 15×1	21	25	5	4	2	14,6	0,009	**KM 2**	MB 2	HN 2
M 17×1	24	28	5	4	2	19,6	0,012	**KM 3**	MB 3	HN 3
M 20×1	26	32	6	4	2	24	0,025	**KM 4**	MB 4	HN 4
M 25×1,5	32	38	7	5	2	31,5	0,028	**KM 5**	MB 5	HN 5
M 30×1,5	38	45	7	5	2	36,5	0,039	**KM 6**	MB 6	HN 6
M 35×1,5	44	52	8	5	2	50	0,059	**KM 7**	MB 7	HN 7
M 40×1,5	50	58	9	6	2,5	62	0,078	**KM 8**	MB 8	HN 8
M 45×1,5	56	65	10	6	2,5	78	0,11	**KM 9**	MB 9	HN 9
M 50×1,5	61	70	11	6	2,5	91,5	0,14	**KM 10**	MB 10	HN 10
M 55×2	67	75	11	7	3	91,5	0,15	**KM 11**	MB 11	HN 11
M 60×2	73	80	11	7	3	95	0,16	**KM 12**	MB 12	HN 12
M 65×2	79	85	12	7	3	108	0,19	**KM 13**	MB 13	HN 13
M 70×2	85	92	12	8	3,5	118	0,23	**KM 14**	MB 14	HN 14
M 75×2	90	98	13	8	3,5	134	0,27	**KM 15**	MB 15	HN 15
M 80×2	95	105	15	8	3,5	173	0,36	**KM 16**	MB 16	HN 16
M 85×2	102	110	16	8	3,5	190	0,41	**KM 17**	MB 17	HN 17
M 90×2	108	120	16	10	4	216	0,51	**KM 18**	MB 18	HN 18
M 95×2	113	125	17	10	4	236	0,55	**KM 19**	MB 19	HN 19
M 100×2	120	130	18	10	4	255	0,64	**KM 20**	MB 20	HN 20

Dimensions						Axial load carrying capacity	Mass	Designations		
G	d_1	d_3	B	b	h	static		Lock nut	Appropriate locking washer	spanner
mm						kN	kg	–		
M 105×2	126	140	18	12	5	290	0,79	**KM 21**	MB 21	HN 21
M 110×2	133	145	19	12	5	310	0,87	**KM 22**	MB 22	HN 22
M 115×2	137	150	19	12	5	315	0,91	**KM 23**	MB 23	TMFN 23-30
M 120×2	135	145	20	12	5	265	0,69	**KML 24**	MBL 24	TMFN 23-30
	138	155	20	12	5	340	0,97	**KM 24**	MB 24	TMFN 23-30
M 125×2	148	160	21	12	5	360	1,09	**KM 25**	MB 25	TMFN 23-30
M 130×2	145	155	21	12	5	285	0,80	**KML 26**	MBL 26	TMFN 23-30
	149	165	21	12	5	365	1,09	**KM 26**	MB 26	TMFN 23-30
M 135×2	160	175	22	14	6	430	1,39	**KM 27**	MB 27	TMFN 23-30
M 140×2	155	165	22	12	5	305	0,92	**KML 28**	MBL 28	TMFN 23-30
	160	180	22	14	6	430	1,40	**KM 28**	MB 28	TMFN 23-30
M 145×2	171	190	24	14	6	520	1,80	**KM 29**	MB 29	TMFN 23-30
M 150×2	170	180	24	14	5	390	1,25	**KML 30**	MBL 30	TMFN 23-30
	171	195	24	14	6	530	1,88	**KM 30**	MB 30	TMFN 23-30
M 155×3	182	200	25	16	7	540	2,09	**KM 31**	MB 31	TMFN 30-40
M 160×3	180	190	25	14	5	405	1,39	**KML 32**	MBL 32	TMFN 23-30
	182	210	25	16	7	585	2,29	**KM 32**	MB 32	TMFN 30-40
M 165×3	193	210	26	16	7	570	2,31	**KM 33**	MB 33	TMFN 30-40
M 170×3	190	200	26	16	5	430	1,56	**KML 34**	MBL 34	TMFN 30-40
	193	220	26	16	7	620	2,34	**KM 34**	MB 34	TMFN 30-40
M 180×3	200	210	27	16	5	450	1,78	**KML 36**	MBL 36	TMFN 30-40
	203	230	27	18	8	670	2,78	**KM 36**	MB 36	TMFN 30-40
M 190×3	210	220	28	16	5	475	1,84	**KML 38**	MBL 38	TMFN 30-40
	214	240	28	18	8	695	3,05	**KM 38**	MB 38	TMFN 30-40
M 200×3	222	240	29	18	8	625	2,61	**KML 40**	MBL 40	TMFN 30-40
	226	250	29	18	8	735	3,37	**KM 40**	MB 40	TMFN 30-40

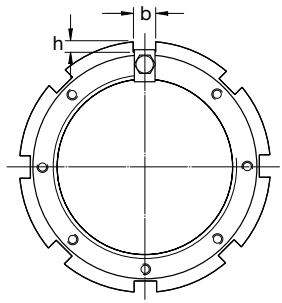
HM lock nuts with locking clip
Tr 220×4 – Tr 950×8



HM design



HME design



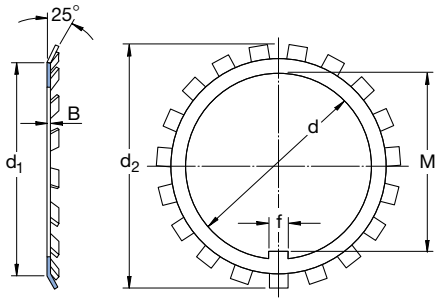
Dimensions									Mass	Designations		
G	d_1	d_2	d_3	B	B_1	B_2	b	h		Lock nut without locking clip	Appropriate locking clip	spanner
mm									kg	–		
Tr 220×4	242	229	260	30	41	–	20	9	2,75	**HM 3044**	MS 3044	TMFN 40-52
Tr 240×4	270	253	290	34	46	–	20	10	4,50	**HM 3048**	MS 3052-48	TMFN 40-52
	270	253	290	34	46	5	20	10	4,50	**HME 3048**	MS 3052-48	TMFN 40-52
Tr 260×4	290	273	310	34	46	–	20	10	4,80	**HM 3052**	MS 3052-48	TMFN 40-52
Tr 280×4	310	293	330	38	50	–	24	10	5,75	**HM 3056**	MS 3056	TMFN 52-64
Tr 300×4	336	316	360	42	54	–	24	12	8,35	**HM 3060**	MS 3060	TMFN 52-64
	340	326	380	40	53	–	24	12	11,5	**HM 3160**	MS 3160	TMFN 52-64
Tr 320×5	356	336	380	42	55	–	24	12	9,00	**HM 3064**	MS 3068-64	TMFN 52-64
	360	346	400	42	56	–	24	12	13,0	**HM 3164**	MS 3164	TMFN 52-64
Tr 340×5	376	356	400	45	58	–	24	12	11,0	**HM 3068**	MS 3068-64	TMFN 52-64
	400	373	440	55	72	–	28	15	24,0	**HM 3168**	MS 3172-68	TMFN 64-80
Tr 360×5	394	375	420	45	58	–	28	13	11,5	**HM 3072**	MS 3072	TMFN 64-80
	420	393	460	58	75	–	28	15	26,5	**HM 3172**	MS 3172-68	TMFN 64-80
Tr 380×5	422	399	450	48	62	–	28	14	15,0	**HM 3076**	MS 3080-76	TMFN 64-80
	440	415	490	60	77	–	32	18	32,0	**HM 3176**	MS 3176	TMFN 64-80
Tr 400×5	442	419	470	52	66	–	28	14	17,0	**HM 3080**	MS 3080-76	TMFN 64-80
	460	440	520	62	82	–	32	18	38,0	**HM 3180**	MS 3184-80	TMFN 64-80
Tr 420×5	462	439	490	52	66	–	32	14	18,5	**HM 3084**	MS 3084	TMFN 64-80
	462	439	490	52	66	5	32	14	18,5	**HME 3084**	MS 3084	TMFN 64-80
	490	460	540	70	90	–	32	18	45,0	**HM 3184**	MS 3184-80	TMFN 80-500
Tr 440×5	490	463	520	60	77	–	32	15	26,0	**HM 3088**	MS 3092-88	TMFN 64-80
	510	478	560	70	90	–	36	20	46,5	**HM 3188**	MS 3192-88	TMFN 80-500
Tr 460×5	510	483	540	60	77	–	32	15	27,0	**HM 3092**	MS 3092-88	TMFN 80-500
	540	498	580	75	95	–	36	20	50,5	**HM 3192**	MS 3192-88	TMFN 80-500
Tr 480×5	530	503	560	60	77	–	36	15	28,0	**HM 3096**	MS 30/500-96	TMFN 80-500
	560	528	620	75	95	–	36	20	62,0	**HM 3196**	MS 3196	TMFN 80-500

For HME lock nuts not listed in the table, please contact SKF

Dimensions									Mass	Designations		
G	d_1	d_2	d_3	B	B_1	B_2	b	h		Lock nut without locking clip	Appropriate locking clip	spanner
mm									kg	–		
Tr 500×5	550	523	580	68	85	–	36	15	33,5	**HM 30/500**	MS 30/500-96	TMFN 80-500
	550	523	580	68	85	8	36	15	33,5	**HME 30/500**	MS 30/500-96	TMFN 80-500
	580	540	630	80	100	–	40	23	63,5	**HM 31/500**	MS 31/500	TMFN 80-500
Tr 530×6	590	558	630	68	90	–	40	20	42,5	**HM 30/530**	MS 30/600-530	TMFN 500-600
	610	575	670	80	105	–	40	23	71,5	**HM 31/530**	MS 31/530	TMFN 500-600
Tr 560×6	610	583	650	75	97	–	40	20	44,5	**HM 30/560**	MS 30/560	TMFN 500-600
	610	583	650	75	97	12	40	20	44,5	**HME 30/560**	MS 30/560	TMFN 500-600
	650	608	710	85	110	–	45	25	86,5	**HM 31/560**	MS 31/600-560	TMFN 500-600
Tr 600×6	660	628	700	75	97	–	40	20	52,5	**HM 30/600**	MS 30/600-530	TMFN 500-600
	660	628	700	75	97	12	40	20	52,5	**HME 30/600**	MS 30/600-530	TMFN 500-600
	690	648	750	85	110	–	45	25	91,5	**HM 31/600**	MS 31/600-560	TMFN 500-600
Tr 630×6	690	658	730	75	97	–	45	20	55,0	**HM 30/630**	MS 30/630	TMFN 500-600
	730	685	800	95	120	–	50	28	125	**HM 31/630**	MS 31/630	TMFN 600-750
Tr 670×6	740	703	780	80	102	–	45	20	68,5	**HM 30/670**	MS 30/670	TMFN 600-750
	775	730	850	106	131	–	50	28	155	**HM 31/670**	MS 31/670	TMFN 600-750
Tr 710×7	780	742	830	90	112	–	50	25	91,5	**HM 30/710**	MS 30/710	TMFN 600-750
	780	742	830	90	112	12	50	25	91,5	**HME 30/710**	MS 30/710	TMFN 600-750
	825	772	900	106	133	–	55	30	162	**HM 31/710**	MS 31/710	TMFN 600-750
Tr 750×7	820	782	870	90	112	–	55	25	94,0	**HM 30/750**	MS 30/800-750	TMFN 600-750
	820	782	870	90	112	12	55	25	94,0	**HME 30/750**	MS 30/800-750	TMFN 600-750
	875	813	950	112	139	–	60	34	190	**HM 31/750**	MS 31/800-750	TMFN 600-750
Tr 800×7	870	832	920	90	112	–	55	25	99,5	**HM 30/800**	MS 30/800-750	TMFN 600-750
	925	863	1000	112	139	–	60	34	202	**HM 31/800**	MS 31/800-750	–
Tr 850×7	925	887	980	90	115	–	60	25	115	**HM 30/850**	MS 30/900-850	–
	925	887	980	90	115	12	60	25	110	**HME 30/850**	MS 30/900-850	–
	975	914	1 060	118	145	–	70	38	234	**HM 31/850**	MS 31/850	–
Tr 900×7	975	937	1 030	100	125	–	60	25	131	**HM 30/900**	MS 30/900-850	–
	1 030	969	1 120	125	154	–	70	38	280	**HM 31/900**	MS 31/900	–
Tr 950×8	1 025	985	1 080	100	125	–	60	25	139	**HM 30/950**	MS 30/950	–

For HME lock nuts not listed in the table, please contact SKF

MB locking washers
d **10 – 280** mm

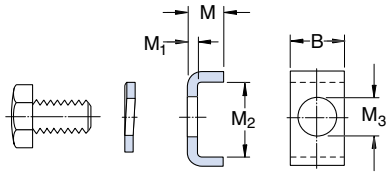


Dimensions						Mass	Designation
d	d_1	d_2	B	f	M		
mm						kg	–
10	13,5	21	1	3	8,5	0,001	**MB 0**
12	17	25	1	3	10,5	0,002	**MB 1**
	17	25	1,2	3	10,5	0,002	**MB 1 A**
15	21	28	1	4	13,5	0,003	**MB 2**
	21	28	1,2	4	13,5	0,003	**MB 2 A**
17	24	32	1	4	15,5	0,003	**MB 3**
	24	32	1,2	4	15,5	0,003	**MB 3 A**
20	26	36	1	4	18,5	0,004	**MB 4**
	26	36	1,2	4	18,5	0,005	**MB 4 A**
25	32	42	1,25	5	23	0,006	**MB 5**
	32	42	1,8	5	23	0,009	**MB 5 A**
30	38	49	1,25	5	27,5	0,008	**MB 6**
	38	49	1,8	5	27,5	0,011	**MB 6 A**
35	44	57	1,25	6	32,5	0,011	**MB 7**
	44	57	1,8	6	32,5	0,016	**MB 7 A**
40	50	62	1,25	6	37,5	0,013	**MB 8**
	50	62	1,8	6	37,5	0,018	**MB 8 A**
45	56	69	1,25	6	42,5	0,015	**MB 9**
	56	69	1,8	6	42,5	0,021	**MB 9 A**
50	61	74	1,25	6	47,5	0,016	**MB 10**
	61	74	2,3	6	47,5	0,023	**MB 10 A**
55	67	81	1,5	8	52,5	0,022	**MB 11**
	67	81	2,5	8	52,5	0,037	**MB 11 A**
60	73	86	1,5	8	57,5	0,024	**MB 12**
	73	86	2,5	8	57,5	0,040	**MB 12 A**
65	79	92	1,5	8	62,5	0,030	**MB 13**
	79	92	2,5	8	62,5	0,050	**MB 13 A**

Dimensions						Mass	Designation
d	d_1	d_2	B	f	M		
mm						kg	–
70	85	98	1,5	8	66,5	0,032	**MB 14**
	85	98	2,5	8	66,5	0,053	**MB 14 A**
75	90	104	1,5	8	71,5	0,035	**MB 15**
	90	104	2,5	8	71,5	0,058	**MB 15 A**
80	95	112	1,75	10	76,5	0,046	**MB 16**
	95	112	2,5	10	76,5	0,066	**MB 16 A**
85	102	119	1,75	10	81,5	0,053	**MB 17**
	102	119	2,5	10	81,5	0,076	**MB 17 A**
90	108	126	1,75	10	86,5	0,061	**MB 18**
	108	126	2,5	10	86,5	0,087	**MB 18 A**
95	113	133	1,75	10	91,5	0,066	**MB 19**
	113	133	2,5	10	91,5	0,094	**MB 19 A**
100	120	142	1,75	12	96,5	0,077	**MB 20**
	120	142	2,5	12	96,5	0,11	**MB 20 A**
105	126	145	1,75	12	100,5	0,083	**MB 21**
110	133	154	1,75	12	105,5	0,091	**MB 22**
115	137	159	2	12	110,5	0,11	**MB 23**
120	135	152	2	14	115	0,07	**MBL 24**
	138	164	2	14	115	0,11	**MB 24**
125	148	170	2	14	120	0,12	**MB 25**
130	145	161	2	14	125	0,08	**MBL 26**
	149	175	2	14	125	0,12	**MB 26**
135	160	185	2	14	130	0,14	**MB 27**
140	155	172	2	16	135	0,09	**MBL 28**
	160	192	2	16	135	0,14	**MB 28**

Dimensions						Mass	Designation
d	d_1	d_2	B	f	M		
mm						kg	–
145	172	202	2	16	140	0,17	**MB 29**
150	170	189	2	16	145	0,10	**MBL 30**
	171	205	2	16	145	0,18	**MB 30**
155	182	212	2,5	16	147,5	0,20	**MB 31**
160	180	199	2,5	18	154	0,14	**MBL 32**
	182	217	2,5	18	154	0,22	**MB 32**
165	193	222	2,5	18	157,5	0,24	**MB 33**
170	190	211	2,5	18	164	0,15	**MBL 34**
	193	232	2,5	18	164	0,24	**MB 34**
180	200	222	2,5	20	174	0,16	**MBL 36**
	203	242	2,5	20	174	0,26	**MB 36**
190	210	232	2,5	20	184	0,17	**MBL 38**
	214	252	2,5	20	184	0,26	**MB 38**
200	222	245	2,5	20	194	0,22	**MBL 40**
	226	262	2,5	20	194	0,28	**MB 40**
220	250	292	3	24	213	0,35	**MB 44**
240	270	313	3	24	233	0,46	**MB 48**
260	300	342	3	28	253	0,64	**MB 52**
280	320	362	3	28	273	0,74	**MB 56**

MS locking clips
B **20 – 70** mm

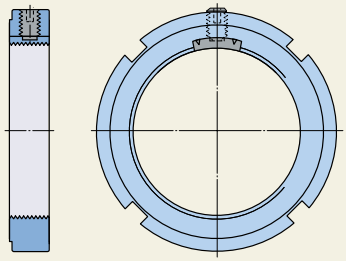


Dimensions					Mass	Designations		
B	M	M_1	M_2	M_3		Locking clip	Hexagon headed bolt	Spring washer to DIN 128
mm					kg	–		
20	12	4	13,5	7	0,022	**MS 3044**	M 6×12	A 6
	12	4	17,5	9	0,024	**MS 3052-48**	M 8×16	A 8
24	12	4	17,5	9	0,030	**MS 3056**	M 8×16	A 8
	12	4	20,5	9	0,033	**MS 3060**	M 8×16	A 8
	15	5	21	9	0,046	**MS 3068-64**	M 8×16	A 8
28	15	5	20	9	0,051	**MS 3072**	M 8×16	A 8
	15	5	24	12	0,055	**MS 3080-76**	M 10×20	A 10
32	15	5	24	12	0,063	**MS 3084**	M 10×20	A 10
	15	5	28	14	0,067	**MS 3092-88**	M 12×25	A 12
36	15	5	28	14	0,076	**MS 30/500-96**	M 12×25	A 12
40	21	7	29	18	0,15	**MS 30/560**	M 16×30	A 16
	21	7	34	18	0,14	**MS 30/600-530**	M 16×30	A 16
45	21	7	34	18	0,17	**MS 30/630**	M 16×30	A 16
	21	7	39	18	0,19	**MS 30/670**	M 16×30	A 16
50	21	7	39	18	0,21	**MS 30/710**	M 16×30	A 16
55	21	7	39	18	0,23	**MS 30/800-750**	M 16×30	A 16
60	21	7	44	22	0,26	**MS 30/900-850**	M 20×40	A 20
	21	7	46	22	0,26	**MS 30/950**	M 20×40	A 20
	21	7	51	22	0,28	**MS 30/1000**	M 20×40	A 20
24	12	4	30,5	12	0,040	**MS 3160**	M 10×20	A 10
	15	5	31	12	0,055	**MS 3164**	M 10×20	A 10
28	15	5	38	14	0,069	**MS 3172-68**	M 12×25	A 12
32	15	5	40	14	0,083	**MS 3176**	M 12×25	A 12
	15	5	45	18	0,089	**MS 3184-80**	M 16×30	A 16
36	15	5	43	18	0,097	**MS 3192-88**	M 16×30	A 16
	15	5	53	18	0,11	**MS 3196**	M 16×30	A 16
40	15	5	45	18	0,11	**MS 31/500**	M 16×30	A 16
	21	7	51	22	0,19	**MS 31/530**	M 20×40	A 20

Dimensions					Mass	Designations		
B	M	M_1	M_2	M_3		Locking clip	Hexagon headed bolt	Spring washer to DIN 128
mm					kg	–		
45	21	7	54	22	0,22	**MS 31/600-560**	M 20×40	A 20
50	21	7	61	22	0,27	**MS 31/630**	M 20×40	A 20
	21	7	66	22	0,28	**MS 31/670**	M 20×40	A 20
55	21	7	69	26	0,32	**MS 31/710**	M 24×50	A 24
60	21	7	70	26	0,35	**MS 31/800-750**	M 24×50	A 24
70	21	7	71	26	0,41	**MS 31/850**	M 24×50	A 24
	21	7	76	26	0,41	**MS 31/900**	M 24×50	A 24
	21	7	78	26	0,42	**MS 31/950**	M 24×50	A 24
	21	7	88	26	0,50	**MS 31/1000**	M 24×50	A 24

Lock nuts with integral locking device

Fig 9



These lock nuts of the KMK design (→ **fig** 9) have an integral locking device, which takes the form of a pressure plate, the surface of which has a threaded profile. The pressure plate is pressed against the shaft thread by a grub screw, thus locking the nut in position.

Mounting and dismounting are simple and the axial location effective and reliable. Neither additional locking washer nor keyway in the shaft is required. The KMK nuts can be re-used.

The KMK nuts have slots in the outside diameter so that they can be tightened using a hook spanner. A hexagonal wrench is needed to tighten the grub screw. Appropriate sizes of spanner and key are given in the product table. Tighten the grub screw until the recommended tightening torque quoted in the product table is obtained.

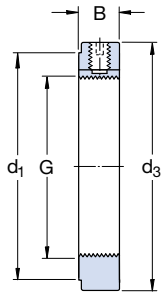
Dimensions
The dimensions and the thread of the KMK nuts are in accordance with ISO 2982-2:2001, except for the width. The grub screw corresponds to ISO 4026:1993, material class 45H.

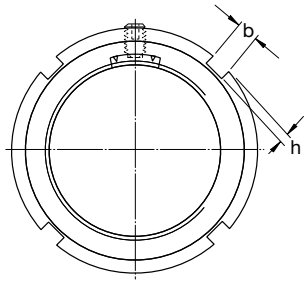
Tolerances
The metric ISO thread is machined to tolerance 5H according to ISO 965-3:1998.

Material
SKF lock nuts in the KMFE series are made of steel and are phosphated and saturated with oil.

Mating shaft threads
SKF recommends that the mating thread on the shaft to be made to 6g according to ISO 965-3:1998.

