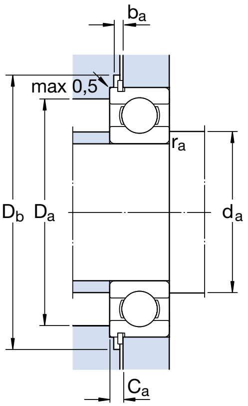
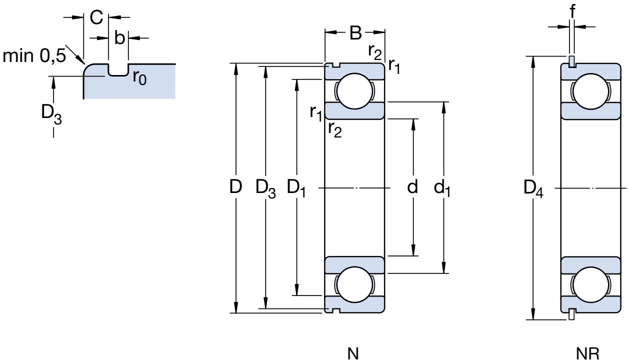


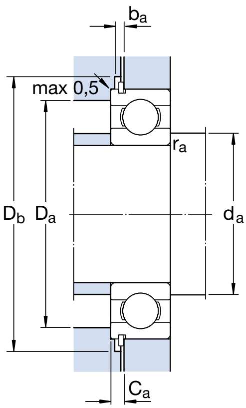
Dimensions										Abutment and fillet dimensions						Calculation factors	
d	d_1 ~	D_1 ~	D_3	D_4	b	f	C	$r_{1,2}$ min	r_0 max	d_a min	D_a max	D_b min	b_a min	C_a max	r_a max	k_r	f_0
mm										mm						–	
10	17	23,2	28,17	34,7	1,35	1,12	2,06	0,6	0,4	14,2	25,8	36	1,5	3,18	0,6	0,025	13
12	18,5	25,7	30,15	36,7	1,35	1,12	2,06	0,6	0,4	16,2	27,8	38	1,5	3,18	0,6	0,025	12
15	21,7	29	33,17	39,7	1,35	1,12	2,06	0,6	0,4	19,2	30,8	41	1,5	3,18	0,6	0,025	13
17	24,5	32,7	38,1	44,6	1,35	1,12	2,06	0,6	0,4	21,2	35,8	46	1,5	3,18	0,6	0,025	13
	26,5	37,4	44,6	52,7	1,35	1,12	2,46	1	0,4	22,6	41,4	54	1,5	3,58	1	0,03	12
20	27,2	34,8	39,75	46,3	1,35	1,12	2,06	0,6	0,4	23,2	38,8	48	1,5	3,18	0,6	0,025	14
	28,8	38,5	44,6	52,7	1,35	1,12	2,46	1	0,4	25,6	41,4	54	1,5	3,58	1	0,025	13
	30,4	41,6	49,73	57,9	1,35	1,12	2,46	1,1	0,4	27	45	59	1,5	3,58	1	0,03	12
25	32	40	44,6	52,7	1,35	1,12	2,06	0,6	0,4	28,2	43,8	54	1,5	3,18	0,6	0,025	14
	34,4	44	49,73	57,9	1,35	1,12	2,46	1	0,4	30,6	46,4	59	1,5	3,58	1	0,025	14
	36,6	50,4	59,61	67,7	1,9	1,7	3,28	1,1	0,6	32	55	69	2,2	4,98	1	0,03	12
30	38,2	46,8	52,6	60,7	1,35	1,12	2,06	1	0,4	34,6	50,4	62	1,5	3,18	1	0,025	15
	40,4	51,6	59,61	67,7	1,9	1,7	3,28	1	0,6	35,6	56,4	69	2,2	4,98	1	0,025	14
	44,6	59,1	68,81	78,6	1,9	1,7	3,28	1,1	0,6	37	65	80	2,2	4,98	1	0,03	13
35	43,8	53,3	59,61	67,7	1,9	1,7	2,06	1	0,6	39,6	57,4	69	2,2	3,76	1	0,025	15
	46,9	60	68,81	78,6	1,9	1,7	3,28	1	0,6	40,6	66,4	80	2,2	4,98	1	0,025	14
	49,6	65,4	76,81	86,6	1,9	1,7	3,28	1,5	0,6	44	71	88	2,2	4,98	1,5	0,03	13
	57,4	79,5	96,8	106,5	2,7	2,46	3,28	1,5	0,6	46	89	108	3	5,74	1,5	0,035	12
40	49,3	58,8	64,82	74,6	1,9	1,7	2,49	1	0,6	44,6	63,4	76	2,2	4,19	1	0,025	15
	52,6	67,4	76,81	86,6	1,9	1,7	3,28	1,1	0,6	47	73	88	2,2	4,98	1	0,025	14
	56,1	73,8	86,79	96,5	2,7	2,46	3,28	1,5	0,6	49	81	98	3	5,74	1,5	0,03	13
	62,8	87	106,81	116,6	2,7	2,46	3,28	2	0,6	53	97	118	3	5,74	2	0,035	12
45	54,8	65,3	71,83	81,6	1,9	1,7	2,49	1	0,6	49,6	70,4	83	2,2	4,19	1	0,025	15
	57,6	72,4	81,81	91,6	1,9	1,7	3,28	1,1	0,6	52	78	93	2,2	4,98	1	0,025	14
	62,2	82,7	96,8	106,5	2,7	2,46	3,28	1,5	0,6	54	91	108	3	5,74	1,5	0,03	13
	68,9	95,8	115,21	129,7	3,1	2,82	4,06	2	0,6	58	107	131	3,5	6,88	2	0,035	12

Single row deep groove ball bearings with snap ring groove
d **50 – 90** mm



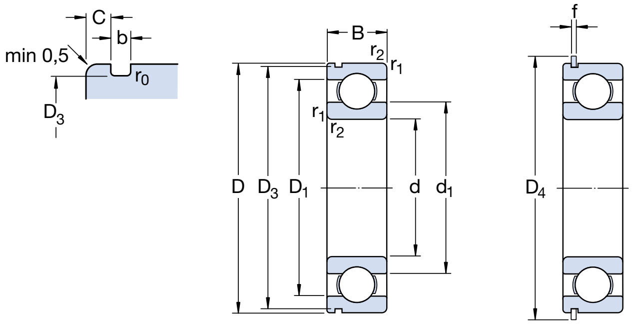
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations		
			dynamic	static		Reference speed	Limiting speed		Bearing with snap ring groove	snap ring groove and snap ring	Snap ring
d	D	B	C	C_0	P_u						
mm			kN		kN	r/min		kg	–		
50	80	16	22,9	16	0,71	18 000	11 000	0,26	* **6010 N**	* **6010 NR**	SP 80
	90	20	37,1	23,2	0,98	15 000	10 000	0,46	* **6210 N**	* **6210 NR**	SP 90
	110	27	65	38	1,6	13 000	8 500	1,05	* **6310 N**	* **6310 NR**	SP 110
	130	31	87,1	52	2,2	12 000	7 500	1,90	**6410 N**	**6410 NR**	SP 130
55	90	18	29,6	21,2	0,9	16 000	10 000	0,39	* **6011 N**	* **6011 NR**	SP 90
	100	21	46,2	29	1,25	14 000	9 000	0,61	* **6211 N**	* **6211 NR**	SP 100
	120	29	74,1	45	1,9	12 000	8 000	1,35	* **6311 N**	* **6311 NR**	SP 120
	140	33	99,5	62	2,6	11 000	7 000	2,30	**6411 N**	**6411 NR**	SP 140
60	95	18	30,7	23,2	0,98	15 000	9 500	0,42	* **6012 N**	* **6012 NR**	SP 95
	110	22	55,3	36	1,53	13 000	8 000	0,78	* **6212 N**	* **6212 NR**	SP 110
	130	31	85,2	52	2,2	11 000	7 000	1,70	* **6312 N**	* **6312 NR**	SP 130
	150	35	108	69,5	2,9	10 000	6 300	2,75	**6412 N**	**6412 NR**	SP 150
65	100	18	31,9	25	1,06	14 000	9 000	0,44	* **6013 N**	* **6013 NR**	SP 100
	120	23	58,5	40,5	1,73	12 000	7 500	0,99	* **6213 N**	* **6213 NR**	SP 120
	140	33	97,5	60	2,5	10 000	6 700	2,10	* **6313 N**	* **6313 NR**	SP 140
	160	37	119	78	3,15	9 500	6 000	3,30	**6413 N**	**6413 NR**	SP 160
70	110	20	39,7	31	1,32	13 000	8 000	0,60	* **6014 N**	* **6014 NR**	SP 110
	125	24	63,7	45	1,9	11 000	7 000	1,05	* **6214 N**	* **6214 NR**	SP 125
	150	35	111	68	2,75	9 500	6 300	2,50	* **6314 N**	* **6314 NR**	SP 150
75	115	20	41,6	33,5	1,43	12 000	7 500	0,64	* **6015 N**	* **6015 NR**	SP 115
	130	25	68,9	49	2,04	10 000	6 700	1,20	* **6215 N**	* **6215 NR**	SP 130
	160	37	119	76,5	3	9 000	5 600	3,00	* **6315 N**	* **6315 NR**	SP 160
80	125	22	49,4	40	1,66	11 000	7 000	0,85	* **6016 N**	* **6016 NR**	SP 125
	140	26	72,8	55	2,2	9 500	6 000	1,40	* **6216 N**	* **6216 NR**	SP 140
85	130	22	52	43	1,76	11 000	6 700	0,89	* **6017 N**	* **6017 NR**	SP 130
	150	28	87,1	64	2,5	9 000	5 600	1,80	* **6217 N**	* **6217 NR**	SP 150
90	140	24	60,5	50	1,96	10 000	6 300	1,15	* **6018 N**	* **6018 NR**	SP 140
	160	30	101	73,5	2,8	8 500	5 300	2,15	* **6218 N**	* **6218 NR**	SP 160

* SKF Explorer bearing



Dimensions										**Abutment and fillet dimensions**						**Calculation factors**	
d	d_1 ~	D_1 ~	D_3	D_4	b	f	C	$r_{1,2}$ min	r_0 max	d_a min	D_a max	D_b min	b_a min	C_a max	r_a max	k_r	f_0
mm										mm						–	
50	59,8	70,3	76,81	86,6	1,9	1,7	2,49	1	0,6	54,6	75,4	88	2,2	4,19	1	0,025	15
	62,5	77,4	86,79	96,5	2,7	2,46	3,28	1,1	0,6	57	83	98	3	5,74	1	0,025	14
	68,8	91,1	106,81	116,6	2,7	2,46	3,28	2	0,6	61	99	118	3	5,74	2	0,03	13
	75,5	104	125,22	139,7	3,1	2,82	4,06	2,1	0,6	64	116	141	3,5	6,88	2	0,035	12
55	66,3	78,7	86,79	96,5	2,7	2,46	2,87	1,1	0,6	61	84	98	3	5,33	1	0,025	15
	69,1	85,8	96,8	106,5	2,7	2,46	3,28	1,5	0,6	64	91	108	3	5,74	1,5	0,025	14
	75,3	99,5	115,21	129,7	3,1	2,82	4,06	2	0,6	66	109	131	3,5	6,88	2	0,03	13
	81,6	113	135,23	149,7	3,1	2,82	4,9	2,1	0,6	69	126	151	3,5	7,72	2	0,035	12
60	71,3	83,7	91,82	101,6	2,7	2,46	2,87	1,1	0,6	66	87	103	3	5,33	1	0,025	16
	75,5	94,6	106,81	116,6	2,7	2,46	3,28	1,5	0,6	69	101	118	3	5,74	1,5	0,025	14
	81,9	108	125,22	139,7	3,1	2,82	4,06	2,1	0,6	72	118	141	3,5	6,88	2	0,03	13
	88,1	122	145,24	159,7	3,1	2,82	4,9	2,1	0,6	74	136	162	3,5	7,72	2	0,035	12
65	76,3	88,7	96,8	106,5	2,7	2,46	2,87	1,1	0,6	71	94	108	3	5,33	1	0,025	16
	83,3	102	115,21	129,7	3,1	2,82	4,06	1,5	0,6	74	111	131	3,5	6,88	1,5	0,025	15
	88,4	116	135,23	149,7	3,1	2,82	4,9	2,1	0,6	77	128	151	3,5	7,72	2	0,03	13
	94	131	155,22	169,7	3,1	2,82	4,9	2,1	0,6	79	146	172	3,5	7,72	2	0,035	12
70	82,9	97,2	106,81	116,6	2,7	2,46	2,87	1,1	0,6	76	104	118	3	5,33	1	0,025	16
	87,1	108	120,22	134,7	3,1	2,82	4,06	1,5	0,6	79	116	136	3,5	6,88	1,5	0,025	15
	95	125	145,24	159,7	3,1	2,82	4,9	2,1	0,6	82	138	162	3,5	7,72	2	0,03	13
75	87,9	102	111,81	121,6	2,7	2,46	2,87	1,1	0,6	81	109	123	3	5,33	1	0,025	16
	92,1	113	125,22	139,7	3,1	2,82	4,06	1,5	0,6	84	121	141	3,5	6,88	1,5	0,025	15
	101	133	155,22	169,7	3,1	2,82	4,9	2,1	0,6	87	148	172	3,5	7,72	2	0,03	13
80	94,4	111	120,22	134,7	3,1	2,82	2,87	1,1	0,6	86	119	136	3,5	5,69	1	0,025	16
	101	122	135,23	149,7	3,1	2,82	4,9	2	0,6	91	129	151	3,5	7,72	2	0,025	15
85	99,4	116	125,22	139,7	3,1	2,82	2,87	1,1	0,6	91	124	141	3,5	5,69	1	0,025	16
	106	130	145,24	159,7	3,1	2,82	4,9	2	0,6	96	139	162	3,5	7,72	2	0,025	15
90	106	124	135,23	149,7	3,1	2,82	3,71	1,5	0,6	97	133	151	3,5	6,53	1,5	0,025	16
	113	138	155,22	169,7	3,1	2,82	4,9	2	0,6	101	149	172	3,5	7,72	2	0,025	15

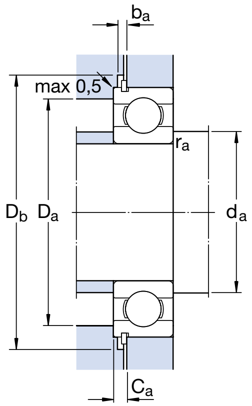
Single row deep groove ball bearings with snap ring groove
d **95 – 120** mm



N NR

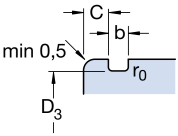
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations		
			dynamic	static		Reference speed	Limiting speed		Bearing with snap ring groove	snap ring groove and snap ring	Snap ring
d	D	B	C	C_0	P_u						
mm			kN		kN	r/min		kg	–		
95	170	32	114	81,5	3	8 000	5 000	2,60	*** 6219 N**	*** 6219 NR**	SP 170
100	150	24	63,7	54	2,04	9 500	5 600	1,25	*** 6020 N**	*** 6020 NR**	SP 150
	180	34	127	93	3,35	7 500	4 800	3,15	*** 6220 N**	*** 6220 NR**	SP 180
105	160	26	76,1	65,5	2,4	8 500	5 300	1,60	*** 6021 N**	*** 6021 NR**	SP 160
110	170	28	85,2	73,5	2,6	8 000	5 000	1,95	*** 6022 N**	*** 6022 NR**	SP 170
120	180	28	88,4	80	2,75	7 500	4 800	2,05	*** 6024 N**	*** 6024 NR**	SP 180

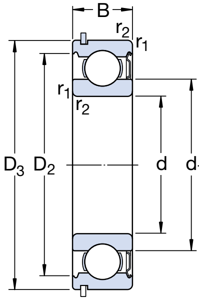
* SKF Explorer bearing



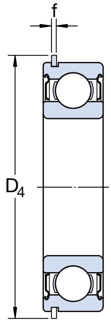
Dimensions										Abutment and fillet dimensions						Calculation factors	
d	d_1 ~	D_1 ~	D_3	D_4	b	f	C	$r_{1,2}$ min	r_0 max	d_a min	D_a max	D_b min	b_a min	C_a max	r_a max	k_r	f_0
mm										mm						–	
95	118	146	163,65	182,9	3,5	3,1	5,69	2,1	0,6	107	158	185	4	8,79	2	0,025	14
100	116	134	145,24	159,7	3,1	2,82	3,71	1,5	0,6	107	143	162	3,5	6,53	1,5	0,025	16
	125	155	173,66	192,9	3,5	3,1	5,69	2,1	0,6	112	168	195	4	8,79	2	0,025	14
105	123	143	155,22	169,7	3,1	2,82	3,71	2	0,6	114	151	172	3,5	6,53	2	0,025	16
110	129	151	163,65	182,9	3,5	3,1	3,71	2	0,6	119	161	185	4	6,81	2	0,025	16
120	139	161	173,66	192,9	3,5	3,1	3,71	2	0,6	129	171	195	4	6,81	2	0,025	16

Single row deep groove ball bearings with snap ring groove and shields
d **10 – 60** mm





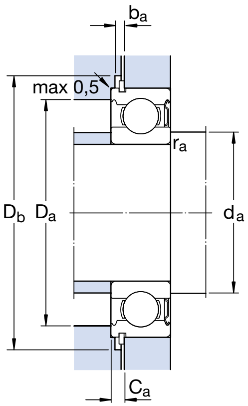
ZNR



2ZNR

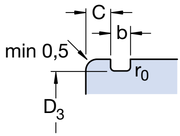
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed[1]	Mass	Designations Bearing with one shield and snap ring	two shields and snap ring	Snap ring
d	D	B	C	C_0	P_u						
mm			kN		kN	r/min		kg	–		
10	30	9	5,4	2,36	0,1	56 000	34 000	0,032	* **6200-ZNR**	* **6200-2ZNR**	SP 30
12	32	10	7,28	3,1	0,132	5 0000	32 000	0,037	* **6201-ZNR**	* **6201-2ZNR**	SP 32
15	35	11	8,06	3,75	0,16	43 000	28 000	0,045	* **6202-ZNR**	* **6202-2ZNR**	SP 35
17	40	12	9,95	4,75	0,2	38 000	24 000	0,065	* **6203-ZNR**	* **6203-2ZNR**	SP 40
	47	14	14,3	6,55	0,275	34 000	22 000	0,12	* **6303-ZNR**	* **6303-2ZNR**	SP 47
20	42	12	9,95	5	0,212	38 000	24 000	0,069	* **6004-ZNR**	* **6004-2ZNR**	SP 42
	47	14	13,5	6,55	0,28	32 000	20 000	0,11	* **6204-ZNR**	* **6204-2ZNR**	SP 47
	52	15	16,8	7,8	0,335	3 0000	19 000	0,14	* **6304-ZNR**	* **6304-2ZNR**	SP 52
25	47	12	11,9	6,55	0,275	32 000	20 000	0,08	* **6005-ZNR**	* **6005-2ZNR**	SP 47
	52	15	14,8	7,8	0,335	28 000	18 000	0,13	* **6205-ZNR**	* **6205-2ZNR**	SP 52
	62	17	23,4	11,6	0,49	24 000	16 000	0,23	* **6305-ZNR**	* **6305-2ZNR**	SP 62
30	62	16	20,3	11,2	0,475	24 000	15 000	0,20	* **6206-ZNR**	* **6206-2ZNR**	SP 62
	72	19	29,6	16	0,67	2 0000	13 000	0,35	* **6306-ZNR**	* **6306-2ZNR**	SP 72
35	72	17	27	15,3	0,655	2 0000	13 000	0,29	* **6207-ZNR**	* **6207-2ZNR**	SP 72
	80	21	35,1	19	0,815	19 000	12 000	0,46	* **6307-ZNR**	* **6307-2ZNR**	SP 80
40	80	18	32,5	19	0,8	18 000	11 000	0,37	* **6208-ZNR**	* **6208-2ZNR**	SP 80
	90	23	42,3	24	1,02	17 000	11 000	0,63	* **6308-ZNR**	* **6308-2ZNR**	SP 90
45	85	19	35,1	21,6	0,915	17 000	11 000	0,41	* **6209-ZNR**	* **6209-2ZNR**	SP 85
	100	25	55,3	31,5	1,34	15 000	9 500	0,83	* **6309-ZNR**	* **6309-2ZNR**	SP 100
50	90	20	37,1	23,2	0,98	15 000	10 000	0,46	* **6210-ZNR**	* **6210-2ZNR**	SP 90
	110	27	65	38	1,6	13 000	8 500	1,05	* **6310-ZNR**	* **6310-2ZNR**	SP 110
55	100	21	46,2	29	1,25	14 000	9 000	0,61	* **6211-ZNR**	* **6211-2ZNR**	SP 100
	120	29	74,1	45	1,9	12 000	8 000	1,35	* **6311-ZNR**	* **6311-2ZNR**	SP 120
60	110	22	55,3	36	1,53	13 000	8 000	0,78	* **6212-ZNR**	* **6212-2ZNR**	SP 110
	130	31	85,2	52	2,2	11 000	7 000	1,70	* **6312-ZNR**	* **6312-2ZNR**	SP 130

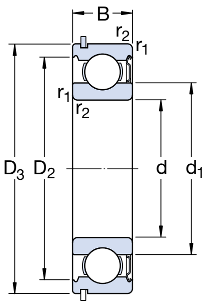
* SKF Explorer bearing
[1] For 2Z design, limiting speeds are about 80 % of the quoted value



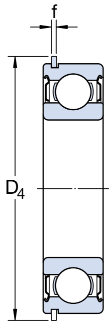
Dimensions										Abutment and fillet dimensions						Calculation factors	
d	d_1 ~	D_2 ~	D_3	D_4	b	f	C	$r_{1,2}$ min	r_0 max	d_a min	D_a max	D_b min	b_a min	C_a max	r_a max	k_r	f_0
mm										mm						–	
10	17	24,8	28,17	34,7	1,35	1,12	2,06	0,6	0,4	14,2	25,8	36	1,5	3,18	0,6	0,025	13
12	18,5	27,4	30,15	36,7	1,35	1,12	2,06	0,6	0,4	16,2	27,8	38	1,5	3,18	0,6	0,025	12
15	21,7	30,4	33,17	39,7	1,35	1,12	2,06	0,6	0,4	19,2	30,8	41	1,5	3,18	0,6	0,025	13
17	24,5	35	38,1	44,6	1,35	1,12	2,06	0,6	0,4	21,2	35,8	46	1,5	3,18	0,6	0,025	13
	26,5	39,7	44,6	52,7	1,35	1,12	2,46	1	0,4	22,6	41,4	54	1,5	3,58	1	0,03	12
20	27,2	37,2	39,75	46,3	1,35	1,12	2,06	0,6	0,4	23,2	38,8	48	1,5	3,18	0,6	0,025	14
	28,8	40,6	44,6	52,7	1,35	1,12	2,46	1	0,4	25,6	41,4	54	1,5	3,58	1	0,025	13
	30,4	44,8	49,73	57,9	1,35	1,12	2,46	1,1	0,4	27	45	59	1,5	3,58	1	0,03	12
25	32	42,2	44,6	52,7	1,35	1,12	2,06	0,6	0,4	28,2	43,8	54	1,5	3,18	0,6	0,025	14
	34,4	46,3	49,73	57,9	1,35	1,12	2,46	1	0,4	30,6	46,4	59	1,5	3,58	1	0,025	14
	36,6	52,7	59,61	67,7	1,9	1,7	3,28	1,1	0,6	32	55	69	2,2	4,98	1	0,03	12
30	40,4	54,1	59,61	67,7	1,9	1,7	3,28	1	0,6	35,6	56,4	69	2,2	4,98	1	0,025	14
	44,6	61,9	68,81	78,6	1,9	1,7	3,28	1,1	0,6	37	65	80	2,2	4,98	1	0,03	13
35	46,9	62,7	68,81	78,6	1,9	1,7	3,28	1	0,6	40,6	66,4	80	2,2	4,98	1	0,025	14
	49,6	69,2	76,81	86,6	1,9	1,7	3,28	1,5	0,6	44	71	88	2,2	4,98	1,5	0,03	13
40	52,6	69,8	76,81	86,6	1,9	1,7	3,28	1,1	0,6	47	73	88	2,2	4,98	1	0,025	14
	56,1	77,7	86,79	96,5	2,7	2,46	3,28	1,5	0,6	49	81	98	3	5,74	1,5	0,03	13
45	57,6	75,2	81,81	91,6	1,9	1,7	3,28	1,1	0,6	52	78	93	2,2	4,98	1	0,025	14
	62,2	86,7	96,8	106,5	2,7	2,46	3,28	1,5	0,6	54	91	108	3	5,74	1,5	0,03	13
50	62,5	81,6	86,79	96,5	2,7	2,46	3,28	1,1	0,6	57	83	98	3	5,74	1	0,025	14
	68,8	95,2	106,81	116,6	2,7	2,46	3,28	2	0,6	61	99	118	3	5,74	2	0,03	13
55	69,1	89,4	96,8	106,5	2,7	2,46	3,28	1,5	0,6	64	91	108	3	5,74	1,5	0,025	14
	75,3	104	115,21	129,7	3,1	2,82	4,06	2	0,6	66	109	131	3,5	6,88	2	0,03	13
60	75,5	98	106,81	116,6	2,7	2,46	3,28	1,5	0,6	69	101	118	3	5,74	1,5	0,025	14
	81,9	112	125,22	139,7	3,1	2,82	4,06	2,1	0,6	72	118	141	3,5	6,88	2	0,03	13

Single row deep groove ball bearings with snap ring and shields
d **65 – 70** mm





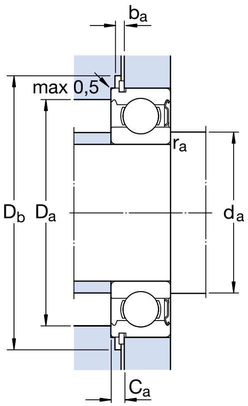
ZNR



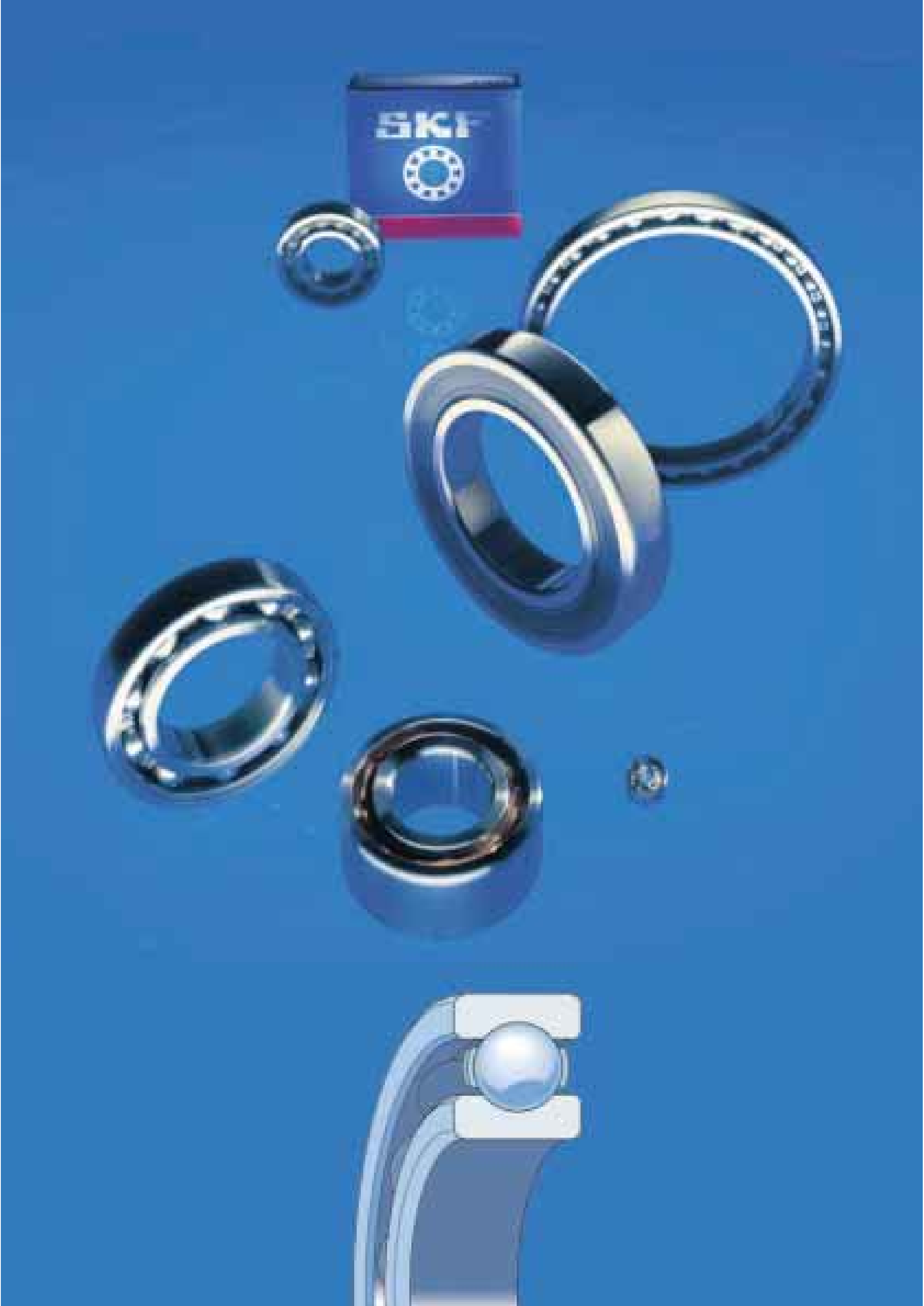
2ZNR

Principal dimensions			**Basic load ratings**		**Fatigue load limit**	**Speed ratings**		**Mass**	**Designations**		
			dynamic	static		Reference speed	Limiting[1] speed		Bearing with one shield and snap ring	two shields and snap ring	Snap ring
d	D	B	C	C_0	P_u						
mm			kN		kN	r/min		kg	–		
65	120	23	58,5	40,5	1,73	12 000	7 500	0,99	* **6213-ZNR**	* **6213-2ZNR**	SP 120
	140	33	97,5	60	2,5	1 0000	6 700	2,10	* **6313-ZNR**	* **6313-2ZNR**	SP 140
70	125	24	63,7	45	1,9	11 000	7 000	1,05	* **6214-ZNR**	* **6214-2ZNR**	SP 125
	150	35	111	68	2,75	9 500	6 300	2,50	* **6314-ZNR**	* **6314-2ZNR**	SP 150

* SKF Explorer bearing
[1] For 2Z design, limiting speeds are about 80 % of the quoted value



Dimensions										Abutment and fillet dimensions						Calculation factors	
d	d_1 ~	D_2 ~	D_3	D_4	b	f	C	$r_{1,2}$ min	r_0 max	d_a min	D_a max	D_b min	b_a min	C_a max	r_a max	k_r	f_0
mm										mm						–	
65	83,3	106	115,21	129,7	3,1	2,82	4,06	1,5	0,6	74	111	131	3,5	6,88	1,5	0,025	15
	88,4	121	135,23	149,7	3,1	2,82	4,9	2,1	0,6	77	128	151	3,5	7,72	2	0,03	13
70	87,1	111	120,22	134,7	3,1	2,82	4,06	1,5	0,6	79	116	136	3,5	6,88	1,5	0,025	15
	95	130	145,24	159,7	3,1	2,82	4,9	2,1	0,6	82	138	162	3,5	7,72	2	0,03	13


SKF

Single row deep groove ball bearings with filling slots

Designs

A single row deep groove ball bearing with filling slots has a filling slot in both the inner and outer ring (➔ **fig** 1) enabling more and larger balls to be incorporated than in standard deep groove ball bearings. Filling slot bearings have a higher radial load carrying capacity than bearings without filling slots, but their axial load carrying capacity is small. They are also unable to operate at such high speeds as bearings without filling slots.

The standard assortment of SKF deep groove ball bearings with filling slots comprises:

- basic design open bearings,
- shielded bearings,
- bearings with a snap ring groove.

Basic design bearings

Basic design bearings with filling slots are open. Those bearings that are also produced in shielded version may have seal recesses in the outer ring, for manufacturing reasons (➔ **fig** 2).

Shielded bearings

SKF deep groove ball bearings with filling slots are available with shields on one or both sides, designation suffixes Z or 2Z. The shield forms a narrow gap to the inner ring shoulder (➔ **fig** 3).

Bearings up to and including sizes 217 and 314 are filled with a high-quality NLGI class 2 polyurea base grease, that can be used at temperatures between –30 and +150 °C. The base oil viscosity is 115 mm^2/s at 40 °C and 12,2 mm^2/s at 100 °C.

Larger bearings are supplied with a high-quality NLGI class 3 lithium base grease, that can be used at temperatures between –30 and +120 °C. The base oil viscosity is 74 mm^2/s at 40 °C and 8,5 mm^2/s at 100 °C.

The quantity of grease fills some 25 to 35 % of the free space in the bearing. The bearings are lubricated for life and are maintenance-free. They should therefore not be washed or heated above 80 °C before mounting.

Fig 1

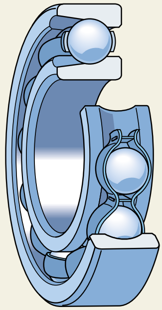


Fig 2

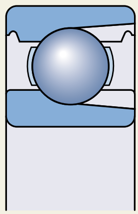
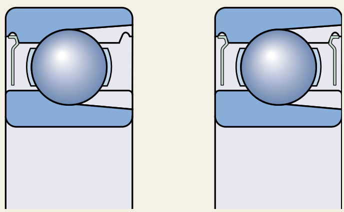


Fig 3



Bearings with snap ring groove
For easy, space saving axial location of the bearing in the housing, SKF deep groove ball bearings with filling slots are fitted with a snap ring groove in the outer ring, designation suffix N (➔ **fig** 4 **a**). The appropriate snap ring is shown in the product table with designation and dimensions and may be supplied separately or already mounted on the bearing, designation suffix NR (➔ **fig** 4 **b**). SKF deep groove ball bearings with filling slots and a snap ring groove can also be supplied with a shield on the side opposite the snap ring groove (➔ **fig** 5 **a**) or with two shields (➔ **fig** 5 **b**).

Bearing data – general

Dimensions
The boundary dimensions of SKF deep groove ball bearings with filling slots are in accordance with ISO 15:1998.
The dimensions of the snap ring groove and snap rings follow ISO 464:1995.

Tolerances
SKF deep groove ball bearings with filling slots are produced to Normal tolerances. The tolerances are in accordance with ISO 492:2002 and can be found in **table** 3 on **page 125**.

Internal clearance
SKF single row deep groove ball bearings with filling slots are manufactured with Normal radial internal clearance. The values for radial internal clearance are given in **table** 3 on **page 297**. They are in accordance with ISO 5753:1991 and are valid for unmounted bearings under zero measuring load.

Fig 4

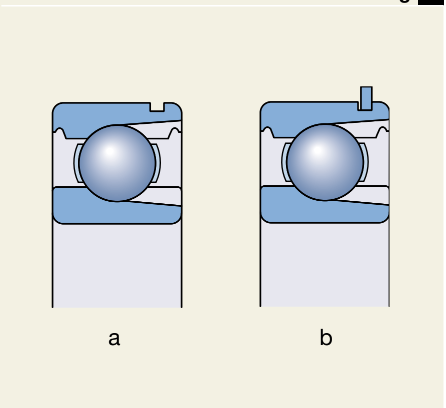
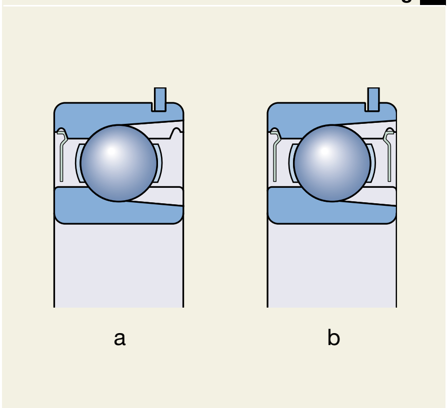


Fig 5



Misalignment

The conditions concerning misalignment of the outer ring with respect to the inner ring are the same for deep groove ball bearings with filling slots as for standard bearings. However, the filling slots limit the angular misalignment to 2 to 5 minutes of arc. Any greater misalignment may lead to the balls running over the edges of the filling slot. This will cause increased bearing noise and reduced bearing service life.

Cages

SKF deep groove ball bearings with filling slots incorporate a riveted pressed steel cage (➔ **fig** 6).

Minimum load

In order to provide satisfactory operation, deep groove ball bearings with filling slots, 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, 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 radial load to be applied to deep groove ball bearings with filling slots can be estimated using

$$F_{rm} = k_r \left(\frac{\nu\, n}{1\,000}\right)^{2/3} \left(\frac{d_m}{100}\right)^2$$

where
F_{rm} = minimum radial load, kN
k_r = minimum load factor
0,04 for bearings in the 2 series
0,05 for bearings in the 3 series
ν = oil viscosity at operating temperature, mm^2/s
n = rotational speed, r/min
d_m = bearing mean diameter
= 0,5 (d + D), mm

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 deep groove ball bearing must be subjected to on additional radial load.

Equivalent dynamic bearing load

For dynamically loaded single row deep groove ball bearings with filling slots

$$P = F_r + F_a$$

provided $F_a/F_r \leq 0,6$ and $P \leq 0,5\ C_0$.

If the axial load $F_a > 0,6\ F_r$ then deep groove ball bearings with filling slots are unsuitable for the application and bearings without filling slots should be used instead.

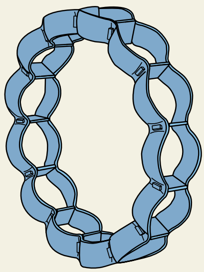
Equivalent static bearing load

For statically loaded single row deep groove ball bearings with filling slots

$$P_0 = F_r + 0,5\ F_a$$

provided $F_a/F_r \leq 0,6$.

Fig 6

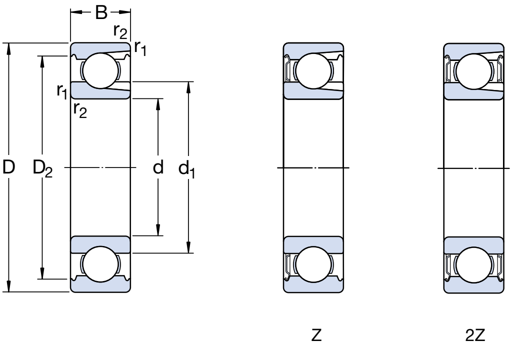


Supplementary designations

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

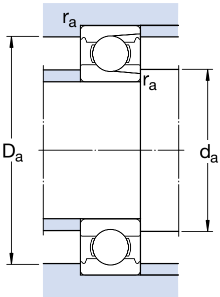
C3	Radial internal clearance greater than Normal
N	Snap ring groove in the outer ring
NR	Snap ring groove in the outer ring, with snap ring
Z	Pressed steel shield on one side of the bearing
ZN	Snap ring groove in the outer ring and pressed steel shield on the opposite side of the bearing
ZNR	Snap ring groove in the outer ring with snap ring, and pressed steel shield on the opposite side of the bearing
2Z	Pressed steel shields on both sides of the bearing
2ZNR	Snap ring groove in the outer ring with snap ring, and pressed steel shields on both sides of the bearing

Single row deep groove ball bearings with filling slots
d **25 – 85** mm



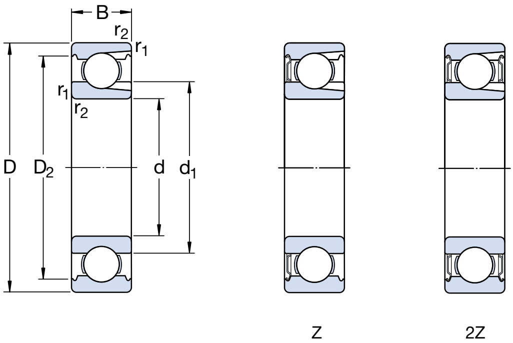
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations		
			dynamic	static		Reference speed	Limiting[1)] speed		Bearing open	with shields on one side	two sides
d	D	B	C	C_0	P_u						
mm			kN		kN	r/min		kg	–		
25	62	17	22,9	15,6	0,67	20 000	13 000	0,24	**305**	**305-Z**	**305-2Z**
30	62	16	22,9	17,3	0,735	20 000	12 000	0,21	**206**	**206-Z**	**206-2Z**
	72	19	29,2	20,8	0,88	18 000	11 000	0,37	**306**	**306-Z**	**306-2Z**
35	72	17	29,7	22,8	0,965	17 000	11 000	0,31	**207**	**207-Z**	**207-2Z**
	80	21	39,1	28,5	1,2	16 000	10 000	0,48	**307**	**307-Z**	**307-2Z**
40	80	18	33,6	26,5	1,12	15 000	9 500	0,39	**208**	**208-Z**	**208-2Z**
	90	23	46,8	36	1,53	14 000	9 000	0,64	**308**	**308-Z**	**308-2Z**
45	85	19	39,6	32,5	1,37	14 000	9 000	0,44	**209**	**209-Z**	**209-2Z**
	100	25	59,4	46,5	1,96	13 000	8 000	0,88	**309**	**309-Z**	**309-2Z**
50	90	20	39,1	34,5	1,46	13 000	8 000	0,5	**210**	**210-Z**	**210-2Z**
	110	27	64,4	52	2,2	11 000	7 000	1,15	**310**	**310-Z**	**310-2Z**
55	100	21	48,4	44	1,86	12 000	7 500	0,66	**211**	**211-Z**	**211-2Z**
	120	29	79,2	67	2,85	10 000	6 700	1,5	**311**	**311-Z**	**311-2Z**
60	110	22	56,1	50	2,12	11 000	6 700	0,85	**212**	**212-Z**	**212-2Z**
	130	31	91,3	78	3,35	9 500	6 000	1,85	**312**	**312-Z**	**312-2Z**
65	120	23	60,5	58,5	2,5	10 000	6 000	1,05	**213**	**213-Z**	**213-2Z**
	140	33	102	90	3,75	9 000	5 600	2,3	**313**	**313-Z**	**313-2Z**
70	125	24	66	65,5	2,75	9 500	6 000	1,15	**214**	**214-Z**	**214-2Z**
	150	35	114	102	4,15	8 000	5 000	2,75	**314**	**314-Z**	**314-2Z**
75	130	25	72,1	72	3	9 000	5 600	1,25	**215**	**215-Z**	**215-2Z**
	160	37	125	116	4,55	7 500	4 800	3,25	**315**	**315-Z**	**315-2Z**
80	140	26	88	85	3,45	8 500	5 300	1,55	**216**	**216-Z**	**216-2Z**
	170	39	138	129	4,9	7 000	4 500	3,95	**316**	**316-Z**	**316-2Z**
85	150	28	96,8	100	3,9	7 500	4 800	1,95	**217**	**217-Z**	**217-2Z**
	180	41	147	146	5,3	6 700	4 300	4,6	**317**	**317-Z**	**317-2Z**

1) For 2Z design, limiting speeds are about 80 % of the quoted value



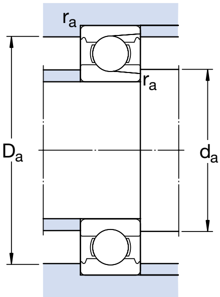
Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_2 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
25	32,8	52,7	1,1	31,5	55,5	1
30	36,2	54,1	1	35	57	1
	43,9	61,9	1,1	36,5	65,5	1
35	41,7	62,7	1,1	41,5	65,5	1
	43,7	69,2	1,5	43	72	1,5
40	48,9	69,8	1,1	46,5	73,5	1
	50,5	77,7	1,5	48	82	1,5
45	52,5	75,2	1,1	51,5	78,5	1
	55,9	86,7	1,5	53	92	1,5
50	57,5	81,7	1,1	56,5	83,5	1
	67,5	95,2	2	59	101	2
55	63,1	89,4	1,5	63	92	1,5
	74	104	2	64	111	2
60	70,1	97	1,5	68	102	1,5
	80,3	113	2,1	71	119	2
65	83,3	106	1,5	73	112	1,5
	86,8	122	2,1	76	129	2
70	87,1	111	1,5	78	117	1,5
	93,2	130	2,1	81	139	2
75	92,1	117	1,5	83	122	1,5
	99,7	139	2,1	86	149	2
80	88,8	127	2	89	131	2
	106	147	2,1	91	159	2
85	97	135	2	94	141	2
	113	156	3	98	167	2,5

Single row deep groove ball bearings with filling slots
d **90 – 100** mm



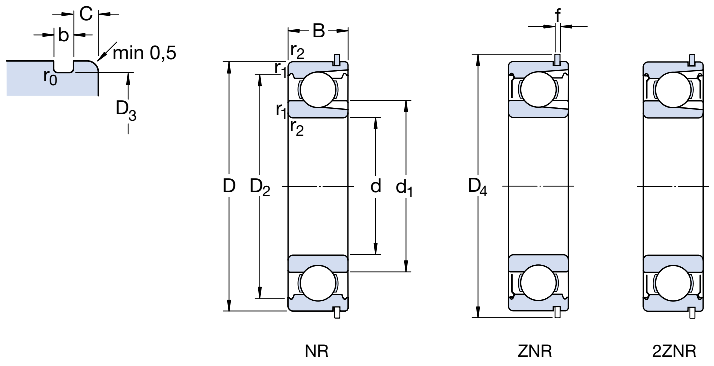
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations		
			dynamic	static		Reference speed	Limiting[1)] speed		Bearing open	with shields on one side	two sides
d	D	B	C	C_0	P_u						
mm			kN		kN	r/min		kg	–		
90	160	30	112	114	4,3	7 000	4 500	2,35	**218**	**218-Z**	**218-2Z**
	190	43	157	160	5,7	6 300	4 000	5,40	**318**	**318-Z**	**318-2Z**
95	170	32	121	122	4,5	6 700	4 300	2,70	**219**	**219-Z**	**219-2Z**
100	180	34	134	140	5	6 300	4 000	3,45	**220**	**220-Z**	**220-2Z**

[1)] For 2Z design, limiting speeds are about 80 % of the quoted value



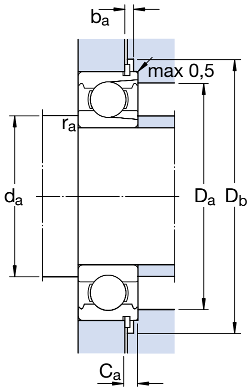
Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_2 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
90	110	143	2	99	151	2
	119	164	3	103	177	2,5
95	117	152	2,1	106	159	2
100	123	160	2,1	111	169	2

Single row deep groove ball bearings with filling slots and snap ring
d **25 – 95** mm

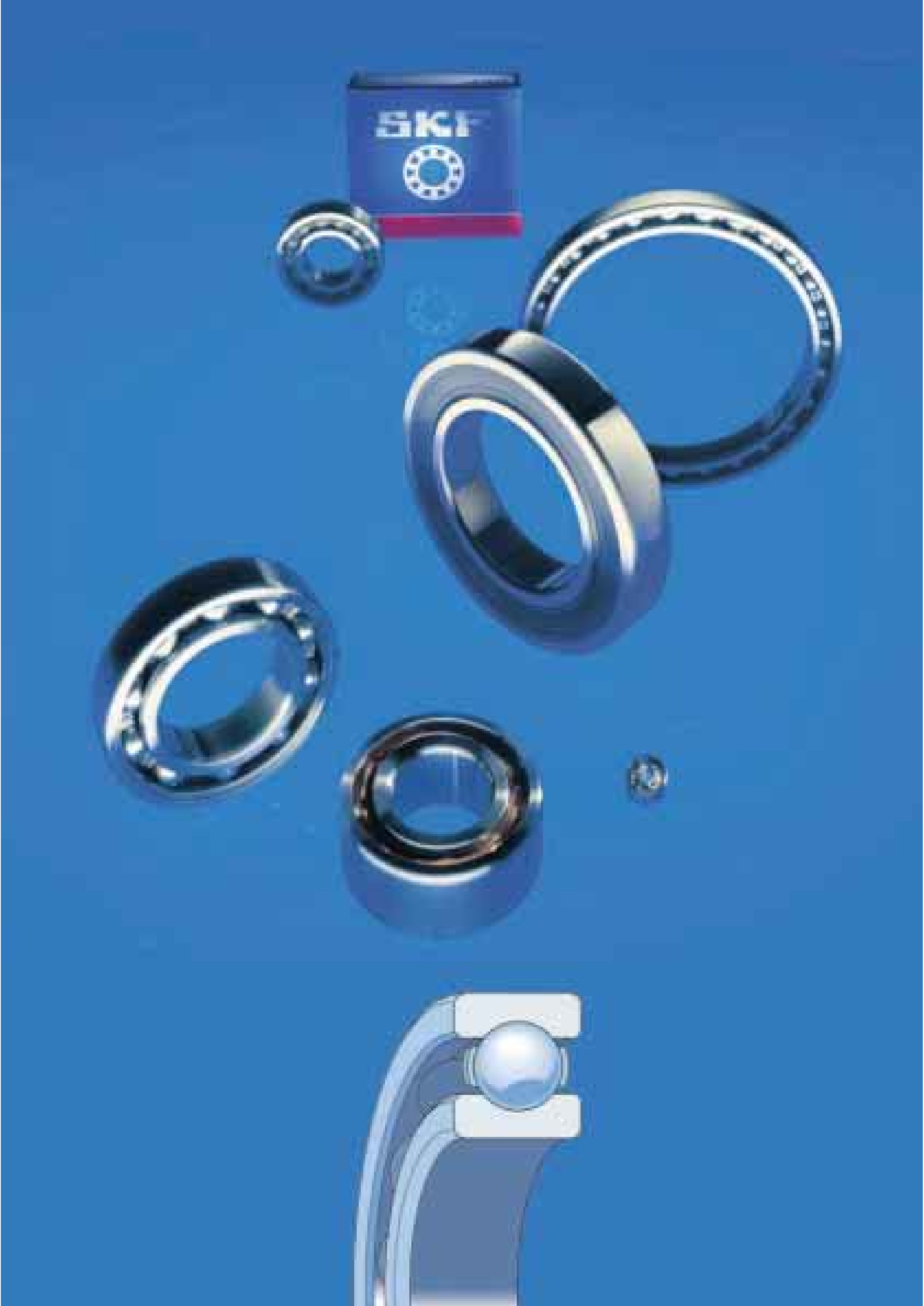


Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations			
			dynamic	static		Reference speed	Limiting[1] speed		Bearing open	with shields on one side	with shields on both sides	Snap ring
d	D	B	C	C_0	P_u							
mm			kN		kN	r/min		kg	–			
25	62	17	23	16	1	20 000	13 000	0,24	**305 NR**	**305-ZNR**	**305-2ZNR**	SP 62
30	62	16	22,9	17,3	0,735	20 000	12 000	0,21	**206 NR**	**206-ZNR**	**206-2ZNR**	SP 62
	72	19	29,2	20,8	0,88	18 000	11 000	0,37	**306 NR**	**306-ZNR**	**306-2ZNR**	SP 72
35	72	17	29,7	22,8	0,965	17 000	11 000	0,31	**207 NR**	**207-ZNR**	**207-2ZNR**	SP 72
	80	21	39,1	28,5	1,2	16 000	10 000	0,48	**307 NR**	**307-ZNR**	**307-2ZNR**	SP 80
40	80	18	33,6	26,5	1,12	15 000	9 500	0,39	**208 NR**	**208-ZNR**	**208-2ZNR**	SP 80
	90	23	46,8	36	1,53	14 000	9 000	0,64	**308 NR**	**308-ZNR**	**308-2ZNR**	SP 90
45	85	19	39,6	32,5	1,37	14 000	9 000	0,44	**209 NR**	**209-ZNR**	**209-2ZNR**	SP 85
	100	25	59,4	46,5	1,96	13 000	8 000	0,88	**309 NR**	**309-ZNR**	**309-2ZNR**	SP 100
50	90	20	39,1	34,5	1,46	13 000	8 000	0,50	**210 NR**	**210-ZNR**	**210-2ZNR**	SP 90
	110	27	64,4	52	2,2	11 000	7 000	1,15	**310 NR**	**310-ZNR**	**310-2ZNR**	SP 110
55	100	21	48,4	44	1,86	12 000	7 500	0,66	**211 NR**	**211-ZNR**	**211-2ZNR**	SP 100
	120	29	79,2	67	2,85	10 000	6 700	1,50	**311 NR**	**311-ZNR**	**311-2ZNR**	SP 120
60	110	22	56,1	50	2,12	11 000	6 700	0,85	**212 NR**	**212-ZNR**	**212-2ZNR**	SP 110
	130	31	91,3	78	3,35	9 500	6 000	1,85	**312 NR**	**312-ZNR**	**312-2ZNR**	SP 130
65	120	23	60,5	58,5	2,5	10 000	6 000	1,05	**213 NR**	**213-ZNR**	**213-2ZNR**	SP 120
	140	33	102	90	3,75	9 000	5 600	2,30	**313 NR**	**313-ZNR**	**313-2ZNR**	SP 140
70	125	24	66	65,5	2,75	9 500	6 000	1,15	**214 NR**	**214-ZNR**	**214-2ZNR**	SP 125
	150	35	114	102	4,15	8 000	5 000	2,75	**314 NR**	**314-ZNR**	**314-2ZNR**	SP 150
75	130	25	72,1	72	3	9 000	5 600	1,25	**215 NR**	**215-ZNR**	**215-2ZNR**	SP 130
80	140	26	88	85	3,45	8 500	5 300	1,55	**216 NR**	**216-ZNR**	**216-2ZNR**	SP 140
85	150	28	96,8	100	3,9	7 500	4 800	1,95	**217 NR**	**–**	**–**	SP 150
90	160	30	112	114	4	7 000	4 500	2,35	**218 NR**	**–**	**–**	SP 160
95	170	32	121	122	5	6 700	4 300	2,70	**219 NR**	**–**	**–**	SP 170