KMK lock nuts with integral locking device
M 10×0,75 – M 100×2





Dimensions						Axial load carrying capacity	Loos-ening torque	Mass	Designations		Grub screw	
G	d_1	d_3	B	b	h	static			Lock nut	Appropriate spanner	Size	Recomm. tightening torque
mm						kN	Nm	kg	–		–	Nm
M 10×0,75	16	20	8	3	2	9,8	8	0,014	**KMK 0**	–	M 4	2
M 12×1	18	22	8	3	2	11,8	9	0,016	**KMK 1**	HN 1	M 4	2
M 15×1	21	25	8	4	2	14,6	12	0,019	**KMK 2**	HN 2	M 4	2
M 17×1	24	28	8	4	2	19,6	13	0,024	**KMK 3**	HN 3	M 4	2
M 20×1	28	32	8	4	2	24	16	0,03	**KMK 4**	HN 4	M 4	2
M 25×1,5	34	38	9	5	2	31,5	29	0,03	**KMK 5**	HN 5	M 5	4
M 30×1,5	41	45	9	5	2	36,5	35	0,06	**KMK 6**	HN 6	M 5	4
M 35×1,5	48	52	9	5	2	50	40	0,07	**KMK 7**	HN 7	M 5	4
M 40×1,5	53	58	11	6	2,5	62	67	0,11	**KMK 8**	HN 8	M 6	8
M 45×1,5	60	65	11	6	2,5	78	76	0,14	**KMK 9**	HN 9	M 6	8
M 50×1,5	65	70	13	6	2,5	91,5	84	0,18	**KMK 10**	HN 10	M 6	8
M 55×2	69	75	13	7	3	91,5	172	0,19	**KMK 11**	HN 11	M 8	18
M 60×2	74	80	13	7	3	95	188	0,20	**KMK 12**	HN 12	M 8	18
M 65×2	79	85	14	7	3	108	203	0,24	**KMK 13**	HN 13	M 8	18
M 70×2	85	92	14	8	3,5	118	219	0,28	**KMK 14**	HN 14	M 8	18
M 75×2	91	98	14	8	3,5	134	235	0,33	**KMK 15**	HN 15	M 8	18
M 80×2	98	105	18	8	3,5	173	378	0,45	**KMK 16**	HN 16	M 8	18
M 85×2	103	110	18	8	3,5	190	401	0,52	**KMK 17**	HN 17	M 10	35
M 90×2	112	120	18	10	4	216	425	0,65	**KMK 18**	HN 18	M 10	35
M 95×2	117	125	20	10	4	236	448	0,76	**KMK 19**	HN 19	M 10	35
M 100×2	122	130	20	10	4	255	472	0,80	**KMK 20**	HN 20	M 10	35

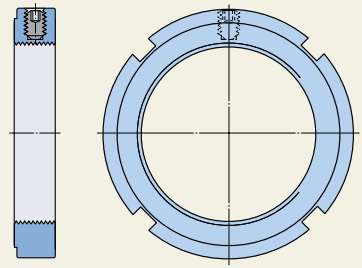
Lock nuts with locking screw

Lock nuts with locking screw (→ **fig** 10) are designated KMFE. The locking screw presses a small part of the nut thread onto the shaft thread and prevents the nut from turning.

Mounting and dismounting are simple and the axial location effective and reliable. Neither additional locking washers nor keyway in the shaft are required. The KMFE nuts can be re-used.

The KMFE nuts have slots in the outside diameter so that they can be tightened using a hook or impact spanner. A hexagonal wrench is needed to tighten the grub screw. Appropriate sizes of the spanner are given in the product table. Tighten the grub screw until the recommended tightening torque quoted in the product table is obtained.

Fig 10



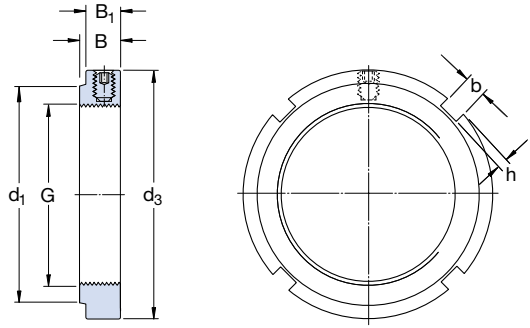
Dimensions
The dimensions and the thread of KMFE nuts are in accordance with ISO 2982-2:1995, except for the width. The grub screw correspond to ISO 4026:1993, material class 45H.

Tolerances
The metric ISO thread is machined to tolerance 5H according to ISO 965-3:1998.

Material
SKF lock nuts in the KMFE series are made of steel and are saturated with oil.

Mating shaft threads
SKF recommends that the mating thread on the shaft be made to 6g according to ISO 965-3:1998.

KMFE lock nuts with locking screw
M 20×1 – M 130×2



Dimensions							Axial load carrying capacity	Loosening torque	Mass	Designations		Grub screw	
G	d_1	d_3	B	B_1	b	h	static			Lock nut	Appropriate spanner	Size	Recomm. tightening torque
mm							kN	Nm	kg	–		–	Nm
M 20×1	26	32	9,5	8,5	4	2	24	28	0,031	**KMFE 4**	HN 4	M 5	4
M 25×1,5	31	38	10,5	8,5	5	2	31,5	35	0,042	**KMFE 5**	HN 5	M 5	4
M 30×1,5	36	45	10,5	8,5	5	2	36,5	42	0,058	**KMFE 6**	HN 6	M 5	4
M 35×1,5	42,5	52	11,5	8,5	5	2	50	49	0,080	**KMFE 7**	HN 7	M 5	4
M 40×1,5	47	58	13	10	6	2,5	62	80	0,11	**KMFE 8**	HN 8	M 6	8
M 45×1,5	53	65	13	10	6	2,5	78	94	0,14	**KMFE 9**	HN 9	M 6	8
M 50×1,5	57,5	70	14	11	6	2,5	91,5	100	0,16	**KMFE 10**	HN 10	M 6	8
M 55×2	64	75	14	11	7	3	91,5	110	0,18	**KMFE 11**	HN 11	M 6	8
M 60×2	69	80	14	11	7	3	95	120	0,19	**KMFE 12**	HN 12	M 6	8
M 65×2	76	85	15	12	7	3	108	130	0,23	**KMFE 13**	HN 13	M 6	8
M 70×2	79	92	15	12	8	3,5	118	140	0,26	**KMFE 14**	HN 14	M 6	8
M 75×2	85	98	16	13	8	3,5	134	150	0,32	**KMFE 15**	HN 15	M 6	8
M 80×2	91,5	105	18	15	8	3,5	173	300	0,42	**KMFE 16**	HN 16	M 8	18
M 85×2	98	110	19	15	8	3,5	190	315	0,46	**KMFE 17**	HN 17	M 8	18
M 90×2	102	120	19	15	10	4	216	335	0,58	**KMFE 18**	HN 18	M 8	18
M 95×2	110	125	20	16	10	4	236	355	0,66	**KMFE 19**	HN 19	M 8	18
M 100×2	112	130	21	17	10	4	255	370	0,71	**KMFE 20**	HN 20	M 8	18
M 105×2	112	140	21	17	12	5	290	390	0,85	**KMFE 21**	HN 21	M 8	18
M 110×2	122	145	21,5	17,5	12	5	310	410	0,93	**KMFE 22**	HN 22	M 8	18
M 115×2	126	150	25	20	12	5	315	645	1,11	**KMFE 23**	TMFN 23-30	M 10	35
M 120×2	130	155	26	20	12	5	340	675	1,16	**KMFE 24**	TMFN 23-30	M 10	35
M 125×2	136	160	27	21	12	5	360	700	1,26	**KMFE 25**	TMFN 23-30	M 10	35
M 130×2	141	165	28	21	12	5	365	730	1,33	**KMFE 26**	TMFN 23-30	M 10	35

Precision lock nuts with locking pins

SKF precision lock nuts were originally developed for use with precision bearings and their dimensions were chosen accordingly.

Precision lock nuts have three locking pins equally spaced around the circumference. These pins are pressed against the shaft by grub screws and prevent the nut from turning. The locking pins and grub screws are arranged at the same angle to the shaft as that of the thread flanks. The ends of the pins are machined with the nut thread and as a result also have a threaded profile. As the locking pins are not deformed, the nuts retain their high precision irrespective of the frequency with which they are mounted and dismounted. Additional locking washers or keyways in the shaft are not needed.

SKF precision lock nuts are available in two designs:

- KMT lock nuts (➔ **fig** 11) are designed as slotted nuts and the smaller sizes up to and including size 15 are also produced with two diametrically opposed flats to take spanners. They are intended for applications where high precision, simple assembly and reliable locking are required.
- KMTA lock nuts (➔ **fig** 12) have a different external shape from that of KMT nuts and in part a different thread pitch. They have a cylindrical outside surface and are primarily intended for applications where space is limited. As the outside surface is cylindrical the nut can also be used to form part of a gap-type seal. Holes around the circumference and in one side face facilitate mounting.

Precision lock nuts are adjustable. The three equally spaced locking pins enable the nut to be accurately positioned at right angles to the shaft or they can be used to adjust for inaccuracies or deviations of other components which are to be located on the shaft.

Dimensions
The KMT and KMTA nuts have a metric ISO thread according to ISO 965-3:1998.

Tolerances
The metric ISO thread is machined to tolerance 5H according to ISO 965-3:1998. The maximum runout between the thread and the locating face is 0,005 mm.

Fig 11

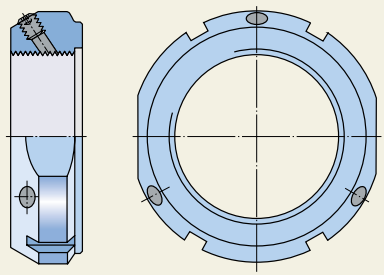
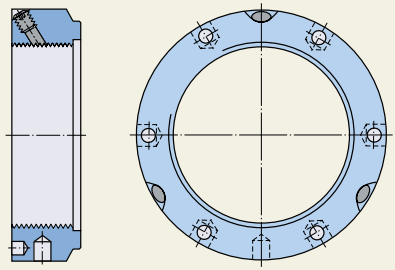


Fig 12



Material
SKF lock nuts in the KMT and KMTA series are made of high-strength steel and are phosphated and saturated with oil.

Mating shaft threads
SKF recommends that the mating thread on the shaft be made to 6g according to ISO 965-3:1998.

Mounting
KMT lock nuts have slots around the circumference with two diametrically opposed flats on all nuts up to and including size 15. Various types of spanners can be used depending on the nut size, including hook and impact spanners. Appropriate sizes of spanners are given in the product table.

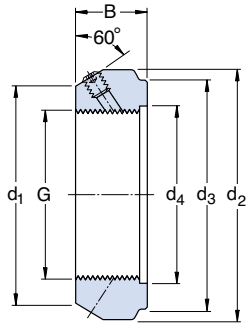
KMTA lock nuts can be tightened using hook spanners in the HN .. B series with a stud to engage one of the holes in the circumference. Alternatively a pin-type face spanner or a tommy bar can be used. Appropriate hook spanners are given in the product table.

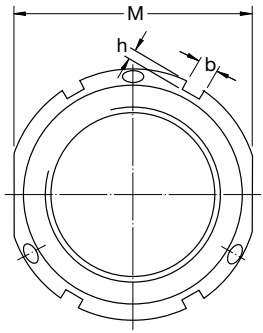
To lock the KMT and KMTA nuts, the grub screws should first be gently tightened until the thread of the locking pin engages the shaft thread. The grub screws should then be firmly tightened until the recommended tightening torque quoted in the product tables is obtained.

If it is necessary to correct for any misalignment between the abutment surfaces of the nut and adjacent component, the grub screw at the position of greatest deviation should first be loosened and the other two screws should be tightened to an equal degree. The loosened screw should then be retightened. If this correction for the misalignment is found to be inadequate, the procedure should be repeated until the desired accuracy has been achieved. This can be checked using a dial gauge.

Dismounting
When dismounting KMT and KMTA lock nuts the locking pins may still firmly engage the shaft thread even after the grub screws have been loosened. Light blows with a rubber hammer to the nut in the vicinity of the grub screws will serve to loosen the pins. The nuts can then be unscrewed easily from the shaft thread.

KMT precision lock nuts with locking pins
M 10×0,75 – M 200×3

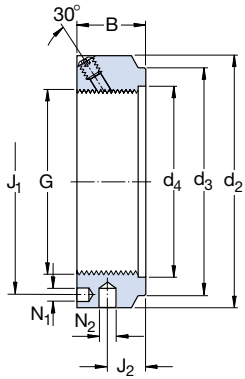


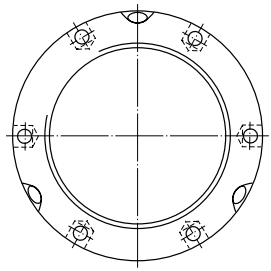


Dimensions									Axial load carrying capacity	Loos-ening torque	Mass	Designations		Grub screws	
G	d_1	d_2	d_3	d_4	B	b	h	M	static			Lock nut	Appropriate spanner	Size	Recomm. tightening torque
mm									kN	Nm	kg	–		–	Nm
M 10×0,75	21	28	23	11	14	4	2	24	35	15	0,045	**KMT 0**	HN 2/3	M 5	4,5
M 12×1	23	30	25	13	14	4	2	27	40	18	0,050	**KMT 1**	HN 3	M 5	4,5
M 15×1	26	33	28	16	16	4	2	30	60	20	0,075	**KMT 2**	HN 4	M 5	4,5
M 17×1	29	37	33	18	18	5	2	34	80	25	0,10	**KMT 3**	HN 4	M 6	8
M 20×1	32	40	35	21	18	5	2	36	90	35	0,11	**KMT 4**	HN 5	M 6	8
M 25×1,5	36	44	39	26	20	5	2	41	130	45	0,13	**KMT 5**	HN 5	M 6	8
M 30×1,5	41	49	44	32	20	5	2	46	160	55	0,16	**KMT 6**	HN 6	M 6	8
M 35×1,5	46	54	49	38	22	5	2	50	190	65	0,19	**KMT 7**	HN 7	M 6	8
M 40×1,5	54	65	59	42	22	6	2,5	60	210	80	0,30	**KMT 8**	HN 8/9	M 8	18
M 45×1,5	60	70	64	48	22	6	2,5	65	240	95	0,33	**KMT 9**	HN 9/10	M 8	18
M 50×1,5	64	75	68	52	25	7	3	70	300	115	0,40	**KMT 10**	HN 10/11	M 8	18
M 55×2	74	85	78	58	25	7	3	80	340	225	0,54	**KMT 11**	HN 12/13	M 8	18
M 60×2	78	90	82	62	26	8	3,5	85	380	245	0,61	**KMT 12**	HN 13	M 8	18
M 65×2	83	95	87	68	28	8	3,5	90	460	265	0,71	**KMT 13**	HN 14	M 8	18
M 70×2	88	100	92	72	28	8	3,5	95	490	285	0,75	**KMT 14**	HN 15	M 8	18
M 75×2	93	105	97	77	28	8	3,5	100	520	305	0,80	**KMT 15**	HN 15/16	M 8	18
M 80×2	98	110	100	83	32	8	3,5	–	620	325	0,90	**KMT 16**	HN 16/17	M 8	18
M 85×2	107	120	110	88	32	10	4	–	650	660	1,15	**KMT 17**	HN 17/18	M 10	35
M 90×2	112	125	115	93	32	10	4	–	680	720	1,20	**KMT 18**	HN 18/19	M 10	35
M 95×2	117	130	120	98	32	10	4	–	710	780	1,25	**KMT 19**	HN 19/20	M 10	35
M 100×2	122	135	125	103	32	10	4	–	740	840	1,30	**KMT 20**	HN 20	M 10	35

Dimensions								Axial load carrying capacity	Loosening torque	Mass	Designations		Grub screws	
G	d_1	d_2	d_3	d_4	B	b	h	static			Lock nut	Appropriate spanner	Size	Recomm. tightening torque
mm								kN	Nm	kg	–		–	Nm
M 110×2	132	145	134	112	32	10	4	800	960	1,45	**KMT 22**	HN 22	M 10	35
M 120×2	142	155	144	122	32	10	4	860	1 080	1,60	**KMT 24**	TMFN 23-30	M 10	35
M 130×2	152	165	154	132	32	12	5	920	1 200	1,70	**KMT 26**	TMFN 23-30	M 10	35
M 140×2	162	175	164	142	32	14	6	980	1 320	1,80	**KMT 28**	TMFN 23-30	M 10	35
M 150×2	172	185	174	152	32	14	6	1 040	1 440	1,95	**KMT 30**	TMFN 23-30	M 10	35
M 160×3	182	195	184	162	32	14	6	1 100	1 600	2,10	**KMT 32**	TMFN 30-40	M 10	35
M 170×3	192	205	192	172	32	14	6	1 160	1 750	2,20	**KMT 34**	TMFN 30-40	M 10	35
M 180×3	202	215	204	182	32	16	7	1 220	1 900	2,30	**KMT 36**	TMFN 30-40	M 10	35
M 190×3	212	225	214	192	32	16	7	1 280	2 050	2,40	**KMT 38**	TMFN 30-40	M 10	35
M 200×3	222	235	224	202	32	18	8	1 340	2 300	2,50	**KMT 40**	TMFN 30-40	M 10	35

KMTA precision lock nuts with locking pins
M 25×1,5 – M 200×3





Dimensions									Axial load carrying capacity	Loosening torque	Mass	Designations		Grub screws	
G	d_2	d_3	d_4	B	J_1	J_2	N_1	N_2	static			Lock nut	Appropriate spanner	Size	Recomm. tightening torque
mm									kN	Nm	kg	–		–	Nm
M 25×1,5	42	35	26	20	32,5	11	4,3	4	130	45	0,13	**KMTA 5**	HN 5 B	M 6	8
M 30×1,5	48	40	32	20	40,5	11	4,3	5	160	55	0,16	**KMTA 6**	HN 6 B	M 6	8
M 35×1,5	53	47	38	20	45,5	11	4,3	5	190	65	0,19	**KMTA 7**	HN 7 B	M 6	8
M 40×1,5	58	52	42	22	50,5	12	4,3	5	210	80	0,23	**KMTA 8**	HN 8 B	M 6	8
M 45×1,5	68	58	48	22	58	12	4,3	6	240	95	0,33	**KMTA 9**	HN 9 B	M 6	8
M 50×1,5	70	63	52	24	61,5	13	4,3	6	300	115	0,34	**KMTA 10**	HN 10 B	M 6	8
M 55×1,5	75	70	58	24	66,5	13	4,3	6	340	135	0,37	**KMTA 11**	HN 12 B	M 6	8
M 60×1,5	84	75	62	24	74,5	13	5,3	6	380	150	0,49	**KMTA 12**	HN 13 B	M 8	18
M 65×1,5	88	80	68	25	78,5	13	5,3	6	460	170	0,52	**KMTA 13**	HN 14 B	M 8	18
M 70×1,5	95	86	72	26	85	14	5,3	8	490	285	0,62	**KMTA 14**	HN 15 B	M 8	18
M 75×1,5	100	91	77	26	88	13	6,4	8	520	305	0,66	**KMTA 15**	HN 15 B	M 8	18
M 80×2	110	97	83	30	95	16	6,4	8	620	325	1,00	**KMTA 16**	HN 16 B	M 8	18
M 85×2	115	102	88	32	100	17	6,4	8	650	660	1,15	**KMTA 17**	HN 17 B	M 10	35
M 90×2	120	110	93	32	108	17	6,4	8	680	720	1,20	**KMTA 18**	HN 18 B	M 10	35
M 95×2	125	114	98	32	113	17	6,4	8	710	780	1,25	**KMTA 19**	HN 19 B	M 10	35
M 100×2	130	120	103	32	118	17	6,4	8	740	840	1,30	**KMTA 20**	HN 20 B	M 10	35
M 110×2	140	132	112	32	128	17	6,4	8	800	960	1,45	**KMTA 22**	HN 22 B	M 10	35
M 120×2	155	142	122	32	140	17	6,4	8	860	1 080	1,85	**KMTA 24**	B 155-165	M 10	35
M 130×3	165	156	132	32	153	17	6,4	8	920	1 200	2,00	**KMTA 26**	B 155-165	M 10	35
M 140×3	180	166	142	32	165	17	6,4	10	980	1 320	2,45	**KMTA 28**	B 180-195	M 10	35
M 150×3	190	180	152	32	175	17	6,4	10	1 040	1 440	2,60	**KMTA 30**	B 180-195	M 10	35

Dimensions									**Axial load carrying capacity**	**Loos-ening torque**	**Mass**	**Designations**		**Grub screws**	
G	d_2	d_3	d_4	B	J_1	J_2	N_1	N_2	static			Lock nut	Appropriate spanner	Size	Recomm. tightening torque
mm									kN	Nm	kg	–		–	Nm
M 160×3	205	190	162	32	185	17	8,4	10	1 100	1 600	3,15	**KMTA 32**	B 205-220	M 10	35
M 170×3	215	205	172	32	195	17	8,4	10	1 160	1 750	3,30	**KMTA 34**	B 205-220	M 10	35
M 180×3	230	215	182	32	210	17	8,4	10	1 220	1 900	3,90	**KMTA 36**	B 230-245	M 10	35
M 190×3	240	225	192	32	224	17	8,4	10	1 280	2 050	4,10	**KMTA 38**	B 230-245	M 10	35
M 200×3	245	237	202	32	229	17	8,4	10	1 340	2 200	3,85	**KMTA 40**	B 230-245	M 10	35


SKF

Bearing housings

SNL plummer block housings, series 2, 3, 5 and 6 1029

Other bearing housings 1054

SNL plummer block housings, series 30 and 31 1054

SONL plummer block housings 1055

SDG plummer block housings 1056

SAF plummer block housings 1057

SDAF plummer block housings 1058

SBD plummer block housings 1059

TVN housings 1060

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Flanged housings I-1200(00) 1061

Flanged housings 7225(00) 1062

THD take-up housings 1063

Bearing housings together with appropriate SKF bearings constitute economic, interchangeable bearing units that meet the demand for designs which are easy to maintain.

As a leading supplier of rolling bearings, SKF also produces bearing housings in a wide range of designs and sizes that are based on experience collected in all industrial areas. Among others, SKF bearing housings have the following advantages:

- large assortment of design and sizes
- high quality of design and manufacture
- worldwide availability

Plummer (pillow) block housings in the SNL 2, 3, 5 and 6 series are the most common housings and are shown in this catalogue with technical details. They have additional advantages:

- short delivery times
- long term supply stability
- no minimum order quantities
- simplified ordering and stocking

Other bearing housings in the SKF standard range, include

- split plummer (pillow) block housings,
- one-piece plummer block housings,
- flanged housings, or
- take-up housings.

They are only presented with their main design features. Publications with detailed information are noted and will be supplied on request.

The SKF manufacturing programme also includes special housings for particular applications, such as

- conveyors and drums
- roller beds and converters
- tube mills and rotary furnaces
- paper machines
- windmills
- pinions of open gears
- large electrical machines
- rudder post bearing arrangements
- ships' shafting support bearing arrangements

For detailed information on these housings, please ask the SKF application engineering service and provide application details.

Besides bearing housings, SKF also supplies complete ready-to-mount bearing units, consisting of housing, bearing, and appropriate seals. These units are presented in the section "Bearing units" on **page 1107**.

SNL plummer block housings, series 2, 3, 5 and 6

Design features **1030**
Building block system 1030
Reinforced base 1030
Attachment 1030
Good heat conduction 1030
Relubrication facility 1030
Caps and bases individually marked 1031
Mounting aid 1031
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SNL plummer block housings for bearings with cylindrical bore 1044

Design features

SNL plummer block housings (→ **fig** 1) are the most popular of the wide range of SKF housings. Because of their versatility it is seldom necessary to resort to tailored housings for specific applications. The main design features are listed below. Further information on SNL plummer block housings can be obtained from

- the product brochure “SNL plummer block housings solve the housing problems” or
- the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Building block system
The basis of the SNL plummer block housing system consists of a number of housings of the same design but in different sizes. By combining these housings with different standard seals (→ **fig** 2) a wide variety of housing variants, all belonging to the standard range, can be supplied. SNL plummer blocks can accommodate shaft diameters ranging from 20 to 160 mm.

Reinforced base
The housing base is reinforced with ribs and extra material surrounding the holes for the attachment bolts in order to improve seating on the base plate. The attachment bolts can be preloaded to give better location and cannot deform the housing base or housing bore.

Attachment
SNL housings have two attachment bolt holes in the base as standard. Housings of size 511-609 and larger are also available with four cast attachment bolt holes as standard, designated FSNL .. NM. These larger housings are also available without attachment bolt holes (blank base, designated SSNLD), but only made of ductile cast iron.

Also the smaller housings below size 511-609 can be used for four bolt mounting. Cast indications show where to drill the additional holes.

Good heat conduction
The extra ribs in the housing base provide additional surface area between the base and base plate to improve heat flow away from the bearing.

Relubrication facility
SNL housings are equipped with a grease nipple as standard. Cast indications mark other grease nipple locations for relubrication of the bearing or the seals.

Fig 1

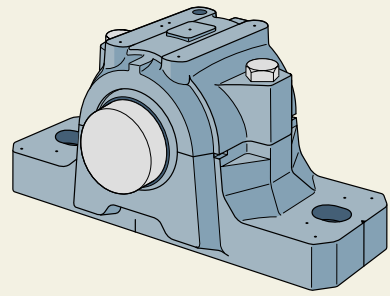
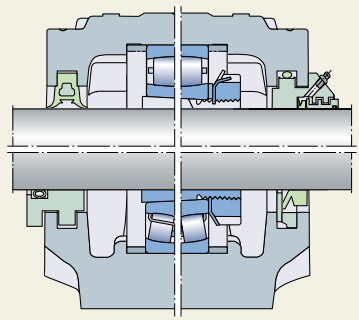


Fig 2



Caps and bases individually marked
The housing base and cap are matched during manufacture and are not interchangeable. To prevent mixing, the same consecutive number is marked on the cap and base of each individual housing.