[1] For 2Z design, limiting speeds are about 80 % of the quoted value



Dimensions										Abutment and fillet dimensions					
d	d_1 ~	D_2 ~	D_3	D_4	f	b	C	r_0 max	$r_{1,2}$ min	d_a min	D_a max	D_b min	b_a min	C_a max	r_a max
mm										mm					
25	32,8	52,7	59,61	67,7	1,7	1,9	3,28	0,6	1,1	31,5	55,5	69	2,2	4,98	1
30	36,2	54,1	59,61	67,7	1,7	1,9	3,28	0,6	1	35	57	69	2,2	4,98	1
	40,1	61,9	68,81	78,6	1,7	1,9	3,28	0,6	1,1	36,5	65,5	80	2,2	4,98	1
35	41,7	62,7	68,81	78,6	1,7	1,9	3,28	0,6	1,1	41,5	65,5	80	2,2	4,98	1
	43,7	69,2	76,81	86,6	1,7	1,9	3,28	0,6	1,5	43	72	88	2,2	4,98	1,5
40	48,9	69,8	76,81	86,6	1,7	1,9	3,28	0,6	1,1	46,5	73,5	88	2,2	4,98	1
	50,5	77,7	86,79	96,5	2,46	2,7	3,28	0,6	1,5	48	82	98	3	5,74	1,5
45	52,5	75,2	81,81	91,6	1,7	1,9	3,28	0,6	1,1	51,5	78,5	93	2,2	4,98	1
	55,9	86,7	96,8	106,5	2,46	2,7	3,28	0,6	1,5	53	92	108	3	5,74	1,5
50	57,5	81,7	86,79	96,5	2,46	2,7	3,28	0,6	1,1	56,5	83,5	98	3	5,74	1
	62,5	95,2	106,81	116,6	2,46	2,7	3,28	0,6	2	59	101	118	3	5,74	2
55	63,1	89,4	96,8	106,5	2,46	2,7	3,28	0,6	1,5	63	92	108	3	5,74	1,5
	74	104	115,21	129,7	2,82	3,1	4,06	0,6	2	64	111	131	3,5	6,88	2
60	70,1	97	106,81	116,6	2,46	2,7	3,28	0,6	1,5	68	102	118	3	5,74	1,5
	80,3	113	125,22	139,7	2,82	3,1	4,06	0,6	2,1	71	119	141	3,5	6,88	2
65	83,3	106	115,21	129,7	2,82	3,1	4,06	0,6	1,5	73	112	131	3,5	6,88	1,5
	86,8	122	135,23	149,7	2,82	3,1	4,9	0,6	2,1	76	129	151	3,5	7,72	2
70	87,1	111	120,22	134,7	2,82	3,1	4,06	0,6	1,5	78	117	136	3,5	6,88	1,5
	87,2	130	145,24	159,7	2,82	3,1	4,9	0,6	2,1	81	139	162	3,5	7,72	2
75	92,1	117	125,22	139,7	2,82	3,1	4,06	0,6	1,5	83	122	141	3,5	6,88	1,5
80	88,8	127	135,23	149,7	2,82	3,1	4,9	0,6	2	89	131	151	3,5	7,72	2
85	97	135	145,24	159,7	2,82	3,1	4,9	0,6	2	94	141	162	3,5	7,72	2
90	110	143	155,22	169,7	2,82	3,1	4,9	0,6	2	99	151	172	3,5	7,72	2
95	117	152	163,65	182,9	3,1	3,5	5,69	0,6	2,1	106	159	185	4	8,79	2



Stainless steel deep groove ball bearings

Designs

SKF stainless steel deep groove ball bearings are resistant to corrosion from moisture and several other media. These single row deep groove ball bearings have the same deep raceway grooves and close conformity between raceways and balls as standard deep groove ball bearings made of carbon chromium (rolling bearing) steel. They are without filling slots and can carry axial loads acting in both directions in addition to radial loads, even at high speeds. SKF stainless steel deep groove ball bearings have the same running properties as conventional steel deep groove ball bearings, but have a lower load carrying capacity.

The bearings are available in open and sealed designs for shaft diameters from 1 to 50 mm. Flanged bearings according to ISO 8443-1999 are not presented in this catalogue. They can be found in the "SKF Interactive Engineering Catalogue" on CD-ROM or online at www.skf.com.

SKF stainless steel bearings are identified by the designation prefix W, e.g. W 626-2Z.

Basic design bearings

Basic design bearings are open, i.e. unsealed. Open bearings that are also available with shields or seals may have seal recesses in the outer ring for manufacturing reasons (➔ **fig 1**).

Sealed bearings

Most SKF stainless steel deep groove ball bearings are available with shields. Some are also available with contact seals. Bearings with shields or seals on both sides are lubricated for life and are maintenance-free. They should not be washed or heated to temperatures above 80 °C. Depending on the size, stainless steel deep groove ball bearings are supplied charged with two different standard greases. Characteristics of the greases are listed in **table 1**. The standard grease is not identified in the bearing designation. The grease quantity fills some 25 to 35 % of the free space in the bearing.

Fig 1

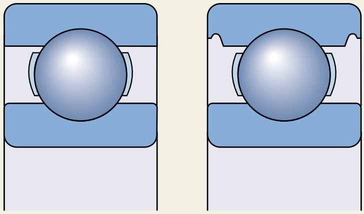


Fig 2

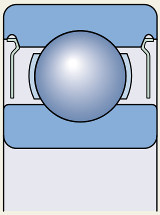
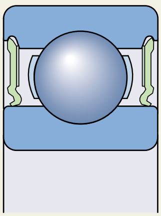


Fig 3



Because stainless steel deep groove ball bearings are often used in food processing machines, the bearings can be delivered with a special non-toxic grease, designation suffix VT378. This grease

- fulfils the requirements of the “Guidelines of section 21 CFR 178.3570” of the FDA (US Food and Drug Administration) regulations and
- is approved by the USDA (United States Department of Agriculture) for catelory H1 use (occasional contact with food stuffs).

Please check availability of bearings with non-toxic grease before ordering.

Bearings with shields

Bearing with shields, designation suffix 2Z (➔ **fig** 2), have shields made of stainless steel. The shields form a sealing gap with the land of the bearing inner ring shoulder and allow high temperatures and speeds. Bearings fitted with shields are primarily intended for applications where the inner ring rotates. If the outer ring rotates, there is a risk of the grease leaking from the bearing at elevated speeds.

Bearings with seals

Bearings with contact seals, designation suffix 2RS1 (➔ **fig** 3), have seals made of an oil and wear resistant acrylonitrile butadiene rubber (NBR) with a sheet metal reinforcement. The permissible operating temperature range for the seals is –40 to +100 °C and up to +120 °C for brief periods. Contact seals run with their seal lip on the land of the bearing inner ring shoulder. The seals are fitted with their external edge in the recesses at the outer ring and seal tightly.

Under extreme operating conditions, e.g. at high speeds or high temperatures, grease may leak from bearings fitted with seals. For bearing arrangements where this would be undesirable, special steps must be taken at the design stage. Please consult the SKF engineering application service.

Bearing data – general

Dimensions
The boundary dimensions of stainless steel deep groove ball bearings are in accordance with ISO 15:1998.

Tolerances
SKF stainless steel deep groove ball bearings are manufactured to Normal tolerances. The values for Normal tolerances correspond to ISO 492:2002 and can be found in **table** 3 on **page 125**.

Table 1

SKF grease filling for sealed stainless steel deep groove ball bearings

Technicl specifications	**Standard grease** for bearings with d ≤ 9 mm	d > 9 mm	**Non-toxic grease**
Thickener	Lithium soap	Lithium soap	Aluminum complex soap
Base oil type	Ester oil	Mineral oil	PAO oil
NLGI consistency class	2	2	2
Operating temperature, °C	–50 to +140	–30 to +110	–25 to +120
Base oil viscosity, mm^2/s			
at 40 °C	26	74	150
at 100 °C	5,1	8,5	15,5

Internal clearance

SKF stainless steel deep groove ball bearings are produced as standard with Normal radial internal clearance. The values for the internal clearance are in accordance with ISO 5753:1991 and will be found in **table** 3 on **page 297**. The clearance limits are valid before mounting under zero measuring load.

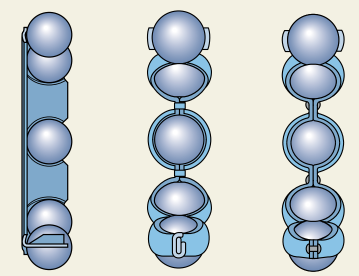
Materials

The bearing rings and balls are produced from stainless steel X65Cr13 and the shields and cages are made of stainless steel X5CrNi18-10, according to ISO 683-17:1999.

Misalignment

Single row stainless steel deep groove ball bearings have only limited ability to accommodate misalignment. The permissible angular misalignment between inner and outer rings, which will not produce inadmissibly high additional stresses in the bearing, depends on the radial internal clearance of the bearing in operation, bearing size, the internal design and the forces and moments acting on the bearing. Because of the complex relationship between these factors, no generally applicable specific values can be given. Depending on the various influences of the factors, the permissible angular misalignment lies between 2 and 10 minutes of arc. Any greater misalignment will result in increased noise in operation and decrease bearing service life.

Fig 4



Cages

Depending on the bearing series and size, SKF stainless steel deep groove ball bearings are supplied with one of the following stainless steel cages (➔ **fig** 4) as standard:

- pressed snap-type sheet steel cage (**a**)
- ribbon-type cage of steel sheet (**b**)
- riveted cage of steel sheet (**c**)

For bearings with injection moulded polyamide 6,6 cage availability should be checked prior to ordering.

Minimum load

In order to provide satisfactory operation, stainless steel deep groove 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 condition the inertia forces of the balls and cage, and the friction in the lubricant, can have a determental 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 radial load to be applied to stainless steel deep groove ball bearings can be estimated using

$$F_{rm} = k_r \left(\frac{\nu\, n}{1\,000}\right)^{2/3} \left(\frac{d_m}{100}\right)^2$$

where

F_{rm} = minimum radial load, kN
k_r = minimum load factor (➔ product tables)
ν = oil viscosity at operating temperature, mm^2/s
n = rotational speed, r/min
d_m = bearing mean diameter = 0,5 (d + D), mm

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 stainless steel deep groove ball bearing must be subjected to an additional radial load. For applications where stainless steel deep groove ball bearings are used, an axial preload can be applied by adjusting the inner and outer rings against each other, or by using springs.

Axial load carrying capacity

If the bearings are subjected to a purely axial load, this axial load should generally not exceed the value of 0,25 C_0. Excessive axial loads can lead to a considerable reduction in bearing service life.

Equivalent dynamic bearing load

For dynamically loaded stainless steel single row deep groove ball bearings

$P = F_r$ when $F_a/F_r \le e$
$P = 0,56\, F_r + YF_a$ when $F_a/F_r > e$

The factors e and Y depend on the relationship $f_0\, F_a/C_0$, where f_0 is a calculation factor (➔ product tables), F_a the axial component of the load and C_0 the basic static load rating.

The values for e and Y are listed in **table 2**. They are valid for stainless steel deep groove ball bearings with Normal internal clearance mounted with the usual fits (shaft tolerance g5 to j6, depending on the shaft diameter, and housing bore tolerance H6).

Table 2

Calculation factors for stainless steel single row deep groove ball bearings

$f_0\, F_a/C_0$	e	Y
0,172	0,19	2,30
0,345	0,22	1,99
0,689	0,26	1,71
1,03	0,28	1,55
1,38	0,30	1,45
2,07	0,34	1,31
3,45	0,38	1,15
5,17	0,42	1,04
6,89	0,44	1,00

Intermediate values are obtained by linear interpolation

Equivalent static bearing load

For statically loaded stainless steel single row deep groove ball bearings

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

If $P_0 < F_r$, $P_0 = F_r$ should be used.

Supplementary designations

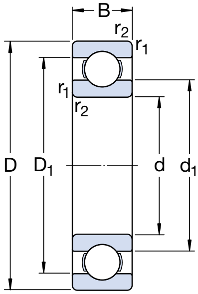
The designation suffixes used to identify certain features of SKF stainless steel deep groove ball bearings are explained in the following.

R Integral external outer ring flange
VT378 Non-toxic grease (for occasional contact with food stuffs)
2RS1 Acrylonitrile butadiene rubber (NBR) seal with sheet steel reinforcement on both sides of the bearing
2Z Pressed steel shields on both sides of the bearing
2ZR Integral external outer ring flange and pressed steel shields on both sides of the bearing

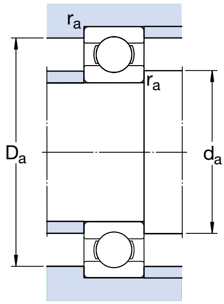
Design of bearing arrangements

In most cases the cross section of the bearing rings of a stainless steel deep groove ball bearing is very thin and the side faces correspondingly slim. The transitions from the side faces to the ring bore or outside diameter are also very small. It is therefore necessary to make sure that the adjacent components are appropriate for the bearings and are produced to the required accuracy.

Stainless steel deep groove ball bearings
d **1 – 10** mm

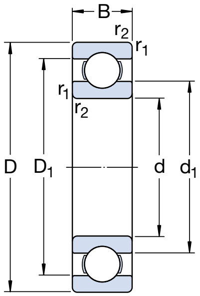


Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation
mm			kN		kN	r/min		kg	–
1	3	1	0,056	0,017	0,00075	240 000	150 000	0,000036	**W 618/1**
2	5	1,5	0,133	0,045	0,002	85 000	100 000	0,00015	**W 618/2**
3	6	3	0,178	0,057	0,0025	170 000	110 000	0,00035	**W 637/3**
	10	4	0,39	0,129	0,0056	130 000	80 000	0,0016	**W 623**
4	9	2,5	0,449	0,173	0,0075	140 000	85 000	0,0007	**W 618/4**
	11	4	0,605	0,224	0,0098	130 000	80 000	0,0019	**W 619/4**
	12	4	0,676	0,27	0,012	120 000	75 000	0,0024	**W 604**
	13	5	0,793	0,28	0,012	110 000	67 000	0,0031	**W 624**
5	11	3	0,54	0,245	0,011	120 000	75 000	0,0012	**W 618/5**
	13	4	0,741	0,325	0,014	110 000	67 000	0,0023	**W 619/5**
	16	5	0,923	0,365	0,016	95 000	60 000	0,0050	**W 625**
6	13	3,5	0,741	0,335	0,015	110 000	67 000	0,0020	**W 618/6**
	15	5	1,04	0,455	0,02	100 000	63 000	0,0039	**W 619/6**
	19	6	1,86	0,915	0,04	80 000	50 000	0,0084	**W 626**
7	17	5	1,24	0,54	0,024	90 000	56 000	0,0049	**W 619/7**
	19	6	1,86	0,915	0,04	85 000	53 000	0,0075	**W 607**
	22	7	2,76	1,32	0,057	70 000	45 000	0,013	**W 627**
8	16	4	1,12	0,55	0,024	90 000	56 000	0,0030	**W 618/8**
	19	6	1,59	0,71	0,031	80 000	50 000	0,0071	**W 619/8**
	22	7	2,76	1,32	0,057	75 000	48 000	0,012	**W 608**
9	17	4	1,19	0,62	0,027	85 000	53 000	0,0034	**W 618/9**
	20	6	1,74	0,83	0,036	80 000	48 000	0,0076	**W 619/9**
	24	7	3,12	1,6	0,071	70 000	43 000	0,014	**W 609**
	26	8	3,9	1,9	0,083	60 000	38 000	0,020	**W 629**
10	15	3	0,715	0,425	0,018	85 000	56 000	0,0014	**W 61700**
	19	5	1,14	0,57	0,025	80 000	48 000	0,0055	**W 61800**
	22	6	1,74	0,815	0,036	75 000	45 000	0,010	**W 61900**
	26	8	3,9	1,9	0,083	67 000	40 000	0,019	**W 6000**
	30	9	4,23	2,28	0,1	56 000	34 000	0,032	**W 6200**
	35	11	6,76	3,25	0,143	50 000	32 000	0,053	**W 6300**

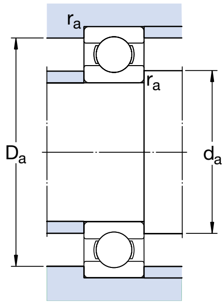


Dimensions				Abutment and fillet dimensions			Calculation factors	
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	k_r	f_0
mm				mm			–	
1	1,6	2,4	0,05	1,4	2,6	0,05	0,015	10
2	2,7	3,9	0,08	2,5	4,5	0,08	0,015	11
3	4,2	4,9	0,08	3,5	5,5	0,08	0,020	11
	4,8	7,1	0,15	4,4	8,6	0,1	0,025	8,2
4	5,2	7,5	0,1	4,6	8,4	0,1	0,015	10
	6,2	9	0,15	4,8	10,2	0,1	0,020	8,1
	6,2	9	0,2	5,4	10,6	0,2	0,025	8,3
	7	10,5	0,2	5,8	11,2	0,2	0,025	7,7
5	6,8	9,2	0,15	5,8	10,2	0,1	0,015	11
	7,5	10,5	0,2	6,4	11,6	0,2	0,020	8,8
	8,5	12,5	0,3	7,4	13,6	0,3	0,025	8
6	8	11	0,15	6,8	11,2	0,1	0,015	11
	8,2	11,7	0,2	7,4	13,6	0,2	0,020	8,4
	10,1	15	0,3	8,4	16,6	0,3	0,025	12
7	10,4	13,6	0,3	9	15	0,3	0,020	8,9
	10,1	15	0,3	9	17	0,3	0,025	12
	12,1	18	0,3	9,4	19,6	0,3	0,025	12
8	10,5	13,5	0,2	9,4	14,6	0,2	0,015	11
	10,5	15,5	0,3	10	17	0,3	0,020	8,8
	12,1	18	0,3	10	20	0,3	0,025	12
9	11,5	14,5	0,2	10,4	15,6	0,2	0,015	11
	11,6	16,2	0,3	11	18	0,3	0,020	11
	13,8	19,5	0,3	11	22	0,3	0,025	13
	14,5	21,3	0,3	11,4	23,6	0,3	0,025	12
10	11,2	13,6	0,15	10,8	14,2	0,1	0,015	16
	12,7	16,3	0,3	12	17	0,3	0,015	9,4
	13,9	18,2	0,3	12	20	0,3	0,020	9,3
	14,2	21	0,3	12	24	0,3	0,025	12
	17,6	23,8	0,6	14,2	25,8	0,6	0,025	13
	17,7	27,4	0,6	14,2	30,8	0,6	0,030	11

Stainless steel deep groove ball bearings
d **12 – 50** mm

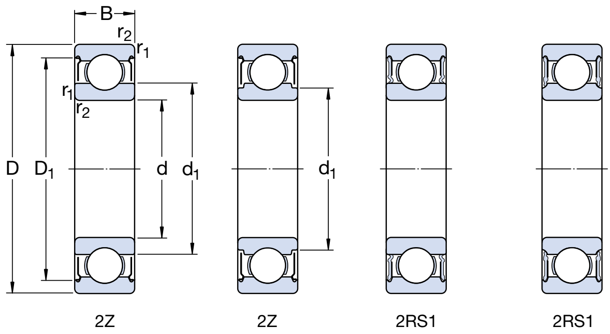


Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation
mm			kN		kN	r/min		kg	–
12	21	5	1,21	0,64	0,028	70 000	43 000	0,0063	**W 61801**
	24	6	1,9	0,95	0,043	67 000	40 000	0,011	**W 61901**
	28	8	4,23	2,28	0,1	60 000	38 000	0,022	**W 6001**
	32	10	5,85	3	0,132	50 000	32 000	0,037	**W 6201**
	37	12	8,19	4,05	0,176	45 000	28 000	0,060	**W 6301**
15	24	5	1,3	0,78	0,034	60 000	38 000	0,0074	**W 61802**
	28	7	3,64	2,16	0,095	56 000	34 000	0,016	**W 61902**
	32	9	4,68	2,75	0,12	50 000	32 000	0,030	**W 6002**
	35	11	6,5	3,65	0,16	43 000	28 000	0,045	**W 6202**
	42	13	9,56	5,2	0,228	38 000	24 000	0,085	**W 6302**
17	30	7	3,9	2,45	0,108	56 000	28 000	0,018	**W 61903**
	35	10	5,07	3,15	0,137	45 000	28 000	0,039	**W 6003**
	40	12	8,06	4,65	0,2	38 000	24 000	0,065	**W 6203**
	47	14	11,4	6,3	0,275	34 000	22 000	0,12	**W 6303**
20	32	7	3,38	2,24	0,104	45 000	28 000	0,018	**W 61804**
	42	12	7,93	4,9	0,212	38 000	24 000	0,069	**W 6004**
	47	14	10,8	6,4	0,28	32 000	20 000	0,11	**W 6204**
	52	15	13,5	7,65	0,335	30 000	19 000	0,14	**W 6304**
25	47	12	8,52	5,7	0,25	32 000	20 000	0,08	**W 6005**
	52	15	11,9	7,65	0,335	28 000	18 000	0,13	**W 6205**
	62	17	17,2	10,8	0,475	24 000	16 000	0,23	**W 6305**
30	55	13	11,1	8	0,355	28 000	17 000	0,12	**W 6006**
	62	16	16,3	10,8	0,475	24 000	15 000	0,2	**W 6206**
	72	19	22,5	14,6	0,64	20 000	13 000	0,35	**W 6306**
35	62	14	13,5	10	0,44	24 000	15 000	0,16	**W 6007**
	72	17	21,6	14,6	0,655	20 000	13 000	0,29	**W 6207**
40	68	15	14	10,8	0,49	22 000	14 000	0,19	**W 6008**
	80	18	24,7	17,3	0,75	18 000	11 000	0,37	**W 6208**
45	75	16	17,8	14,6	0,64	20 000	12 000	0,25	**W 6009**
	85	19	27,6	19,6	0,865	17 000	11 000	0,41	**W 6209**
50	80	16	18,2	16	0,71	18 000	11 000	0,26	**W 6010**
	90	20	29,6	22,4	0,98	15 000	10 000	0,46	**W 6210**

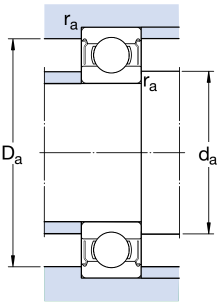


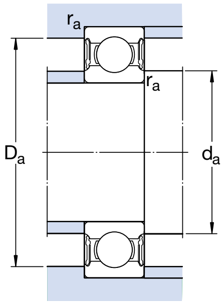
Dimensions				Abutment and fillet dimensions			Calculation factors	
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	k_r	f_0
mm				mm			–	
12	14,8	18,3	0,3	14	19	0,3	0,015	9,7
	16	20,3	0,3	14	22	0,3	0,020	9,7
	17,2	24,1	0,3	14	26	0,3	0,025	13
	18,5	26,2	0,6	16,2	27,8	0,6	0,025	12
	19,3	29,9	1	17,6	31,4	1	0,030	11
15	17,8	21,3	0,3	17	22	0,3	0,015	10
	18,8	24,2	0,3	17	26	0,3	0,020	14
	20,2	27	0,3	17	30	0,3	0,025	14
	21,7	29,5	0,6	19,2	30,8	0,6	0,025	13
	24,5	34,9	1	20,8	36,2	1	0,030	12
17	21	26,8	0,3	19	28	0,3	0,020	15
	23,5	30,1	0,3	19	33	0,3	0,025	14
	24,9	33,6	0,6	21,2	35,8	0,6	0,025	13
	27,5	38,9	1	22,8	41,2	1	0,030	12
20	23,2	28,2	0,3	22	30	0,3	0,015	15
	27,6	35,7	0,6	23,2	38,8	0,6	0,025	14
	29,5	39,5	1	25,2	41,8	1	0,025	13
	30	41,7	1,1	27	45	1	0,030	12
25	31,7	40,2	0,6	28,2	43,8	0,6	0,025	15
	34	44,2	1	30,6	46,4	1	0,025	14
	38,1	51	1,1	32	55	1	0,030	13
30	38	47,3	1	34,6	50,4	1	0,025	15
	40,7	52,8	1	35,6	56,4	1	0,025	14
	44,9	59,3	1,1	37	65	1	0,030	13
35	44	54,3	1	39,6	57,4	1	0,025	15
	47,6	61,6	1,1	42	65	1	0,025	14
40	49,2	59,5	1	44,6	63,4	1	0,025	15
	52,9	67,2	1,1	47	73	1	0,025	14
45	54,5	65,8	1	49,6	70,4	1	0,025	15
	56,6	71,8	1,1	52	78	1	0,025	14
50	60	71	1	54,6	75,4	1	0,025	15
	63,5	78,7	1,1	57	83	1	0,025	14

Sealed stainless steel deep groove ball bearings
d **1,5 – 7** mm



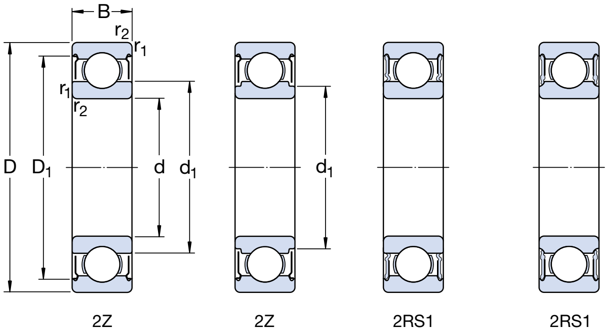
Principal dimensions d	D	B	**Basic load ratings** dynamic C	static C_0	**Fatigue load limit** P_u	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designation**
mm			kN		kN	r/min		kg	–
1,5	4	2	0,114	0,034	0,0015	220 000	110 000	0,00014	**W 638/1.5-2Z**
2	5	2,3	0,156	0,048	0,002	190 000	95 000	0,00018	**W 638/2-2Z**
	6	3	0,238	0,075	0,0034	180 000	90 000	0,00035	**W 639/2-2Z**
3	6	3	0,176	0,057	0,0025	170 000	85 000	0,00035	**W 637/3-2Z**
	7	3	0,216	0,085	0,0036	160 000	80 000	0,00045	**W 638/3-2Z**
	8	3	0,39	0,129	0,0056	150 000	75 000	0,00067	**W 619/3-2Z**
	8	4	0,39	0,129	0,0056	150 000	75 000	0,00080	**W 639/3-2Z**
	10	4	0,39	0,129	0,0056	130 000	63 000	0,0015	**W 623-2Z**
4	9	3,5	0,449	0,173	0,0075	140 000	70 000	0,0010	**W 628/4-2Z**
	9	4	0,449	0,173	0,0075	140 000	70 000	0,0010	**W 638/4-2Z**
	11	4	0,605	0,224	0,0098	130 000	63 000	0,0017	**W 619/4-2Z**
	12	4	0,676	0,27	0,012	120 000	60 000	0,0023	**W 604-2Z**
	13	5	0,793	0,28	0,012	110 000	53 000	0,0031	**W 624-2Z**
	13	5	0,793	0,28	0,012	–	32 000	0,0031	**W 624-2RS1**
5	8	2,5	0,14	0,057	0,0025	140 000	70 000	0,00034	**W 627/5-2Z**
	11	4	0,54	0,245	0,011	120 000	60 000	0,00062	**W 628/5-2Z**
	11	5	0,54	0,245	0,011	120 000	60 000	0,0019	**W 638/5-2Z**
	13	4	0,741	0,325	0,014	110 000	53 000	0,0025	**W 619/5-2Z**
	16	5	0,923	0,365	0,016	95 000	48 000	0,0050	**W 625-2Z**
	16	5	0,923	0,365	0,016	–	28 000	0,0050	**W 625-2RS1**
	19	6	1,86	0,915	0,04	80 000	40 000	0,0090	**W 635-2Z**
6	10	3	0,319	0,137	0,0061	120 000	60 000	0,0007	**W 627/6-2Z**
	13	5	0,741	0,335	0,015	110 000	53 000	0,0027	**W 628/6-2Z**
	15	5	1,04	0,455	0,02	100 000	50 000	0,0037	**W 619/6-2Z**
	19	6	1,86	0,915	0,04	80 000	40 000	0,0087	**W 626-2Z**
	19	6	1,86	0,915	0,04	–	24 000	0,0087	**W 626-2RS1**
7	11	3	0,291	0,127	0,0056	110 000	56 000	0,0007	**W 627/7-2Z**
	14	5	0,806	0,39	0,017	100 000	50 000	0,0030	**W 628/7-2Z**
	17	5	1,24	0,54	0,024	90 000	45 000	0,0050	**W 619/7-2Z**
	19	6	1,86	0,915	0,04	85 000	43 000	0,0082	**W 607-2Z**
	19	6	1,86	0,915	0,04	–	24 000	0,0082	**W 607-2RS1**
	22	7	2,76	1,32	0,057	70 000	36 000	0,013	**W 627-2Z**



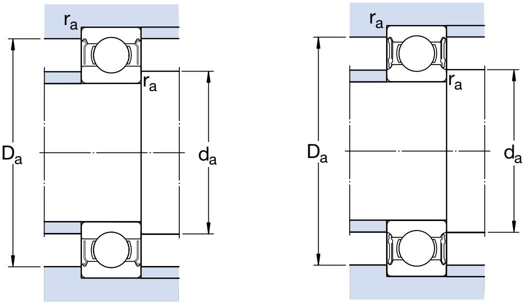


Dimensions				Abutment and fillet dimensions			Calculation factors	
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	k_r	f_0
mm				mm			–	
1,5	2,1	3,5	0,05	1,9	3,6	0,05	0,015	9,5
2	2,7	4,4	0,08	2,5	4,5	0,08	0,015	11
	3	5,4	0,15	2,8	5,2	0,1	0,015	10
3	4,2	5,4	0,08	3,5	5,6	0,08	0,020	11
	3,9	6,4	0,1	3,6	6,4	0,1	0,015	11
	5	7,4	0,15	3,8	7,2	0,1	0,020	9,5
	4,4	7,3	0,15	3,8	7,2	0,1	0,020	9,5
	4,4	8	0,15	4,4	8,6	0,1	0,025	8,2
4	5,2	8,1	0,1	4,6	8,4	0,1	0,015	10
	5,2	8,1	0,1	4,6	8,4	0,1	0,015	10
	5,6	9,9	0,15	4,8	10,2	0,1	0,020	8,1
	5,6	9,9	0,2	5,4	10,6	0,2	0,025	8,3
	6	11,4	0,2	5,8	11,2	0,2	0,025	7,7
	6	11,4	0,2	5,8	11,2	0,2	0,025	7,7
5	5,8	7,4	0,08	5,5	7,5	0,08	0,015	10
	6,8	9,9	0,15	5,8	10,2	0,1	0,015	11
	6,2	9,9	0,15	5,8	10,2	0,1	0,015	11
	6,6	11,2	0,2	6,4	11,6	0,2	0,020	8,8
	7,5	13,8	0,3	7,4	13,6	0,3	0,025	8
	7,5	13,8	0,3	7,4	13,6	0,3	0,025	8
	8,5	16,5	0,3	7,4	16,6	0,3	0,030	12
6	7	9,3	0,1	6,6	9,4	0,1	0,015	10
	7,4	11,7	0,15	6,8	11,2	0,1	0,015	11
	7,5	13	0,2	7,4	13,6	0,2	0,020	8,4
	8,5	16,5	0,3	8,4	16,6	0,3	0,025	12
	8,5	16,5	0,3	8,4	16,6	0,3	0,025	12
7	8	10,3	0,1	7,6	10,4	0,1	0,015	10
	8,5	12,7	0,15	7,8	13,2	0,1	0,015	11
	9,3	14,3	0,3	9	15	0,3	0,020	8,9
	9	16,5	0,3	9	17	0,3	0,025	12
	9	16,5	0,3	9	17	0,3	0,025	12
	10,5	19	0,3	9,4	19,6	0,3	0,025	12

Sealed stainless steel deep groove ball bearings
d **8 – 12** mm

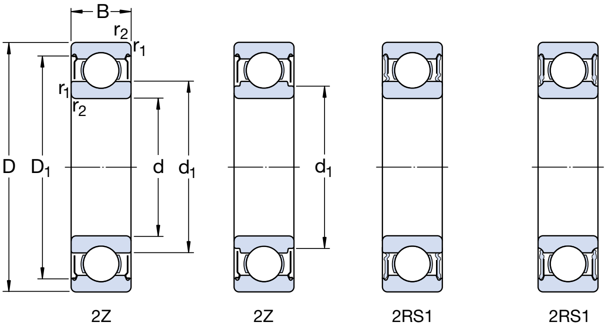


Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
8	16	5	1,12	0,55	0,024	90 000	45 000	0,0040	**W 628/8-2Z**
	16	6	1,12	0,55	0,024	90 000	45 000	0,0043	**W 638/8-2Z**
	19	6	1,59	0,71	0,031	80 000	40 000	0,0076	**W 619/8-2Z**
	19	6	1,46	0,6	1,6	–	24 000	0,0071	**W 619/8-2RS1**
	22	7	2,76	1,32	0,057	75 000	38 000	0,013	**W 608-2Z**
	22	7	2,76	1,32	0,057	–	22 000	0,013	**W 608-2RS1**
9	17	5	1,19	0,62	0,027	85 000	43 000	0,0044	**W 628/9-2Z**
	20	6	1,74	0,83	0,036	80 000	38 000	0,0085	**W 619/9-2Z**
	24	7	3,12	1,6	0,071	70 000	34 000	0,016	**W 609-2Z**
	26	8	3,9	1,9	0,083	60 000	30 000	0,022	**W 629-2Z**
10	19	5	1,14	0,57	0,025	80 000	38 000	0,0056	**W 61800-2Z**
	19	7	1,14	0,57	0,025	80 000	38 000	0,0074	**W 63800-2Z**
	22	6	1,74	0,815	0,036	75 000	36 000	0,010	**W 61900-2Z**
	26	8	3,9	1,9	0,083	67 000	34 000	0,019	**W 6000-2Z**
	26	8	3,9	1,9	0,083	–	19 000	0,019	**W 6000-2RS1**
	30	9	4,23	2,28	0,1	56 000	28 000	0,032	**W 6200-2Z**
	30	9	4,23	2,28	0,1	–	17 000	0,032	**W 6200-2RS1**
	35	11	6,76	3,25	0,143	50 000	26 000	0,053	**W 6300-2Z**
	35	11	6,76	3,25	0,143	–	15 000	0,053	**W 6300-2RS1**
12	21	5	1,21	0,64	0,028	70 000	36 000	0,0065	**W 61801-2Z**
	24	6	1,9	0,95	0,043	67 000	32 000	0,012	**W 61901-2Z**
	28	8	4,23	2,28	0,1	60 000	30 000	0,022	**W 6001-2Z**
	28	8	4,23	2,28	0,1	–	17 000	0,022	**W 6001-2RS1**
	32	10	5,85	3	0,132	50 000	26 000	0,037	**W 6201-2Z**
	32	10	5,85	3	0,132	–	15 000	0,037	**W 6201-2RS1**
	37	12	8,19	4,05	0,176	45 000	22 000	0,06	**W 6301-2Z**
	37	12	8,19	4,05	0,176	–	14 000	0,06	**W 6301-2RS1**

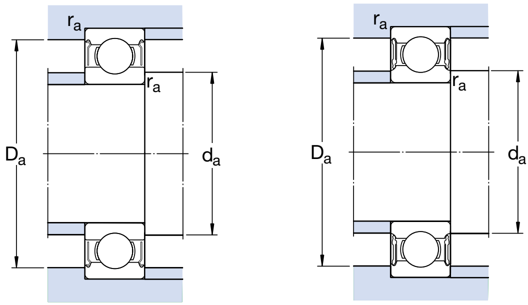


Dimensions				Abutment and fillet dimensions			Calculation factors	
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	k_r	f_0
mm				mm			–	
8	9,6	14,2	0,2	9,4	14,6	0,2	0,015	11
	9,6	14,2	0,2	9,4	14,6	0,2	0,015	11
	9,8	16,7	0,3	9,8	17	0,3	0,020	8,8
	9,8	16,7	0,3	9,8	17	0,3	0,020	8,8
	10,5	19	0,3	10	20	0,3	0,025	12
	10,5	19	0,3	10	20	0,3	0,025	12
9	10,7	15,2	0,2	10,4	15,6	0,2	0,015	11
	11,6	17,5	0,3	11	18	0,3	0,020	11
	12,1	20,5	0,3	11	22	0,3	0,025	13
	13,9	22,4	0,3	11,4	23,6	0,3	0,025	12
10	11,8	17,2	0,3	11,8	17	0,3	0,015	9,4
	11,8	17,2	0,3	11,8	17	0,3	0,015	9,4
	13,2	19,4	0,3	12	20	0,3	0,020	9,3
	12,9	22,4	0,3	12	24	0,3	0,025	12
	12,9	22,4	0,3	12	24	0,3	0,025	12
	15,3	25,3	0,6	14,2	25,8	0,6	0,025	13
	15,3	25,3	0,6	14,2	25,8	0,6	0,025	13
	17,7	29,3	0,6	14,2	30,8	0,6	0,030	11
	17,7	29,3	0,6	14,2	30,8	0,6	0,030	11
12	13,8	19,2	0,3	13,8	19	0,3	0,015	9,7
	15,4	21,4	0,3	14	22	0,3	0,020	9,7
	17,2	25,5	0,3	14	26	0,3	0,025	13
	17,2	25,5	0,3	14	26	0,3	0,025	13
	18,5	28	0,6	16,2	27,8	0,6	0,025	12
	18,5	28	0,6	16,2	27,8	0,6	0,025	12
	19,3	31,9	1	17,6	31,4	1	0,030	11
	19,3	31,9	1	17,6	31,4	1	0,030	11

Sealed stainless steel deep groove ball bearings
d **15 – 20** mm

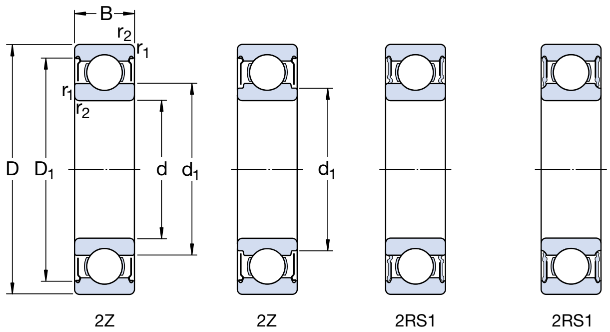


Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
15	24	5	1,3	0,78	0,034	60 000	30 000	0,0076	**W 61802-2Z**
	28	7	3,64	2,16	0,095	56 000	28 000	0,019	**W 61902-2Z**
	28	7	3,64	2,16	0,095	–	16 000	0,019	**W 61902-2RS1**
	32	9	4,68	2,75	0,12	50 000	26 000	0,030	**W 6002-2Z**
	32	9	4,68	2,75	0,12	–	14 000	0,030	**W 6002-2RS1**
	35	11	6,5	3,65	0,16	43 000	22 000	0,045	**W 6202-2Z**
	35	11	6,5	3,65	0,16	–	13 000	0,045	**W 6202-2RS1**
	42	13	9,56	5,2	0,228	38 000	19 000	0,082	**W 6302-2Z**
	42	13	9,56	5,2	0,228	–	12 000	0,082	**W 6302-2RS1**
17	26	5	1,4	0,9	0,039	56 000	34 000	0,0082	**W 61803-2Z**
	30	7	3,9	2,45	0,108	50 000	32 000	0,019	**W 61903-2Z**
	30	7	3,9	2,45	0,108	–	14 000	0,019	**W 61903-2RS1**
	35	10	5,07	3,15	0,137	45 000	22 000	0,039	**W 6003-2Z**
	35	10	5,07	3,15	0,137	–	13 000	0,039	**W 6003-2RS1**
	40	12	8,06	4,65	0,2	38 000	19 000	0,065	**W 6203-2Z**
	40	12	8,06	4,65	0,2	–	12 000	0,065	**W 6203-2RS1**
	47	14	11,4	6,3	0,275	34 000	17 000	0,12	**W 6303-2Z**
	47	14	11,4	6,3	0,275	–	11 000	0,12	**W 6303-2RS1**
20	32	7	3,38	2,24	0,104	–	13 000	0,018	**W 61804-2RS1**
	37	9	5,4	3,55	0,156	–	12 000	0,04	**W 61904-2RS1**
	42	12	7,93	4,9	0,212	38 000	19 000	0,069	**W 6004-2Z**
	42	12	7,93	4,9	0,212	–	11 000	0,069	**W 6004-2RS1**
	47	14	10,8	6,4	0,28	32 000	17 000	0,11	**W 6204-2Z**
	47	14	10,8	6,4	0,28	–	10 000	0,11	**W 6204-2RS1**
	52	15	13,5	7,65	0,335	30 000	15 000	0,14	**W 6304-2Z**
	52	15	13,5	7,65	0,335	–	9 500	0,14	**W 6304-2RS1**

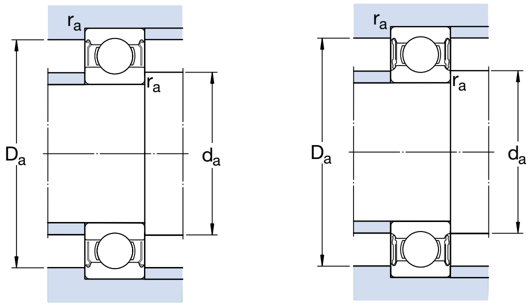


Dimensions				Abutment and fillet dimensions			Calculation factors	
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	k_r	f_0
mm				mm			–	
15	16,8	22,2	0,3	16,8	22	0,3	0,015	10
	18,8	25,3	0,3	17	26	0,3	0,020	14
	18,8	25,3	0,3	17	26	0,3	0,020	14
	20,2	28,7	0,3	17	30	0,3	0,025	14
	20,2	28,7	0,3	17	30	0,3	0,025	14
	21,7	31,4	0,6	19,2	30,8	0,6	0,025	13
	21,7	31,4	0,6	19,2	30,8	0,6	0,025	13
	24,5	36,8	1	20,8	36,2	1	0,030	12
	24,5	36,8	1	20,8	36,2	1	0,030	12
17	18,8	24,3	0,3	18,8	24	0,3	0,015	10
	21	27,8	0,3	19	28	0,3	0,020	15
	21	27,8	0,3	19	28	0,3	0,020	15
	23,5	31,9	0,3	19	33	0,3	0,025	14
	23,5	31,9	0,3	19	33	0,3	0,025	14
	24,9	35,8	0,6	21,2	35,8	0,6	0,025	13
	24,9	35,8	0,6	21,2	35,8	0,6	0,025	13
	27,5	41,1	1	22,8	41,2	1	0,030	12
	27,5	41,1	1	22,8	41,2	1	0,030	12
20	22,6	29,5	0,3	22	30	0,3	0,015	15
	23,6	33,5	0,3	22	35	0,3	0,020	15
	27,6	38,7	0,6	23,2	38,8	0,6	0,025	14
	27,6	38,7	0,6	23,2	38,8	0,6	0,025	14
	29,5	40,9	1	25,2	41,8	1	0,025	13
	29,5	40,9	1	25,2	41,8	1	0,025	13
	30	45,4	1,1	27	45	1	0,030	12
	30	45,4	1,1	27	45	1	0,030	12

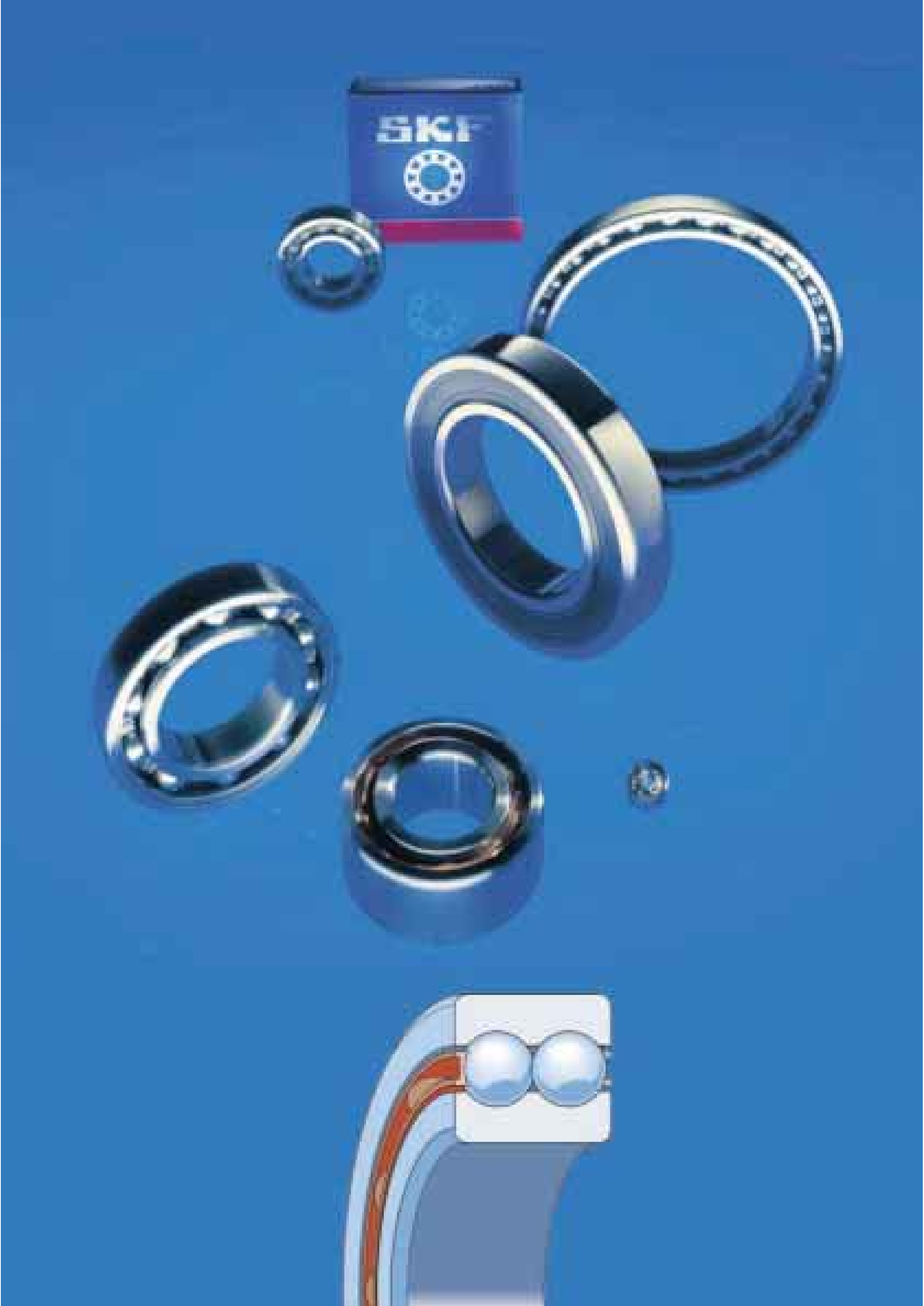
Sealed stainless steel deep groove ball bearings
d **25 – 50** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
25	42	9	5,92	4,15	0,193	–	10 000	0,047	**W 61905-2RS1**
	47	12	8,52	5,7	0,25	32 000	16 000	0,08	**W 6005-2Z**
	47	12	8,52	5,7	0,25	–	9 500	0,08	**W 6005-2RS1**
	52	15	11,9	7,65	0,335	28 000	14 000	0,13	**W 6205-2Z**
	52	15	11,9	7,65	0,335	–	8 500	0,13	**W 6205-2RS1**
	62	17	17,2	10,8	0,475	24 000	13 000	0,23	**W 6305-2Z**
	62	17	17,2	10,8	0,475	–	7 500	0,23	**W 6305-2RS1**
30	55	13	11,1	8	0,355	28 000	14 000	0,12	**W 6006-2Z**
	55	13	11,1	8	0,355	–	8 000	0,12	**W 6006-2RS1**
	62	16	16,3	10,8	0,475	24 000	12 000	0,2	**W 6206-2Z**
	62	16	16,3	10,8	0,475	–	7 500	0,2	**W 6206-2RS1**
	72	19	22,5	14,6	0,64	20 000	11 000	0,35	**W 6306-2Z**
	72	19	22,5	14,6	0,64	–	6 300	0,35	**W 6306-2RS1**
35	62	14	13,5	10	0,44	24 000	12 000	0,16	**W 6007-2Z**
	62	14	13,5	10	0,44	–	7 000	0,16	**W 6007-2RS1**
	72	17	21,6	14,6	0,655	20 000	10 000	0,29	**W 6207-2Z**
	72	17	21,6	14,6	0,655	–	6 300	0,29	**W 6207-2RS1**
40	68	15	14	10,8	0,49	22 000	11 000	0,19	**W 6008-2Z**
	68	15	14	10,8	0,49	–	6 300	0,19	**W 6008-2RS1**
	80	18	24,7	17,3	0,75	18 000	90 000	0,37	**W 6208-2Z**
	80	18	24,7	17,3	0,75	–	5 600	0,37	**W 6208-2RS1**
45	75	16	17,8	14,6	0,64	20 000	10 000	0,25	**W 6009-2Z**
	75	16	17,8	14,6	0,64	–	5 600	0,25	**W 6009-2RS1**
	85	19	27,6	19,6	0,865	17 000	8 500	0,41	**W 6209-2Z**
	85	19	27,6	19,6	0,865	–	5 000	0,41	**W 6209-2RS1**
50	80	16	18,2	16	0,71	18 000	9 000	0,26	**W 6010-2Z**
	80	16	18,2	16	0,71	–	5 000	0,26	**W 6010-2RS1**
	90	20	29,6	22,4	0,98	15 000	8 000	0,46	**W 6210-2Z**
	90	20	29,6	22,4	0,98	–	4 800	0,46	**W 6210-2RS1**



Dimensions				Abutment and fillet dimensions			Calculation factors	
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	k_r	f_0
mm				mm			–	
25	30,9	39,5	0,3	27	40	0,3	0,020	15
	31,7	42,7	0,6	28,2	43,8	0,6	0,025	15
	31,7	42,7	0,6	28,2	43,8	0,6	0,025	15
	34	45,7	1	30,6	46,4	1	0,025	14
	34	45,7	1	30,6	46,4	1	0,025	14
	38,1	53,2	1,1	32	55	1	0,030	13
	38,1	53,2	1,1	32	55	1	0,030	13
30	38	49,9	1	34,6	50,4	1	0,025	15
	38	49,9	1	34,6	50,4	1	0,025	15
	40,7	55,1	1	35,6	56,4	1	0,025	14
	40,7	55,1	1	35,6	56,4	1	0,025	14
	44,9	62,4	1,1	37	65	1	0,030	13
	44,9	62,4	1,1	37	65	1	0,030	13
35	44	57,1	1	39,6	57,4	1	0,025	15
	44	57,1	1	39,6	57,4	1	0,025	15
	47,6	64,9	1,1	42	65	1	0,025	14
	47,6	64,9	1,1	42	65	1	0,025	14
40	49,2	62,5	1	44,6	63,4	1	0,025	15
	49,2	62,5	1	44,6	63,4	1	0,025	15
	52,9	70,8	1,1	47	73	1	0,025	14
	52,9	70,8	1,1	47	73	1	0,025	14
45	54,5	69	1	49,6	70,4	1	0,025	15
	54,5	69	1	49,6	70,4	1	0,025	15
	56,6	74,5	1,1	52	78	1	0,025	14
	56,6	74,5	1,1	52	78	1	0,025	14
50	60	74,6	1	54,6	75,4	1	0,025	15
	60	74,6	1	54,6	75,4	1	0,025	15
	63,5	81,4	1,1	57	83	1	0,025	14
	63,5	81,4	1,1	57	83	1	0,025	14


SKF

Double row deep groove ball bearings

SKF double row deep groove ball bearings (➔ **fig** 1) correspond in design to single row deep groove ball bearings. They have deep uninterrupted raceways and high conformity between the balls and raceways. They are able to carry axial loads acting in both directions in addition to radial loads.

Double row deep groove ball bearings are very suitable for bearing arrangements where the load carrying capacity of a single row bearing is inadequate. For the same outside and bore diameters, double row bearings are slightly wider than single row bearings but have considerably higher load carrying capacity than single row bearings in the 62 and 63 series.

Fig 1

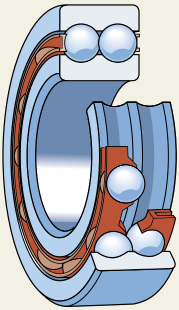
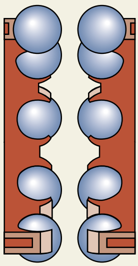


Fig 2



Bearing data – general

Dimensions

The boundary dimensions of SKF double row deep groove ball bearings are in accordance with ISO 15:1998.

Tolerances

SKF double row deep groove ball bearings are produced to Normal tolerances. The values for tolerances correspond to ISO 492:2002 and can be found in **table** 3 on **page 125**.

Internal clearance

SKF double row deep groove ball bearings have Normal radial internal clearance as standard. The clearance limits are as specified in ISO 5753:1991 and can be found in **table** 3 on **page 297**.

Misalignment

Misalignment of the inner ring relative to the outer ring of a double row deep groove ball bearing can only be accommodated by force, which leads to increased ball loads and cage forces and a reduction in bearing service life. For this reason, the maximum permissible angular misalignment is two minutes of arc. Any misalignment of the bearing rings will result in increased noise during operation.

Cages

SKF double row deep groove ball bearings are fitted with two glass fibre reinforced polyamide 6,6 cages (➔ **fig** 2), designation suffix TN9.

Note:

Double row deep groove ball bearings with polyamide 6,6 cages can be operated at temperatures up to +120 °C. The lubricants generally used for rolling bearings do not have a detrimental effect on cage properties, with the exception of a few synthetic oils and greases with a synthetic oil base, and lubricants containing a high proportion of EP additives when used at high temperatures.