Mounting aid
To simplify mounting and make alignment more accurate, cast indications in the end faces of the housing base indicate the housing bore axis and the vertical axis.

Indications for holes to accommodate other components
Cast indications mark the positions where holes can be drilled for dowel pins, sensors for condition monitoring, or additional grease nipples.

Types of arrangement

Not only can different bearing types be incorporated in SNL plummer block housings but they can also be arranged in different ways:

- bearings with a tapered bore on an adapter sleeve on a smooth shaft (➔ **fig** 3) – SNL housings, series 5 and 6 (➔ table starting on **page 1034**)
- bearings with a cylindrical bore on stepped shafts (➔ **fig** 4) – SNL housings, series 2 and 3 (➔ table starting on **page 1044**)

Non-locating bearing arrangements
The bearing seatings in the housings are sufficiently wide to allow axial displacement of the bearing. CARB bearings, which compensate axial displacement within the bearing, must always be secured in the housing bore with locating rings. In addition, please follow the recommendations in the section "Free space at the sides of the bearing" in the chapter "CARB toroidal roller bearings" (➔ **page 788**).

Locating bearing arrangements
For locating bearing arrangements two locating rings of the same width have to be inserted on each side of the bearing. This means, locating bearings are placed in the middle of the housing seating.

The locating rings are identified by the prefix FRB followed by the size (width/outside diameter) in millimetres uncoded, e.g. FRB 11,5/100. Appropriate locating rings are listed together with the bearings in the product tables.

Fig 3

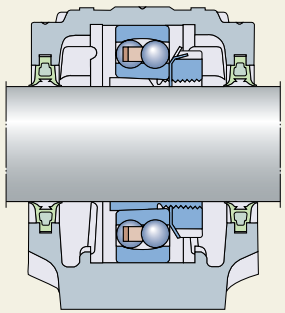
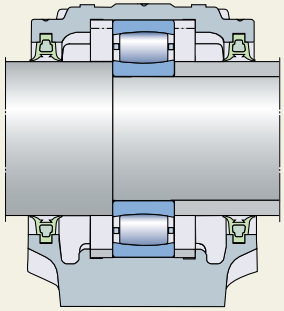


Fig 4



Seals

The following standard seals (→ **fig** 5) are available for SNL plummer block housings:

- double-lip seals of TSN .. G design (**a**) for peripheral speeds of up to 8 m/s and operating temperatures from –40 to +100 °C
- V-ring seals of TSN .. A design (**b**) for peripheral speeds of up to 7 m/s, under special conditions up to 12 m/s and operating temperatures from –40 to +100 °C
- labyrinth seals of TSN .. S design (**c**) for unlimited peripheral speeds and operating temperatures from –50 to +200 °C
- taconite heavy-duty seals with radial labyrinth of TSN .. ND design (**d**) for peripheral speeds of up to 12 m/s and operating temperatures from –40 to +100 °C

All seals are fully interchangeable because no modifications to the housing are required.

For housings mounted on shaft ends, end covers of the ASNH series are available (**e**).

Special design features

On request SNL plummer block housings can be supplied with special design features deviating from the standard. The essential features are listed below. They are indicated by designation suffixes.

NM Drilled and tapped hole 1/8-27 NPSF in middle of housing cap for bearings with lubrication groove and three holes in the outer ring, with grease nipple AH 1/8-27 PTF

V Housing with grease escape hole

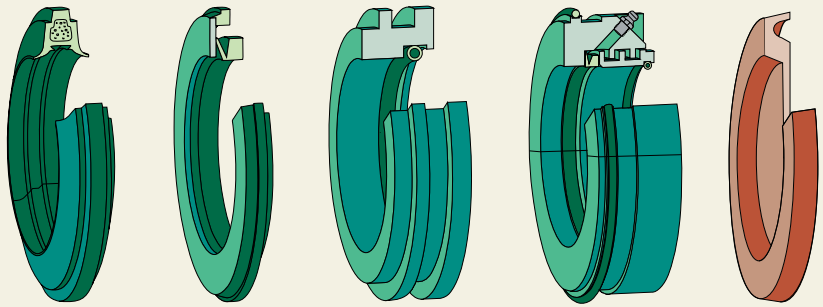
T Drilled and tapped hole 1/4-28 UNF on one side of housing cap with grease nipple AH 1/4-28 SAE-LT for relubrication of seals

TD Drilled and tapped hole 1/4-28 UNF on both sides of housing cap with two grease nipples AH 1/4-28 SAE-LT for relubrication of seals

SN Housing with drilled and tapped hole for sensor

K7 Seating in the housing machined to tolerance K7

Fig 5



General data

Dimensions
The boundary dimensions of an SNL plummer block housing conform to ISO 113:1999. The housings are dimensionally interchangeable with earlier SN, SNA, and SNH housings.

Tolerances
The tolerance limits for the centre height H_1 (of the housing bore above the support surface) are to js11. The bearing seating in the housing is machined to tolerance G7 as standard.

Materials
SNL plummer block housings are made of grey cast iron.

For applications where the strength of grey cast iron is inadequate, dimensionally equivalent housings made of spheroidal graphite cast iron can be supplied. These housings are only available with four cast attachment bolt holes (series FSNLD) or without any holes in the base (series SSNLD).

Painting system
SNL plummer block housings are painted as standard in accordance with ISO 12944-2:1998, environmental Class C2. Black colour: RAL 9005.

Load carrying ability
SNL plummer block housings are intended for loads acting vertically towards the base plate (support). In this case, loads are limited only by the load limits of the bearing. If loads acting in other directions occur, check that the magnitude of the load is permissible for the housing, the bolts joining the housing cap and base, and for the attachment bolts.

Lubrication

SNL plummer block housings with standard seals are designed for grease lubrication. For oil lubrication, modified SNL housings are available. These housings are supplied only together with the seals specially developed for oil lubrication.

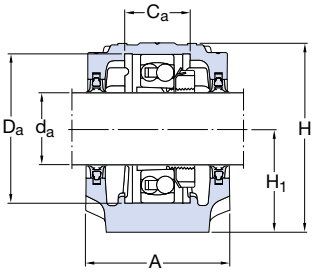
How to order

The housing, seals, end cover and locating rings must be ordered individually. Bearings and any necessary sleeves must also be ordered individually.

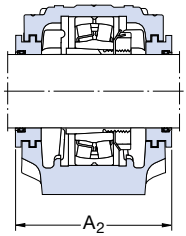
Example
Two plummer block housings with double-lip seals are required for spherical roller bearings 22212 EK on adapter sleeves H 312. One housing should be for a non-locating bearing arrangement at the end of a shaft, and the other housing for a locating bearing arrangement and a through shaft. The following items must be ordered (in addition to the bearings and sleeves):

- 2 plummer block housings SNL 512-610
- 2 double-lip seal packs TSN 512 G (each pack contains two seals)
- 1 end cover ASNH 512-610
- 2 locating rings FRB 10/110

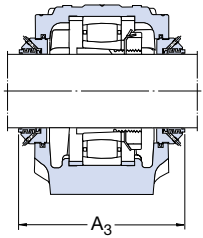
SNL plummer block housings for bearings on adapter sleeve
d_a **20 – 35** mm



Double-lip seals
G design

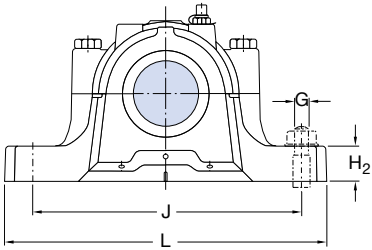


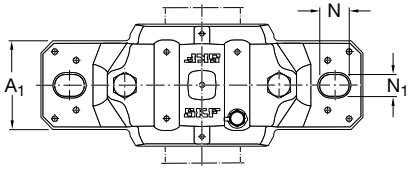
Labyrinth seals
S design



Taconite seals
ND design

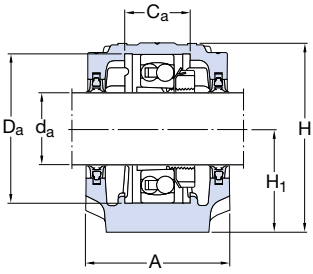
Shaft	Housing Dimensions										Mass	Designations			
												Housing complete with two seals	Components Housing only	Seals	End cover
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G					
mm	mm										kg	–			
20	67	46	74	40	19	130	165	20	15	12	1,45	**SNL 505 TG**	**SNL 505**	**TSN 505 G**	**ASNH 505**
												SNL 505 TA	**SNL 505**	**TSN 505 A**	**ASNH 505**
												SNL 505 TS	**SNL 505**	**TSN 505 S**	**ASNH 505**
												SNL 505 TND	**SNL 505**	**TSN 505 ND**	**ASNH 505**
	77	52	89	50	22	150	185	20	15	12	2,00	**SNL 605 TG**	**SNL 506-605**	**TSN 605 G**	**ASNH 506-605**
												SNL 605 TA	**SNL 506-605**	**TSN 605 A**	**ASNH 506-605**
												SNL 605 TS	**SNL 506-605**	**TSN 605 S**	**ASNH 506-605**
												SNL 605 TND	**SNL 506-605**	**TSN 605 ND**	**ASNH 506-605**
25	77	52	89	50	22	150	185	20	15	12	2,00	**SNL 506 TG**	**SNL 506-605**	**TSN 506 G**	**ASNH 506-605**
												SNL 506 TA	**SNL 506-605**	**TSN 506 A**	**ASNH 506-605**
												SNL 506 TS	**SNL 506-605**	**TSN 506 S**	**ASNH 506-605**
												SNL 506 TND	**SNL 506-605**	**TSN 506 ND**	**ASNH 506-605**
	82	52	93	50	22	150	185	20	15	12	2,20	**SNL 606 TG**	**SNL 507-606**	**TSN 606 G**	**ASNH 507-606**
												SNL 606 TA	**SNL 507-606**	**TSN 606 A**	**ASNH 507-606**
												SNL 606 TS	**SNL 507-606**	**TSN 606 S**	**ASNH 507-606**
												SNL 606 TND	**SNL 507-606**	**TSN 606 ND**	**ASNH 507-606**
30	82	52	93	50	22	150	185	20	15	12	2,20	**SNL 507 TG**	**SNL 507-606**	**TSN 507 G**	**ASNH 507-606**
												SNL 507 TA	**SNL 507-606**	**TSN 507 A**	**ASNH 507-606**
												SNL 507 TS	**SNL 507-606**	**TSN 507 S**	**ASNH 507-606**
												SNL 507 TND	**SNL 507-606**	**TSN 507 ND**	**ASNH 507-606**
	85	60	108	60	25	170	205	20	15	12	2,90	**SNL 607 TG**	**SNL 508-607**	**TSN 607 G**	**ASNH 508-607**
												SNL 607 TA	**SNL 508-607**	**TSN 607 A**	**ASNH 508-607**
												SNL 607 TS	**SNL 508-607**	**TSN 607 S**	**ASNH 508-607**
												SNL 607 TND	**SNL 508-607**	**TSN 607 ND**	**ASNH 508-607**
35	85	60	108	60	25	170	205	20	15	12	2,90	**SNL 508 TG**	**SNL 508-607**	**TSN 508 G**	**ASNH 508-607**
												SNL 508 TA	**SNL 508-607**	**TSN 508 A**	**ASNH 508-607**
												SNL 508 TS	**SNL 508-607**	**TSN 508 S**	**ASNH 508-607**
												SNL 508 TND	**SNL 508-607**	**TSN 508 ND**	**ASNH 508-607**
	90	60	113	60	25	170	205	20	15	12	3,20	**SNL 608 TG**	**SNL 510-608**	**TSN 608 G**	**ASNH 510-608**
												SNL 608 TA	**SNL 510-608**	**TSN 608 A**	**ASNH 510-608**
												SNL 608 TS	**SNL 510-608**	**TSN 608 S**	**ASNH 510-608**
												SNL 608 TND	**SNL 510-608**	**TSN 608 ND**	**ASNH 510-608**



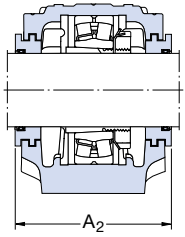


Shaft	Bearing seating		Width across seal		Appropriate bearings and associated components					
					Self-aligning ball bearing Spherical roller bearing	Adapter sleeve	Locating rings 2 per housing	Self-aligning ball bearing Spherical roller bearing CARB bearing	Adapter sleeve	Locating rings 2 per housing
d_a	C_a	D_a	A_2	A_3						
mm	mm		mm		–					
20	25	52	80	125	**1205 EK**	H 205	FRB 5/52	**2205 EK**	H 305	FRB 3.5/52
					–	–	–	**22205 EK**	H 305	FRB 3.5/52
								C 2205 K	H 305 E	FRB 3.5/52
	32	62	89	135	**1305 EK**	H 305	FRB 7.5/62	**2305 EK**	H 2305	FRB 4/62
					–	–	–	**–**	–	–
								–	–	–
25	32	62	89	135	**1206 EK**	H 206	FRB 8/62	**2206 EK**	H 306	FRB 6/62
					–	–	–	**22206 EK**	H 306	FRB 6/62
								C 2206 K	H 306 E	FRB 6/62
	34	72	94	140	**1306 EK**	H 306	FRB 7.5/72	**2306 K**	H 2306	FRB 3.5/72
					21306 CCK	H 306	FRB 7.5/72	**–**	–	–
								–	–	–
30	34	72	94	145	**1207 EK**	H 207	FRB 8.5/72	**2207 EK**	H 307	FRB 5.5/72
					–	–	–	**22207 EK**	H 307	FRB 5.5/72
								C 2207 K	H 307 E	FRB 5.5/72
	39	80	97	145	**1307 EK**	H 307	FRB 9/80	**2307 EK**	H 2307	FRB 4/80
					21307 CCK	H 307	FRB 9/80	**–**	–	–
								–	–	–
35	39	80	97	150	**1208 EK**	H 208	FRB 10.5/80	**2208 EK**	H 308	FRB 8/80
					–	–	–	**22208 EK**	H 308	FRB 8/80
								C 2208 K	H 308 E	FRB 8/80
	41	90	102	150	**1308 EK**	H 308	FRB 9/90	**2308 EK**	H 2308	FRB 4/90
					21308 CCK	H 308	FRB 9/90	**22308 EK**	H 2308	FRB 4/90
								–	–	–

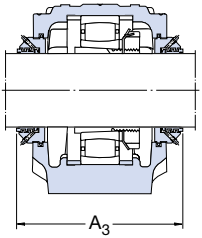
SNL plummer block housings for bearings on adapter sleeve
d_a **40 – 55** mm



Double-lip seals
G design

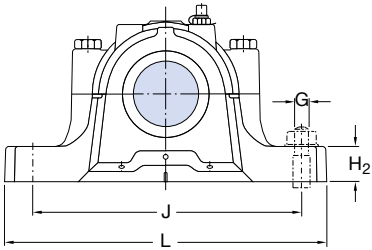


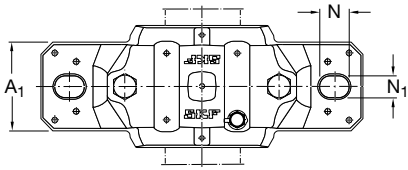
Labyrinth seals
S design



Taconite seals
ND design

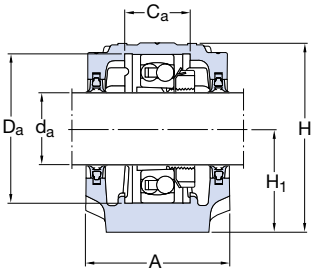
Shaft	Housing Dimensions										Mass	Designations			
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G		Housing complete with two seals	Components Housing only	Seals	End cover
mm	mm										kg	–			
40	85	60	109	60	25	170	205	20	15	12	2,90	**SNL 509 TG**	**SNL 509**	**TSN 509 G**	**ASNH 509**
												SNL 509 TA	**SNL 509**	**TSN 509 A**	**ASNH 509**
												SNL 509 TS	**SNL 509**	**TSN 509 S**	**ASNH 509**
												SNL 509 TND	**SNL 509**	**TSN 509 ND**	**ASNH 509**
	95	70	128	70	28	210	255	24	18	16	4,40	**SNL 609 TG**	**SNL 511-609**	**TSN 609 G**	**ASNH 511-609**
												SNL 609 TA	**SNL 511-609**	**TSN 609 A**	**ASNH 511-609**
												SNL 609 TS	**SNL 511-609**	**TSN 609 S**	**ASNH 511-609**
												SNL 609 TND	**SNL 511-609**	**TSN 609 ND**	**ASNH 511-609**
45	90	60	113	60	25	170	205	20	15	12	3,20	**SNL 510 TG**	**SNL 510-608**	**TSN 510 G**	**ASNH 510-608**
												SNL 510 TA	**SNL 510-608**	**TSN 510 A**	**ASNH 510-608**
												SNL 510 TS	**SNL 510-608**	**TSN 510 S**	**ASNH 510-608**
												SNL 510 TND	**SNL 510-608**	**TSN 510 ND**	**ASNH 510-608**
	105	70	134	70	30	210	255	24	18	16	5,10	**SNL 610 TG**	**SNL 512-610**	**TSN 610 G**	**ASNH 512-610**
												SNL 610 TA	**SNL 512-610**	**TSN 610 A**	**ASNH 512-610**
												SNL 610 TS	**SNL 512-610**	**TSN 610 S**	**ASNH 512-610**
												SNL 610 TND	**SNL 512-610**	**TSN 610 ND**	**ASNH 512-610**
50	95	70	128	70	28	210	255	24	18	16	4,40	**SNL 511 TG**	**SNL 511-609**	**TSN 511 G**	**ASNH 511-609**
												SNL 511 TA	**SNL 511-609**	**TSN 511 A**	**ASNH 511-609**
												SNL 511 TS	**SNL 511-609**	**TSN 511 S**	**ASNH 511-609**
												SNL 511 TND	**SNL 511-609**	**TSN 511 ND**	**ASNH 511-609**
	110	80	149	80	30	230	275	24	18	16	6,50	**SNL 611 TG**	**SNL 513-611**	**TSN 611 G**	**ASNH 513-611**
												SNL 611 TA	**SNL 513-611**	**TSN 611 A**	**ASNH 513-611**
												SNL 611 TS	**SNL 513-611**	**TSN 611 S**	**ASNH 513-611**
												SNL 611 TND	**SNL 513-611**	**TSN 611 ND**	**ASNH 513-611**
55	105	70	134	70	30	210	255	24	18	16	5,10	**SNL 512 TG**	**SNL 512-610**	**TSN 512 G**	**ASNH 512-610**
												SNL 512 TA	**SNL 512-610**	**TSN 512 A**	**ASNH 512-610**
												SNL 512 TS	**SNL 512-610**	**TSN 512 S**	**ASNH 512-610**
												SNL 512 TND	**SNL 512-610**	**TSN 512 ND**	**ASNH 512-610**
	115	80	155	80	30	230	280	24	18	16	7,00	**SNL 612 TG**	**SNL 515-612**	**TSN 612 G**	**ASNH 515-612**
												SNL 612 TA	**SNL 515-612**	**TSN 612 A**	**ASNH 515-612**
												SNL 612 TS	**SNL 515-612**	**TSN 612 S**	**ASNH 515-612**
												SNL 612 TND	**SNL 515-612**	**TSN 612 ND**	**ASNH 515-612**



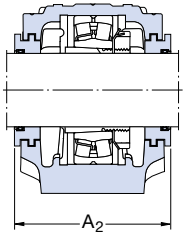


Shaft	Bearing seating		Width across seal		Appropriate bearings and associated components					
					Self-aligning ball bearing Spherical roller bearing	Adapter sleeve	Locating rings 2 per housing	Self-aligning ball bearing Spherical roller bearing CARB bearing	Adapter sleeve	Locating rings 2 per housing
d_a	C_a	D_a	A_2	A_3						
mm	mm		mm		–					
40	30	85	97	150	**1209 EK** **–**	H 209 –	FRB 5.5/85 –	**2209 EK** **22209 EK** **C 2209 K**	H 309 H 309 H 309 E	FRB 3.5/85 FRB 3.5/85 FRB 3.5/85
	44	100	107	155	**1309 EK** **21309 EK**	H 309 H 309	FRB 9.5/100 FRB 9.5/100	**2309 EK** **22309 EK** **–**	H 2309 H 2309 –	FRB 4/100 FRB 4/100 –
45	41	90	102	155	**1210 EK** **–**	H 210 –	FRB 10.5/90 –	**2210 EK** **22210 EK** **C 2210 K**	H 310 H 310 H 310 E	FRB 9/90 FRB 9/90 FRB 9/90
	48	110	117	165	**1310 EK** **21310 EK**	H 310 H 310	FRB 10.5/110 FRB 10.5/110	**2310 K** **22310 EK** **–**	H 2310 H 2310 –	FRB 4/110 FRB 4/110 –
50	44	100	107	165	**1211 EK** **–**	H 211 –	FRB 11.5/100 –	**2211 EK** **22211 EK** **C 2211 K**	H 311 H 311 H 311 E	FRB 9.5/100 FRB 9.5/100 FRB 9.5/100
	51	120	122	170	**1311 EK** **21311 EK**	H 311 H 311	FRB 11/120 FRB 11/120	**2311 K** **22311 EK** **–**	H 2311 H 2311 –	FRB 4/120 FRB 4/120 –
55	48	110	117	175	**1212 EK** **–**	H 212 –	FRB 13/110 –	**2212 EK** **22212 EK** **C 2212 K**	H 312 H 312 H 312 E	FRB 10/110 FRB 10/110 FRB 10/110
	56	130	127	175	**1312 EK** **21312 EK**	H 312 H 312	FRB 12.5/130 FRB 12.5/130	**2312 K** **22312 EK** **–**	H 2312 H 2312 –	FRB 5/130 FRB 5/130 –

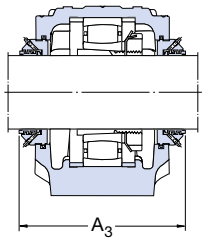
SNL plummer block housings for bearings on adapter sleeve
d_a **60 – 75** mm



Double-lip seals
G design

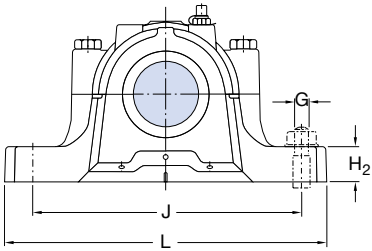


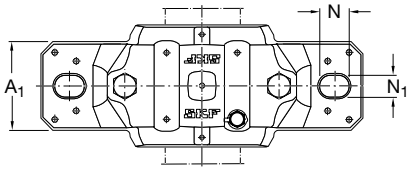
Labyrinth seals
S design



Taconite seals
ND design

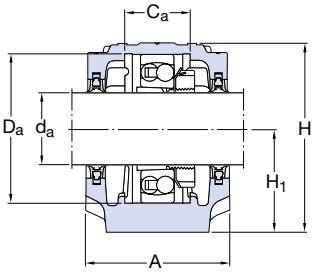
Shaft	Housing Dimensions											Mass	Designations			
													Housing complete with two seals	Components Housing only	Seals	End cover
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G						
mm	mm											kg	–			
60	110	80	149	80	30	230	275	24	18	16		6,50	**SNL 513 TG**	**SNL 513-611**	**TSN 513 G**	**ASNH 513-611**
													SNL 513 TA	**SNL 513-611**	**TSN 513 A**	**ASNH 513-611**
													SNL 513 TS	**SNL 513-611**	**TSN 513 S**	**ASNH 513-611**
													SNL 513 TND	**SNL 513-611**	**TSN 513 ND**	**ASNH 513-611**
	120	90	177	95	32	260	315	28	22	20		9,50	**SNL 613 TG**	**SNL 516-613**	**TSN 613 G**	**ASNH 516-613**
													SNL 613 TA	**SNL 516-613**	**TSN 613 A**	**ASNH 516-613**
													SNL 613 TS	**SNL 516-613**	**TSN 613 S**	**ASNH 516-613**
													SNL 613 TND	**SNL 516-613**	**TSN 613 ND**	**ASNH 516-613**
65	115	80	155	80	30	230	280	24	18	16		7,00	**SNL 515 TG**	**SNL 515-612**	**TSN 515 G**	**ASNH 515-612**
													SNL 515 TA	**SNL 515-612**	**TSN 515 A**	**ASNH 515-612**
													SNL 515 TS	**SNL 515-612**	**TSN 515 S**	**ASNH 515-612**
													SNL 515 TND	**SNL 515-612**	**TSN 515 ND**	**ASNH 515-612**
	140	100	194	100	35	290	345	28	22	20		12,5	**SNL 615 TG**	**SNL 518-615**	**TSN 615 G**	**ASNH 518-615**
													SNL 615 TA	**SNL 518-615**	**TSN 615 A**	**ASNH 518-615**
													SNL 615 TS	**SNL 518-615**	**TSN 615 S**	**ASNH 518-615**
													SNL 615 TND	**SNL 518-615**	**TSN 615 ND**	**ASNH 518-615**
70	120	90	177	95	32	260	315	28	22	20		9,50	**SNL 516 TG**	**SNL 516-613**	**TSN 516 G**	**ASNH 516-613**
													SNL 516 TA	**SNL 516-613**	**TSN 516 A**	**ASNH 516-613**
													SNL 516 TS	**SNL 516-613**	**TSN 516 S**	**ASNH 516-613**
													SNL 516 TND	**SNL 516-613**	**TSN 516 ND**	**ASNH 516-613**
	145	100	212	112	35	290	345	28	22	20		13,7	**SNL 616 TG**	**SNL 519-616**	**TSN 616 G**	**ASNH 519-616**
													SNL 616 TA	**SNL 519-616**	**TSN 616 A**	**ASNH 519-616**
													SNL 616 TS	**SNL 519-616**	**TSN 616 S**	**ASNH 519-616**
													SNL 616 TND	**SNL 519-616**	**TSN 616 ND**	**ASNH 519-616**
75	125	90	183	95	32	260	320	28	22	20		10,0	**SNL 517 TG**	**SNL 517**	**TSN 517 G**	**ASNH 517**
													SNL 517 TA	**SNL 517**	**TSN 517 A**	**ASNH 517**
													SNL 517 TS	**SNL 517**	**TSN 517 S**	**ASNH 517**
													SNL 517 TND	**SNL 517**	**TSN 517 ND**	**ASNH 517**
	160	110	218	112	40	320	380	32	26	24		17,6	**SNL 617 TG**	**SNL 520-617**	**TSN 617 G**	**ASNH 520-617**
													SNL 617 TA	**SNL 520-617**	**TSN 617 A**	**ASNH 520-617**
													SNL 617 TS	**SNL 520-617**	**TSN 617 S**	**ASNH 520-617**
													SNL 617 TND	**SNL 520-617**	**TSN 617 ND**	**ASNH 520-617**



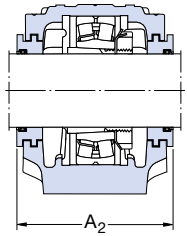


Shaft	Bearing seating		Width across seal		Appropriate bearings and associated components					
					Self-aligning ball bearing	Adapter sleeve	Locating rings 2 per housing	Self-aligning ball bearing Spherical roller bearing CARB bearing	Adapter sleeve	Locating rings 2 per housing
d_a	C_a	D_a	A_2	A_3	Spherical roller bearing					
mm	mm		mm		–					
60	51	120	122	180	**1213 EK**	H 213	FRB 14/120	**2213 EK**	H 313	FRB 10/120
					–	–	–	**22213 EK**	H 313	FRB 10/120
								C 2213 K	H 313 E	FRB 10/120
	58	140	138	180	**1313 EK**	H 313	FRB 12.5/140	**2313 K**	H 2313	FRB 5/140
					21313 EK	H 313	FRB 12.5/140	**22313 EK**	H 2313	FRB 5/140
								–	–	–
65	65	160	158	200	**1315 K**	H 315	FRB 14/160	**2315 K**	H 2315	FRB 5/160
					21315 EK	H 315	FRB 14/160	**22315 EK**	H 2315	FRB 5/160
								C 2315 K	H 2315	FRB 5/160
	56	130	127	175	**1215 K**	H 215	FRB 15.5/130	**2215 EK**	H 315	FRB 12.5/130
					–	–	–	**22215 EK**	H 315	FRB 12.5/130
								C 2215 K	H 315 E	FRB 12.5/130
70	58	140	138	205	**1216 K**	H 216	FRB 16/140	**2216 EK**	H 316	FRB 12.5/140
					–	–	–	**22216 EK**	H 316	FRB 12.5/140
								C 2216 K	H 316 E	FRB 12.5/140
	68	170	163	205	**1316 K**	H 316	FRB 14.5/170	**2316 K**	H 2316	FRB 5/170
					21316 EK	H 316	FRB 14.5/170	**22316 EK**	H 2316	FRB 5/170
								C 2316 K	H 2316	FRB 5/170
75	61	150	143	210	**1217 K**	H 217	FRB 16.5/150	**2217 K**	H 317	FRB 12.5/150
					–	–	–	**22217 EK**	H 317	FRB 12.5/150
								C 2217 K	H 317 E	FRB 12.5/150
	70	180	178	220	**1317 K**	H 317	FRB 14.5/180	**2317 K**	H 2317	FRB 5/180
					21317 EK	H 317	FRB 14.5/180	**22317 EK**	H 2317	FRB 5/180
								C 2317 K	H 2317	FRB 5/180

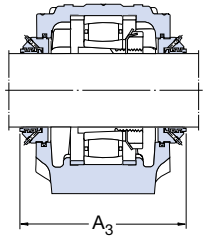
SNL plummer block housings for bearings on adapter sleeve
d_a **80 – 115** mm



Double-lip seals
G design

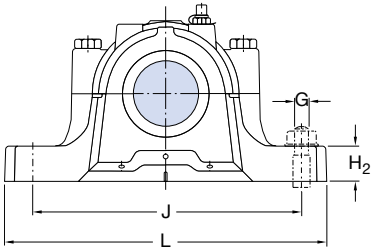


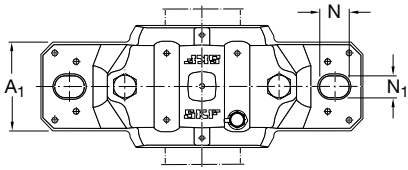
Labyrinth seals
S design



Taconite seals
ND design

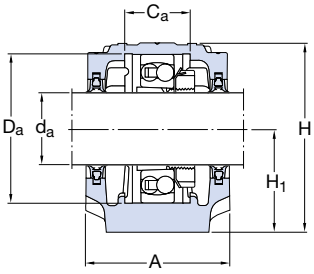
Shaft	Housing Dimensions											Mass	Designations			
													Housing complete with two seals	Components Housing only	Seals	End cover
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G						
mm	mm											kg	–			
80	140	100	194	100	35	290	345	28	22	20		12,5	**SNL 518 TG**	**SNL 518-615**	**TSN 518 G**	**ASNH 518-615**
													SNL 518 TA	**SNL 518-615**	**TSN 518 A**	**ASNH 518-615**
													SNL 518 TS	**SNL 518-615**	**TSN 518 S**	**ASNH 518-615**
													SNL 518 TND	**SNL 518-615**	**TSN 518 ND**	**ASNH 518-615**
85	145	100	212	112	35	290	345	28	22	20		13,7	**SNL 519 TG**	**SNL 519-616**	**TSN 519 G**	**ASNH 519-616**
													SNL 519 TA	**SNL 519-616**	**TSN 519 A**	**ASNH 519-616**
													SNL 519 TS	**SNL 519-616**	**TSN 519 S**	**ASNH 519-616**
													SNL 519 TND	**SNL 519-616**	**TSN 519 ND**	**ASNH 519-616**
	175	120	242	125	45	350	410	32	26	24		22,0	**SNL 619 TG**	**SNL 522-619**	**TSN 619 G**	**ASNH 522-619**
													SNL 619 TA	**SNL 522-619**	**TSN 619 A**	**ASNH 522-619**
													SNL 619 TS	**SNL 522-619**	**TSN 619 S**	**ASNH 522-619**
													SNL 619 TND	**SNL 522-619**	**TSN 619 ND**	**ASNH 522-619**
90	160	110	218	112	40	320	380	32	26	24		17,6	**SNL 520 TG**	**SNL 520-617**	**TSN 520 G**	**ASNH 520-617**
													SNL 520 TA	**SNL 520-617**	**TSN 520 A**	**ASNH 520-617**
													SNL 520 TS	**SNL 520-617**	**TSN 520 S**	**ASNH 520-617**
													SNL 520 TND	**SNL 520-617**	**TSN 520 ND**	**ASNH 520-617**
	185	120	271	140	45	350	410	32	26	24		26,2	**SNL 620 TG**	**SNL 524-620**	**TSN 620 G**	**ASNH 524-620**
													SNL 620 TA	**SNL 524-620**	**TSN 620 A**	**ASNH 524-620**
													SNL 620 TS	**SNL 524-620**	**TSN 620 S**	**ASNH 524-620**
													SNL 620 TND	**SNL 524-620**	**TSN 620 ND**	**ASNH 524-620**
100	175	120	242	125	45	350	410	32	26	24		22,0	**SNL 522 TG**	**SNL 522-619**	**TSN 522 G**	**ASNH 522-619**
													SNL 522 TA	**SNL 522-619**	**TSN 522 A**	**ASNH 522-619**
													SNL 522 TS	**SNL 522-619**	**TSN 522 S**	**ASNH 522-619**
													SNL 522 TND	**SNL 522-619**	**TSN 522 ND**	**ASNH 522-619**
110	185	120	271	140	45	350	410	32	26	24		26,2	**SNL 524 TG**	**SNL 524-620**	**TSN 524 G**	**ASNH 524-620**
													SNL 524 TA	**SNL 524-620**	**TSN 524 A**	**ASNH 524-620**
													SNL 524 TS	**SNL 524-620**	**TSN 524 S**	**ASNH 524-620**
													SNL 524 TND	**SNL 524-620**	**TSN 524 ND**	**ASNH 524-620**
115	190	130	290	150	50	380	445	35	28	24		33,0	**SNL 526 TG**	**SNL 526**	**TSN 526 G**	**ASNH 526**
													SNL 526 TA	**SNL 526**	**TSN 526 A**	**ASNH 526**
													SNL 526 TS	**SNL 526**	**TSN 526 S**	**ASNH 526**
													SNL 526 TND	**SNL 526**	**TSN 526 ND**	**ASNH 526**



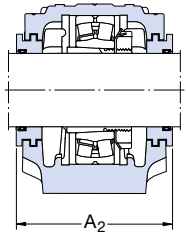


Shaft	Bearing seating		Width across seal		Appropriate bearings and associated components					
					Self-aligning ball bearing	Adapter sleeve	Locating rings 2 per housing	Self-aligning ball bearing	Adapter sleeve	Locating rings 2 per housing
					Spherical roller bearing			Spherical roller bearing CARB bearing		
d_a	C_a	D_a	A_2	A_3	–					
mm	mm		mm		–					
80	65	160	158	225	**1218 K**	H 218	FRB 17.5/160	**2218 K**	H 318	FRB 12.5/160
					22218 EK	H 318	FRB 12.5/160	**23218 CCK/W33**	H 2318	FRB 6.25/160
								C 2218 K	H 318 E	FRB 12.5/160
85	68	170	163	220	**1219 K**	H 219	FRB 18/170	**2219 K**	H 319	FRB 12.5/170
					–	–	–	**22219 EK**	H 319	FRB 12.5/170
								–	–	–
	80	200	191	235	**1319 K**	H 319	FRB 17.5/200	**2319 K**	H 2319	FRB 6.5/200
					21319 EK	H 319	FRB 17.5/200	**22319 EK**	H 2319	FRB 6.5/200
								–	–	–
90	70	180	178	230	**1220 K**	H 220	FRB 18/180	**2220 K**	H 320	FRB 12/180
					22220 EK	H 320	FRB 12/180	**23220 CCK/W33**	H 2320	FRB 4.85/180
								C 2220 K	H 320 E	FRB 12/180
	86	215	199	240	**1320 K**	H 320	FRB 19.5/215	**2320 K**	H 2320	FRB 6.5/215
					21320 EK	H 320	FRB 19.5/215	**22320 EK**	H 2320	FRB 6.5/215
								C 2320 K	H 2320	FRB 6.5/215
100	80	200	191	250	**1222 K**	H 222	FRB 21/200	**2222 K**	H 322	FRB 13.5/200
					22222 EK	H 322	FRB 13.5/200	**23222 CCK/W33**	H 2322	FRB 5.1/200
								C 2222 K	H 322 E	FRB 13.5/200
110	86	215	199	260	**1224 K**	H 3024	FRB 22/215	**–**	–	–
					22224 EK	H 3124	FRB 14/215	**23224 CCK/W33**	H 2324	FRB 5/215
								C 3224 K	H 2324 L	FRB 5/215
115	90	230	208	265	**–**	–	–	**–**	–	–
					22226 EK	H 3126	FRB 13/230	**23226 CCK/W33**	H 2326	FRB 5/230
								C 2226 K	H 3126 L	FRB 13/230

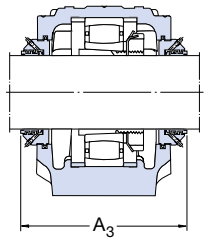
SNL plummer block housings for bearings on adapter sleeve
d_a **125 – 140** mm



Double-lip seals
G design

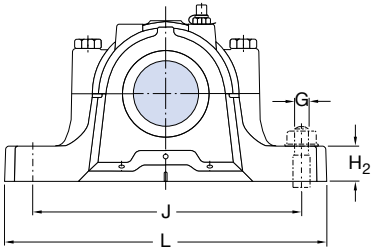


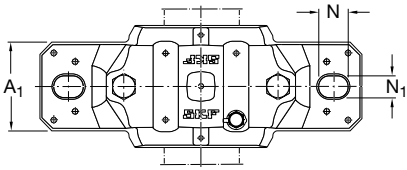
Labyrinth seals
S design



Taconite seals
ND design

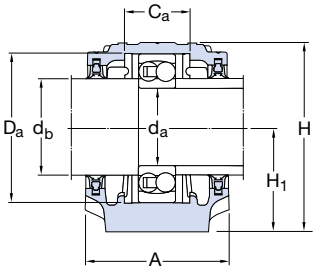
Shaft Housing Dimensions											Mass	Designations			
												Housing	Components		
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G		complete with two seals	Housing only	Seals	End cover
mm	mm										kg	–			
125	205	150	302	150	50	420	500	42	35	30	40,0	**SNL 528 TG**	**SNL 528**	**TSN 528 G**	**ASNH 528**
												SNL 528 TA	**SNL 528**	**TSN 528 A**	**ASNH 528**
												SNL 528 TS	**SNL 528**	**TSN 528 S**	**ASNH 528**
												SNL 528 TND	**SNL 528**	**TSN 528 ND**	**ASNH 528**
135	220	160	323	160	60	450	530	42	35	30	49,0	**SNL 530 TG**	**SNL 530**	**TSN 530 G**	**ASNH 530**
												SNL 530 TA	**SNL 530**	**TSN 530 A**	**ASNH 530**
												SNL 530 TS	**SNL 530**	**TSN 530 S**	**ASNH 530**
												SNL 530 TND	**SNL 530**	**TSN 530 ND**	**ASNH 530**
140	235	160	344	170	60	470	550	42	35	30	55,0	**SNL 532 TG**	**SNL 532**	**TSN 532 G**	**ASNH 532**
												SNL 532 TA	**SNL 532**	**TSN 532 A**	**ASNH 532**
												SNL 532 TS	**SNL 532**	**TSN 532 S**	**ASNH 532**
												SNL 532 TND	**SNL 532**	**TSN 532 ND**	**ASNH 532**



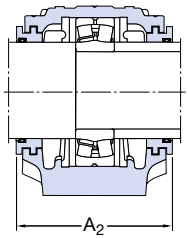


Shaft	Bearing seating		Width across seal		Appropriate bearings and associated components					
					Spherical roller bearing	Adapter sleeve	Locating rings 2 per housing	Spherical roller bearing CARB bearing	Adapter sleeve	Locating rings 2 per housing
d_a	C_a	D_a	A_2	A_3						
mm	mm		mm		–					
125	98	250	223	285	**22228 CCK/W33**	H 3128	FRB 15/250	**23228 CCK/W33** **C 2228 K**	H 2328 H 3128 L	FRB 5/250 FRB 15/250
135	106	270	241	295	**22230 CCK/W33**	H 3130	FRB 16.5/270	**23230 CCK/W33** **C 2230 K**	H 2330 H 3130 L	FRB 5/270 FRB 16.5/270
140	114	290	254	315	**22232 CCK/W33**	H 3132	FRB 17/290	**23232 CCK/W33** **C 3232 K**	H 2332 H 2332 L	FRB 5/290 FRB 5/290

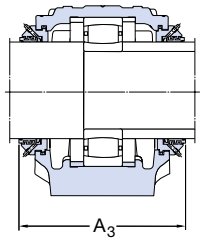
SNL plummer block housings for bearings with cylindrical bore
d_a **25 – 40** mm



Double-lip seals
G design

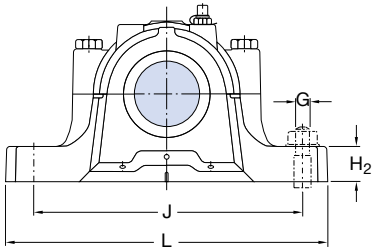


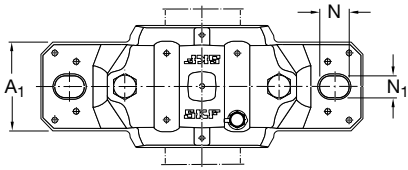
Labyrinth seals
S design



Taconite seals
ND design

Shaft	Housing Dimensions										Mass	Designations			
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G		Housing complete with two seals	Components Housing only	Seals	End cover
mm	mm										kg	–			
25	67	46	74	40	19	130	165	20	15	12	1,40	**SNL 205 TG**	**SNL 205**	**TSN 205 G**	**ASNH 506-605**
												SNL 205 TS	**SNL 205**	**TSN 205 S**	**ASNH 506-605**
												SNL 205 TND	**SNL 205**	**TSN 205 ND**	**ASNH 506-605**
	77	52	89	50	22	150	185	20	15	12	1,90	**SNL 305 TG**	**SNL 206-305**	**TSN 305 G**	**ASNH 507-606**
												SNL 305 TA	**SNL 206-305**	**TSN 305 A**	**ASNH 507-606**
												SNL 305 TS	**SNL 206-305**	**TSN 305 S**	**ASNH 507-606**
												SNL 305 TND	**SNL 206-305**	**TSN 305 ND**	**ASNH 507-606**
30	77	52	89	50	22	150	185	20	15	12	1,90	**SNL 206 TG**	**SNL 206-305**	**TSN 206 G**	**ASNH 507-606**
												SNL 206 TA	**SNL 206-305**	**TSN 206 A**	**ASNH 507-606**
												SNL 206 TS	**SNL 206-305**	**TSN 206 S**	**ASNH 507-606**
												SNL 206 TND	**SNL 206-305**	**TSN 206 ND**	**ASNH 507-606**
	82	52	93	50	22	150	185	20	15	12	2,20	**SNL 306 TG**	**SNL 507-606**	**TSN 306 G**	**ASNH 507-606**
												SNL 306 TA	**SNL 507-606**	**TSN 306 A**	**ASNH 507-606**
												SNL 306 TS	**SNL 507-606**	**TSN 306 S**	**ASNH 507-606**
												SNL 306 TND	**SNL 507-606**	**TSN 306 ND**	**ASNH 507-606**
35	82	52	93	50	22	150	185	20	15	12	2,10	**SNL 207 TG**	**SNL 207**	**TSN 207 G**	**ASNH 509**
												SNL 207 TA	**SNL 207**	**TSN 207 A**	**ASNH 509**
												SNL 207 TS	**SNL 207**	**TSN 207 S**	**ASNH 509**
												SNL 207 TND	**SNL 207**	**TSN 207 ND**	**ASNH 509**
	85	60	108	60	25	170	205	20	15	12	2,75	**SNL 307 TG**	**SNL 208-307**	**TSN 307 G**	**ASNH 510-608**
												SNL 307 TA	**SNL 208-307**	**TSN 307 A**	**ASNH 510-608**
												SNL 307 TS	**SNL 208-307**	**TSN 307 S**	**ASNH 510-608**
												SNL 307 TND	**SNL 208-307**	**TSN 307 ND**	**ASNH 510-608**
40	85	60	108	60	25	170	205	20	15	12	2,75	**SNL 208 TG**	**SNL 208-307**	**TSN 208 G**	**ASNH 510-608**
												SNL 208 TA	**SNL 208-307**	**TSN 208 A**	**ASNH 510-608**
												SNL 208 TS	**SNL 208-307**	**TSN 208 S**	**ASNH 510-608**
												SNL 208 TND	**SNL 208-307**	**TSN 208 ND**	**ASNH 510-608**
	90	60	113	60	25	170	205	20	15	12	3,20	**SNL 308 TG**	**SNL 510-608**	**TSN 308 G**	**ASNH 510-608**
												SNL 308 TA	**SNL 510-608**	**TSN 308 A**	**ASNH 510-608**
												SNL 308 TS	**SNL 510-608**	**TSN 308 S**	**ASNH 510-608**
												SNL 308 TND	**SNL 510-608**	**TSN 308 ND**	**ASNH 510-608**

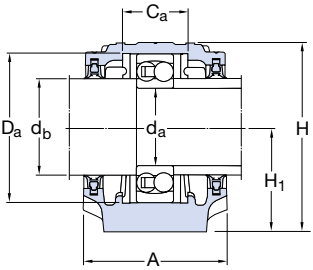




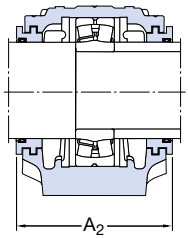
Shaft		Bearing seating		Width across seal		Appropriate bearings and locating rings			
						Self-aligning ball bearing Spherical roller bearing	Locating rings 2 per housing	Self-aligning ball bearing Spherical roller bearing CARB bearing	Locating rings 2 per housing
d_a	d_b	C_a	D_a	A_2	A_3				
mm		mm		mm		–			
25	30	25	52	90	140	**1205 E** **–**	FRB 5/52 –	**2205 E** **22205 E** **C 2205**	FRB 3.5/52 FRB 3.5/52 FRB 3.5/52
	30	32	62	89	140	**1305 E** **21305 CC**	FRB 7.5/62 FRB 7.5/62	**2305** **–** **–**	FRB 4/62 – –
30	35	32	62	89	150	**1206 E** **–**	FRB 8/62 –	**2206 E** **22206 E** **C 2206**	FRB 6/62 FRB 6/62 FRB 6/62
	35	34	72	94	155	**1306 E** **21306 CC**	FRB 7.5/72 FRB 7.5/72	**2306** **–** **–**	FRB 3.5/72 – –
35	45	34	72	96	160	**1207 E** **–**	FRB 8.5/72 –	**2207 E** **22207 E** **C 2207**	FRB 5.5/72 FRB 5.5/72 FRB 5.5/72
	45	39	80	99	145	**1307 E** **21307 CC**	FRB 9/80 FRB 9/80	**2307 E** **–** **–**	FRB 4/80 – –
40	50	39	80	99	160	**1208 E** **–**	FRB 10.5/80 –	**2208 E** **22208 E** **C 2208**	FRB 8/80 FRB 8/80 FRB 8/80
	50	41	90	102	167	**1308 E** **21308 E**	FRB 9/90 FRB 9/90	**2308 E** **22308 E** **–**	FRB 4/90 FRB 4/90 –