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 obtain satisfactory operation, double row deep groove ball bearings, like all ball and roller bearings, must 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 cages, and the friction in the lubricant, can have a detrimental effect on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the balls and raceways.

The requisite minimum load to be applied to double row deep groove ball bearings can be estimated using

$$F_{rm} = k_r \left(\frac{\nu\, n}{1\,000}\right)^{2/3} \left(\frac{d_m}{100}\right)^2$$

where

F_{rm} = minimum radial load, kN
k_r = minimum radial load factor (➔ product table)
ν = oil viscosity at operating temperature, mm^2/s
n = rotational speed, r/min
d_m = bearing mean diameter = 0,5 (d + D), mm

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 double row deep groove ball bearings must be subjected to additional radial load.

Axial load carrying capacity

If double row deep groove ball bearings are subjected to a purely axial load, this axial load should generally not exceed the value of 0,5 C_0. Excessive axial loads can lead to a substantial reduction in bearing life.

Equivalent dynamic bearing load

For dynamically loaded double row deep groove ball bearings

$P = F_r$ when $F_a/F_r \leq e$
$P = 0{,}56\, F_r + YF_a$ when $F_a/F_r > e$

The factors e and Y depend on the relationship $f_0\, F_a/C_0$, where f_0 is a calculation factor (➔ product table), F_a the axial component of the load and C_0 the basic static load rating.

If the bearings are mounted with the usual fits (shaft tolerance j5 or k5, depending on the shaft diameter, and housing bore tolerance J7) the values for e and Y given in **table 1** can be used to calculate the equivalent load.

Equivalent static bearing load

For statically loaded double row deep groove ball bearings

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

If $P_0 < F_r$, $P_0 = F_r$ should be used.

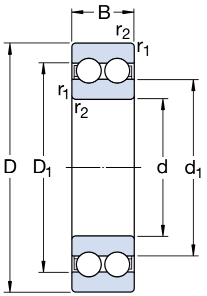
Table 1

Calculation factors for double row deep groove ball bearings

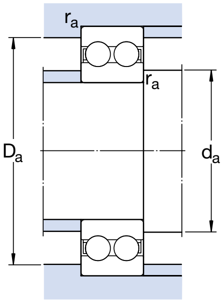
$f_0\ F_a/C_0$	e	Y
0,172	0,19	2,30
0,345	0,22	1,99
0,689	0,26	1,71
1,03	0,28	1,55
1,38	0,30	1,45
2,07	0,34	1,31
3,45	0,38	1,15
5,17	0,42	1,04
6,89	0,44	1,00

Intermediate values are obtained by linear interpolation

Double row deep groove ball bearings
d **10 – 65** mm

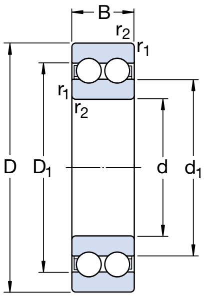


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
10	30	14	9,23	5,2	0,224	40 000	22 000	0,049	**4200 ATN9**
12	32	14	10,6	6,2	0,26	36 000	20 000	0,053	**4201 ATN9**
	37	17	13	7,8	0,325	34 000	18 000	0,092	**4301 ATN9**
15	35	14	11,9	7,5	0,32	32 000	17 000	0,059	**4202 ATN9**
	42	17	14,8	9,5	0,405	28 000	15 000	0,120	**4302 ATN9**
17	40	16	14,8	9,5	0,405	28 000	15 000	0,090	**4203 ATN9**
	47	19	19,5	13,2	0,56	24 000	13 000	0,16	**4303 ATN9**
20	47	18	17,8	12,5	0,53	24 000	13 000	0,14	**4204 ATN9**
	52	21	23,4	16	0,68	22 000	12 000	0,21	**4304 ATN9**
25	52	18	19	14,6	0,62	20 000	11 000	0,16	**4205 ATN9**
	62	24	31,9	22,4	0,95	18 000	10 000	0,34	**4305 ATN9**
30	62	20	26	20,8	0,88	17 000	9 500	0,26	**4206 ATN9**
	72	27	41	30	1,27	16 000	8 500	0,50	**4306 ATN9**
35	72	23	35,1	28,5	1,2	15 000	8 000	0,40	**4207 ATN9**
	80	31	50,7	38	1,63	14 000	7 500	0,69	**4307 ATN9**
40	80	23	37,1	32,5	1,37	13 000	7 000	0,50	**4208 ATN9**
	90	33	55,9	45	1,9	12 000	6 700	0,95	**4308 ATN9**
45	85	23	39	36	1,53	12 000	6 700	0,54	**4209 ATN9**
	100	36	68,9	56	2,4	11 000	6 000	1,25	**4309 ATN9**
50	90	23	41	40	1,7	11 000	6 000	0,58	**4210 ATN9**
	110	40	81,9	69,5	2,9	10 000	5 300	1,70	**4310 ATN9**
55	100	25	44,9	44	1,9	10 000	5 600	0,80	**4211 ATN9**
	120	43	97,5	83	3,45	9 000	5 000	2,15	**4311 ATN9**
60	110	28	57,2	55	2,36	9 500	5 300	1,10	**4212 ATN9**
	130	46	112	98	4,15	8 500	4 500	2,65	**4312 ATN9**
65	120	31	67,6	67	2,8	8 500	4 800	1,45	**4213 ATN9**
	140	48	121	106	4,5	8 000	4 300	3,25	**4313 ATN9**

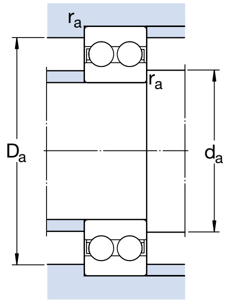


Dimensions				Abutment and fillet dimensions			Calculation factors	
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	k_r	f_o
mm				mm			–	
10	16,7	23,3	0,6	14	26	0,6	0,05	12
12	18,3	25,7	0,6	16	28	0,6	0,05	12
	20,5	28,5	1	17	32	1	0,06	12
15	21,5	29	0,6	19	31	0,6	0,05	13
	24,5	32,5	1	20	37	1	0,06	13
17	24,3	32,7	0,6	21	36	0,6	0,05	13
	28,7	38,3	1	22	42	1	0,06	13
20	29,7	38,3	1	25	42	1	0,05	14
	31,8	42,2	1,1	26,5	45,5	1	0,06	13
25	34,2	42,8	1	30	47	1	0,05	14
	37,3	49,7	1,1	31,5	55,5	1	0,06	13
30	40,9	51,1	1	35	57	1	0,05	14
	43,9	58,1	1,1	36,5	65,5	1	0,06	13
35	47,5	59,5	1,1	41,5	65,5	1	0,05	14
	49,5	65,4	1,5	43	72	1,5	0,06	13
40	54	66	1,1	46,5	73,5	1	0,05	15
	56,9	73,1	1,5	48	82	1,5	0,06	14
45	59,5	71,5	1,1	51,5	78,5	1	0,05	15
	63,5	81,5	1,5	53	92	1,5	0,06	14
50	65,5	77,5	1,1	56,5	83,5	1	0,05	15
	70	90	2	59	101	2	0,06	14
55	71,2	83,8	1,5	63	92	1,5	0,05	16
	76,5	98,5	2	64	111	2	0,06	14
60	75,6	90,4	1,5	68	102	1,5	0,05	15
	83,1	107	2,1	71	119	2	0,06	14
65	82,9	99,1	1,5	73	112	1,5	0,05	15
	89,6	115	2,1	76	129	2	0,06	14

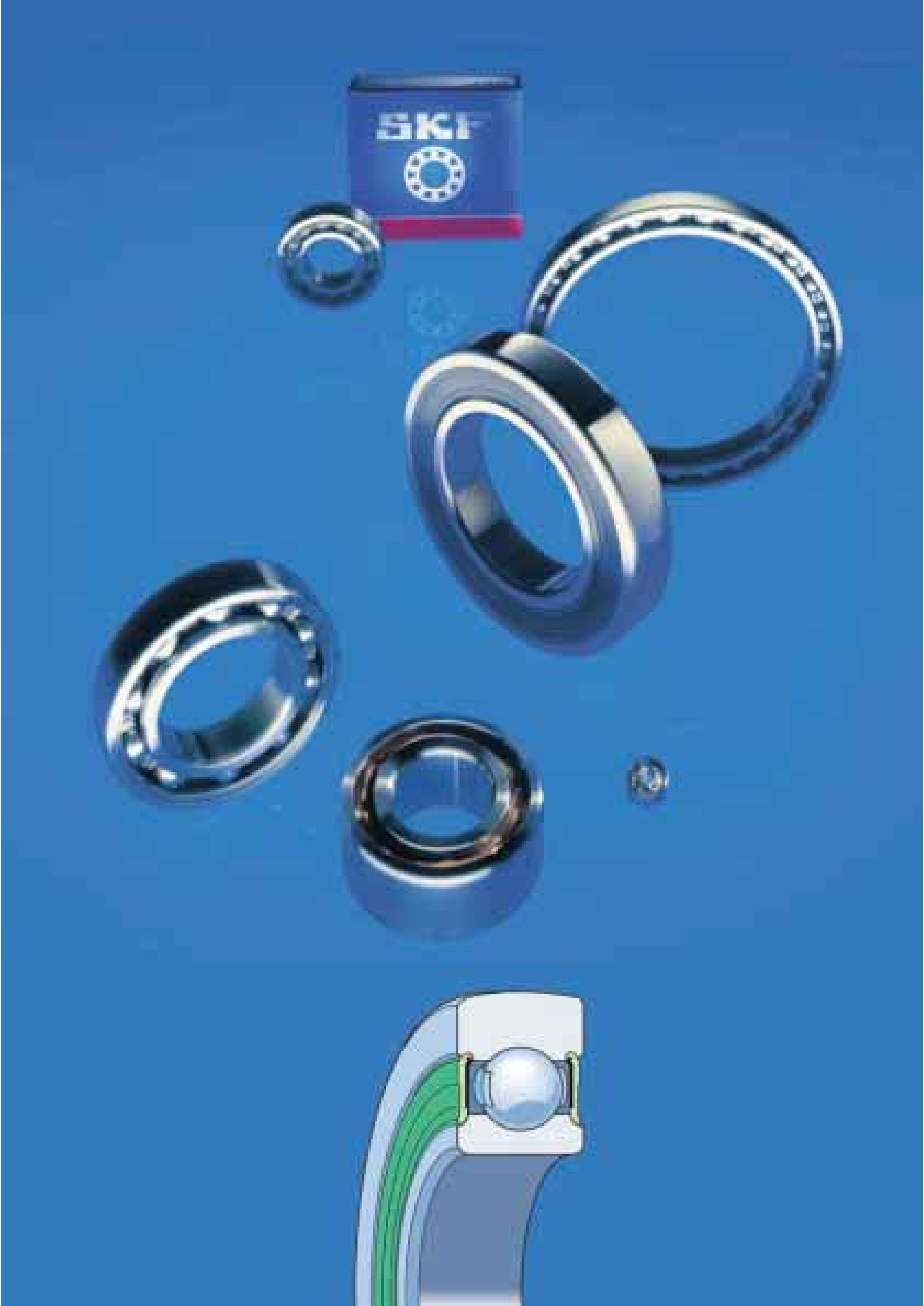
Double row deep groove ball bearings
d **70 – 100** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
70	125	31	70,2	73,5	3,1	8 000	4 300	1,50	**4214 ATN9**
	150	51	138	125	5	7 000	3 800	3,95	**4314 ATN9**
75	130	31	72,8	80	3,35	7 500	4 000	1,60	**4215 ATN9**
	160	55	156	143	5,5	6 700	3 600	4,80	**4315 ATN9**
80	140	33	80,6	90	3,6	7 000	3 800	2,00	**4216 ATN9**
85	150	36	93,6	102	4	7 000	3 600	2,55	**4217 ATN9**
90	160	40	112	122	4,65	6 300	3 400	3,20	**4218 ATN9**
100	180	46	140	156	5,6	5 600	3 000	4,70	**4220 ATN9**



Dimensions				Abutment and fillet dimensions			Calculation factors	
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	k_r	f_o
mm				mm			–	
70	89,4	106	1,5	78	117	1,5	0,05	15
	96,7	124	2,1	81	139	2	0,06	14
75	96,9	114	1,5	83	122	1,5	0,05	16
	103	132	2,1	86	149	2	0,06	14
80	102	120	2	89	131	2	0,05	16
85	105	125	2	94	141	2	0,05	15
90	114	136	2	99	151	2	0,05	15
100	130	154	2,1	111	169	2	0,05	15


SKF

Single row cam rollers

Designs

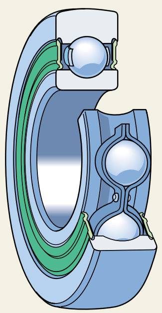
Single row cam rollers (➔ **fig** 1) in the narrow 3612(00) R series are based on deep groove ball bearings in the 62 series. They have a crowned runner surface and incorporate sheet steel reinforced acrylonitrile butadiene rubber (NBR) contact seals on both sides. They are ready-to-mount pre-greased cam rollers and are used for all types of cam drives, conveyor systems etc. Because of their crowned runner surface they can be used in applications where angular misalignment with respect to the track may be expected; and where edge stresses need to be minimized.

In addition to single row cam rollers, the SKF standard range of track runner bearings comprises other cam rollers, support rollers, or cam followers. These are for example

- double row cam rollers, wide series 3057(00) and 3058(00), ➔ **page 457**,
- support rollers based on needle roller or cylindrical roller bearings, and
- cam followers based on needle roller or cylindrical roller bearings.

For further information on support rollers and cam followers, consult the SKF catalogue “Needle roller bearings” or the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Fig 1



Cam roller data – general

Dimensions

With the exception of the outside diameter, the boundary dimensions of SKF single row cam rollers are in accordance with ISO 15:1998 for bearings in the 02 Dimension Series.

Tolerances

SKF single row cam rollers are produced to Normal tolerances as standard, except for the tolerance of the crowned runner surface diameter which is twice the Normal tolerance.

The values for tolerances correspond to ISO 492:2002 and can be found in **table** 3 on **page 125**.

Internal clearance

SKF single row cam rollers have C3 radial internal clearance as standard. The clearance limits are as specified in ISO 5753:1991 and can be found in **table** 3 on **page 297**.

Cages

Single row cam rollers are fitted with a pressed steel cage.

Load carrying ability

In contrast to standard ball bearings, where the outer ring is supported over its entire outside diameter surface in the bore of a housing, the outer ring of a cam roller has only a small contact area with the surface against which it runs, e.g. a rail or cam. The actual contact area depends on the load and the crowning of the runner surface. The deformation of the outer ring caused by this limited contact alters the force distribution in the bearing and thus has an influence on load carrying ability. The basic load ratings given in the product table take this into account. With reference to this deformation and the strength of the outer ring, it is not only necessary to use the basic dynamic and static load ratings, but also not to exceed the maximum permissible dynamic and static radial loads.

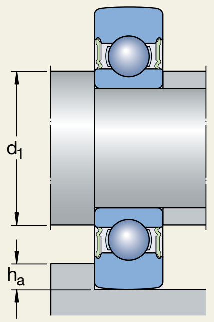
The ability to carry dynamic loads depends on the requisite life, but the value of the maximum dynamic radial load F_r must not be exceeded.

The permissible static load for a cam roller is determined by the smaller of the values of F_{0r} and C_0. If requirements regarding smooth running are below normal, the static load may exceed C_0 but should never exceed the maximum permissible static radial load F_{0r}.

Axial load carrying capacity

Cam rollers are intended for predominantly radial loads. If axial loads act on the outer ring, e.g. as produced when the cam roller runs against a guide flange, they will produce tilting moments in the cam roller and the service life may be reduced as a consequence.

Fig 2



Design of associated components

Pins

With few exceptions, cam rollers operate under conditions of stationary inner ring load. If easy displacement of the inner ring is required under such conditions, the pin or shaft should be machined to tolerance g6. If, for some reason, a tighter fit is required, then the pin or shaft should be machined to tolerance j6.

For applications where cam rollers are subjected to higher axial loads, SKF recommends supporting the inner ring of the cam roller over its entire side face (➔ **fig 2**). The diameter of the supporting surface should be the same as the face diameter d_1 of the inner ring (➔ product table, **page 402**).

Guide flanges

For rails or cams with guide flanges (➔ **fig 2**), the recommended flange height h_a should not exceed

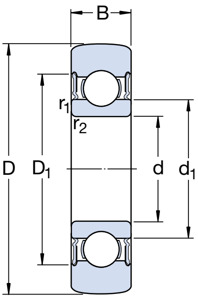
$$h_a = 0,5\,(D - D_1)$$

This helps to avoid damage to the seals fitted in the outer ring. The values for the outer ring diameters D and D_1 are listed in the product table.

Lubrication

SKF single row cam rollers are greased for life and cannot be relubricated. They are filled with a lithium base grease of consistency 3 to the NLGI Scale with good rust inhibiting properties and an operating temperature range of –30 to +120 °C. The base oil viscosity is 74 mm^2/s at 40 °C and 8,5 mm^2/s at 100 °C.

Single row cam rollers
D **32 – 80** mm

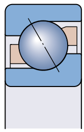
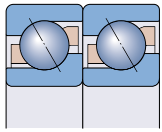


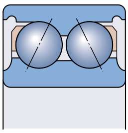
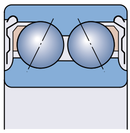
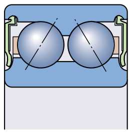
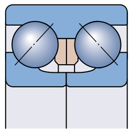
Dimensions						Limiting speed	Mass	Designation
D	B	d	d_1 ~	D_1 ~	$r_{1,2}$ min			
mm						r/min	kg	–
32	9	10	14,8	23,4	0,6	12 000	0,041	**361200 R**
35	10	12	16,1	25,9	0,6	11 000	0,052	**361201 R**
40	11	15	19,2	29,7	0,6	9 500	0,074	**361202 R**
47	12	17	21,6	32,9	0,6	8 500	0,11	**361203 R**
52	14	20	26	38,7	1	7 500	0,16	**361204 R**
62	15	25	31,4	44,2	1	6 300	0,24	**361205 R**
72	16	30	37,6	52,1	1	5 300	0,34	**361206 R**
80	17	35	44	60,6	1,1	4 500	0,43	**361207 R**

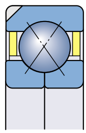
Outside diameter	Basic load ratings dynamic	static	Fatigue load limit	Maximum radial loads dynamic	static
D	C	C_0	P_u	F_r	F_{0r}
mm	kN		kN	kN	
32	4,62	2	0,085	3,4	4,9
35	6,24	2,6	0,11	3,25	4,65
40	7,02	3,2	0,134	5	7,2
47	8,84	4,15	0,176	8,15	11,6
52	11,4	5,4	0,228	7,35	10,6
62	12,7	6,8	0,285	12,9	18,3
72	17,4	9,3	0,4	14,3	20,4
80	22,1	11,8	0,5	12,7	18

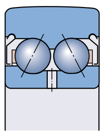

SKF

Angular contact ball bearings





Angular contact ball bearings have raceways in the inner and outer rings that are displaced with respect to each other in the direction of the bearing axis. This means that they are designed to accommodate combined loads, i.e. simultaneously acting radial and axial loads.

The axial load carrying capacity of angular contact ball bearings increases with increasing contact angle. The contact angle is defined as the angle between the line joining the points of contact of the ball and the raceways in the radial plane, along which the load is transmitted from one raceway to another, and a line perpendicular to the bearing axis.

SKF angular contact ball bearings are produced in a wide variety of designs and sizes. Those commonly used in general engineering are:

- single row angular contact ball bearings (→ **fig** 1),
- double row angular contact ball bearings (→ **fig** 2),
- four-point contact ball bearings (→ **fig** 3),
- double row cam rollers (→ **fig** 4).

Detailed information on these bearings and cam rollers belonging to the SKF standard assortment are given on the following pages. For other SKF angular contact ball bearings e.g. high-precision angular contact ball bearings, fixed section bearings, slewing bearings or hub units please refer to the section “Other SKF products”, starting on **page 1077**.

Fig 1

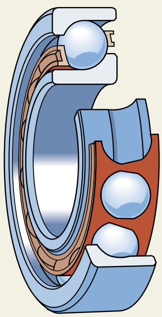


Fig 2

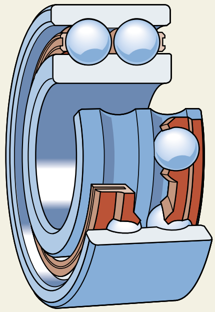


Fig 3

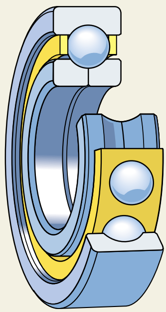
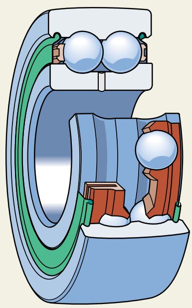


Fig 4



Single row angular contact ball bearings

Designs

Single row angular contact ball bearings can accommodate axial loads acting in one direction only. The bearing is normally adjusted against a second bearing.

The standard assortment of SKF angular contact ball bearings comprises bearings in the 72 B and 73 B series. Two versions are available for different purposes:

- bearings for universal matching in sets or
- basic design bearings (not universally matchable) for arrangements with single bearings.

The bearings have a 40° contact angle (➔ **fig** 1) and therefore support heavy axial loads. They are non-separable and the bearing rings have one high and one low shoulder. The low shoulder enables a large number of balls to be incorporated in the bearing, thus giving the bearing a relatively high load carrying capacity.

In addition, SKF single row angular contact ball bearings are available in many other dimension series, designs, and sizes. For further information on these bearings, consult the "SKF Interactive Engineering Catalogue" on CD-ROM or online at www.skf.com.

Bearings for universal matching

The bearings for universal matching are specifically manufactured so that when mounted in random order, but immediately adjacent to each other, a given internal clearance or preload and/or an even load distribution will be obtained without the use of shims or similar devices. Universally matchable bearings carry a designation suffix to indicate the internal clearance (CA, CB, CC) or preload (GA, GB, GC).

When ordering, it is necessary to state the number of individual bearings required and not the number of sets.

Paired mounting (➔ **fig** 2) is used when the load carrying capacity of a single bearing is inadequate (tandem arrangement) or when combined or axial loads act in both directions (back-to-back and face-to-face arrangements).

When arranged in tandem (**a**) the load lines are parallel and the radial and axial loads are equally shared by the bearings. However, the bearing set can only accommodate axial loads acting in one direction. If axial loads act in the opposite direction, or if combined loads are present, a third bearing adjusted against the tandem pair must be added.

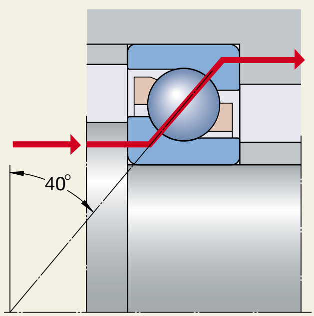
The load lines of bearings arranged back-to-back (**b**) diverge towards the bearing axis. Axial loads acting in both directions can be accommodated, but only by one bearing in each direction. Bearings mounted back-to-back provide a relatively stiff bearing arrangement that can also accommodate tilting moments.

The load lines of bearings mounted face-to-face (**c**) converge towards the bearing axis. Axial loads acting in both directions can be accommodated, but only by one bearing in each direction. This arrangement is not as stiff as the back-to-back arrangement and is less suitable for the accommodation of tilting moments.

Basic design bearings

Basic design single row angular contact ball bearings are intended for arrangements where only one bearing is used at each bearing position. They have Normal tolerances concerning bearing width and standout of the rings. Therefore, they are not suitable for mounting directly adjacent to each other.

Fig 1



SKF Explorer class bearings

High performance SKF Explorer angular contact ball bearings are shown with an asterisk in the product table. SKF Explorer bearings retain the designation of the earlier standard bearings, e. g. 7208 BECBP. However, each bearing and its box are marked with the name "EXPLORER".

Bearing data – general

Dimensions
The boundary dimensions of SKF single row angular contact ball bearings are in accordance with ISO 15:1998.

Tolerances
Basic design SKF single row angular contact ball bearings for single mounting are produced to Normal tolerances. Standard design universally matchable bearings are manufactured to better than Normal tolerances.

SKF Explorer angular contact ball bearings are manufactured only as bearings for universal matching with P6 dimensional accuracy and P5 running accuracy.

The values for tolerances correspond to ISO 492:2002 and can be found in **tables** 3 to 5, starting on **page 125**.

Internal clearance and preload
Internal clearance in single row angular contact ball bearings is only obtained after mounting and is dependent on adjustment against a second bearing, which provides axial location in the opposite direction.

SKF universally matchable bearings are produced in three different clearance and preload classes each. The classes for bearing sets with clearance are:

- CA small axial clearance,
- CB Normal axial clearance (standard),
- CC large axial clearance.

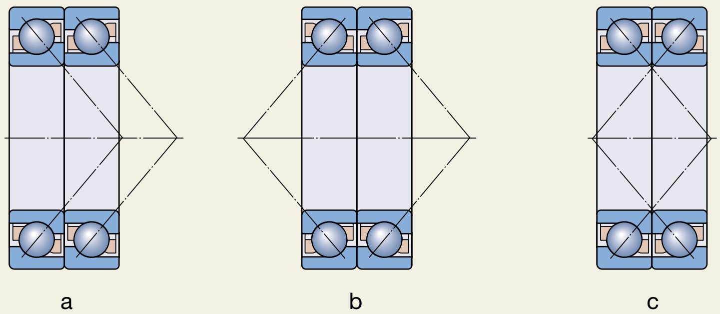
Bearings with clearance class CB are standard. The availability of bearings with other clearance classes can be obtained from **matrix** 1 on **page 417**. SKF universally matchable bearings with clearance can be combined in sets of any number of bearings.

The classes for bearing sets with preload are:

- GA light preload (standard),
- GB moderate preload,
- GC heavy preload.

Bearings to GA class preload are standard (➔ **matrix** 1 on **page 417**). Bearings with preload can only be paired in sets of two bearings, in contrast to the SKF universally matchable bearings with clearance, as otherwise the preload would increase.

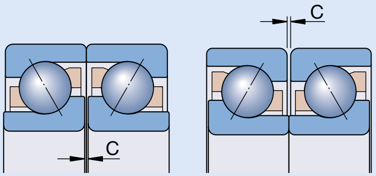
Fig 2



The values for the clearance classes are given in **table 1** and for the preload classes in **table 2**. The values apply to unmounted bearing sets, arranged back-to-back or face-to-face, and in case of clearance to zero measuring loads.

Table 1

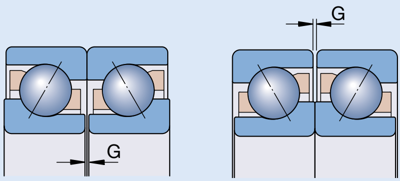
Axial internal clearance of universally matchable single row angular contact ball bearings arranged back-to-back or face-to-face



Bore diameter d over	incl.	**Axial internal clearance** **Class** **CA** min	max	**CB** min	max	**CC** min	max
mm		µm					
10	**18**	5	13	15	23	24	32
18	**30**	7	15	18	26	32	40
30	**50**	9	17	22	30	40	48
50	**80**	11	23	26	38	48	60
80	**110**	14	26	32	44	55	67
110	**180**	17	29	35	47	62	74
180	**250**	21	37	45	61	74	90

Table 2

Preload of universally matchable single row angular contact ball bearings arranged back-to-back or face-to-face



Bore diameter d over	incl.	**Preload** **Class** **GA** min	max	max	**GB** min	max	min	max	**GC** min	max	min	max
mm		µm		N	µm		N		µm		N	
10	**18**	+4	–4	80	–2	–10	30	330	–8	–16	230	660
18	**30**	+4	–4	120	–2	–10	40	480	–8	–16	340	970
30	**50**	+4	–4	160	–2	–10	60	630	–8	–16	450	1 280
50	**80**	+6	–6	380	–3	–15	140	1 500	–12	–24	1 080	3 050
80	**110**	+6	–6	410	–3	–15	150	1 600	–12	–24	1 150	3 250
110	**180**	+6	–6	540	–3	–15	200	2 150	–12	–24	1 500	4 300
180	**250**	+8	–8	940	–4	–20	330	3 700	–16	–32	2 650	7 500

Misalignment

Single row angular contact ball bearings have only limited ability to accommodate misalignment. The permissible misalignment of the shaft relative to the housing that will not produce inadmissibly high additional forces depends on the operating clearance in the bearing, bearing size, internal design and the forces and moments acting on the bearing. Because of the complex relationship between the influencing factors, it is not possible to quote any values that are universally valid.

For bearings mounted in sets, particularly those with small axial internal clearance mounted in a back-to-back arrangement, misalignment can only be accommodated by increased ball loads, which will create cage stresses and reduce bearing service life. Any misalignment of the bearing rings will also lead to increased running noise.

Influence of operating temperature on bearing material

SKF angular contact ball bearings undergo a special heat treatment. When equipped with a steel or brass cage, they can operate at temperatures of up to +150 °C.

Cages

Depending on size and series, SKF single row angular contact ball bearings are equipped as standard with one of the cages described below and shown in **fig** 3. The available SKF standard assortment is shown in **matrix** 1 on **page 417**:

The standard cages used for single row angular contact ball bearings are

- injection moulded cage of glass fibre reinforced polyamide 6,6 (**a**), ball centred, designation suffix P,
- pressed window-type brass cage (**b**), ball centred, designation suffix Y,
- machined window-type brass cage (**c**), ball centred, designation suffix M.

Bearings having a pressed sheet steel cage, designation suffix J, or machined steel cage, designation suffix F, may also be available. Please check availability before ordering.

Note:

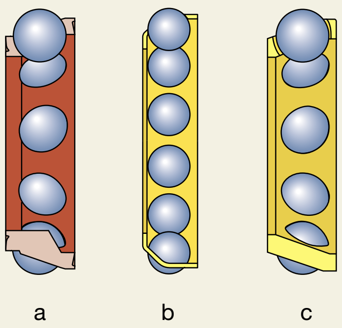
Bearings with polyamide 6,6 cages can be operated at temperatures up to +120 °C. The lubricants generally used for rolling bearings do not have a detrimental effect on cage properties, with the exception of a few synthetic oils and greases with a synthetic oil base, and lubricants containing a high proportion of EP additives when used at high temperatures.

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

Speed ratings for bearing pairs

For bearings arranged in pairs, the reference speeds provided in the product table for single bearings should be reduced by approximately 20 %.

Fig 3



Load carrying capacity of bearing pairs

The values for basic load ratings and fatigue load limits given in the product table apply to single bearings. For bearing pairs mounted immediately adjacent to each other the following values apply:

- basic dynamic load rating for standard bearings in all arrangements and for SKF Explorer bearings in back-to-back or face-to-face arrangement
  $C = 1{,}62 \times C_{\text{single bearing}}$
- basic dynamic load rating for SKF Explorer bearings in tandem arrangement
  $C = 2 \times C_{\text{single bearing}}$
- basic static load rating
  $C_0 = 2 \times C_{0\ \text{single bearing}}$
- fatigue load limit
  $P_u = 2 \times P_{u\ \text{single bearing}}$

Minimum load

In order to provide satisfactory operation, angular contact 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, and the friction in the lubricant, 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 load to be applied to single bearings and bearing pairs arranged in tandem can be estimated using

$$F_{am} = k_a \frac{C_0}{1\,000} \left(\frac{n\, d_m}{100\,000}\right)^2$$

and for bearing pairs arranged back-to-back or face-to-face from

$$F_{rm} = k_r \left(\frac{\nu\, n}{1\,000}\right)^{2/3} \left(\frac{d_m}{100}\right)^2$$

Table 3

Minimum load factors

Bearing series	Minimum load factors k_a	k_r
–	–	
72 BE	1,4	0,095
72 B	1,2	0,08
73 BE	1,6	0,1
73 B	1,4	0,09

where

F_{am} = minimum axial load, kN
F_{rm} = minimum radial load, kN
C_0 = basic static load rating of single bearing, or bearing pair, kN (➔ product table)
k_a = minimum axial load factor according to **table 3**
k_r = minimum radial load factor according to **table 3**
ν = oil viscosity at operating temperature, mm^2/s
n = rotational speed, r/min
d_m = bearing mean diameter = 0,5 (d + D), mm

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 angular contact ball bearing must be subjected to an additional load. Single bearings and bearing pairs arranged in tandem can be axially preloaded by adjusting the inner or outer rings against each other, or by using springs.

Equivalent dynamic bearing load

For single bearings and bearings paired in tandem

$P = F_r$ when $F_a/F_r \leq 1,14$
$P = 0,35\ F_r + 0,57\ F_a$ when $F_a/F_r > 1,14$

When determining the axial force F_a reference should be made to the section "Determining axial force for bearings mounted singly or paired in tandem".

For bearings mounted in pairs arranged back-to-back or face-to-face

$P = F_r + 0,55\ F_a$ when $F_a/F_r \leq 1,14$
$P = 0,57\ F_r + 0,93\ F_a$ when $F_a/F_r > 1,14$

F_r and F_a are the forces acting on the bearing pair.

Equivalent static bearing load

For single bearings and bearings paired in tandem

$P_0 = 0,5\ F_r + 0,26\ F_a$

If $P_0 < F_r$, then $P_0 = F_r$ should be used. When determining the axial force F_a reference should be made to the section "Determining axial force for bearings mounted singly or paired in tandem".

For bearings mounted in pairs arranged back-to-back or face-to-face

$P_0 = F_r + 0,52\ F_a$

F_r and F_a are the forces acting on the bearing pair.

Determining axial force for bearings mounted singly or paired in tandem

When a radial load is applied, the load is transmitted from one raceway to the other at an angle to the bearing axis and an internal axial force will be induced in single row angular contact ball bearings. This must be considered when calculating the equivalent bearing loads for bearing arrangements consisting of two single bearings and/or bearing pairs arranged in tandem.

The necessary equations are given in **table 4**, **page 414**, for the various bearing arrangements and load cases. The equations are only valid if the bearings are adjusted against each other to practically zero clearance, but without any preload. In the arrangements shown, bearing A is subjected to a radial load F_{rA} and bearing B to a radial load F_{rB}. Both F_{rA} and F_{rB} are always considered positive even when they act in the direction opposite to that shown in the figures. The radial loads act at the pressure centres of the bearings (see dimension a in the product table).

Variable R

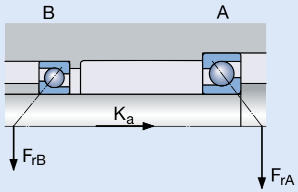
The variable R from **table 4** takes into account the contact conditions inside the bearing. The values for R can be obtained from **diagram 1**, **page 415**, as a function of the ratio K_a/C. K_a is the external axial load acting on the shaft or on the housing and C is the basic dynamic load rating of the bearing, which must accommodate the external axial load. For $K_a = 0$ use R = 1.

Table 4

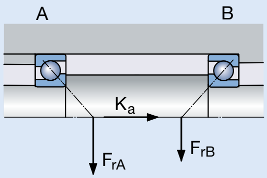
Axial loading of bearing arrangements incorporating two single row B or BE design angular contact ball bearings and/or bearing pairs in tandem

Bearing arrangement	Load case	Axial forces	
Back-to-back	**Case 1a**		
	$F_{rA} \geq F_{rB}$	$F_{aA} = R\,F_{rA}$	$F_{aB} = F_{aA} + K_a$
	$K_a \geq 0$		
	Case 1b		
	$F_{rA} < F_{rB}$	$F_{aA} = R\,F_{rA}$	$F_{aB} = F_{aA} + K_a$
	$K_a \geq R\,(F_{rB} - F_{rA})$		
Face-to-face	**Case 1c**		
	$F_{rA} < F_{rB}$	$F_{aA} = F_{aB} - K_a$	$F_{aB} = R\,F_{rB}$
	$K_a < R\,(F_{rB} - F_{rA})$		
Back-to-back	**Case 2a**		
	$F_{rA} \leq F_{rB}$	$F_{aA} = F_{aB} + K_a$	$F_{aB} = R\,F_{rB}$
	$K_a \geq 0$		
	Case 2b		
	$F_{rA} > F_{rB}$	$F_{aA} = F_{aB} + K_a$	$F_{aB} = R\,F_{rB}$
	$K_a \geq R\,(F_{rA} - F_{rB})$		
Face-to-face	**Case 2c**		
	$F_{rA} > F_{rB}$	$F_{aA} = R\,F_{rA}$	$F_{aB} = F_{aA} - K_a$
	$K_a < R\,(F_{rA} - F_{rB})$		

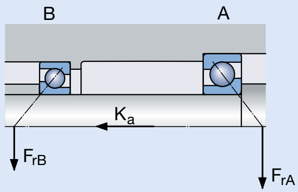
Back-to-back (cases 1a, 1b)



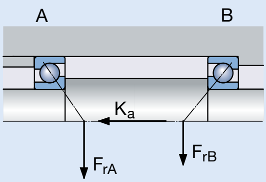
Face-to-face (case 1c)



Back-to-back (cases 2a, 2b)



Face-to-face (case 2c)

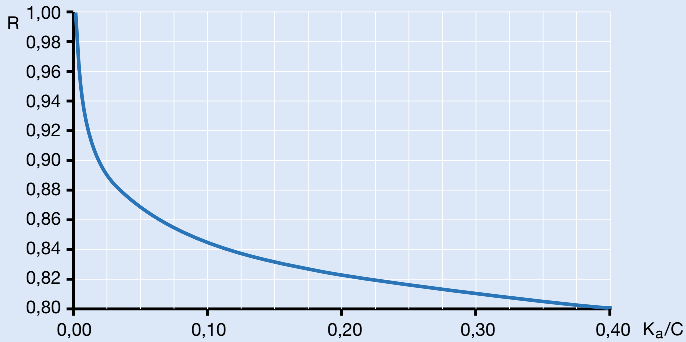


Supplementary designations

The designation suffixes used to identify certain features of SKF single row angular contact ball bearings are explained in the following.

A 30° contact angle
AC 25° contact angle
B 40° contact angle
CA Bearing for universal matching in random order; when arranged back-to-back or face-to-face the axial internal clearance will be smaller than Normal (CB)
CB Bearing for universal matching in random order; when arranged back-to-back or face-to-face the axial internal clearance will be Normal
CC Bearing for universal matching in random order; when arranged back-to-back or face-to-face the axial internal clearance will be greater than Normal (CB)
DB Two bearings matched back-to-back
DF Two bearings matched face-to-face
DT Two bearings matched in tandem
E Optimized internal design
F Machined steel cage
GA Bearing for universal matching mounted in random order; when arranged back-to-back or face-to-face there will be a light preload
GB Bearing for universal matching mounted in random order; when arranged back-to-back or face-to-face there will be a moderate preload
GC Bearing for universal matching mounted in random order; when arranged back-to-back or face-to-face there will be a heavy preload
J Pressed steel cage, ball centred
M Machined brass cage, ball centred, different designs are identified by a figure, e.g. M1
N1 One locating slot in the outer ring
N2 Two locating slots in the outer ring, positioned at 180° to each other
P Injection moulded cage of glass fibre reinforced polyamide 6,6, ball centred
P5 Dimensional and running accuracy to ISO tolerance class 5
P6 Dimensional and running accuracy to ISO tolerance class 6
W64 Solid Oil filling
Y Pressed window-type brass cage, ball centred

Diagram 1



Design of bearing arrangements

When designing bearing arrangements incorporating single row angular contact ball bearings, remember that these bearings must either be used with a second bearing or in sets (➔ **fig 4**).

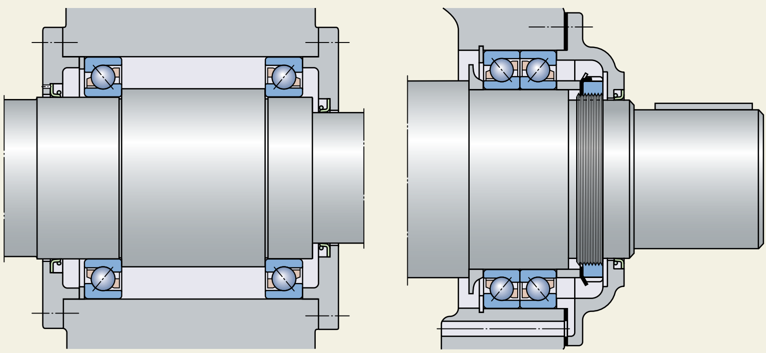
When two single row angular contact ball bearings are used, they must be adjusted against each other until the requisite preload or clearance is obtained (➔ section "Bearing preload", starting on **page 206**).

Where bearings for universal pairing are used and the bearings are mounted immediately adjacent to each other, there is no need for adjustment. The requisite preload or clearance is obtained by choosing bearings from an appropriate preload or clearance class and by applying suitable fits for the bearings on the shaft and in the housing.

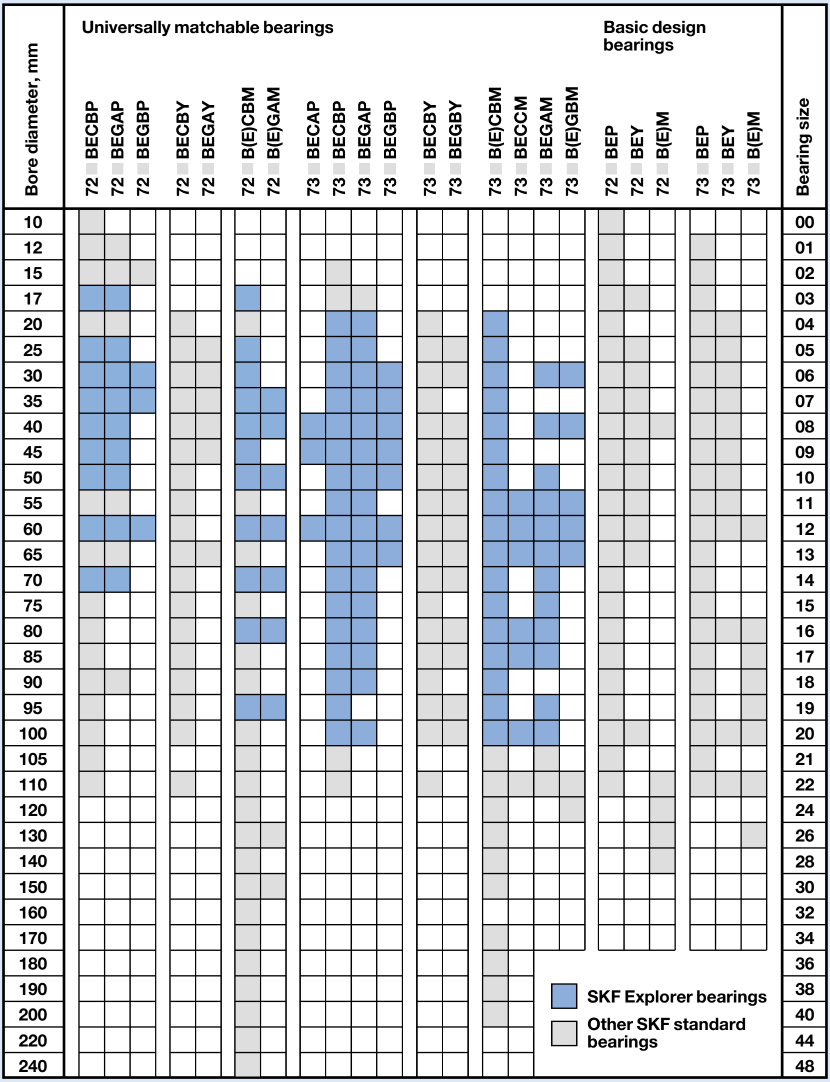
It is important for proper bearing performance and for the operational reliability of the arrangement that the bearings are correctly adjusted, or that the correct choice of preload or clearance has been made. If the clearance of the bearing in operation is too large, the load carrying capacity of the bearings will not be fully utilized; on the other hand, excessive preload will produce more friction and higher operating temperatures, leading to a reduction in bearing service life. It should also be remembered that with 72 B and 73 B series single row angular contact ball bearings (40° contact angle), correct rolling conditions will only be achieved in the bearing when the load ratio $F_a/F_r \geq 1$.

Special attention should also be paid to back-to-back and face-to-face arrangements where the axial load acts predominantly in one direction. This creates an unfavourable rolling condition for the balls of the unloaded bearing and can lead to noise, discontinuity in the lubricant film and increased stressing of the cage. Under these conditions, zero operational clearance is best and should be attained, for example, by using springs. For additional information contact the SKF application engineering service.

Fig 4

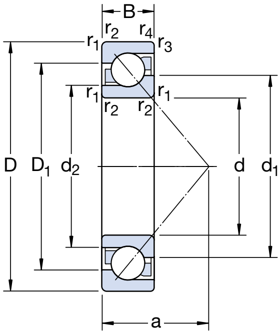


SKF single row angular contact ball bearings – standard assortment



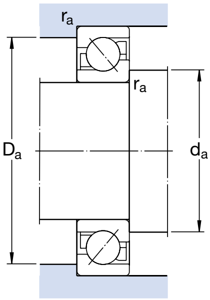
For other dimension series, sizes and designs, please consult the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com

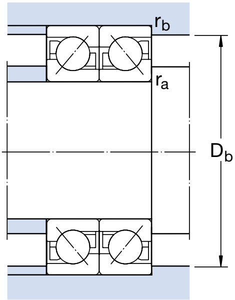
Single row angular contact ball bearings
d **10 – 30** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass	Designations[1)] Universally matchable bearing	Basic design bearing
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
10	30	9	7,02	3,35	0,14	30 000	30 000	0,030	**7200 BECBP**	**7200 BEP**
12	32	10	7,61	3,8	0,16	26 000	26 000	0,036	**7201 BECBP**	**7201 BEP**
	37	12	10,6	5	0,208	24 000	24 000	0,063	**–**	**7301 BEP**
15	35	11	8,84	4,8	0,204	24 000	24 000	0,045	**7202 BECBP**	**7202 BEP**
	42	13	13	6,7	0,28	20 000	20 000	0,081	**7302 BECBP**	**7302 BEP**
17	40	12	11	5,85	0,25	22 000	22 000	0,064	⋆ **7203 BECBP**	**–**
	40	12	10,4	5,5	0,236	20 000	20 000	0,064	**–**	**7203 BEP**
	40	12	11,1	6,1	0,26	20 000	20 000	0,064	**–**	**7203 BEY**
	40	12	11	5,85	0,25	22 000	22 000	0,070	⋆ **7203 BECBM**	**–**
	47	14	15,9	8,3	0,355	19 000	19 000	0,11	**7303 BECBP**	**7303 BEP**
20	47	14	14	8,3	0,355	18 000	18 000	0,11	**7204 BECBP**	**7204 BEP**
	47	14	14	8,3	0,355	18 000	18 000	0,11	**7204 BECBY**	**–**
	47	14	13,3	7,65	0,325	18 000	19 000	0,11	**7204 BECBM**	**–**
	52	15	19	10	0,425	18 000	18 000	0,14	⋆ **7304 BECBP**	**–**
	52	15	17,4	9,5	0,4	16 000	16 000	0,14	**–**	**7304 BEP**
	52	15	19	10,4	0,44	16 000	16 000	0,15	**7304 BECBY**	**7304 BEY**
	52	15	19	10	0,425	18 000	18 000	0,15	⋆ **7304 BECBM**	**–**
25	52	15	15,6	10	0,43	17 000	17 000	0,13	⋆ **7205 BECBP**	**–**
	52	15	14,8	9,3	0,4	15 000	15 000	0,13	**–**	**7205 BEP**
	52	15	15,6	10,2	0,43	15 000	15 000	0,13	**7205 BECBY**	**7205 BEY**
	52	15	15,6	10	0,43	17 000	17 000	0,14	⋆ **7205 BECBM**	**–**
	62	17	26,5	15,3	0,655	15 000	15 000	0,23	⋆ **7305 BECBP**	**–**
	62	17	24,2	14	0,6	14 000	14 000	0,23	**–**	**7305 BEP**
	62	17	26	15,6	0,655	14 000	14 000	0,24	**7305 BECBY**	**7305 BEY**
	62	17	26,5	15,3	0,655	15 000	15 000	0,24	⋆ **7305 BECBM**	**–**
30	62	16	24	15,6	0,655	14 000	14 000	0,19	⋆ **7206 BECBP**	**–**
	62	16	22,5	14,3	0,61	13 000	13 000	0,19	**–**	**7206 BEP**
	62	16	23,8	15,6	0,655	13 000	13 000	0,21	**7206 BECBY**	**7206 BEY**
	62	16	24	15,6	0,655	14 000	14 000	0,21	⋆ **7206 BECBM**	**–**
	72	19	35,5	21,2	0,9	13 000	13 000	0,33	⋆ **7306 BECBP**	**–**
	72	19	32,5	19,3	0,815	12 000	12 000	0,33	**–**	**7306 BEP**
	72	19	34,5	21,2	0,9	12 000	12 000	0,37	**7306 BECBY**	**7306 BEY**
	72	19	35,5	21,2	0,9	13 000	13 000	0,37	⋆ **7306 BECBM**	**–**

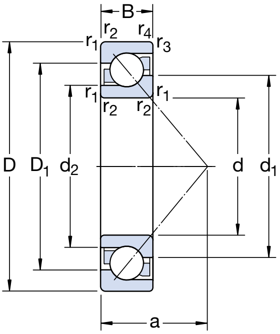
⋆ SKF Explorer bearing
1) For available final variants ➔ **matrix 1** on **page 417**





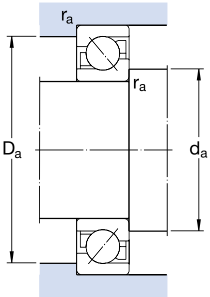
Dimensions							Abutment and fillet dimensions				
d	d_1 ~	d_2 ~	D_1 ~	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm							mm				
10	18,3	14,6	22,9	0,6	0,3	13	14,2	25,8	27,6	0,6	0,3
12	20,2	16,6	25	0,6	0,3	14,4	16,2	27,8	29,6	0,6	0,3
	21,8	17	28,3	1	0,6	16,3	17,6	31,4	32,8	1	0,6
15	22,7	19	27,8	0,6	0,3	16	19,2	30,8	32,6	0,6	0,3
	26	20,7	32,6	1	0,6	18,6	20,6	36,4	37,8	1	0,6
17	26,3	21,7	31,2	0,6	0,6	18	21,2	35,8	35,8	0,6	0,6
	26,3	21,7	31,2	0,6	0,6	18	21,2	35,8	35,8	0,6	0,6
	26,3	21,7	31,2	0,6	0,6	18	21,2	35,8	35,8	0,6	0,6
	26,3	21,7	31,2	0,6	0,6	18	21,2	35,8	35,8	0,6	0,6
	28,7	22,8	36,2	1	0,6	20,4	22,6	41,4	42,8	1	0,6
20	30,8	25,9	37	1	0,6	21	25,6	41,4	42,8	1	0,6
	30,8	25,9	37	1	0,6	21	25,6	41,4	42,8	1	0,6
	30,8	25,9	37	1	0,6	21	25,6	41,4	42,8	1	0,6
	33,3	26,8	40,4	1,1	0,6	22,8	27	45	47,8	1	0,6
	33,3	26,8	40,4	1,1	0,6	22,8	27	45	47,8	1	0,6
	33,3	26,8	40,4	1,1	0,6	22,8	27	45	47,8	1	0,6
	33,3	26,8	40,4	1,1	0,6	22,8	27	45	47,8	1	0,6
25	36,1	30,9	41,5	1	0,6	23,7	30,6	46,4	47,8	1	0,6
	36,1	30,9	41,5	1	0,6	23,7	30,6	46,4	47,8	1	0,6
	36,1	30,9	41,5	1	0,6	23,7	30,6	46,4	47,8	1	0,6
	36,1	30,9	41,5	1	0,6	23,7	30,6	46,4	47,8	1	0,6
	39,8	32,4	48,1	1,1	0,6	26,8	32	55	57,8	1	0,6
	39,8	32,4	48,1	1,1	0,6	26,8	32	55	57,8	1	0,6
	39,8	32,4	48,1	1,1	0,6	26,8	32	55	57,8	1	0,6
	39,8	32,4	48,1	1,1	0,6	26,8	32	55	57,8	1	0,6
30	42,7	36,1	50,1	1	0,6	27,3	35,6	56,4	57,8	1	0,6
	42,7	36,1	50,1	1	0,6	27,3	35,6	56,4	57,8	1	0,6
	42,7	36,1	50,1	1	0,6	27,3	35,6	56,4	57,8	1	0,6
	42,7	36,1	50,1	1	0,6	27,3	35,6	56,4	57,8	1	0,6
	46,6	37,9	56,5	1,1	0,6	31	37	65	67,8	1	0,6
	46,6	37,9	56,5	1,1	0,6	31	37	65	67,8	1	0,6
	46,6	37,9	56,5	1,1	0,6	31	37	65	67,8	1	0,6
	46,6	37,9	56,5	1,1	0,6	31	37	65	67,8	1	0,6

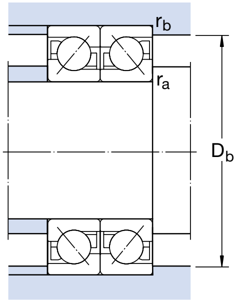
Single row angular contact ball bearings
d **35 – 55** mm



Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designations[1)] Universally matchable bearing	Basic design bearing
mm			kN		kN	r/min		kg	–	
35	72	17	31	20,8	0,88	12 000	12 000	0,28	★ **7207 BECBP**	**–**
	72	17	29,1	19	0,815	11 000	11 000	0,28	**–**	**7207 BEP**
	72	17	30,7	20,8	0,88	11 000	11 000	0,30	**7207 BECBY**	**7207 BEY**
	72	17	31	20,8	0,88	12 000	12 000	0,30	★ **7207 BECBM**	**–**
	80	21	41,5	26,5	1,14	11 000	11 000	0,45	★ **7307 BECBP**	**–**
	80	21	39	24,5	1,04	10 000	10 000	0,45	**–**	**7307 BEP**
	80	21	39	24,5	1,04	10 000	10 000	0,49	**7307 BECBY**	**7307 BEY**
	80	21	41,5	26,5	1,14	11 000	11 000	0,49	★ **7307 BECBM**	**–**
40	80	18	36,5	26	1,1	11 000	11 000	0,37	★ **7208 BECBP**	**–**
	80	18	34,5	24	1,02	10 000	10 000	0,37	**–**	**7208 BEP**
	80	18	36,4	26	1,1	10 000	10 000	0,38	**7208 BECBY**	**7208 BEY**
	80	18	36,5	26	1,1	11 000	11 000	0,39	★ **7208 BECBM**	**–**
	80	18	34,5	24	1,02	10 000	10 000	0,39	**–**	**7208 BEM**
	90	23	50	32,5	1,37	10 000	10 000	0,61	★ **7308 BECBP**	**–**
	90	23	46,2	30,5	1,13	9 000	9 000	0,61	**–**	**7308 BEP**
	90	23	49,4	33,5	1,4	9 000	9 000	0,64	**7308 BECBY**	**7308 BEY**
	90	23	50	32,5	1,37	10 000	10 000	0,68	★ **7308 BECBM**	**–**
45	85	19	38	28,5	1,22	10 000	10 000	0,42	★ **7209 BECBP**	**–**
	85	19	35,8	26	1,12	9 000	9 000	0,42	**–**	**7209 BEP**
	85	19	37,7	28	1,2	9 000	9 000	0,43	**7209 BECBY**	**7209 BEY**
	85	19	38	28,5	1,22	10 000	10 000	0,44	★ **7209 BECBM**	**–**
	100	25	61	40,5	1,73	9 000	9 000	0,82	★ **7309 BECBP**	**–**
	100	25	55,9	37,5	1,73	8 000	8 000	0,82	**–**	**7309 BEP**
	100	25	60,5	41,5	1,73	8 000	8 000	0,86	**7309 BECBY**	**7309 BEY**
	100	25	61	40,5	1,73	9 000	9 000	0,90	★ **7309 BECBM**	**–**
50	90	20	40	31	1,32	9 000	9 000	0,47	★ **7210 BECBP**	**–**
	90	20	37,7	28,5	1,22	8 500	8 500	0,47	**–**	**7210 BEP**
	90	20	39	30,5	1,29	8 500	8 500	0,47	**7210 BECBY**	**7210 BEY**
	90	20	40	31	1,32	9 000	9 000	0,51	★ **7210 BECBM**	**–**
	110	27	75	51	2,16	8 000	8 000	1,04	★ **7310 BECBP**	**–**
	110	27	68,9	47,5	2	7 500	7 500	1,04	**–**	**7310 BEP**
	110	27	74,1	51	2,2	7 500	7 500	1,13	**7310 BECBY**	**7310 BEY**
	110	27	75	51	2,16	8 000	8 000	1,16	★ **7310 BECBM**	**–**
55	100	21	48,8	38	1,63	7 500	7 500	0,62	**7211 BECBP**	**7211 BEP**
	100	21	48,8	38	1,63	7 500	7 500	0,62	**7211 BECBY**	**7211 BEY**
	100	21	46,2	36	1,53	7 500	8 000	0,66	**7211 BECBM**	**–**

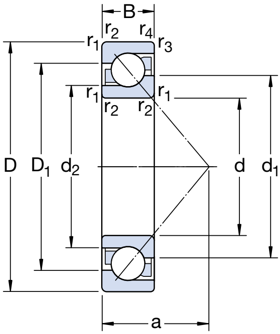
★ SKF Explorer bearing
1) For available final variants ➔ **matrix 1** on **page 417**





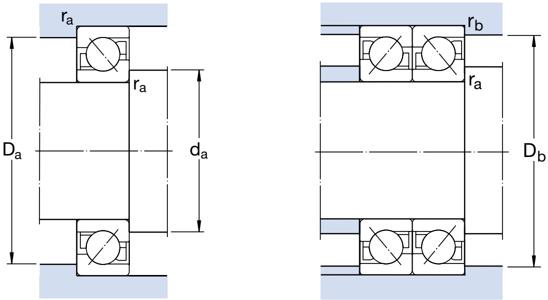
Dimensions							**Abutment and fillet dimensions**				
d	d_1 ~	d_2 ~	D_1 ~	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm							mm				
35	49,7	42	58,3	1,1	0,6	31	42	65	67,8	1	0,6
	49,7	42	58,3	1,1	0,6	31	42	65	67,8	1	0,6
	49,7	42	58,3	1,1	0,6	31	42	65	67,8	1	0,6
	49,7	42	58,3	1,1	0,6	31	42	65	67,8	1	0,6
	52,8	43,6	63,3	1,5	1	35	44	71	74,4	1,5	1
	52,8	43,6	63,3	1,5	1	35	44	71	74,4	1,5	1
	52,8	43,6	63,3	1,5	1	35	44	71	74,4	1,5	1
	52,8	43,6	63,3	1,5	1	35	44	71	74,4	1,5	1
40	56,3	48,1	65,6	1,1	0,6	34	47	73	75,8	1	0,6
	56,3	48,1	65,6	1,1	0,6	34	47	73	75,8	1	0,6
	56,3	48,1	65,6	1,1	0,6	34	47	73	75,8	1	0,6
	56,3	48,1	65,6	1,1	0,6	34	47	73	75,8	1	0,6
	56,3	48,1	65,6	1,1	0,6	34	47	73	75,8	1	0,6
	59,7	49,6	71,6	1,5	1	39	49	81	84,4	1,5	1
	59,7	49,6	71,6	1,5	1	39	49	81	84,4	1,5	1
	59,7	49,6	71,6	1,5	1	39	49	81	84,4	1,5	1
	59,7	49,6	71,6	1,5	1	39	49	81	84,4	1,5	1
45	60,9	52,7	70,2	1,1	0,6	37	52	78	80,8	1	0,6
	60,9	52,7	70,2	1,1	0,6	37	52	78	80,8	1	0,6
	60,9	52,7	70,2	1,1	0,6	37	52	78	80,8	1	0,6
	60,9	52,7	70,2	1,1	0,6	37	52	78	80,8	1	0,6
	66,5	55,3	79,8	1,5	1	43	54	91	94,4	1,5	1
	66,5	55,3	79,8	1,5	1	43	54	91	94,4	1,5	1
	66,5	55,3	79,8	1,5	1	43	54	91	94,4	1,5	1
	66,5	55,3	79,8	1,5	1	43	54	91	94,4	1,5	1
50	65,8	57,7	75,2	1,1	0,6	39	57	83	85,8	1	0,6
	65,8	57,7	75,2	1,1	0,6	39	57	83	85,8	1	0,6
	65,8	57,7	75,2	1,1	0,6	39	57	83	85,8	1	0,6
	65,8	57,7	75,2	1,1	0,6	39	57	83	85,8	1	0,6
	73,8	61,1	88,8	2	1	47	61	99	104	2	1
	73,8	61,1	88,8	2	1	47	61	99	104	2	1
	73,8	61,1	88,8	2	1	47	61	99	104	2	1
	73,8	61,1	88,8	2	1	47	61	99	104	2	1
55	72,4	63,6	83,7	1,5	1	43	64	91	94	1,5	1
	72,4	63,6	83,7	1,5	1	43	64	91	94	1,5	1
	72,4	63,6	83,7	1,5	1	43	64	91	94	1,5	1

Single row angular contact ball bearings
d **55 – 80** mm



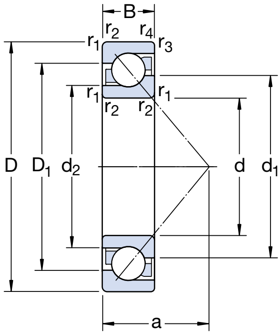
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designations[1] Universally matchable bearing	Basic design bearing
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
55	120	29	85	60	2,55	7 000	7 000	1,34	★ **7311 BECBP**	–
cont.	120	29	79,3	55	2,32	6 700	6 700	1,34	–	**7311 BEP**
	120	29	85,2	60	2,55	6 700	6 700	1,48	**7311 BECBY**	**7311 BEY**
	120	29	85	60	2,55	7 000	7 000	1,49	★ **7311 BECBM**	–
60	110	22	61	50	2,12	7 500	7 500	0,78	★ **7212 BECBP**	–
	110	22	57,2	45,5	1,93	7 000	7 000	0,78	–	**7212 BEP**
	110	22	57,2	45,5	1,93	7 000	7 000	0,83	**7212 BECBY**	**7212 BEY**
	110	22	61	50	2,12	7 500	7 500	0,85	★ **7212 BECBM**	–
	130	31	104	76,5	3,2	6 700	6 700	1,71	★ **7312 BECBP**	–
	130	31	95,6	69,5	3	6 000	6 000	1,71	–	**7312 BEP**
	130	31	95,6	69,5	3	6 000	6 000	1,75	**7312 BECBY**	**7312 BEY**
	130	31	104	76,5	3,2	6 700	6 700	1,88	★ **7312 BECBM**	–
	130	31	95,6	69,5	3	6 000	6 300	1,88	–	**7312 BEM**
65	120	23	66,3	54	2,28	6 300	6 300	1,00	**7213 BECBP**	**7213 BEP**
	120	23	66,3	54	2,28	6 300	6 300	1,00	**7213 BECBY**	**7213 BEY**
	120	23	66,3	54	2,28	6 300	6 700	1,10	**7213 BECBM**	–
	140	33	116	86,5	3,65	6 300	6 300	2,10	★ **7313 BECBP**	–
	140	33	108	80	3,35	5 600	5 600	2,15	**7313 BECBY**	**7313 BEP**
	140	33	116	86,5	3,65	6 300	6 300	2,31	★ **7313 BECBM**	–
70	125	24	75	64	2,7	6 300	6 300	1,10	★ **7214 BECBP**	–
	125	24	71,5	60	2,5	6 000	6 000	1,10	**7214 BECBY**	**7214 BEP**
	125	24	72	60	2,55	6 300	6 300	1,18	★ **7214 BECBM**	–
	150	35	127	98	3,9	5 600	5 600	2,55	★ **7314 BECBP**	–
	150	35	119	90	3,65	5 300	5 300	2,67	**7314 BECBY**	**7314 BEP**
	150	35	127	98	3,9	5 600	5 600	2,83	★ **7314 BECBM**	–
75	130	25	72,8	64	2,65	5 600	5 600	1,18	**7215 BECBP**	**7215 BEP**
	130	25	72,8	64	2,65	5 600	5 600	1,26	**7215 BECBY**	–
	130	25	70,2	60	2,5	5 600	6 000	1,29	**7215 BECBM**	–
	160	37	132	104	4,15	5 300	5 300	3,06	★ **7315 BECBP**	–
	160	37	125	98	3,8	5 000	5 000	3,06	–	**7315 BEP**
	160	37	133	106	4,15	5 000	5 000	3,20	**7315 BECBY**	–
	160	37	132	104	4,15	5 300	5 300	3,26	★ **7315 BECBM**	–
80	140	26	80,6	69,5	2,8	5 300	5 300	1,43	**7216 BECBP**	**7216 BEP**
	140	26	83,2	73,5	3	5 300	5 300	1,58	**7216 BECBY**	–
	140	26	85	75	3,05	5 600	5 600	1,59	★ **7216 BECBM**	–

★ SKF Explorer bearing
[1] For available final variants ➔ **matrix 1** on **page 417**



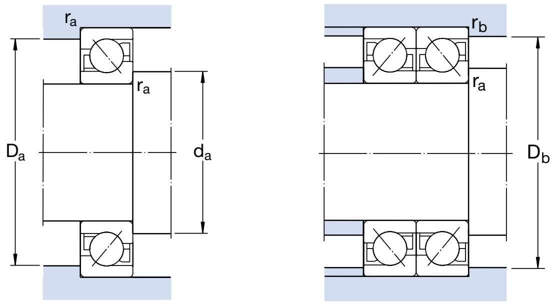
Dimensions							Abutment and fillet dimensions				
d	d_1 ~	d_2 ~	D_1 ~	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm							mm				
55	80,3	66,7	96,6	2	1	51	66	109	114	2	1
	80,3	66,7	96,6	2	1	51	66	109	114	2	1
	80,3	66,7	96,6	2	1	51	66	109	114	2	1
	80,3	66,7	96,6	2	1	51	66	109	114	2	1
60	79,6	69,3	91,55	1,5	1	47	69	101	104	1,5	1
	79,6	69,3	91,6	1,5	1	47	69	101	104	1,5	1
	79,6	69,3	91,6	1,5	1	47	69	101	104	1,5	1
	79,6	69,3	91,6	1,5	1	47	69	101	104	1,5	1
	87,3	72,6	104,8	2,1	1,1	55	72	118	123	2	1
	87,3	72,6	104,8	2,1	1,1	55	72	118	123	2	1
	87,3	72,6	104,8	2,1	1,1	55	72	118	123	2	1
	87,3	72,6	104,8	2,1	1,1	55	72	118	123	2	1
	87,3	72,6	104,8	2,1	1,1	55	72	118	123	2	1
65	86,4	75,5	100	1,5	1	50	74	111	114	1,5	1
	86,4	75,5	100	1,5	1	50	74	111	114	1,5	1
	86,4	75,5	100	1,5	1	50	74	111	114	1,5	1
	94,2	78,5	112,9	2,1	1,1	60	77	128	133	2	1
	94,2	78,5	112,9	2,1	1,1	60	77	128	133	2	1
	94,2	78,5	112,9	2,1	1,1	60	77	128	133	2	1
70	91,5	80,3	104,8	1,5	1	53	79	116	119	1,5	1
	91,5	80,3	104,8	1,5	1	53	79	116	119	1,5	1
	91,5	80,3	104,8	1,5	1	53	79	116	119	1,5	1
	101,1	84,4	121	2,1	1,1	64	82	138	143	2	1
	101,1	84,4	121	2,1	1,1	64	82	138	143	2	1
	101,1	84,4	121	2,1	1,1	64	82	138	143	2	1
75	96,3	85,3	110,1	1,5	1	56	84	121	124	1,5	1
	96,3	85,3	110,1	1,5	1	56	84	121	124	1,5	1
	96,3	85,3	110,1	1,5	1	56	84	121	124	1,5	1
	108,3	91,1	128,7	2,1	1,1	68	87	148	153	2	1
	108,3	91,1	128,7	2,1	1,1	68	87	148	153	2	1
	108,3	91,1	128,7	2,1	1,1	68	87	148	153	2	1
	108,3	91,1	128,7	2,1	1,1	68	87	148	153	2	1
80	103,6	91,4	117,9	2	1	59	91	129	134	2	1
	103,6	91,4	117,9	2	1	59	91	129	134	2	1
	103,6	91,4	117,9	2	1	59	91	129	134	2	1

Single row angular contact ball bearings
d **80 – 100** mm



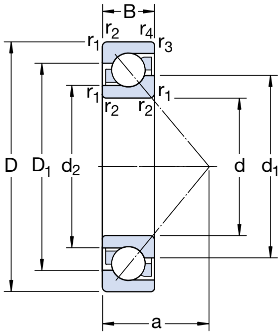
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designations**[1] Universally matchable bearing	Basic design bearing
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
80	170	39	143	118	4,5	5 000	5 000	3,64	* **7316 BECBP**	–
cont.	170	39	135	110	4,15	4 500	4 500	3,64	–	**7316 BEP**
	170	39	143	118	4,5	4 500	4 500	3,70	**7316 BECBY**	**7316 BEY**
	170	39	143	118	4,5	5 000	5 000	4,03	* **7316 BECBM**	–
	170	39	135	110	4,15	4 500	4 800	3,80	–	**7316 BEM**
85	150	28	95,6	83	3,25	5 000	5 000	1,83	**7217 BECBP**	**7217 BEP**
	150	28	95,6	83	3,25	5 000	5 000	1,83	**7217 BECBY**	–
	150	28	95,6	83	3,25	5 000	5 300	1,99	**7217 BECBM**	–
	180	41	156	132	4,9	4 800	4 800	4,26	* **7317 BECBP**	–
	180	41	146	112	4,5	4 300	4 300	4,26	–	**7317 BEP**
	180	41	153	132	4,9	4 300	4 300	4,59	**7317 BECBY**	–
	180	41	156	132	4,9	4 800	4 800	4,74	* **7317 BECBM**	–
	180	41	146	112	4,5	4 300	4 500	4,74	–	**7317 BEM**
90	160	30	108	96,5	3,65	4 500	4 500	2,12	**7218 BECBP**	**7218 BEP**
	160	30	108	96,5	3,65	4 500	4 500	2,34	**7218 BECBY**	–
	160	30	108	96,5	3,65	4 500	4 800	2,41	**7218 BECBM**	–
	190	43	166	146	5,3	4 500	4 500	4,98	* **7318 BECBP**	–
	190	43	156	134	4,8	4 000	4 000	4,98	–	**7318 BEP**
	190	43	165	146	5,2	4 000	4 000	5,22	**7318 BECBY**	–
	190	43	166	146	5,3	4 500	4 500	5,53	* **7318 BECBM**	–
	190	43	156	134	4,8	4 000	4 300	5,53	–	**7318 BEM**
95	170	32	124	108	4	4 300	4 300	2,68	**7219 BECBP**	**7219 BEP**
	170	32	124	108	4	4 300	4 300	2,82	**7219 BECBY**	–
	170	32	129	118	4,4	4 800	4 800	2,95	* **7219 BECBM**	–
	200	45	180	163	5,7	4 300	4 300	5,77	* **7319 BECBP**	–
	200	45	168	150	5,2	3 800	3 800	5,77	–	**7319 BEP**
	200	45	178	163	5,6	3 800	3 800	6,17	**7319 BECBY**	–
	200	45	180	163	5,7	4 300	4 300	6,41	* **7319 BECBM**	–
	200	45	168	150	5,2	3 800	4 000	6,41	–	**7319 BEM**
100	180	34	135	122	4,4	4 000	4 000	3,29	**7220 BECBP**	**7220 BEP**
	180	34	135	122	4,4	4 000	4 000	3,38	**7220 BECBY**	**7220 BEY**
	180	34	135	122	4,4	4 000	4 300	3,61	**7220 BECBM**	–
	215	47	216	208	6,95	4 000	4 000	7,17	* **7320 BECBP**	–
	215	47	203	190	6,4	3 600	3 600	7,17	–	**7320 BEP**
	215	47	203	190	6,4	3 600	3 600	7,15	**7320 BECBY**	**7320 BEY**
	215	47	216	208	6,95	4 000	4 000	8,00	* **7320 BECBM**	–
	215	47	203	190	6,4	3 600	3 800	8,00	–	**7320 BEM**

* SKF Explorer bearing. [1] For available final variants → **matrix 1** on **page 417**



Dimensions							Abutment and fillet dimensions				
d	d_1 ~	d_2 ~	D_1 ~	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm							mm				
80	115,2	97,1	136,8	2,1	1,1	72	92	158	163	2	1
	115,2	97,1	136,8	2,1	1,1	72	92	158	163	2	1
	115,2	97,1	136,8	2,1	1,1	72	92	158	163	2	1
	115,2	97,1	136,8	2,1	1,1	72	92	158	163	2	1
	115,2	97,1	136,8	2,1	1,1	72	92	158	163	2	1
85	110,1	97	126,7	2	1	63	96	139	144	2	1
	110,1	97	126,7	2	1	63	96	139	144	2	1
	110,1	97	126,7	2	1	63	96	139	144	2	1
	122,3	103	145	3	1,1	76	99	166	173	2,5	1
	122,3	103	145	3	1,1	76	99	166	173	2,5	1
	122,3	103	145	3	1,1	76	99	166	173	2,5	1
	122,3	103	145	3	1,1	76	99	166	173	2,5	1
	122,3	103	145	3	1,1	76	99	166	173	2,5	1
90	117,1	103	134,8	2	1	67	101	149	154	2	1
	117,1	103	134,8	2	1	67	101	149	154	2	1
	117,1	103	134,8	2	1	67	101	149	154	2	1
	129,2	109	153,1	3	1,1	80	104	176	183	2,5	1
	129,2	109	153,1	3	1,1	80	104	176	183	2,5	1
	129,2	109	153,1	3	1,1	80	104	176	183	2,5	1
	129,2	109	153,1	3	1,1	80	104	176	183	2,5	1
	129,2	109	153,1	3	1,1	80	104	176	183	2,5	1
95	124,3	109,1	142,5	2,1	1,1	72	107	158	163	2	1
	124,3	109,1	142,5	2,1	1,1	72	107	158	163	2	1
	124,3	109,1	142,5	2,1	1,1	72	107	158	163	2	1
	136,2	114,9	161,3	3	1,1	84	109	186	193	2,5	1
	136,2	114,9	161,3	3	1,1	84	109	186	193	2,5	1
	136,2	114,9	161,3	3	1,1	84	109	186	193	2,5	1
	136,2	114,9	161,3	3	1,1	84	109	186	193	2,5	1
	136,2	114,9	161,3	3	1,1	84	109	186	193	2,5	1
100	131	115,2	150,9	2,1	1,1	76	112	168	173	2	1
	131	115,2	150,9	2,1	1,1	76	112	168	173	2	1
	131	115,2	150,9	2,1	1,1	76	112	168	173	2	1
	144,5	120,5	173,4	3	1,1	90	114	201	-	2,5	-
	144,5	120,5	173,4	3	1,1	90	114	201	208	2,5	1
	144,5	120,5	173,4	3	1,1	90	114	201	208	2,5	1
	144,5	120,5	173,4	3	1,1	90	114	201	-	2,5	-
	144,5	120,5	173,4	3	1,1	90	114	201	208	2,5	1

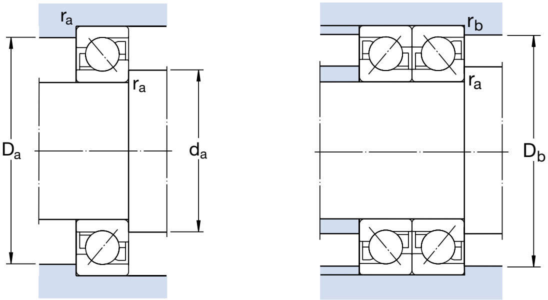
Single row angular contact ball bearings
d **105 – 240** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designations[1)] Universally matchable bearing	Basic design bearing
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
105	190	36	148	137	4,8	3 800	3 800	3,82	**7221 BECBP**	**7221 BEP**
	190	36	148	137	4,8	3 800	4 000	4,18	**7221 BECBM**	**–**
	225	49	212	208	6,95	3 400	3 400	8,46	**7321 BECBP**	**7321 BEP**
	225	49	203	193	6,4	3 400	3 600	9,12	**7321 BECBM**	**–**
110	200	38	163	153	5,2	3 600	3 600	4,60	**7222 BECBP**	**7222 BEP**
	200	38	163	153	5,2	3 600	3 600	4,75	**7222 BECBY**	**–**
	200	38	153	143	4,9	3 600	3 800	4,95	**7222 BECBM**	**7222 BEM**
	240	50	225	224	7,2	3 200	3 200	9,69	**7322 BECBP**	**7322 BEP**
	240	50	225	224	7,2	3 200	3 200	9,69	**7322 BECBY**	**7322 BEY**
	240	50	225	224	7,2	3 200	3 400	10,7	**7322 BECBM**	**7322 BEM**
120	215	40	165	163	5,3	3 400	3 600	5,89	**7224 BCBM**	**7224 BM**
	260	55	238	250	7,65	3 000	3 200	13,8	**7324 BCBM**	**–**
130	230	40	186	193	6,1	3 200	3 400	6,76	**7226 BCBM**	**7226 BM**
	280	58	296	305	9	2 800	2 800	17,1	**7326 BCBM**	**7326 BM**
140	250	42	199	212	6,4	2 800	3 000	8,63	**7228 BCBM**	**7228 BM**
	300	62	302	345	9,8	2 600	2 600	21,3	**7328 BCBM**	**–**
150	270	45	216	240	6,95	2 600	2 800	10,8	**7230 BCBM**	**–**
	320	65	332	390	10,8	2 400	2 400	25,0	**7330 BCBM**	**–**
160	290	48	255	300	8,5	2 400	2 600	13,6	**7232 BCBM**	**–**
170	310	52	281	345	9,5	2 400	2 400	16,7	**7234 BCBM**	**–**
	360	72	390	490	12,7	2 000	2 200	34,6	**7334 BCBM**	**–**
180	320	52	291	375	10	2 200	2 400	17,6	**7236 BCBM**	**–**
	380	75	410	540	13,7	2 000	2 000	40,0	**7336 BCBM**	**–**
190	340	55	307	405	10,4	2 000	2 200	21,9	**7238 BCBM**	**–**
	400	78	442	600	14,6	1 900	1 900	48,3	**7338 BCBM**	**–**
200	360	58	325	430	11	1 800	2 000	25,0	**7240 BCBM**	**–**
	420	80	462	655	15,6	1 800	1 800	52,8	**7340 BCBM**	**–**
220	400	65	319	465	11,2	1 800	1 800	35,2	**7244 BCBM**	**–**
240	440	72	364	540	12,5	1 600	1 700	49,0	**7248 BCBM**	**–**

[1)] For available final variants ➔ **matrix 1** on **page 417**

SKF



Dimensions							Abutment and fillet dimensions				
d	d_1 ~	d_2 ~	D_1 ~	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a min	D_a max	D_b max	r_a max	r_b max
mm							mm				
105	138	121,2	159,1	2,1	1,1	80	117	178	183	2	1
	138	121,2	159,1	2,1	1,1	80	117	178	183	2	1
	151,7	127,9	181,4	3	1,1	94	119	211	218	2,5	1
	151,7	127,9	181,4	3	1,1	94	119	211	218	2,5	1
110	144,9	127,1	167,4	2,1	1,1	84	122	188	193	2	1
	144,9	127,1	167,4	2,1	1,1	84	122	188	193	2	1
	144,9	127,1	167,4	2,1	1,1	84	122	188	193	2	1
	160,8	135	193,5	3	1,1	99	124	226	233	2,5	1
	160,8	135	193,5	3	1,1	99	124	226	233	2,5	1
	160,8	135	193,5	3	1,1	99	124	226	233	2,5	1
120	157	138,6	179,4	2,1	1,1	90	132	203	208	2	1
	178,4	153,9	211	3	1,5	107	134	246	253	2,5	1
130	169	149,6	192,6	3	1,1	96	144	216	222	2,5	1
	189,9	161,4	227,5	4	1,5	115	147	263	271	3	1,5
140	183,3	163,6	209,5	3	1,1	103	154	236	243	2,5	1
	203	172,2	243	4	1,5	123	157	283	291	3	1,5
150	197,2	175,6	226	3	1,1	111	164	256	263	2,5	1
	216,1	283,9	258,7	4	1,5	131	167	303	311	3	1,5
160	211	187,6	242,3	3	1,1	118	174	276	283	2,5	1
170	227,4	202	261	4	1,5	127	187	293	301	3	1,5
	243,8	207,9	292	4	2	147	187	343	351	3	1,5
180	234,9	209,6	268,8	4	1,5	131	197	303	311	3	1,5
	257,7	219,8	308	4	2	156	197	363	369	3	2
190	250,4	224,1	285,4	4	1,5	139	207	323	331	3	1,5
	271,6	231,8	324,3	5	2	164	210	380	389	4	2
200	263,3	235,1	300,8	4	1,5	146	217	343	351	3	1,5
	287	247	339,5	5	2	170	220	400	409	4	2
220	291,1	259,1	333,4	4	1,5	164	237	383	391	3	1,5
240	322	292	361	4	1,5	180	257	423	431	3	1,5


SKF

Double row angular contact ball bearings

Designs

SKF double row angular contact ball bearings correspond in design to two single row angular contact ball bearings but take up less axial space. They can accommodate radial loads as well as axial loads acting in both directions. They provide stiff bearing arrangements and are able to accommodate tilting moments.