SNL plummer block housings for bearings with cylindrical bore

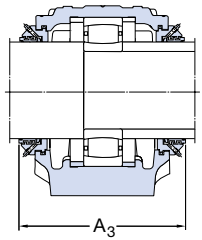
d_a **45 – 60** mm



Double-lip seals
G design

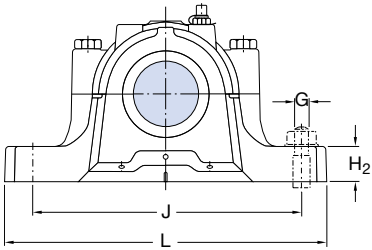


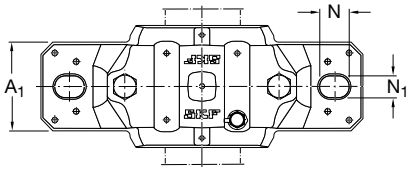
Labyrinth seals
S design



Taconite seals
ND design

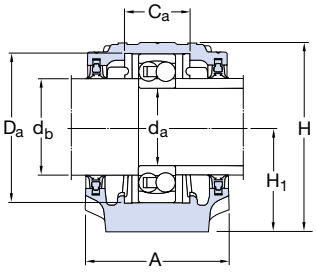
Shaft	Housing Dimensions										Mass	Designations			
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G		Housing complete with two seals	Components Housing only	Seals	End cover
mm	mm										kg	–			
45	85	60	109	60	25	170	205	20	15	12	2,75	**SNL 209 TG**	**SNL 209**	**TSN 209 G**	**ASNH 511-609**
												SNL 209 TA	**SNL 209**	**TSN 209 A**	**ASNH 511-609**
												SNL 209 TS	**SNL 209**	**TSN 209 S**	**ASNH 511-609**
												SNL 209 TND	**SNL 209**	**TSN 209 ND**	**ASNH 511-609**
	95	70	128	70	28	210	255	24	18	16	4,40	**SNL 309 TG**	**SNL 511-609**	**TSN 309 G**	**ASNH 511-609**
												SNL 309 TA	**SNL 511-609**	**TSN 309 A**	**ASNH 511-609**
												SNL 309 TS	**SNL 511-609**	**TSN 309 S**	**ASNH 511-609**
												SNL 309 TND	**SNL 511-609**	**TSN 309 ND**	**ASNH 511-609**
50	90	60	113	60	25	170	205	20	15	12	3,00	**SNL 210 TG**	**SNL 210**	**TSN 210 G**	**ASNH 512-610**
												SNL 210 TA	**SNL 210**	**TSN 210 A**	**ASNH 512-610**
												SNL 210 TS	**SNL 210**	**TSN 210 S**	**ASNH 512-610**
												SNL 210 TND	**SNL 210**	**TSN 210 ND**	**ASNH 512-610**
	105	70	134	70	30	210	255	24	18	16	5,10	**SNL 310 TG**	**SNL 512-610**	**TSN 310 G**	**ASNH 512-610**
												SNL 310 TA	**SNL 512-610**	**TSN 310 A**	**ASNH 512-610**
												SNL 310 TS	**SNL 512-610**	**TSN 310 S**	**ASNH 512-610**
												SNL 310 TND	**SNL 512-610**	**TSN 310 ND**	**ASNH 512-610**
55	95	70	128	70	28	210	255	24	18	16	4,20	**SNL 211 TG**	**SNL 211**	**TSN 211 G**	**ASNH 513-611**
												SNL 211 TA	**SNL 211**	**TSN 211 A**	**ASNH 513-611**
												SNL 211 TS	**SNL 211**	**TSN 211 S**	**ASNH 513-611**
												SNL 211 TND	**SNL 211**	**TSN 211 ND**	**ASNH 513-611**
	110	80	149	80	30	230	275	24	18	16	6,50	**SNL 311 TG**	**SNL 513-611**	**TSN 311 G**	**ASNH 513-611**
												SNL 311 TA	**SNL 513-611**	**TSN 311 A**	**ASNH 513-611**
												SNL 311 TS	**SNL 513-611**	**TSN 311 S**	**ASNH 513-611**
												SNL 311 TND	**SNL 513-611**	**TSN 311 ND**	**ASNH 513-611**
60	105	70	134	70	30	210	255	24	18	16	4,75	**SNL 212 TG**	**SNL 212**	**TSN 212 G**	**ASNH 515-612**
												SNL 212 TA	**SNL 212**	**TSN 212 A**	**ASNH 515-612**
												SNL 212 TS	**SNL 212**	**TSN 212 S**	**ASNH 515-612**
												SNL 212 TND	**SNL 212**	**TSN 212 ND**	**ASNH 515-612**
	115	80	155	80	30	230	280	24	18	16	7,00	**SNL 312 TG**	**SNL 515-612**	**TSN 312 G**	**ASNH 515-612**
												SNL 312 TA	**SNL 515-612**	**TSN 312 A**	**ASNH 515-612**
												SNL 312 TS	**SNL 515-612**	**TSN 312 S**	**ASNH 515-612**
												SNL 312 TND	**SNL 515-612**	**TSN 312 ND**	**ASNH 515-612**



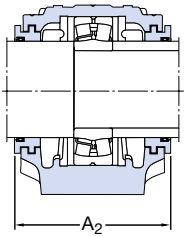


Shaft		Bearing seating		Width across seal		Appropriate bearings and locating rings			
						Self-aligning ball bearing Spherical roller bearing	Locating rings 2 per housing	Self-aligning ball bearing Spherical roller bearing CARB bearing	Locating rings 2 per housing
d_a	d_b	C_a	D_a	A_2	A_3				
mm		mm		mm		–			
45	55	30	85	97	160	**1209 E** **–**	FRB 5.5/85 –	**2209 E** **22209 E** **C 2209**	FRB 3.5/85 FRB 3.5/85 FRB 3.5/85
	55	44	100	107	172	**1309 E** **21309 E**	FRB 9.5/100 FRB 9.5/100	**2309 E** **22309 E** **–**	FRB 4/100 FRB 4/100 –
50	60	41	90	102	165	**1210 E** **–**	FRB 10.5/90 –	**2210 E** **22210 E** **C 2210**	FRB 9/90 FRB 9/90 FRB 9/90
	60	48	110	117	180	**1310 E** **21310 E**	FRB 10.5/110 FRB 10.5/110	**2310** **22310 E** **–**	FRB 4/110 FRB 4/110 –
55	65	44	100	107	170	**1211 E** **–**	FRB 11.5/100 –	**2211 E** **22211 E** **C 2211**	FRB 9.5/100 FRB 9.5/100 FRB 9.5/100
	65	51	120	122	185	**1311 E** **21311 E**	FRB 11/120 FRB 11/120	**2311** **22311 E** **–**	FRB 4/120 FRB 4/120 –
60	70	48	110	117	185	**1212 E** **–**	FRB 13/110 –	**2212 E** **22212 E** **C 2212**	FRB 10/110 FRB 10/110 FRB 10/110
	70	56	130	127	197	**1312** **21312 E**	FRB 12.5/130 FRB 12.5/130	**2312** **22312 E** **–**	FRB 5/130 FRB 5/130 –

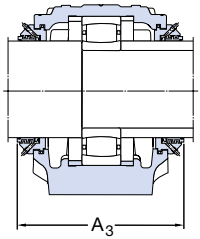
SNL plummer block housings for bearings with cylindrical bore
d_a **65 – 80** mm



Double-lip seals
G design

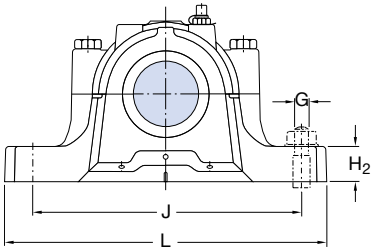


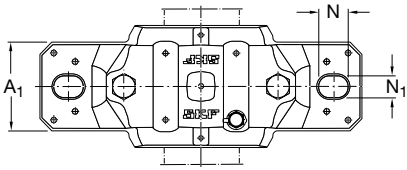
Labyrinth seals
S design



Taconite seals
ND design

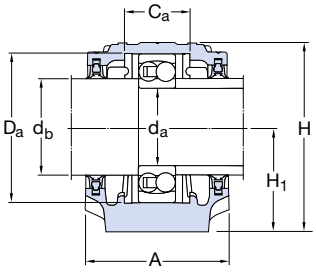
Shaft	Housing Dimensions										Mass	Designations			
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G		Housing complete with two seals	Components Housing only	Seals	End cover
mm	mm										kg	–			
65	110	80	149	80	30	230	275	24	18	16	6,10	**SNL 213 TG**	**SNL 213**	**TSN 213 G**	**ASNH 516-613**
												SNL 213 TA	**SNL 213**	**TSN 213 A**	**ASNH 516-613**
												SNL 213 TS	**SNL 213**	**TSN 213 S**	**ASNH 516-613**
												SNL 213 TND	**SNL 213**	**TSN 213 ND**	**ASNH 516-613**
	120	90	177	95	32	260	315	28	22	20	9,50	**SNL 313 TG**	**SNL 516-613**	**TSN 313 G**	**ASNH 516-613**
												SNL 313 TA	**SNL 516-613**	**TSN 313 A**	**ASNH 516-613**
												SNL 313 TS	**SNL 516-613**	**TSN 313 S**	**ASNH 516-613**
												SNL 313 TND	**SNL 516-613**	**TSN 313 ND**	**ASNH 516-613**
70	125	90	183	95	32	260	320	28	22	20	10,0	**SNL 314 TG**	**SNL 517**	**TSN 314 G**	**ASNH 517**
												SNL 314 TA	**SNL 517**	**TSN 314 A**	**ASNH 517**
												SNL 314 TS	**SNL 517**	**TSN 314 S**	**ASNH 517**
												SNL 314 TND	**SNL 517**	**TSN 314 ND**	**ASNH 517**
75	115	80	155	80	30	230	280	24	18	16	6,60	**SNL 215 TG**	**SNL 215**	**TSN 215 G**	**ASNH 518-615**
												SNL 215 TA	**SNL 215**	**TSN 215 A**	**ASNH 518-615**
												SNL 215 TS	**SNL 215**	**TSN 215 S**	**ASNH 518-615**
												SNL 215 TND	**SNL 215**	**TSN 215 ND**	**ASNH 518-615**
	140	100	194	100	35	290	345	28	22	20	12,5	**SNL 315 TG**	**SNL 518-615**	**TSN 315 G**	**ASNH 518-615**
												SNL 315 TA	**SNL 518-615**	**TSN 315 A**	**ASNH 518-615**
												SNL 315 TS	**SNL 518-615**	**TSN 315 S**	**ASNH 518-615**
												SNL 315 TND	**SNL 518-615**	**TSN 315 ND**	**ASNH 518-615**
80	120	90	177	95	32	260	315	28	22	20	9,00	**SNL 216 TG**	**SNL 216**	**TSN 216 G**	**ASNH 216**
												SNL 216 TA	**SNL 216**	**TSN 216 A**	**ASNH 216**
												SNL 216 TS	**SNL 216**	**TSN 216 S**	**ASNH 216**
												SNL 216 TND	**SNL 216**	**TSN 216 ND**	**ASNH 216**
	145	100	212	112	35	290	345	28	22	20	13,7	**SNL 316 TG**	**SNL 519-616**	**TSN 316 G**	**ASNH 519-616**
												SNL 316 TA	**SNL 519-616**	**TSN 316 A**	**ASNH 519-616**
												SNL 316 TS	**SNL 519-616**	**TSN 316 S**	**ASNH 519-616**
												SNL 316 TND	**SNL 519-616**	**TSN 316 ND**	**ASNH 519-616**



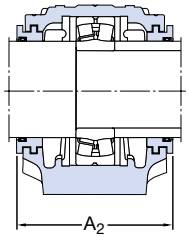


Shaft		Bearing seating		Width across seal		Appropriate bearings and locating rings			
						Self-aligning ball bearing	Locating rings 2 per housing	Self-aligning ball bearing	Locating rings 2 per housing
d_a	d_b	C_a	D_a	A_2	A_3	Spherical roller bearing		Spherical roller bearing CARB bearing	
mm		mm		mm		–			
65	75	51	120	128	190	**1213 E**	FRB 14/120	**2213 E**	FRB 10/120
						–	–	**22213 E**	FRB 10/120
								C 2213	FRB 10/120
	75	58	140	138	200	**1313 E**	FRB 12.5/140	**2313**	FRB 5/140
						21313 E	FRB 12.5/140	**22313 E**	FRB 5/140
								–	–
70	80	61	150	143	205	**1314**	FRB 13/150	**2314**	FRB 5/150
						21314 E	FRB 13/150	**22314 E**	FRB 5/150
								C 2314	FRB 5/150
75	85	56	130	133	195	**1215**	FRB 15.5/130	**2215 E**	FRB 12.5/130
						–	–	**22215 E**	FRB 12.5/130
								C 2215	FRB 12.5/130
	85	65	160	158	220	**1315**	FRB 14/160	**2315**	FRB 5/160
						21315 E	FRB 14/160	**22315 E**	FRB 5/160
								C 2315	FRB 5/160
80	90	58	140	138	200	**1216**	FRB 16/140	**2216 E**	FRB 12.5/140
						–	–	**22216 E**	FRB 12.5/140
								C 2216	FRB 12.5/140
	90	68	170	163	218	**1316**	FRB 14.5/170	**2316**	FRB 5/170
						21316 E	FRB 14.5/170	**22316 E**	FRB 5/170
								C 2316	FRB 5/170

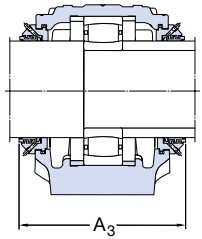
SNL plummer block housings for bearings with cylindrical bore
d_a **85 – 120** mm



Double-lip seals
G design

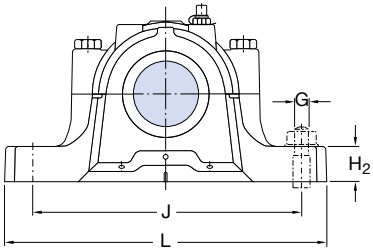


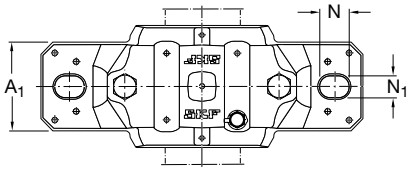
Labyrinth seals
S design



Taconite seals
ND design

Shaft	Housing Dimensions										Mass	Designations			
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G		Housing complete with two seals	Components Housing only	Seals	End cover
mm	mm										kg	–			
85	125	90	183	95	32	260	320	28	22	20	9,50	**SNL 217 TG**	**SNL 217**	**TSN 217 G**	**ASNH 217**
												SNL 217 TA	**SNL 217**	**TSN 217 A**	**ASNH 217**
												SNL 217 TS	**SNL 217**	**TSN 217 S**	**ASNH 217**
												SNL 217 TND	**SNL 217**	**TSN 217 ND**	**ASNH 217**
	160	110	218	112	40	320	380	32	26	24	17,6	**SNL 317 TG**	**SNL 520-617**	**TSN 317 G**	**ASNH 520-617**
												SNL 317 TA	**SNL 520-617**	**TSN 317 A**	**ASNH 520-617**
												SNL 317 TS	**SNL 520-617**	**TSN 317 S**	**ASNH 520-617**
												SNL 317 TND	**SNL 520-617**	**TSN 317 ND**	**ASNH 520-617**
90	140	100	194	100	35	290	345	28	22	20	11,8	**SNL 218 TG**	**SNL 218**	**TSN 218 G**	**ASNH 218**
												SNL 218 TA	**SNL 218**	**TSN 218 A**	**ASNH 218**
												SNL 218 TS	**SNL 218**	**TSN 218 S**	**ASNH 218**
												SNL 218 TND	**SNL 218**	**TSN 218 ND**	**ASNH 218**
95	175	120	242	125	45	350	410	32	26	24	22,0	**SNL 319 TA**	**SNL 522-619**	**TSN 319 A**	**ASNH 522-619**
												SNL 319 TS	**SNL 522-619**	**TSN 319 S**	**ASNH 522-619**
												SNL 319 TND	**SNL 522-619**	**TSN 319 ND**	**ASNH 522-619**
100	160	110	218	112	40	320	380	32	26	24	17,6	**SNL 220 TG**	**SNL 520-617**	**TSN 220 G**	**ASNH 520-617**
												SNL 220 TA	**SNL 520-617**	**TSN 220 A**	**ASNH 520-617**
												SNL 220 TS	**SNL 520-617**	**TSN 220 S**	**ASNH 520-617**
												SNL 220 TND	**SNL 520-617**	**TSN 220 ND**	**ASNH 520-617**
	185	120	271	140	45	350	410	32	26	24	26,2	**SNL 320 TA**	**SNL 524-620**	**TSN 320 A**	**ASNH 524-620**
												SNL 320 TS	**SNL 524-620**	**TSN 320 S**	**ASNH 524-620**
												SNL 320 TND	**SNL 524-620**	**TSN 320 ND**	**ASNH 524-620**
110	175	120	242	125	45	350	410	32	26	24	22,0	**SNL 222 TG**	**SNL 522-619**	**TSN 222 G**	**ASNH 522-619**
												SNL 222 TA	**SNL 522-619**	**TSN 222 A**	**ASNH 522-619**
												SNL 222 TS	**SNL 522-619**	**TSN 222 S**	**ASNH 522-619**
												SNL 222 TND	**SNL 522-619**	**TSN 222 ND**	**ASNH 522-619**
120	185	120	271	140	45	350	410	32	26	24	26,2	**SNL 224 TG**	**SNL 524-620**	**TSN 224 G**	**ASNH 524-620**
												SNL 224 TA	**SNL 524-620**	**TSN 224 A**	**ASNH 524-620**
												SNL 224 TS	**SNL 524-620**	**TSN 224 S**	**ASNH 524-620**
												SNL 224 TND	**SNL 524-620**	**TSN 224 ND**	**ASNH 524-620**

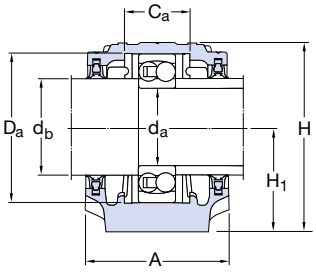




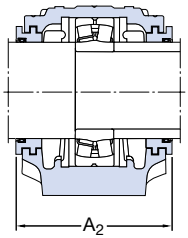
Shaft		Bearing seating		Width across seal		Appropriate bearings and locating rings			
						Self-aligning ball bearing	Locating rings 2 per housing	Self-aligning ball bearing	Locating rings 2 per housing
d_a	d_b	C_a	D_a	A_2	A_3	Spherical roller bearing		Spherical roller bearing CARB bearing	
mm		mm		mm		–			
85	95	61	150	143	205	**1217**	FRB 16.5/150	**2217**	FRB 12.5/150
						–	–	**22217 E**	FRB 12.5/150
								C 2217	FRB 12.5/150
	95	70	180	178	238	**1317**	FRB 14.5/180	**2317**	FRB 5/180
						21317 E	FRB 14.5/180	**22317 E**	FRB 5/180
								C 2317	FRB 5/180
90	100	65	160	158	220	**1218**	FRB 17.5/160	**2218**	FRB 12.5/160
						22218 E	FRB 12.5/160	**23218 CC/W33**	FRB 6.25/160
								C 2218	FRB 12.5/160
95	110	80	200	191	253	**1319**	FRB 17.5/200	**2319**	FRB 6.5/200
						21319 E	FRB 17.5/200	**22319 E**	FRB 6.5/200
								–	–
100	115	70	180	178	245	**1220**	FRB 18/180	**2220**	FRB 12/180
						22220 E	FRB 12/180	**23220 CC/W33**	FRB 4.85/180
								C 2220	FRB 12/180
	115	86	215	199	260	**1320**	FRB 19.5/215	**2320**	FRB 6.5/215
						21320 E	FRB 19.5/215	**22320 E**	FRB 6.5/215
								C 2320	FRB 6.5/215
110	125	80	200	191	255	**1222**	FRB 21/200	**2222**	FRB 13.5/200
						22222 E	FRB 13.5/200	**23222 CC/W33**	FRB 5.1/200
								C 2222	FRB 13.5/200
120	135	86	215	199	270	**1224**	FRB 22/215	**–**	–
						22224 E	FRB 14/215	**23224 CC/W33**	FRB 5/215
								C 3224	FRB 5/215

SNL plummer block housings for bearings with cylindrical bore

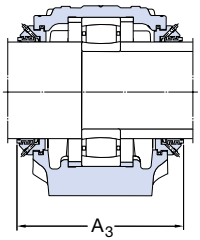
d_a **130 – 160** mm



Double-lip seals
G design

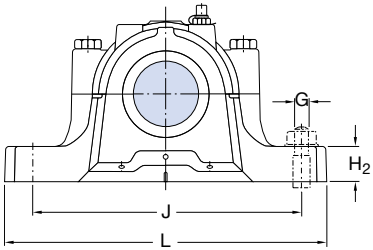


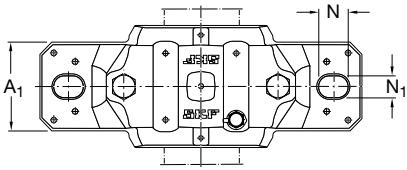
Labyrinth seals
S design



Taconite seals
ND design

Shaft Housing Dimensions											Mass	Designations			
												Housing complete with two seals	Components Housing only	Seals	End cover
d_a	A	A_1	H	H_1	H_2	J	L	N	N_1	G					
mm	mm										kg	–			
130	190	130	290	150	50	380	445	35	28	24	33,0	**SNL 226 TG**	**SNL 526**	**TSN 226 G**	**ASNH 526**
												SNL 226 TA	**SNL 526**	**TSN 226 A**	**ASNH 526**
												SNL 226 TS	**SNL 526**	**TSN 226 S**	**ASNH 526**
												SNL 226 TND	**SNL 526**	**TSN 226 ND**	**ASNH 526**
140	205	150	302	150	50	420	500	42	35	30	40,0	**SNL 228 TG**	**SNL 528**	**TSN 228 G**	**ASNH 528**
												SNL 228 TA	**SNL 528**	**TSN 228 A**	**ASNH 528**
												SNL 228 TS	**SNL 528**	**TSN 228 S**	**ASNH 528**
												SNL 228 TND	**SNL 528**	**TSN 228 ND**	**ASNH 528**
150	220	160	323	160	60	450	530	42	35	30	49,0	**SNL 230 TG**	**SNL 530**	**TSN 230 G**	**ASNH 530**
												SNL 230 TA	**SNL 530**	**TSN 230 A**	**ASNH 530**
												SNL 230 TS	**SNL 530**	**TSN 230 S**	**ASNH 530**
												SNL 230 TND	**SNL 530**	**TSN 230 ND**	**ASNH 530**
160	235	160	344	170	60	470	550	42	35	30	55,0	**SNL 232 TG**	**SNL 532**	**TSN 232 G**	**ASNH 532**
												SNL 232 TA	**SNL 532**	**TSN 232 A**	**ASNH 532**
												SNL 232 TS	**SNL 532**	**TSN 232 S**	**ASNH 532**
												SNL 232 TND	**SNL 532**	**TSN 232 ND**	**ASNH 532**

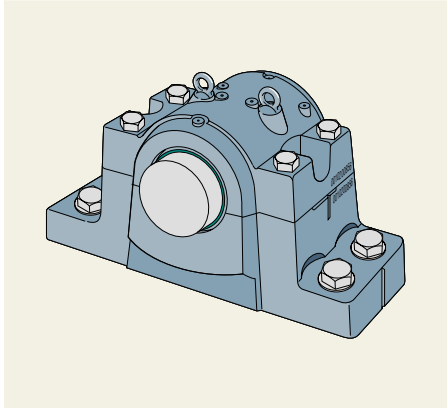




Shaft		Bearing seating		Width across seal		Appropriate bearings and locating rings			
						Self-aligning ball bearing	Locating rings 2 per housing	Spherical roller bearing CARB bearing	Locating rings 2 per housing
d_a	d_b	C_a	D_a	A_2	A_3	Spherical roller bearing			
mm		mm		mm		–			
130	145	90	230	208	275	**1226** **22226 E**	FRB 22/230 FRB 13/230	**23226 CC/W33** **C 2226**	FRB 5/230 FRB 13/230
140	155	98	250	223	290	**22228 CC/W33**	FRB 15/250	**23228 CC/W33** **C 2228**	FRB 5/250 FRB 15/250
150	165	106	270	241	310	**22230 CC/W33**	FRB 16.5/270	**23230 CC/W33** **C 2230**	FRB 5/270 FRB 16.5/270
160	175	114	290	254	325	**22232 CC/W33**	FRB 17/290	**23232 CC/W33** **C 3232**	FRB 5/290 FRB 5/290

SNL plummer block housings, series 30 and 31

Fig 1



The large SNL 30 and SNL 31 series plummer block housings (➔ **fig 1**) incorporate all the wide experience gained by SKF with the smaller SNL housings (➔ **page 1029**) and extend the range to bigger shafts. These housings are a further development of the SD housings with which they are dimensionally interchangeable and which they have replaced.

SNL plummer block housings in the 30 and 31 series can be used as standard for

- spherical roller bearings in the 230, 231 and 240 series as well as
- CARB bearings in the C 30 and C 31 series.

but can be used for other bearing series too. Please contact SKF for further information.

The housings are designed for bearing arrangement types

- bearing on adapter sleeve and smooth shafts with 150 to 470 mm diameter and
- bearing on stepped shafts and cylindrical seatings with 170 to 500 mm diameter.

Seals
- Labyrinth seals
- Taconite heavy-duty seals
- Oil seals

Lubrication
- Grease lubrication
- Oil lubrication

Materials
- Grey cast iron
- Spheroidal graphite cast iron

Further information can be found in the product brochure “SNL 30 and SNL 31 plummer block housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

SONL plummer block housings

SONL plummer block housings with oil dip ring lubrication (➔ **fig 2**) are designed for bearings operating at high speeds and high operating temperatures. These housings are a further development of the SOFN housings with which they are dimensionally interchangeable and which they replace. The split SONL housings can be used for

- spherical roller bearings in the 222 series and
- CARB bearings in the C 22 series.

The housings are designed for bearing arrangement types

- bearing on adapter sleeve and smooth shafts with 75 to 140 mm diameter and
- bearing on stepped shafts and cylindrical seatings with 85 to 160 mm diameter.

Those sizes of SOFN housings for larger shaft diameters or bearings of Dimension Series 23, which are no longer included in the SONL housing range, will still be available for replacement purposes. In all other cases the use of SNL 30 and SNL 31 series housings for oil lubrication of TURT and TURA executions, is recommended.

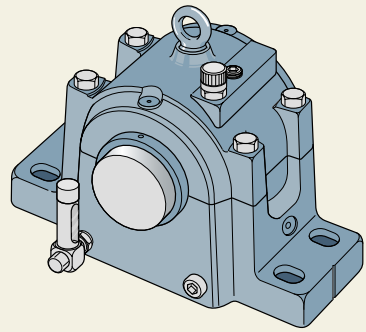
Seals
- Labyrinth seals

Lubrication
- Oil bath lubrication with dip ring
- Circulating oil lubrication

Materials
- Grey cast iron

Further information can be found in the product brochure “SONL plummer block housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 2



SDG plummer block housings

SDG plummer block housings (→ **fig** 3) have been developed for large bearing arrangements. These split housings can be used for

- spherical roller bearings and CARB bearings in several dimension series.

The housings are designed for bearing arrangement types

- bearing on adapter sleeve and smooth shafts with 125 to 670 mm diameter,
- bearing on adapter sleeve and stepped shafts with cylindrical seatings with 125 to 670 mm diameter,
- bearing on withdrawal sleeve and stepped shafts with cylindrical seatings with 135 to 670 mm diameter and
- bearing on stepped shafts and cylindrical seatings with 140 to 710 mm diameter.

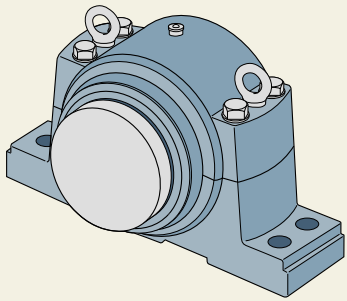
Seals
- Felt seals
- Felt seals with additional V-ring
- Labyrinth seals with inner felt seal

Lubrication
- Grease lubrication

Materials
- Grey cast iron
- Spheroidal graphite cast iron
- Cast steel

Further information can be found in the SKF catalogue “Bearing housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 3



SAF plummer block housings

SAF plummer (pillow) block housings (➔ **fig** 4) were specifically designed for shafts with inch dimensions. The split housings can be used for

- self-aligning ball bearings in the 12 and 13 series,
- spherical roller bearings in the 222, 223, and 230 series as well as
- CARB bearings in the C 22, C 23 and C 30 series.

The housings are designed for bearing arrangement types

- bearing on adapter sleeve and smooth shafts with 1 3/16 to 10 7/16 inch diameter and
- bearing on stepped inch size shafts and cylindrical seatings with 40 to 220 mm diameter.

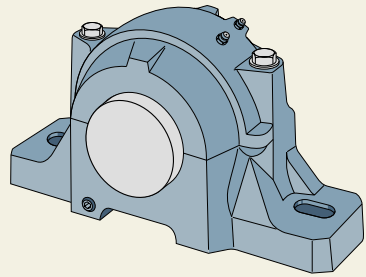
Seals
- Labyrinth seals
- Labyrinth seals with inner radial shaft seal
- Radial shaft seals
- Taconite heavy-duty seals

Lubrication
- Grease lubrication
- Oil lubrication

Materials
- Grey cast iron
- Spheroidal graphite cast iron
- Cast steel

Further information can be found in the SKF catalogue “Mounted Products” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 4



SDAF plummer block housings

SDAF plummer (pillow) block housings (→ **fig** 5) were specifically designed for applications with inch size shafts where heavy thrust loads and/or shock loads require a housing of exceptionally sturdy construction. The split housings can be used for

- spherical roller bearings in the 222 and 223 series as well as
- CARB bearings in the C 22 and C 23 series.

The housings are designed for bearing arrangement types

- bearing on adapter sleeve and smooth shafts with 2 $^{15}/_{16}$ to 7 $^{15}/_{16}$ inch diameter and
- bearing on stepped inch shafts and cylindrical seatings with 85 to 220 mm diameter.

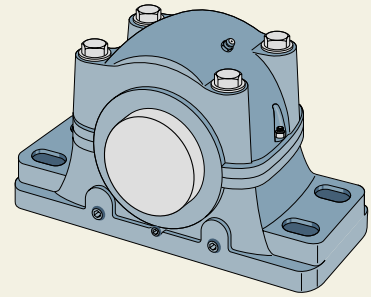
Seals
- Labyrinth seals
- Labyrinth seals with inner radial shaft seal
- Radial shaft seal
- Taconite heavy-duty seals

Lubrication
- Grease lubrication
- Oil lubrication

Materials
- Grey cast iron
- Cast steel

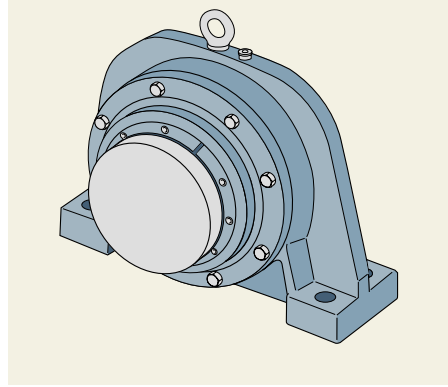
Further information can be found in the SKF catalogue “Mounted Products” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 5



SBD plummer block housings

Fig 6



One-piece SBD plummer block housings (➔ **fig** 6) are able to accommodate heavy loads not only acting towards the support surface, but also in other directions. They can be used for

- spherical roller bearings in the 230, 231, 222 and 232 series as well as
- CARB bearings in the C 30, C 31, C 22 and C 32 series.

The housings are designed for bearing arrangement types

- bearing on adapter sleeve and smooth shafts with 90 to 400 mm diameter,
- bearing on adapter sleeve and stepped shafts with cylindrical seatings with 90 to 400 mm diameter and
- bearing on stepped shafts and cylindrical seatings with 100 to 420 mm diameter.

Seals
- Labyrinth seals

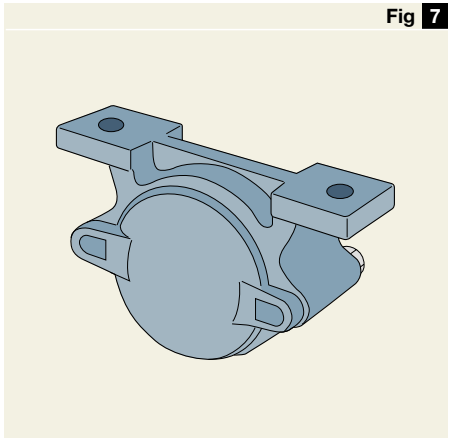
Lubrication
- Grease lubrication

Materials
- Cast steel
- Grey cast iron
- Spheroidal graphite cast iron

Further information can be found in the SKF catalogue “Bearing housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

TVN housings

Fig 7



One-piece TVN housings (➔ **fig** 7) were originally designed for use on light rail-bound trucks but may be used instead of plummer block housings. The one-piece design is stiffer than a horizontally split design. They accommodate

- self-aligning ball bearings in the 12 and 13 series as well as
- spherical roller bearings in the 213 series.

The housings are designed for bearing arrangement type “Bearing on stepped shafts and cylindrical seatings” with 20 to 75 mm diameter.

Seals
- Felt seals

Lubrication
- Grease lubrication

Material
- Grey cast iron

Further information can be found in the SKF catalogue “Bearing housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

TN housings

One-piece TN housings (➔ **fig** 8) are normally used for less demanding applications. They accommodate self-aligning ball bearings with extended inner ring in the 112 series for shaft diameters from 20 to 60 mm.

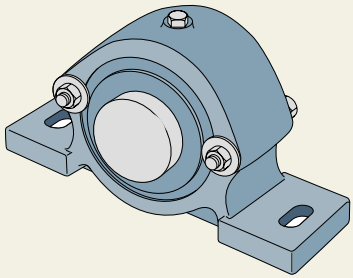
Seals
- Felt seals

Lubrication
- Grease lubrication

Material
- Grey cast iron

Further information can be found in the SKF catalogue “Bearing housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 8



Flanged housings I-1200(00)

Flanged housings in the I-1200(00) series (➔ **fig** 9) are normally used for less demanding applications. They accommodate self-aligning ball bearings with extended inner ring in the 112 series for shaft diameters from 20 mm to 60 mm.

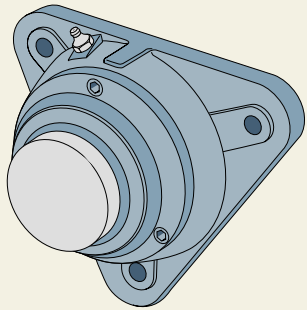
Seals
- Felt seals

Lubrication
- Grease lubrication

Material
- Grey cast iron

Further information can be found in the SKF catalogue “Bearing housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 9



Flanged housings 7225(00)

Flanged housings in the 7225(00) series are produced in two designs depending on size (→ **fig** 10). The smaller sizes are triangular (**a**) and the larger sizes have a square form (**b**). They can be used for

- self-aligning ball bearings in the 12 and 22 series,
- spherical roller bearings in the 222 series as well as
- CARB bearings in the C 22 series.

The housings are designed for bearing arrangement type “Bearing on adapter sleeve and smooth shafts” with 20 to 100 mm diameter.

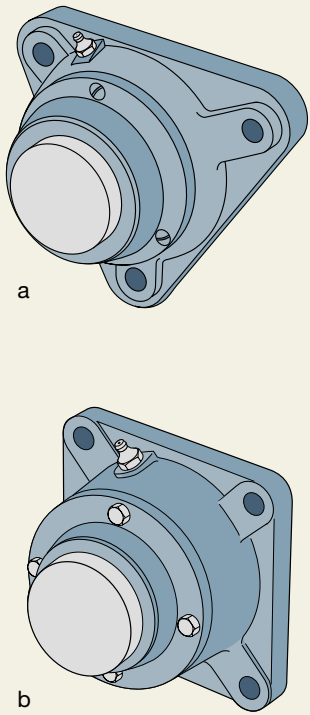
Seals
- Felt seals

Lubrication
- Grease lubrication

Material
- Grey cast iron

Further information can be found in the SKF catalogue “Bearing housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 10



THD take-up housings

THD take-up housings (➔ **fig 11**) are specially designed for belt conveyors. They can be used for

- spherical roller bearings in the 230, 231, 232 and 222 series as well as
- CARB bearings in the C 30, C 31, C 32 and C 22 series.

The housings are designed for bearing arrangement type “Bearing on adapter sleeve and smooth shafts” with 50 to 400 mm diameter.

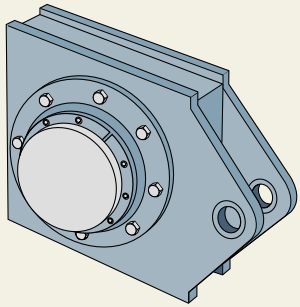
Seals
- Labyrinth seals

Lubrication
- Grease lubrication

Materials
- Cast steel
- Grey cast iron
- Spheroidal graphite cast iron

Further information can be found in the SKF catalogue “Bearing housings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 11





Maintenance and lubrication products

Mechanical tools **1066**
Hook and impact spanners 1066
Lock nut spanners and axial lock nut sockets 1066
Bearing fitting tools 1066
Jaw pullers 1067
Strong back pullers 1067
Internal and blind pullers 1067

Bearing heaters **1068**
Induction heaters 1068
Portable induction heater 1068
Hot plates 1069
Heating devices to remove inner rings 1069
Gloves 1069

Hydraulic tools **1070**
Hydraulic nuts 1070
Hydraulic pumps and oil injectors 1071
Hydraulic accessories 1071

Instruments **1072**
Tachometers 1072
Thermometers 1072
Electronic stethoscope 1072
Oil check monitor 1073
Alignment instruments and shims 1073

Lubricants and lubricators **1074**
Greases 1074
Grease guns and pumps 1074
Grease meter 1074
SYSTEM 24 single point automatic lubricator 1075
SYSTEM MultiPoint automatic lubricator 1075
Oil leveller 1075



SKF develops and markets maintenance tools, lubricants and lubricators to optimize mounting, dismounting and lubrication of bearings. The product assortment includes mechanical tools, heaters, oil injection equipment, instruments, lubricants and lubricators.

Mechanical tools

Mechanical tools are used mainly for mounting and dismounting small and medium-sized bearings. The SKF range comprises tools for the installation and removal of bearings and locking devices. The range also contains bearing handling tools for safe and rapid lifting and positioning of bearings up to 500 kg.



Hook and impact spanners
SKF hook spanners have the exact radius to suit the appropriate lock nut. This enables safe and efficient tightening and minimizes the risk of damage to both the nut and shaft.

Impact spanners are made of spheroidal graphite cast iron and have a special impact face to transmit a maximum torque to the nut. Each spanner can be used with several nut sizes.



Lock nut spanners and axial lock nut sockets
To mount SKF self-aligning ball bearings on adapter sleeves in housings, a special bearing lock nut spanner set is available. Using these spanners, the correct tightening angle is easy to achieve and this enables consistently accurate bearing mounting.

Axial lock nut sockets are especially useful if there is insufficient space around the lock nut. They have drive connections suitable for use with power tools or torque wrenches.



Bearing fitting tools
SKF bearing fitting tools enable small bearings to be cold mounted on a shaft. They can also be used to mount bushings, seals and pulleys. The kits consist of impact rings and sleeves and a dead blow hammer.

Jaw pullers
SKF jaw pullers enable a wide range of bearings to be dismounted. One of the puller series, designated TMMA, which design is unique to SKF, incorporates a spring allowing easy opening and closing of the arms, while a special safety solution helps to prevent dangerous overload. A range of hydraulic spindles and rams are also available for increased puller forces. The SKF jaw puller range contains pullers with withdrawal forces up to 500 kN.

Strong back pullers
SKF strong back pullers are supplied as kits with all necessary accessories to cover the most difficult pulling operations. Strong back pullers consist of either a two or three-piece separable yoke, which when placed behind the bearing makes a “strong back”. The pulling force can be applied using a mechanical spindle, a hydraulic spindle or a hydraulic ram.

Internal and blind pullers
To dismount a wide range of deep groove ball bearings from blind housing bores quickly and easily, SKF has developed blind housing puller kits. These pullers have hinged arms with specially machined ends so that they fit into the bearing raceway(s), allowing the bearing to be extracted from the housing.

Puller kits for removing bearings from housings, using an internal pull, consist of a number of adjustable collets that can be expanded to fit on the rear side of the bearing bore. A slide hammer arrangement allows large forces to be applied to the bearing in order to remove it.







Bearing heaters

A fast and very efficient way to heat a bearing for mounting is to use an induction heater. These heaters, which only heat metallic components, control bearing temperature safely and accurately, to minimize the risk of bearing damage caused by excessive heat.

Induction heaters
SKF pioneered the use of induction heaters for bearing applications. SKF TIH induction heaters cover a wide range of bearing types and sizes. The smaller heaters are recommended for bearings weighing up to 80 kg while the largest floor model can be used for bearings up to 700 kg.

Large heaters are also suitable for heating smaller bearings, as a power reduction feature is incorporated. SKF induction heaters can be controlled by means of time or temperature. In addition, they feature a bearing heating mode to help prevent damage to bearings through over-heating. At the end of each heating cycle, the bearings are automatically demagnetized.

Portable induction heater
The portable SKF induction heater heats bearings and other components with a bore diameter up to 100 mm and a maximum weight of 5 kg. It uses a patented method of heating based on high frequency induction for optimized efficiency. This truly portable unit weighs just 4,5 kg and is supplied with a heating clamp, temperature probe, power cable and a carrying case.







Hot plates
The SKF electric hot plate heats small bearings and other machinery components. It is suitable for bearings with an outside diameter up to approximately 170 mm or with a weight up to 4 kg. A lid for retaining the heat also prevents dirt from entering the bearing.

Heating devices to remove inner rings
A range of special heating devices for removing cylindrical roller bearing inner rings from shafts is available from SKF. Aluminium heating rings are designed for dismounting inner rings of small and medium-size cylindrical roller bearings. Adjustable induction heaters are also available for frequent dismounting of various sizes of cylindrical roller bearing inner rings. Two sizes are available covering raceway diameters from 80 to 170 mm. Non-adjustable induction heaters are designed to suit a particular bearing and application. They are normally used to dismount inner rings of multi-row cylindrical roller bearings.

Gloves
SKF heat resistant gloves specially designed for the handling of heated bearings and other machine components.







Hydraulic tools

A variety of hydraulic tools is available to mount and dismount bearings in a safe and controlled manner. The SKF oil injection method enables easy working while the SKF Drive-up Method provides accurate results.

Hydraulic nuts

HMV .. E type hydraulic nuts enable mounting and dismounting of bearings with tapered bores of 50 mm and above. When compared with mechanical methods, they considerably reduce the time and effort needed to install or remove a bearing. SKF HMV .. E nuts are available with metric or imperial threads or with a plain bore.

SKF HMV .. E nuts, when used in conjunction with SKF pumps fitted with a digital pressure gauge and a dial indicator, allow the full advantages of the SKF Drive-up Method to be realized.







Hydraulic pumps and oil injectors
SKF hand-operated hydraulic pumps can develop pressures up to 150 MPa. They can be supplied with a highly accurate pressure gauge, which allows the SKF Drive-up Method to be employed. All pumps are contained in a sturdy carrying case complete with a hose, quick connection coupling, nipple and mounting fluid.

Oil Injectors can supply oil pressures up to 400 MPa. The SKF range comprises single injectors as well as a number of kits, which contain an injector and a selection of the most common accessories such as an adapter block, high-pressure pipes and nipples.

For large bearings and applications requiring a larger volume of oil, several air-driven portable pumps and injectors providing pressures up to 300 MPa are available.

Hydraulic accessories
To facilitate connections between hydraulic tools and most applications, SKF offers a wide range of accessories including pressure gauges, high pressure pipes, connection nipples and mounting and dismounting fluids.







Instruments

To realize maximum bearing life, it is important to determine the operating condition of machinery and their bearings. With the SKF measuring instrument range, critical environmental conditions can be analysed to achieve optimum bearing performance.

Tachometers
Optical measurement is a safe and reliable technique to determine rotational speed. Using non-contact instruments is often essential to meet industrial safety regulations. SKF provides a range of highly accurate optical tachometers. A range of accessories enables linear and direct contact rotational speeds to be measured.

Thermometers
The temperature of a bearing or bearing housing is a quick and easy indication of the running conditions of the bearing. SKF provides a range of contact and non-contact thermometers from the indispensable ThermoPen up to a highly accurate, advanced dual channel, wide range thermometer. A comprehensive range of temperature probes for a variety of applications is also available.

Electronic stethoscope
The noise of a machine can help indicate troublesome parts such as damaged bearings, valve chatter, tappet noise, piston slap and gear and pump noise. The SKF electronic stethoscope is a hand-held instrument that picks up the noise or vibration from a machine via a probe and helps the user locate the source of the noise.







Oil check monitor
The SKF oil check monitor determines oil condition by analysing the contamination levels and electro-chemical changes in both mineral and synthetic based oils. It was developed originally for engine oils but is suitable for gear and lubrication oils. It can also help to detect water, anti-freeze or metallic particles in an oil sample.

Alignment instruments and shims
SKF has developed laser alignment tools to make the machinery alignment process faster, easier and more reliable. Using the latest laser technology, the SKF shaft alignment tool measures both the parallel and angular alignment of shafts to be connected.

SKF's belt alignment tool aligns the grooves in a pulley rather than the pulley face, facilitating accurate and simultaneous adjustment of belt tension and pulley alignment.

A comprehensive range of pre-cut machinery shims in both metric and inch dimensions is available as well as stainless steel double slot shims for use with many housings.







Lubricants and lubricators

The value and importance of using the right lubricant is explained in the section “Lubrication”, starting on **page 229**. The formulation of all SKF bearing greases is based on extensive research, grease performance testing and field experience.

SKF developed many of the internationally accepted bearing-related grease testing parameters. For correct lubricant application, a range of lubrication equipment is available from SKF.



Greases
SKF offers a range of high quality lubricating greases to suit many bearing applications and conditions. The greases have been developed specifically to meet the needs of rolling bearings and their application conditions. A guide to select the most suitable SKF grease can be found in **table** 2 on **pages 246** and **247**. The table also contains the important properties.



Grease guns and pumps
The SKF range also includes grease guns, manual and air-driven grease pumps and grease filler pumps. Grease filler pumps are used to fill grease guns and grease packers from standard SKF grease drums.

Grease meter
The SKF grease meter can accurately measure the volume of grease pumped into a bearing. A wide range of accessories is available.



SYSTEM 24 single point automatic lubricator
SKF SYSTEM 24 is a single point automatic lubricator, pre-filled with SKF grease or oil. Compared with traditional manual re-lubrication techniques, SKF SYSTEM 24 provides a more accurate control of the quantity of lubricant supplied. It can be set to continuously supply the correct amount of quality lubricant over a given time period, up to a maximum of one year.

SYSTEM MultiPoint automatic lubricator
SKF SYSTEM MultiPoint is a microprocessor controlled automatic lubricator. Grease can be supplied to up to eight points, using standard SKF grease cartridges. The cartridges assure the user that only clean fresh grease is used. SYSTEM MultiPoint lubricator has been tested and approved for use with all SKF bearing greases.

Oil leveller
The SKF oil levellers are designed for automatic adjustment of the optimal oil level in oil bath lubricated applications. They effectively solve the problem of adjusting the correct oil level during operation or due to leakage rather than just during standstill.








SKF

Other SKF products

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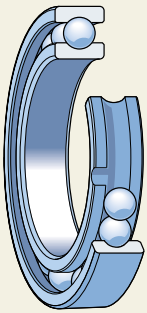
Other ball bearings

Large deep groove ball bearings with filling slots
Special SKF deep groove ball bearings for heavily loaded bearing arrangements where there are slewing movements, e.g. the support bearing arrangement of converter drives. The bearings may be of the full complement type or they may contain separator rings or spacers to separate the balls.

Additional information can be found in the "SKF Interactive Engineering Catalogue".



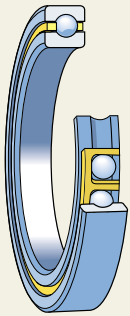
Fixed section ball bearings
Fixed section ball bearings are part of the SKF thin section bearing assortment. As the name suggests, thin section bearings have very thin rings and very low cross section. They are further characterized by low weight, low friction and high stiffness. Fixed section ball bearings are inch dimension bearings that have a constant cross section within a particular series irrespective of the bearing size.

SKF fixed section bearings are available as either open or sealed

- deep groove ball bearings,
- angular contact ball bearings and
- four-point contact ball bearings

in up to eight different cross sections.

Additional information can be found in the SKF product brochure "Fixed section bearings".

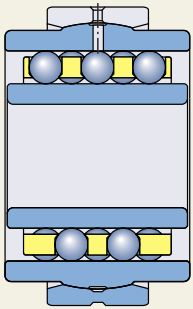


Multi-row ball bearings

Multi-row ball bearings have several rows of balls held and guided in a machined brass cage. The inner and outer ring raceways have a cylindrical form so that axial displacement of the shaft relative to the housing can be accommodated within the bearing in both directions. A convex sphered outside diameter on the outer ring enables the bearing to compensate for initial alignment errors.

Multi-row ball bearings are specially designed to support the axially oscillating doctor rolls of paper machine dryer sections. They are available from SKF in two designs.

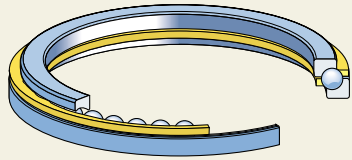
Additional information can be found in the "SKF Interactive Engineering Catalogue".



Large-size angular contact thrust ball bearings

Large-size SKF angular contact thrust ball bearings were originally designed to support the rotary tables of drilling rigs but are also suitable for other applications where high load carrying capacity, high axial stiffness and low friction torque are important. In contrast to conventional thrust ball bearings, angular contact thrust ball bearings can accommodate radial loads in addition to axial loads and are able to operate at high speeds. They are available as single direction or double direction thrust bearings.

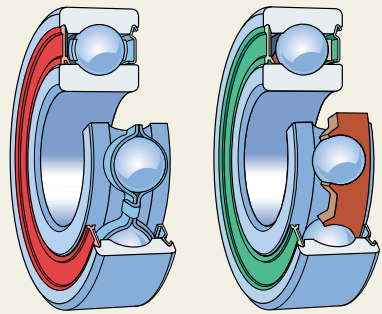
Additional information can be found in the "SKF Interactive Engineering Catalogue".



Bearings for inline skates and skateboards

SKF has been involved in skate bearings since the early days of quads (roller skates), skateboards and inline skates. So many bearing executions were designed by SKF, that today there is a full range of state-of-the-art bearings, adapted to each skating style and need.

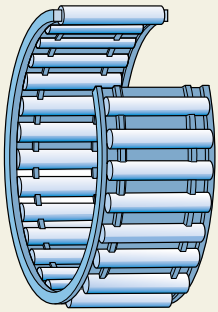
For more information, please visit www.skfsport.com.



Other roller bearings

Needle roller and cage assemblies
Needle roller and cage assemblies are ready-to-mount, self-contained bearing arrangement components. They enable bearing arrangements having high load carrying capacity and stiffness and require a minimum of radial space if the shaft and housing bore can serve as raceways and have the same hardness and surface finish as bearing rings.

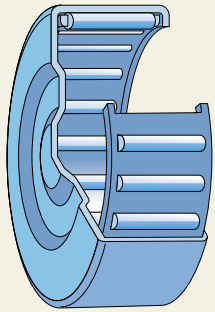
SKF needle roller and cage assemblies are available in single row and double row designs. They are characterized by their simple and rugged design, accurate guidance of the rollers in the cage pockets, and good running properties.



Drawn cup needle roller bearings
Drawn cup needle roller bearings have a deep drawn thin-walled outer ring and are characterized by very low sectional height and high load carrying capacity. They are generally used when the housing bore cannot be used as a raceway. They are used directly on the shaft, but can also be combined with an inner ring.

SKF drawn cup needle roller bearings are available with either an open or closed end; with or without integral seals.

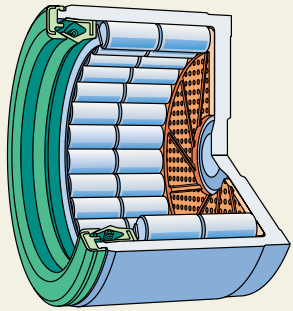
Additional information can be found in the SKF catalogue “Needle roller bearings” or in the “SKF Interactive Engineering Catalogue”.



Drawn cup universal joint bearings
Special drawn cup needle roller bearings with a closed end are available for the universal joints of commercial vehicle propeller shafts. The thin-walled, case hardened drawn cup allows the use of relatively large diameter rollers to provide high load carrying capacity while still permitting compact bearing arrangements.

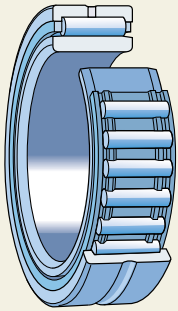
SKF universal joint bearings are available in several designs and sizes in the inside diameter range from 20 to 48 mm.

Further information will be supplied on request.



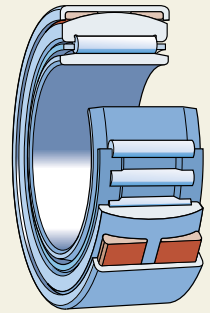
Needle roller bearings
Needle roller bearings with carbon chromium steel rings have a low sectional height and a very high load carrying capacity for their size. They may be used with or without an inner ring, depending on the application.

SKF needle roller bearings are available in several designs and many sizes. The majority of these are bearings with integral internal outer ring flanges. Also included in the range are bearings without these flanges and sealed bearings.



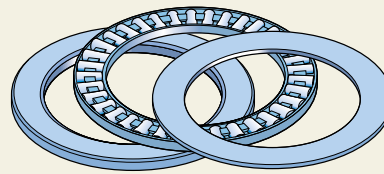
Alignment needle roller bearings
Alignment needle roller bearings have an outer ring with a convex sphered outside surface. A plastic seating ring with a concave sphered inside surface and encased in a drawn sheet steel sleeve is fitted over the outer ring, thus enabling the bearing to align.

Alignment needle roller bearings are therefore insensitive to errors of alignment of the shaft relative to the housing. SKF alignment needle roller bearings can be supplied with or without an inner ring.



Needle roller thrust bearings
Needle roller thrust bearings can support heavy axial loads, are insensitive to shock loads and provide stiff bearing arrangements, which require a minimum of axial space. They are single direction bearings and can accommodate axial loads acting in one direction.

SKF needle roller thrust bearings are available as needle roller and cage thrust assemblies, which can be combined with washers of various designs. Because of all the possible combinations, all the bearing components can be ordered separately.

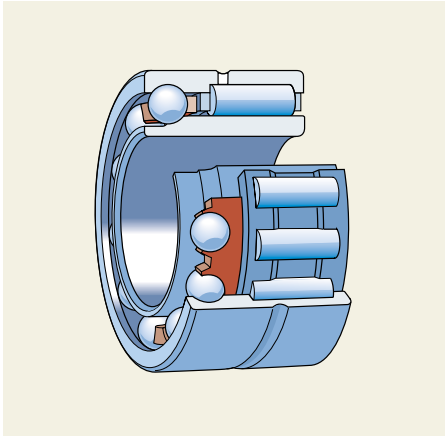


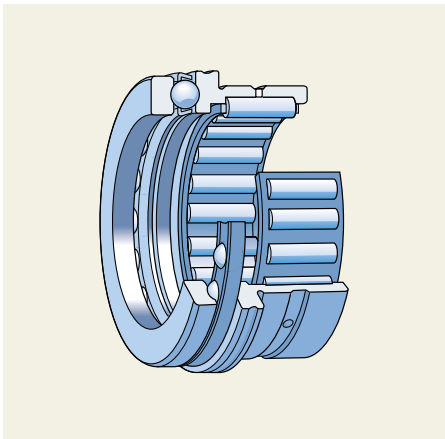
Additional information can be found in the SKF catalogue “Needle roller bearings” or in the “SKF Interactive Engineering Catalogue”.

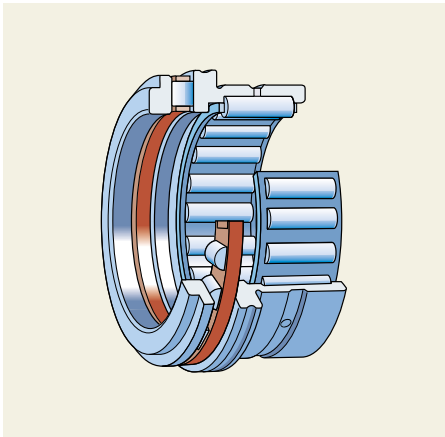
Combined needle roller bearings
Combined needle roller bearings consist of a radial needle roller bearing combined with a thrust bearing and are consequently able to accommodate both radial and axial loads. They provide the means to produce locating bearing arrangements in a minimum of radial space. They are particularly suited for applications where the axial loads are too heavy, speeds too high, or lubrication inadequate for simple thrust washers to be used or where other types of locating bearings occupy too much space.

SKF combined needle roller bearings are available as

- needle roller/angular contact ball bearings,
- needle roller/thrust ball bearings and
- needle roller/cylindrical roller thrust bearings.





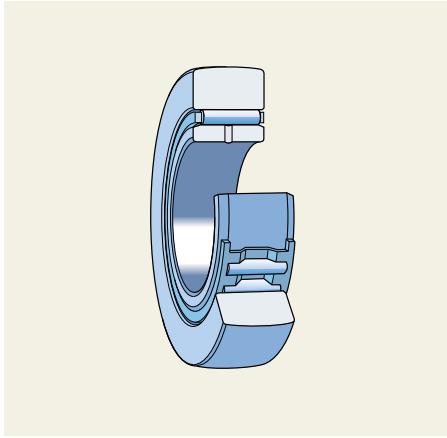


Additional information can be found in the SKF catalogue “Needle roller bearings” or in the “SKF Interactive Engineering Catalogue”.

Track runner bearings
Track runner bearings are rolling bearings with a particularly thick-walled outer ring that can accommodate heavy loads as well as shock loads. Track runner bearings are ready-to-mount units and used for all types of cam drives, conveyor systems etc.

The SKF standard range includes the cam rollers shown in the sections

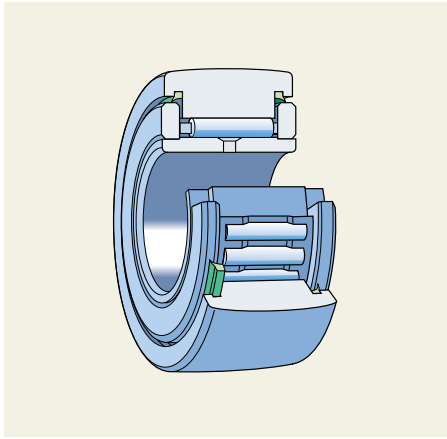
- "Deep groove ball bearings" (➔ **page 399**) and
- "Angular contact ball bearings" (➔ **page 457**) as well as
- support rollers and cam followers mentioned below.



Support rollers

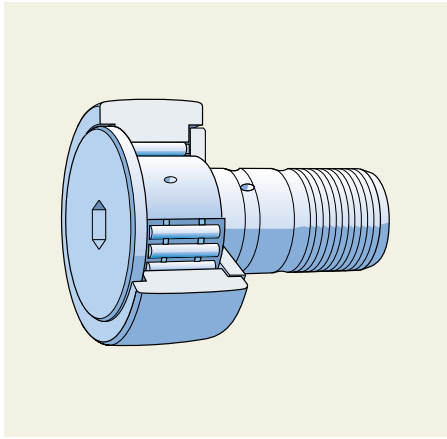
SKF support rollers are basically needle or cylindrical roller bearings. The outside surface of the outer ring is crowned to reduce edge stresses if the roller runs in a tilted or inclined position. They are available in several designs

Sealed support rollers are filled with grease and are ready-to-mount and ready-to-use units.



Cam followers

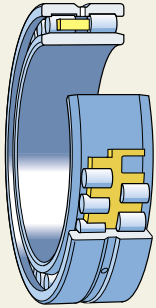
SKF cam followers are essentially needle or cylindrical roller bearings, which have a solid stud instead of the inner ring. The stud is threaded so that the cam follower can be easily attached to appropriate machine components. Cam followers are filled with grease and are ready-to-mount and ready-to-use units.



Additional information can be found in the SKF catalogue "Needle roller bearings" or in the "SKF Interactive Engineering Catalogue".

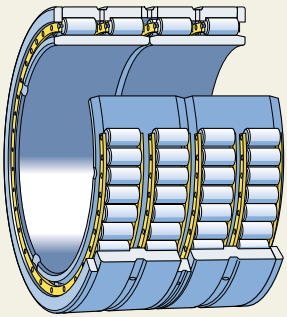
Double row cylindrical roller bearings
Double row cylindrical roller bearings have a low cross section, high load carrying capacity and high stiffness. They are used primarily in machine tools, rolling mill stands, plastic calenders, grinding mills and also large gearboxes.

SKF double row cylindrical roller bearings are produced with a cylindrical or tapered bore and are available in various designs.



Multi-row cylindrical roller bearings
Four-row and six-row cylindrical roller bearings are used almost exclusively for the roll necks of rolling mill stands, calenders and roller presses. They are of separable design to considerably simplify bearing mounting, maintenance and inspection.

SKF four-row cylindrical roller bearings have a cylindrical bore and some sizes are also available with a tapered bore or as sealed bearings, with a seal on one or both sides of the bearing.

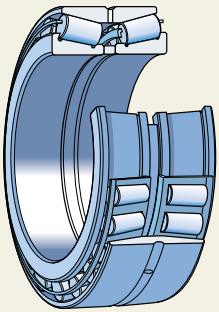


Double row taper roller bearings
Double row taper roller bearings provide a stiff bearing arrangement under heavy load. They can accommodate combined radial and axial loads and locate a shaft axially in both directions with a given axial clearance or preload.

SKF double row taper roller bearings are produced in

- the TDO configuration with a one-piece outer ring and roller sets arranged back-to-back;
- the TDI configuration with a one-piece inner ring and roller sets arranged face-to-face.

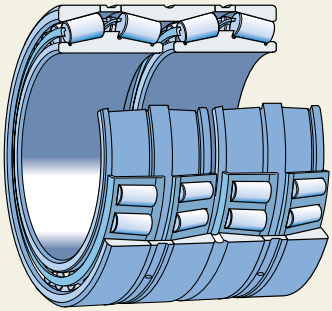
SKF bearings in the TDI configuration have a cylindrical bore and some sizes are also available with a tapered bore or with seals on both sides of the bearing.



Four-row taper roller bearings
Four-row taper roller bearings are used for rolling mill bearing arrangements where rolling speeds are moderate. Because of their special attributes they are produced in several different designs and sizes.

The extensive SKF range of four-row taper roller bearings includes conventional designs with intermediate rings between the outer and/or inner rings, as well as new and modified designs. SKF four-row taper roller bearings are produced in

- the TQI configuration with two pairs of roller sets arranged back-to-back,
- the TQO configuration with two pairs of roller sets arranged face-to-face.

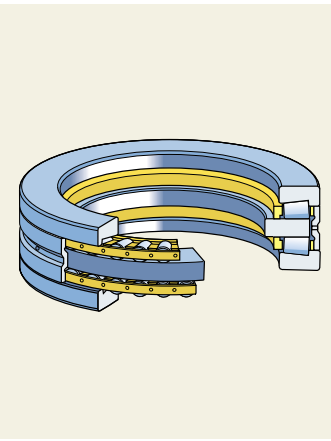


Available with either a cylindrical or tapered bore many sizes are also available with seals on one or both sides of the bearing.

Taper roller thrust bearings
Taper roller thrust bearings enable axially compact bearing arrangements that can accommodate very heavy axial loads. These stiff bearing arrangements are insensitive to shock loads.

SKF produces taper roller thrust bearings as

- caged or full complement single direction bearings, e.g. for kingpin bearing arrangements in commercial vehicles,
- double direction bearings for rolling mill applications and as
- screw-down bearings for the screw spindles in rolling mill applications.

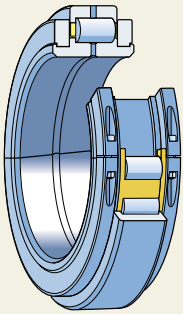


Additional information can be found in the “SKF Interactive Engineering Catalogue”.

Split cylindrical roller bearings
Split cylindrical roller bearings are used primarily for bearing arrangements, that are difficult to access or for crank shafts and other applications where the maintenance or replacement of non-split bearings would require considerable time and effort and would cause long, expensive or even unacceptable machine downtime.

SKF produces single row and double row split cylindrical roller bearings to order. The designs of the bearings are tailored to the application.

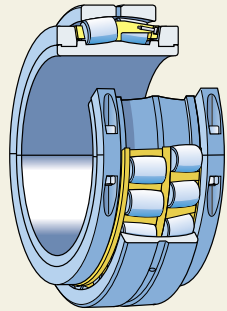
Additional information can be found in the "SKF Interactive Engineering Catalogue".



Split spherical roller bearings
Split spherical roller bearings are used primarily for bearing positions that are difficult to access such as crank shafts, or long shafts where several support positions are required. They are also used in applications where non-split bearings would require considerable time and effort for replacement causing unacceptably long machine downtime.

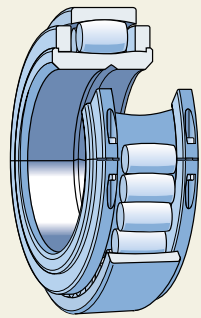
SKF split spherical roller bearings are produced to order in several designs. The designs are tailored to the particular application and, for cost reasons, they are generally based on available bearings of standard design.

Additional information can be found in the "SKF Interactive Engineering Catalogue".



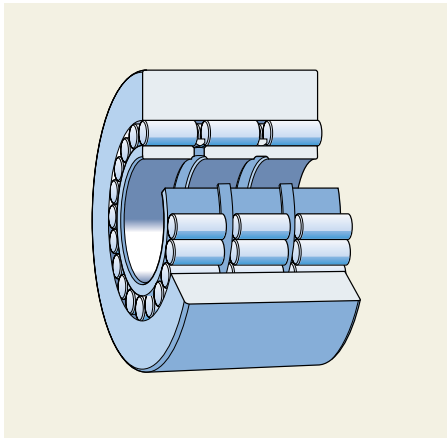
Split CARB® toroidal roller bearings
Split CARB bearings are available as completely split units, which are sealed and water-cooled for bearing arrangements in continuous casters. They are a technically, well-proven solution for high quality requirements and maintenance-free operation.

Additional information can be found in the SKF brochure "Split bearing units for continuous casting plants".



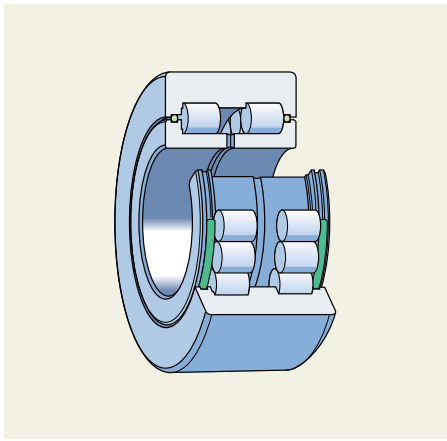
Backing bearings for cluster mills
SKF backing bearings are generally based on double or multi-row cylindrical roller bearings. Single row needle roller bearing and double row taper roller bearing designs are also available. The logarithmic contact profile between the rollers and raceways of an SKF backing bearing for cluster mills provides excellent stress distribution under all load conditions, even when the bearing is misaligned under load. An optimized finish on all contact surfaces maximizes the effects of the lubricant.

For cluster mill bearings SKF also has bearing repair and rework facilities to return a used bearing to a “like-new” condition. If required, all the components of a backing bearing can be reworked.



Indexing roller units for continuous furnaces of sintering plants
SKF indexing roller units were originally developed for use on the continuous furnaces of sintering and pelletising plants. These ready-to-mount units are also suitable for applications where there are very heavy loads and the direction of rotation is frequently reversed, or where rotational speeds are low.

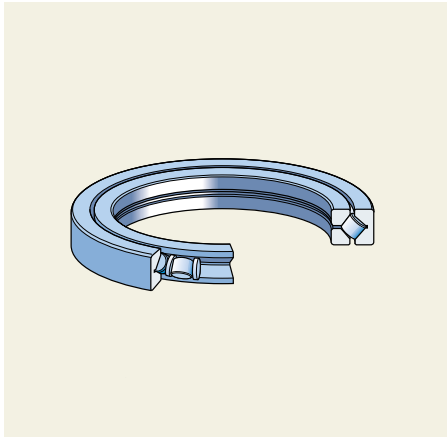
Additional information can be found in the “SKF Interactive Engineering Catalogue”.



Crossed taper roller bearings
Crossed taper roller bearings are particularly compact double direction taper roller thrust bearings and are mainly used in tables of machining centres, milling and drilling machines as well as radar antennae and welding robots.

SKF crossed taper roller bearings consist of an outer ring and a two-piece inner ring. Tapered rollers are arranged between the rings, with every second roller placed at approximately right angles to the adjacent roller. Plastic discs separate the rollers. Because of their special internal geometry the power loss at the roller end contacts is minimal and heat generation is low.

Further information will be supplied on request.



Slewing bearings

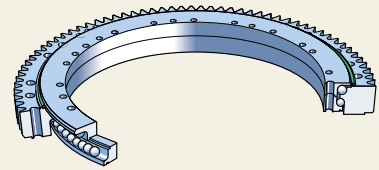
Slewing bearings are ball or cylindrical roller bearings that can accommodate axial, radial and moment loads acting either singly or in combination and in any direction. They are not mounted on a shaft or in a housing; the rings, which are simply bolted on the seating surface are available in one of three executions:

- without gears or
- with an internal gear or
- with an external gear.

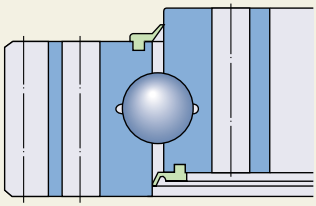
Slewing bearings can perform both oscillating (slewing) movements as well as rotating movements.

The outside diameter range of SKF slewing bearings with a one-piece ring is from 400 to 7 200 mm. Even larger bearings are produced with outside diameters up to 14 000 mm, but these have segmented rings. Some of the smaller sizes, up to approximately 2 000 mm outside diameter are standard production.

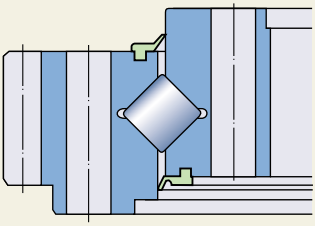
Further information will be supplied on request.



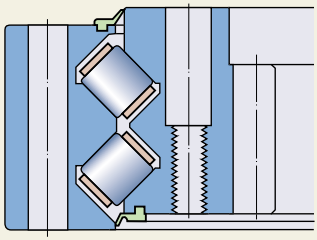
Single row slewing ball bearings
SKF single row slewing ball bearings are four-point contact ball bearings. The balls are inserted through a filling slot which is plugged afterwards. The bearings are sealed, have no preload and are intended for applications where demands regarding accuracy are moderate.



Single row slewing roller bearings
SKF single row slewing roller bearings are crossed cylindrical roller bearings. Every second roller is at right angles to its neighbouring roller. The rollers are inserted through a filling slot which is plugged afterwards. The bearings are under preload and have integral lip seals.



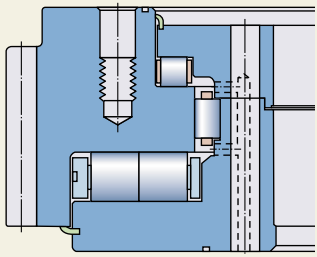
Double row slewing bearings
These slewing rings are angular contact cylindrical roller bearings. The rollers are inserted through filling slots in one of the rings; the slots are plugged afterwards. Plastic separators provide optimum roller guidance. The bearings are normally pre-loaded and are fitted with integral lip seals.



Triple row slewing bearings
Triple row slewing bearings are combined radial and thrust cylindrical roller bearings for very heavy loads with one one-piece and one two-piece ring. The bearings are not under preload and have integral lip seals. These bearings place high demands on the seating surfaces.

Other slewing bearings
In addition to the standard designs outlined above, SKF also produces several other designs, for a multitude of applications, to order. These include

- slewing bearings as combined cylindrical roller/ball bearings,
- slewing bearings as double row angular contact ball bearings,
- dry sliding slewing bearings and
- slewing bearings with integral drive.



Specials for special applications

Products for railway vehicles
Bearings are used for a wide variety of purposes in all kinds of railway vehicles. They are key components in axleboxes and drive systems such as traction motors and suspension units. Other applications include gearboxes, shock absorbers, tilting mechanisms, doors etc. The latest development involves sensors to detect speed, direction of rotation, bearing condition and bogie stability. These are now becoming standard equipment for several modern train designs. Some product examples are:

- compact tapered roller bearing units with metric or inch dimensions,
- axleboxes designed for overall economy, reliability and comfort,
- axlebridges for low floor tramcars supporting the two independent wheels fitted with tapered bearing units.

For more information, please visit www.railways.skf.com.







Products for automotive applications
SKF supplies a wide variety of standard and special bearings, including sensorized bearings as well as ready-to-mount bearing units, to the automotive industry for different car and truck applications. The range includes

- car hub units
- truck hub units
- belt tensioner units
- water pump spindles
- clutch release bearings
- drive shaft (propeller) and intermediate shaft support bearings
- drive shaft (propeller shaft) centring bearings
- suspension bearings
- free wheels (sprag clutches)







Vehicle replacement parts
A comprehensive range of vehicle kits is also available for replacement purposes for a wide selection of cars and trucks. These kits contain everything the mechanic needs to do the complete job which includes not only the requisite bearings, but the appropriate accessories such as seals, nuts, retaining rings etc. The range of kits includes

- hub bearing kits for cars
- hub bearing kits for trucks
- synchronous drive and belt tensioner kits
- clutch release bearings kits for cars
- clutch release bearing kits for trucks
- water pump kits
- suspension bearing kits

For more information about automotive aftermarket products, please visit the SKF website www.vsm.skf.com.







High-precision bearings for machine tools
SKF manufactures a wide range of precision bearings, that are intended for use in machine tool applications and other applications where accuracy and high speed capabilities are important. SKF precision bearings are available in several ISO Dimension Series and in a wide range of sizes. The product range includes traditional all-steel bearings as well as hybrid bearings. For more information, please refer to the SKF catalogue “High-precision bearings”.

Single row angular contact ball bearings

SKF high-precision all-steel and hybrid angular contact ball bearings are available as normal as well as high-speed bearings in three ISO Dimension Series with two different contact angles each.

Cylindrical roller bearings

SKF offers both single row and double row cylindrical roller bearings as all-steel or hybrid bearings. They feature low cross-sectional height, high load carrying capacity and high speed capability.

Double direction angular contact thrust ball bearings

SKF offers three series of high-precision angular contact thrust ball bearings with different contact angles as all-steel or hybrid bearings. They are specially suited to applications demanding accuracy and rigidity of machine tool work spindles.







Single direction angular contact thrust ball bearings

SKF single direction angular contact thrust ball bearings are designed for use in precision ball screws. They provide high load ratings and speed capability, superior axial rigidity and extreme running accuracy. They can be ordered as single bearings, universally matchable bearings and as matched sets. They are also available as ready-to-mount cartridge units.

Magnetic bearings
Magnetic bearings are used in a variety of applications e.g. turbomolecular pumps, compressors, turbo generators, semiconductor equipment and high speed machine tools. They levitate the shaft by inducing a controlled magnetic field. This means that the shaft is rotating without contact. The system senses the shaft position and adjusts the force in real time keeping the shaft at the required position.

Some of the benefits of magnetic bearings are:

- no contamination from wear,
- lubrication-free,
- operate in severe environments e.g. extreme high and low temperatures, ultra-high vacuum or submerged applications,
- minimal vibration transferred to housing,
- precision control and elimination of shaft runout caused by unbalance, and
- built-in condition monitoring of rotor dynamics of vibration and forces.

SKF offers a full range of magnetic bearing products:

- magnetic bearings,
- digital controllers,
- DC brushless motors,
- hyperspin spindles,
- engineered shaft solutions.

For more information, please visit www.revolve.com.







Products for the pulp and paper industry
SKF meets the demands of the pulp and paper industry by offering customized solutions, both in the area of products and services, for example

- self-aligning bearing systems using a spherical roller bearing as the locating bearing and a CARB toroidal roller bearing at the non-locating position, which accommodate axial expansion and deflections, decrease vibrations and increase service life;
- a standard range of housings, designed for high flow circulating oil lubrication, with maintenance-free sealing arrangements;
- condition monitoring equipment to virtually eliminate unplanned downtime.

The SKF handbook “Rolling bearings in paper machines” provides information on bearing selection and how to maximize bearing service life. The handbook is available on request.



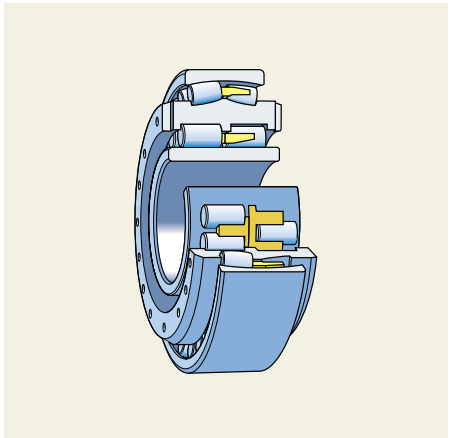


Triple ring roller bearings

Triple ring roller bearings are used almost exclusively in paper machines for the support of variable crowned press rolls at the drive side. SKF produces three different inner/outer bearing combinations:

- cylindrical/spherical roller bearing,
- spherical/cylindrical roller bearing or
- spherical/spherical roller bearing.

Additional information can be found in the SKF catalogue “Large bearings”.



Bearings for the printing industry
For many years SKF has been the partner to the printing industry through continuous innovation and development of customized products and solutions to increase productivity, improve printing quality and to support the need for maximum machine reliability. Examples of SKF specials for printing machines include

- the PCU – a Printing Cylinder Unit, that facilitates print on/off in printing presses required during printing operation;
- the SKF PANLOC – a bearing unit, that permits the axial displacement of the shaft in both directions without generating internal axial forces and allows clearance or preload to be adjusted;
- the Recommended Product Range – an application-oriented bearing selection from the comprehensive SKF range. To choose a bearing from this recommended product range means short delivery times, worldwide availability and no minimum order quantities.

In addition SKF offers a complete assortment of linear motion products, complete service solutions as well as maintenance-free concepts, mechatronics and measuring instruments for printing machine manufacturers and operators.

For more information, please visit www.printing.skf.com.





Products for aerospace applications

The SKF Aeroengine Division

The aeroengine product range includes main shaft and gearbox bearings for helicopters and jet engines. Bearing types include ball bearings and spherical, cylindrical and taper roller bearings. The SKF aerospace specialists MRC and SKF Avio also offer bearing refurbishment services to airlines and aircraft engine overhaul facilities, which restore used aeroengine bearings to like-new condition. In addition to aeroengine products and services, MRC also manufactures specialty aerospace quality steel and ceramic rolling elements that are used in highly engineered industrial and aerospace applications. The MRC Specialty Bearings business unit manufactures high performance custom designed bearings for technically and environmentally demanding applications.

For more information, please visit www.mrcbearings.com.



SARMA aerospace equipment

Sarma, an SKF company, is the European leader in design and manufacture of flight control components and assemblies. Sarma's state of the art facilities are equipped with the latest technology for R&D, testing, production, quality and information technology. Three product ranges are offered:

- metallic and composite rods and struts for structural and flight control applications;
- ball, roller and spherical plain bearings for landing gear, flight controls, wings and engine links;
- a wide range of mechatronic products including position and force transducer units, linear and rotary actuators, for cockpit, flight control and utilities actuation.

For more information , please visit www.sarma-aerospace.com.





Seals

Seals represent an important part of the SKF business. The SKF range consists of seals in contact with stationary or sliding surfaces and covers virtually all application requirements. Not just simple sealing arrangements, but a wide range of seals for demanding industrial applications. From design concepts to high volume production, from original equipment to aftermarket, SKF can provide sealing solutions to its customers.

Detailed information can be found in the catalogue “CR seals” and the “CR Industrial Seals Handbook”. The standard range of dynamic SKF seals for rotating machine components is also listed in the “SKF Interactive Engineering Catalogue”. For additional information, please visit the SKF websites www.sealpool.com and www.chicago-rawhide.com.





Seals for rotating machine components
- Radial shaft seals
- Mechanical seals
- V-ring seals
- Axial clamp seals
- Wear sleeves for shaft repairs

Seals for reciprocating components
- Hydraulic piston seals
- Hydraulic rod seals
- Wiper seals
- Guide rings and guide strips

Seals for stationary surfaces
- O-rings
- Back-up rings

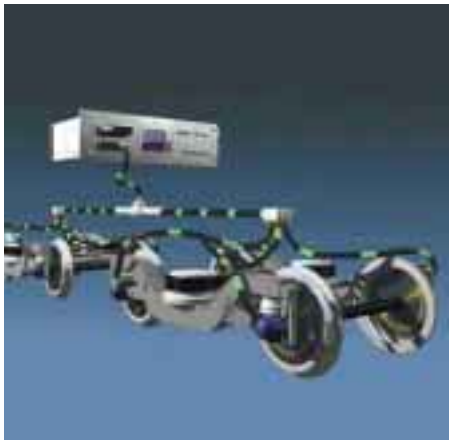
PTFE seals for different purposes
- Piston and rod seals
- Wiper seals
- Guide strips
- Radial shaft seals
- PTFE encapsulated O-rings

SKF system solutions

SKF Copperhead
SKF Copperhead is a system solution for vibrating screens, crushers, mills, conveyors and other mineral processing equipment. It enables fault detection monitoring of the equipment, including the bearing arrangements using vibration and temperature sensors. The SKF Copperhead system comprises the appropriate SKF Explorer spherical roller bearings, CARB® toroidal roller bearings, sensors and monitoring units. The system extends equipment service life and reduces costly unplanned downtime. Either manual, periodic or continuous monitoring is available.



BoMo bogie monitoring system
The bogie monitoring system for railways (BoMo) enables continuous condition monitoring for bogies of railway vehicles as well as data collection of essential operating parameters such as speed, direction of rotation, temperature and vibration. This system solution, developed by SKF and Sécheron, improves safety and reduces life cycle costs.



WindCon solution for wind turbines
WindCon is a tailored monitoring system for wind turbines, especially for offshore wind parks. The system enables continuous data collection of all operational parameters including tower and blade vibration.

The system consists of a monitoring unit in the nacelle and the SKF knowledge based ProCon software program that collects and analyses data to detect changes in the wind turbine's key performance parameters.



SKF Smart Chock Unit
The SKF system solution “Smart Chock Unit” provides reliable online monitoring of rolling mill bearing arrangements. In addition to the intelligent software, the system includes appropriate sensors and wires. The SKF Smart Chock Unit enables rolling mill operators to

- continuously monitor the condition of roll neck bearings,
- change from preventive to predictive maintenance,
- reduce downtime, and
- improve quality of rolled material.



ConRo system for continuous casters
Typical operating conditions in continuous casters include heavy loads, very low speeds, elevated temperatures and huge amounts of cooling water. The SKF ConRo system is a maintenance-free roll unit designed for just these types of severe operating conditions. ConRo enables the operators of continuous casters to reduce the total costs and improve productivity.



SKF bearing carrier
This SKF solution was designed for weight sensitive applications such as automotive gearboxes, where it is difficult to accommodate the occurring loads in light-alloy housings. The SKF bearing carrier unit consists of a rigid sheet steel carrier and the appropriate integrated rolling bearings. The tailored bearing unit safely accommodates the occurring loads and distributes them to a large housing surface. Another advantage is quick and low-cost assembly.



Spindle units
With design and production facilities in Germany, Italy, Japan and North America, SKF is a worldwide supplier of a complete range of spindles – from externally driven and motor integrated spindles with rolling bearings to high performance gas and magnetic bearing spindles. SKF knowledge in bearing technology, sensors and electronics is the base to satisfy specific requirements for precision machining and processing. And it enables SKF to develop tailor-made spindle units together with the customer.



SKF machining centre spindles

Machining centre spindles are designed for milling, tapping and drilling operations. High stiffness, accuracy and low operating temperature are important operational requirements for these applications. SKF offers motor integrated spindles for speeds up to 30 000 r/min as well as belt driven spindles for machining centre applications.



SKF high speed milling spindles

SKF high speed milling spindles are used in applications, where high cutting rates are the norm or where fine surface finishing is required. They are also widely used when cutting advanced geometries which requires a well balanced spindle with good thermal stability. SKF offers state-of-the-art technology with a system of sensors, automatic clamping and cooling through the shaft for speeds up to 60 000 r/min.

SKF turning spindles

The SKF turning spindles are designed to withstand high cutting forces and to provide high productivity while running accuracy enables good surface quality. The thermally stable spindles are robust and provide a space saving design. SKF offers motor integrated spindles for speeds up to 10 000 r/min and belt driven ones up to 16 000 r/min.



SKF grinding spindles

Like the spindles in SKF bearing manufacturing plants, high frequency grinding spindles are designed for high operating speeds and high precision. The standard range has a simple and robust design. Speeds range from 10 000 to 180 000 r/min. In addition to the catalogue product range, SKF produces a wide range of spindle solutions to accommodate automatic tool change and coolant-through applications.



SKF magnetic bearing spindles

SKF is currently working on magnetic bearing spindle technology. The features of magnetic bearing spindles are the advanced digital control and real time information diagnostics, which offer improved cutting finish and process optimization.

Hyperspin, a magnetically levitated spindle, provides a total shaft solution complete with a digital control system, integral motor and motor drive.



SKF Spindle Service

The SKF Spindle Service supports customers worldwide with spindle repair centres in Europe, North America and Japan. The services offered include spindle reconditioning, from bearing replacement to shaft and nose restorations, performance upgrades and analysis. SKF can also provide complete monitoring services as well as preventative maintenance services for machine tool spindles.

Linear motion products



Linear guidance systems
- Linear ball bearings with recirculating range ball tracks which provide low friction movement and the possibility of unlimited stroke.
- Speedi-Roll, the cam roller type rail guide system suitable for applications with long strokes and/or high speeds.
- Profile rail guides with high load carrying capacity, high stiffness and unlimited stroke.
- Precision rail guides with limited strokes for high stiffness and position accuracy.



High efficiency ball screws
In all types of ball screws, the load is transmitted from the screw shaft to the nut through each ball; several recirculating systems are available. To improve positioning accuracy, backlash can be reduced or eliminated.

High efficiency roller screws
Two non-competing designs cover requirements beyond ball screw limitations. Load transferred from the nut to the screw shaft through a number of threaded grooved rollers; the resulting large number of contact points provide a much higher load carrying capacity and a much longer life than ball screws of similar size.



Linear actuators
Linear actuators are designed for a variety of applications. Each actuator is maintenance-free and is equipped with either an Acme screw or a ball screw. Limit switches, encoders or potentiometers are also available.

Positioning systems
Positioning systems provide compact and economical solutions for guided and driven applications. They may be designed to meet special requirements.

For more information, please visit the SKF website www.linearmotion.skf.com.





Plain bearings

Spherical plain bearings and rod ends
Spherical plain bearings, which are designed for slow movement applications, can accommodate misalignment and oscillating movements. They have a very high load carrying capacity and are ready to mount. Spherical plain bearings are available with various sliding combinations: steel on steel, which requires lubrication, or the maintenance-free combinations steel on sinter bronze composite, PTFE fabric or PTFE composite. SKF offers a very comprehensive range:

- Radial spherical plain bearings in metric or inch dimensions, with seals and/or an extended inner ring.
- Angular contact spherical plain bearings for combined radial and axial loads.
- Spherical plain thrust bearings for thrust loads and in combination with a radial spherical plain bearing for heavy duty arrangements.
- Rod ends with integral spherical plain bearings with male or female threads or with cylindrical or rectangular section welding shank.

For detailed information, please refer to the catalogue “SKF spherical plain bearings and rod ends” or the “SKF Interactive Engineering Catalogue”. The SKF Interactive Engineering Catalogue supports the selection of products through calculation facilities.







Bushings
SKF offers the world's widest assortment of stock bushings. The range is suitable for rotating, oscillating and linear movements. Cylindrical and flanged bushings, thrust washers and strips are available. Different materials serve different requirements.

- Solid bronze, the traditional robust material
- Sintered bronze with oil impregnation for high sliding velocities
- Wrapped bronze with lubrication pocket for contaminated environments
- PTFE composite for long service life due to low friction
- POM composite for low maintenance under tough conditions
- Stainless backed composite, maintenance-free in corrosive environments
- PTFE polyamide, cost effective and maintenance-free
- Filament Wound for extreme conditions

For detailed information, please refer to the brochure "SKF bushings", containing comprehensive selection guidance or the "SKF Interactive Engineering Catalogue".

Special solutions
Together with customers, SKF develops special solutions incorporating plain bearings especially for road and rail vehicles and the aircraft industry. For more information, please contact the SKF companies

- Sarma at www.sarma-aerospace.com or
- Ampep at www.ampep.co.uk





Bearing units







Y-bearing units
Standard SKF ball bearing units are referred to as Y-bearing units. Y-bearing units are ready-to-mount units which can accommodate initial errors of alignment. The unit consists of a single row deep groove ball bearing with convex sphered outside diameter (Y-bearing) and a Y-bearing housing, which has a correspondingly sphered but concave bore. Bearings and housings can be ordered separately.

SKF Y-bearing units are available as

- Y-bearing plummer (pillow) block units,
- Y-bearing flanged units, and
- Y-bearing take-up units.

A variety of designs is available with different housing materials:

- composite material,
- grey cast iron, or
- sheet steel

and there is a choice of locking method on the shaft:

- grub screw locking,
- eccentric collar locking, or
- adapter sleeve locking.

For detailed information about SKF Y-bearing units, please refer to the SKF catalogue “Y-bearing units” or the “SKF Interactive Engineering Catalogue”.

ConCentra ball and roller bearing units
ConCentra bearing units use the SKF concentric locking technique. With a patented multi-tapered sleeve a concentric interference fit with the shaft is achieved. The units are easy to mount and dismount with a hexagonal key. The true concentric mounting allows bearings to operate at higher speeds with less vibration resulting in quieter running and longer service life.

ConCentra ball bearing units

ConCentra ball bearing units use Y-bearing housings together with a deep groove ball bearing based on SKF bearings in the 62 series. They can be supplied for metric or inch-sized shafts from 25 to 60 mm or 1 to 2 1/16 inch respectively. The units use a low friction contact seal protected by an additional flinger.

ConCentra roller bearing units

ConCentra roller bearing units are based on SKF Explorer spherical roller bearings in the 222 series. The units are available for metric or inch-sized shafts from 35 to 75 mm or 1 7/16 to 4 inch respectively. Contact or labyrinth seals are available. As standard, all plummer (pillow) block units are available in a locating and a non-locating version.

For detailed information about ConCentra roller bearing units, please refer to the SKF Interactive Engineering Catalogue.





Collar mounted roller bearing units
SKF collar mounted roller bearing units are ready-to-mount bearing units, which are greased and sealed, and are able to compensate for misalignment of the shaft with respect to the housing. They consist of a bearing housing and a spherical roller bearing based on the 222 series. The bearing can be secured to the shaft with a locking collar with grub (set) screws.

SKF collar mounted roller bearing units are available as:

- plummer (pillow) block bearing units,
- flanged bearing units,
- take-up bearing units.

More information will be found in the “SKF Interactive Engineering Catalogue”.



Two-bearing units
SKF two-bearing units were originally designed for use on fan shafts with an overhung impeller. However, they are being used in other applications, e.g. centrifugal pumps, circular saws and grinding spindles. Two-bearing units offer a more compact design, improved running accuracy, quiet operation, and easy installation.

Several series with different bearing arrangements are available to meet different application requirements.

More information will be found in the “SKF Interactive Engineering Catalogue”.



Support and thrust roller assemblies
Many rotary drums or tubes have girth rings. The radial guidance is provided by support rollers and the axial guidance by thrust rollers. SKF supplies complete ready-to-mount support and thrust roller assemblies. They are well-proven units and the incorporated roller bearings offer high operational reliability coupled with minimum maintenance requirements. The assemblies can be selected from two standard ranges, one for support rollers and one for thrust rollers.

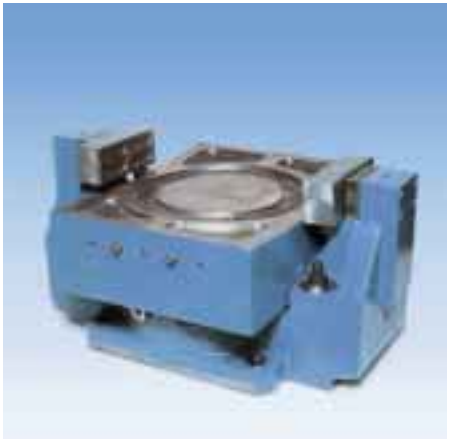


Hydrostatic shoe bearings
Developments in various industrial sectors have led to the use of increasingly large bearings to carry increasingly heavy loads. Examples of these applications include the drums used to grind ore and cement and the debarking drums used in pulp production. The drums have in some cases reached a size where conventional rolling bearings or bearing units cannot be used. SKF developed the hydrostatic shoe bearing for just this type of application. In addition to having very high load carrying capacity these bearings have the following advantages:

- no limit to bearing size,
- friction is negligible,
- virtually no wear,
- bearing life is almost unlimited,
- the sliding surfaces are self-aligning, and
- demands on accuracy of form of the trunnion or runner to be supported are moderate.

The SKF range comprises hydrostatic shoe bearings for horizontal as well as vertical bearing arrangements and also includes combined hydrostatic bearings with integral axial guidance.

For more information please contact the SKF application engineering service.





Auto-balancing
Imbalance is the standard cause of vibration in rotating equipment. It often varies with time and is difficult to correct. The DynaSpin™ auto-balancer is a unique solution that continually counteracts imbalance in rotating machinery. The freely moving balls, with the dynamic power of natural forces, automatically shift their position creating a balance that remains constant, regardless of the unbalance variations. The action dampens the vibration of the machine significantly.

For more information about the DynaSpin auto-balancer, please visit the SKF website www.dynaspin.skf.com.

Fastening systems, rolling elements, steel



Shaft couplings
SKF oil injection shaft couplings of type OKC and OKF join two shaft ends rigidly to each other. They are widely used in high torque applications where power has to be reliably transmitted. Applications range from joining the propeller shafts on a ship to connecting shafts in rolling mill drives.

SKF oil injection couplings are available as cylindrical or flanged couplings for diameters ranging from 100 to 1 000 mm. For more information, please ask for the publication “OK oil injection couplings from SKF” or visit www.couplings.skf.com

Supergrip bolts
SKF Supergrip bolts, based on the SKF oil injection principle, are compared with traditional bolt systems easier to install and remove and therefore offer important technical as well as economic benefits. They are typically used in applications where rotating flanged joints are subjected to high torque loads and downtime is particularly expensive, e.g. a ship’s propeller shafts, steering equipment, steam turbines or rolling mills.

SKF Supergrip bolts are available for hole diameters starting from 40 mm. For more information, please ask for publication “The SKF Supergrip Bolt for Rotating Flanges” or visit www.couplings.skf.com.

ConCentra bushings
Mechanical location devices for true concentric locking of friction shaft hub joints, e.g. slewing, belt or chain drives.

Rolling elements
SKF also supplies loose rolling elements that include balls, as well as cylindrical and needle rollers. Using loose rolling elements it is possible to produce economic full complement bearing arrangements for very heavy loads and low speeds or oscillatory movement, provided the other associated components can take the form of raceways having the same hardness and quality as bearing rings.

The rolling elements are made of carbon chromium bearing steel or silicone nitride. Additional information will be supplied on request.

Steel
Ovako Steel, part of the SKF group, is the world's leading manufacturer of steels for rolling bearings and a major producer of other special engineering steels. Ovako's main strength is in the field of special engineering steel long products – seamless tube, bar, and surface removed wire. Rolled rings are also a specialty. A large part of the production is further processed into precomponents for direct applications in the customers' production.

For more information, please visit the website www.ovako.com.







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