The SKF standard range of double row angular contact ball bearings (➔ **fig 1**) includes:

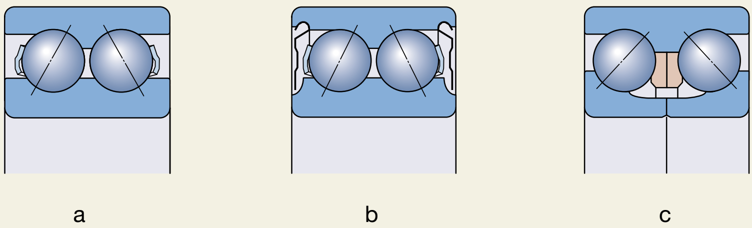
- basic design bearings (**a**)
- sealed bearings (**b**)
- bearings with a two-piece inner ring (**c**)

The standard range is shown in **matrix 1** on **page 437**.

This bearing range covers sizes from 10 to 110 mm bore diameter. For information about other double row angular contact ball bearings, please refer to the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Bearings in the 52 A and 53 A series
Basic design bearings in the 32 A and 33 A series shown in the product table as well as the corresponding sealed bearings to 2Z and 2RS1 design are identical to the corresponding bearings in the 52 and 53 series for the North American market. They have the same performance characteristics and dimensional features (except for the width of size 5200). However, the sealed bearings are filled with a different grease. Bearings in the 52 and 53 series use a mineral oil based high-temperature grease with polyurea thickener. The operating temperature range of this grease is –30 to +175 °C. The base oil viscosity is 115 mm^2/s at 40 °C and 12 mm^2/s at 100 °C.

Fig 1



Basic design bearings
SKF double row angular contact ball bearings in the 32 A and 33 A series have optimized internal geometry and do not have filling slots. The advantages are

- universal applicability,
- high radial and axial load carrying capacity in both directions,
- quiet operation.

The bearings have a 30° contact angle and the ball sets are in a back-to-back arrangement.

Standard design bearings that are also available with seals or shields may, for manufacturing reasons, have seal recesses on inner and outer rings (➔ **fig** 2).

Sealed bearings
The most common basic design bearings can also be supplied with shields or seals (➔ **matrix** 1 on **page 437**). Bearings in the 32 A and 33 A series are filled with a high-quality NLGI class 3 lithium base grease and are marked with the designation suffix MT33. This grease has good corrosion inhibiting properties and can be used at temperatures between –30 and +120 °C. The base oil viscosity is 74 mm^2/s at 40 °C and 8,5 mm^2/s at 100 °C. Regarding the grease fill of bearings in the 52 A and 53 A series please refer to **page 430**.

Sealed bearings are lubricated for life and are maintenance-free. They should therefore not be washed or heated above 80 °C before mounting.

Bearings with shields

Bearings with shields, designation suffix 2Z, are produced in two different designs (➔ **fig** 3). The sheet steel shields used in smaller bearings form a narrow gap with the land of the inner ring shoulder (**a**). Larger bearings as well as all SKF Explorer bearings have recesses in the inner ring side faces into which the shields extend (**b**).

Shielded bearings are primarily intended for applications where the inner ring rotates. If the outer ring rotates there is a risk that grease will be lost from the bearing once it reaches a certain speed.

Fig 2

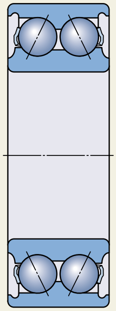
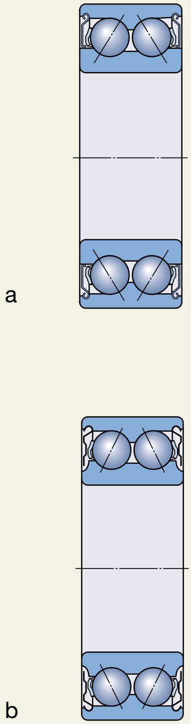


Fig 3



Bearings with seals

Bearings with seals, designation suffix 2RS1, use a acrylonitrile butadiene rubber, sheet steel reinforced seal that fits against a recess in the inner ring side face (➔ **fig** 4). The lip of the seal exerts a light pressure against the inner ring for a positive seal. The periphery of the seal engages in a recess in the outer ring to provide a good sealing. The permissible operating temperature range for these seals is –40 to +100 °C and up to +120 °C for brief periods.

Grease may be lost from sealed bearings at the inner ring under extreme operating conditions, e.g. at high speeds or at high temperatures. For applications where this could be a disadvantage, special design steps should be taken to prevent this. For additional information please contact the SKF application engineering service.

Bearings with a two-piece inner ring
In addition to the basic design bearings, double row angular contact ball bearings are also available with a two-piece inner ring (➔ **fig** 5). These bearings incorporate a large number of large balls and have a high load carrying capacity, especially in the axial direction.

Bearings in the 33 D series

Bearings in the 33 D series (**a**) have a 45° contact angle, a special internal clearance and can support heavy axial loads in both directions. The bearings are separable, i.e. the outer ring with ball and cage assemblies can be mounted independently of the inner ring halves.

Bearings in the 33 DNRCBM series

Bearings in the 33 DNRCBM series (**b**) have a 40° contact angle and a snap ring groove with snap ring in the outer ring, enabling simple and space-saving axial location in the housing. They have been designed specifically to operate under the conditions pertaining in certrifugal pumps, but can also be used in other applications. These bearings are non-separable.

Fig 4

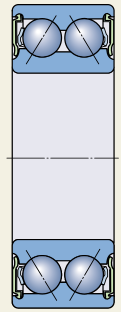
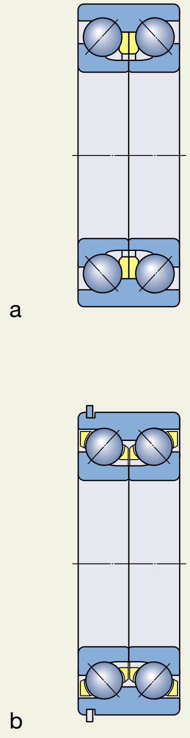


Fig 5



SKF Explorer class bearings

High performance SKF Explorer angular contact ball bearings are shown with an asterisk in the product tables. SKF Explorer bearings retain the designation of the earlier standard bearings, e. g. 3208 ATN9. However, each bearing and its box are marked with the name "EXPLORER", to avoid confusion.

Bearing data – general

Dimensions

The boundary dimensions of SKF double row angular contact ball bearings are in accordance with ISO 15:1998, except for the width of bearing 3200 A.

The dimensions of the snap ring grooves and snap rings for bearings in the 33 DNRCBM series are listed in **table 1**. The dimensions of the snap ring grooves and snap rings conform to ISO 464:1995.

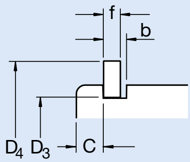
Tolerances

SKF basic design double row angular contact ball bearings are produced to Normal tolerances as standard. SKF Explorer bearings as well as bearings in the 33 DNRCBM series are produced to tolerance class P6 specifications.

The values for tolerances correspond to ISO 492:2002 and can be found in **tables 3** and **4** on **pages 125** and **126**.

Table 1

Dimensions of snap ring grooves and snap rings



Bearing Designation	**Dimensions** C	b	f	D_3	D_4	**Snap ring** Designation
–	mm					–
3308 DNRCBM	3,28	2,7	2,46	86,8	96,5	SP 90
3309 DNRCBM	3,28	2,7	2,46	96,8	106,5	SP 100
3310 DNRCBM	3,28	2,7	2,46	106,8	116,6	SP 110
3311 DNRCBM	4,06	3,4	2,82	115,2	129,7	SP 120
3313 DNRCBM	4,06	3,4	2,82	135,2	149,7	SP 140

Internal clearance

SKF double row angular contact ball bearings in the 32 A and 33 A series are produced as standard with Normal axial internal clearance. They are also available with the greater C3 clearance (→ **matrix** 1 on **page 437**). For bearings with smaller C2 clearance, please check availability before ordering.

Bearings in the 33 D and 33 DNRCBM series are produced exclusively with an axial internal clearance according to the values given in **table** 2. They are valid for bearings before mounting under zero measuring loads.

Misalignment

Misalignment of the outer ring with respect to the inner ring of double row angular contact ball bearings can only be accommodated by generating forces between the balls and the raceways. Any misalignment will lead to increased noise in operation and reduced bearing service life.

Influence of operating temperature on bearing material

SKF angular contact ball bearings undergo a special heat treatment. When equipped with a steel or brass cage, they can operate at temperatures of up to +150 °C.

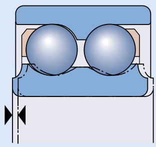
Cages

Depending on size and design, SKF double row angular contact ball bearings are equipped as standard with two of the cages described below and shown in **fig** 6:

- snap-type cage of glass fibre reinforced polyamide 6,6 (**a**), ball centred, designation suffix TN9,
- pressed steel snap-type cage (**b**), ball centred, no designation suffix or suffix J1,
- pressed steel crown cage (**c**), ball centred, no designation suffix,
- machined brass cage, outer ring centred (**d**), designation suffix MA ,

Table 2

Axial internal clearance of double row angular contact ball bearings



Bore diameter d over	incl.	Axial internal clearance of bearings in series 32 A and 33 A C2 min	max	Normal min	max	C3 min	max	33 D min	max	33 DNRCBM min	max
mm		µm						µm		µm	
–	**10**	1	11	5	21	12	28	–	–	–	–
10	**18**	1	12	6	23	13	31	–	–	–	–
18	**24**	2	14	7	25	16	34	–	–	–	–
24	**30**	2	15	8	27	18	37	–	–	–	–
30	**40**	2	16	9	29	21	40	33	54	10	30
40	**50**	2	18	11	33	23	44	36	58	10	30
50	**65**	3	22	13	36	26	48	40	63	18	38
65	**80**	3	24	15	40	30	54	46	71	18	38
80	**100**	3	26	18	46	35	63	55	83	–	–
100	**110**	4	30	22	53	42	73	65	96	–	–

- machined brass cage, ball centred (**e**), designation suffix M.

Several bearings are available with two different cage designs so that bearings with cages appropriate to the operating conditions can be chosen (→ **matrix 1** on **page 437**).

Note:
Bearings with polyamide 6,6 cages can be operated at temperatures up to +120 °C. The lubricants generally used for rolling bearings do not have a detrimental effect on cage properties, with the exception of a few synthetic oils and greases with a synthetic oil base, and lubricants containing a high proportion of EP additives when used at high temperatures.

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, double row angular contact 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 cages, 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 radial load to be applied to double row angular contact ball bearings can be estimated using

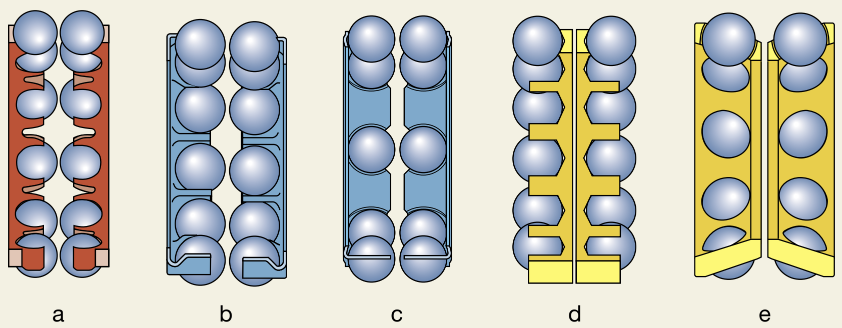
$$F_{rm} = k_r \left(\frac{\nu\, n}{1\,000}\right)^{2/3} \left(\frac{d_m}{100}\right)^2$$

where

F_{rm} = minimum radial load, kN
k_r = minimum radial load factor
0,06 for bearings in the 32 A series
0,07 for bearings in the 33 A series
0,095 for bearings in the 33 D and 33 DNR series
ν = oil viscosity at operating temperature, mm^2/s
n = rotational speed, r/min
d_m = bearing mean diameter = 0,5 (d + D), mm

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 exceed the requisite minimum load. If this is not the case, the double row angular contact ball bearing must be subjected to an additional radial load.

Fig 7



Equivalent dynamic bearing load

For dynamically loaded double row angular contact ball bearings

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

The values for the factors e, X, Y_1 and Y_2 depend on the bearing contact angle and are listed in **table 3**.

Equivalent static bearing load

For statically loaded double row angular contact ball bearings

$P_0 = F_r + Y_0 F_a$

The value for the factor Y_0 depends on the bearing contact angle and is given in **table 3**.

Table 3

Calculation factors for double row angular contact ball bearings

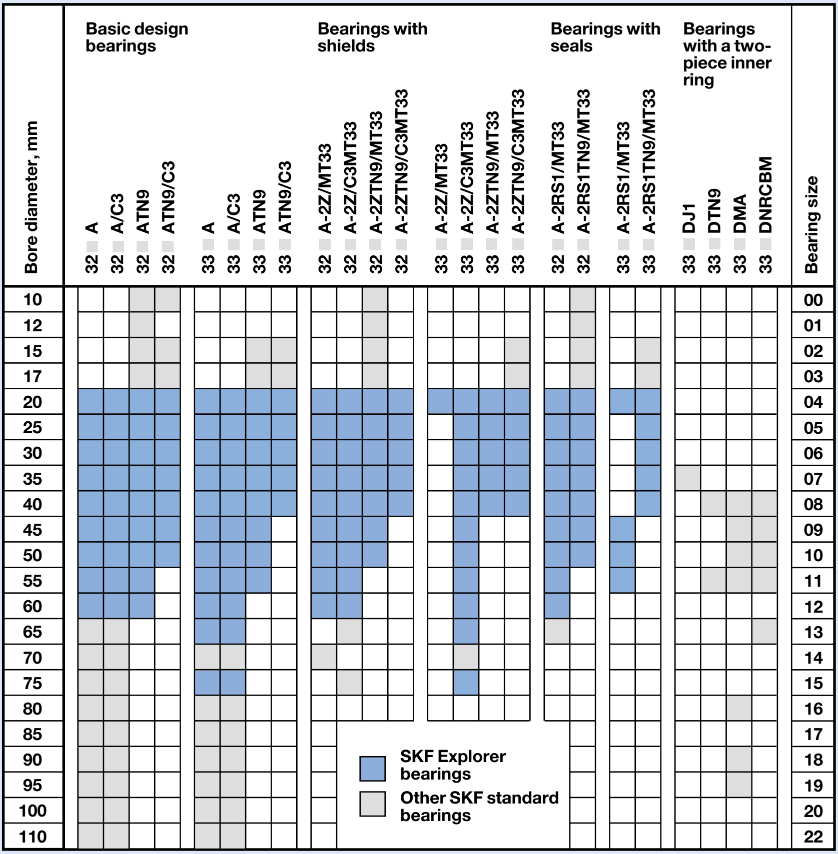
Bearing series	Limiting value e	Load factors X	Y_1	Y_2	Y_0
32 A (52 A)	0,8	0,63	0,78	1,24	0,66
33 A (53 A)	0,8	0,63	0,78	1,24	0,66
33 D	1,34	0,54	0,47	0,81	0,44
33 DNRCBM	1,14	0,57	0,55	0,93	0,52

Supplementary designations

The designation suffixes used to identify certain features of SKF double row angular contact ball bearings are explained in the following.

- **A** No filling slots
- **CB** Controlled axial internal clearance
- **C2** Clearance smaller than Normal
- **C3** Clearance greater than Normal
- **D** Two-piece inner ring
- **HT51** High temperature grease for operating temperatures in the range –30 to +175 °C
- **J1** Sheet steel cage, ball centred
- **M** Machined brass cage, ball centred
- **MA** Machined brass cage, outer ring centred
- **MT33** Lithium base grease for operating temperatures in the range –30 to +120 °C
- **N** Snap ring groove in the outer ring
- **NR** Snap ring groove in the outer ring with snap ring
- **P5** Dimensional and running accuracy in accordance with ISO tolerance class 5
- **P6** Dimensional and running accuracy in accordance with ISO tolerance class 6
- **P62** P6 + C2
- **P63** P6 + C3
- **TN9** Snap type cage of glass fibre reinforced polyamide 6,6, ball centred
- **2RS1** Sheet steel reinforced acrylonitrile butadiene rubber seals on both sides of bearing
- **2Z** Pressed steel shields on both sides of bearing

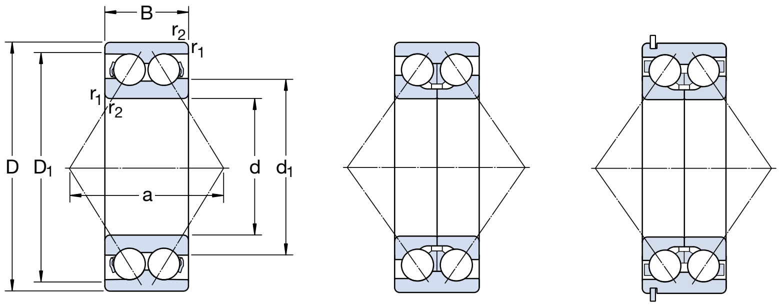
SKF double row angular contact ball bearings – standard assortment



Bearings in the 52 A and 53 A series
This matrix is also valid for bearings in the 52 A and 53 A series, which are identical to the corresponding bearings in the 32 A and 33 A series. However, sealed bearings in the 52 A and 53 A series are filled with a high-temperature grease (→ **page 430**). They do not carry any designation suffix for the grease.

Bearings above 110 mm bore
Please consult the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

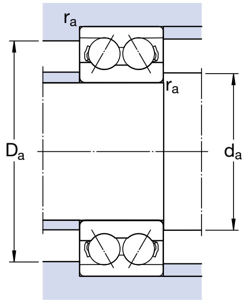
Double row angular contact ball bearings
d **10 – 50** mm



A design | 33 D | 33 DNR[1]

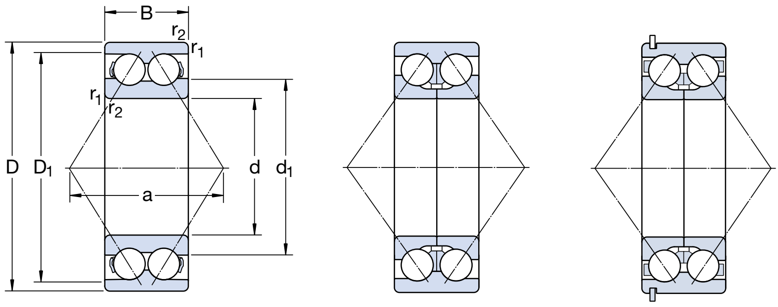
Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designations[2] Bearing with metal cage	polyamide cage
mm			kN		kN	r/min		kg	–	
10	30	14	7,61	4,3	0,183	16 000	22 000	0,051	**–**	**3200 ATN9**
12	32	15,9	10,1	5,6	0,24	15 000	20 000	0,058	**–**	**3201 ATN9**
15	35	15,9	11,2	6,8	0,285	12 000	17 000	0,066	**–**	**3202 ATN9**
	42	19	15,1	9,3	0,4	10 000	15 000	0,13	**–**	**3302 ATN9**
17	40	17,5	14,3	8,8	0,365	10 000	15 000	0,096	**–**	**3203 ATN9**
	47	22,2	21,6	12,7	0,54	9 500	14 000	0,18	**–**	**3303 ATN9**
20	47	20,6	20	12	0,51	9 000	13 000	0,16	⋆ **3204 A**	⋆ **3204 ATN9**
	52	22,2	23,6	14,6	0,62	8 500	12 000	0,22	⋆ **3304 A**	⋆ **3304 ATN9**
25	52	20,6	21,6	14,3	0,6	8 000	11 000	0,18	⋆ **3205 A**	⋆ **3205 ATN9**
	62	25,4	32	20,4	0,865	7 500	10 000	0,35	⋆ **3305 A**	⋆ **3305 ATN9**
30	62	23,8	30	20,4	0,865	7 000	9 500	0,29	⋆ **3206 A**	⋆ **3206 ATN9**
	72	30,2	41,5	27,5	1,16	6 300	8 500	0,53	⋆ **3306 A**	⋆ **3306 ATN9**
35	72	27	40	28	1,18	6 000	8 000	0,44	⋆ **3207 A**	⋆ **3207 ATN9**
	80	34,9	52	35,5	1,5	5 600	7 500	0,71	⋆ **3307 A**	⋆ **3307 ATN9**
	80	34,9	52,7	41,5	1,76	5 600	7 500	0,79	**3307 DJ1**	**–**
40	80	30,2	47,5	34	1,43	5 600	7 500	0,58	⋆ **3208 A**	⋆ **3208 ATN9**
	90	36,5	64	44	1,86	5 000	6 700	1,05	⋆ **3308 A**	⋆ **3308 ATN9**
	90	36,5	49,4	41,5	1,76	5 000	6 700	1,20	**3308 DNRCBM**	**–**
	90	36,5	68,9	64	2,45	5 000	6 700	1,05	**3308 DMA**	**3308 DTN9**
45	85	30,2	51	39	1,63	5 000	6 700	0,63	⋆ **3209 A**	⋆ **3209 ATN9**
	100	39,7	75	53	2,24	4 500	6 000	1,40	⋆ **3309 A**	⋆ **3309 ATN9**
	100	39,7	61,8	52	2,2	4 500	6 000	1,50	**3309 DNRCBM**	**–**
	100	39,7	79,3	69,5	3	4 500	6 000	1,60	**3309 DMA**	**–**
50	90	30,2	51	39	1,66	4 800	6 300	0,66	⋆ **3210 A**	⋆ **3210 ATN9**
	110	44,4	90	64	2,75	4 000	5 300	1,95	⋆ **3310 A**	⋆ **3310 ATN9**
	110	44,4	81,9	69,5	3	4 000	5 300	1,95	**3310 DNRCBM**	**–**
	110	44,4	93,6	85	3,6	4 000	5 300	2,15	**3310 DMA**	**–**

⋆ SKF Explorer bearing
[1] For dimensions of snap ring groove and snap ring ➔ **table 1** on **page 433**
[2] For available final variants ➔ **matrix 1** on **page 437**



Dimensions					**Abutment and fillet dimensions**		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	a	d_a min	D_a max	r_a max
mm					mm		
10	17,7	23,6	0,6	16	14,4	25,6	0,6
12	19,1	26,5	0,6	19	16,4	27,6	0,6
15	22,1	29,5	0,6	21	19,4	30,6	0,6
	25,4	34,3	1	24	20,6	36,4	1
17	25,1	33,6	0,6	23	21,4	35,6	0,6
	27,3	38,8	1	28	22,6	41,4	1
20	27,7	40,9	1	28	25,6	41,4	1
	29,9	44,0	1,1	30	27	45	1
25	32,7	45,9	1	30	30,6	46,4	1
	35,7	53,4	1,1	36	32	55	1
30	38,7	55,2	1	36	35,6	56,4	1
	39,8	64,1	1,1	42	37	65	1
35	45,4	63,9	1,1	42	42	65	1
	44,6	70,5	1,5	47	44	71	1,5
	52,8	69,0	1,5	76	44	71	1,5
40	47,8	72,1	1,1	46	47	73	1
	50,8	80,5	1,5	53	49	81	1,5
	60,1	79,5	1,5	71	49	81	1,5
	59,4	80,3	1,5	84	49	81	1,5
45	52,8	77,1	1,1	49	52	78	1
	55,6	90	1,5	58	54	91	1,5
	68	87,1	1,5	79	54	91	1,5
	70	86,4	1,5	93	54	91	1,5
50	57,8	82,1	1,1	52	57	83	1
	62	99,5	2	65	61	99	2
	74,6	87	2	88	61	99	2
	76,5	94,2	2	102	61	99	2

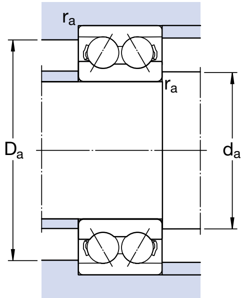
Double row angular contact ball bearings
d **55 – 110** mm



A design | 33 D | 33 DNR[1)]

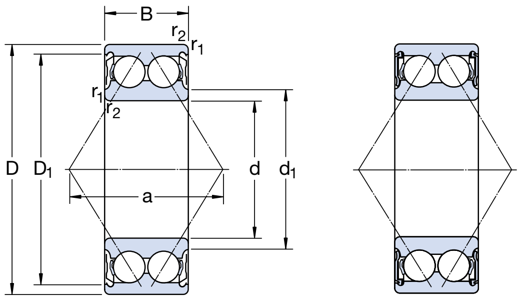
Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designations[2)] Bearing with metal cage	polyamide cage
mm			kN		kN	r/min		kg	–	
55	100	33,3	60	47,5	2	4 300	5 600	1,05	⋆ **3211 A**	⋆ **3211 ATN9**
	120	49,2	112	81,5	3,45	3 600	4 800	2,55	⋆ **3311 A**	–
	120	49,2	95,6	83	3,55	3 800	5 000	2,55	**3311 DNRCBM**	–
	120	49,2	111	100	4,3	3 600	4 800	2,80	**3311 DMA**	–
60	110	36,5	73,5	58,5	2,5	4 000	5 300	1,40	⋆ **3212 A**	⋆ **3212 ATN9**
	130	54	127	95	4,05	3 400	4 500	3,25	⋆ **3312 A**	–
65	120	38,1	80,6	73,5	3,1	3 400	4 500	1,75	**3213 A**	–
	140	58,7	146	110	4,55	3 200	4 300	4,10	⋆ **3313 A**	–
	140	58,7	138	122	5,1	3 200	4 300	4,00	**3313 DNRCBM**	–
70	125	39,7	88,4	80	3,4	3 200	4 300	1,90	**3214 A**	–
	150	63,5	153	125	5	3 000	4 000	5,05	**3314 A**	–
75	130	41,3	95,6	88	3,75	3 200	4 300	2,10	**3215 A**	–
	160	68,3	176	140	5,5	2 600	3 600	5,55	⋆ **3315 A**	–
80	140	44,4	106	95	3,9	3 000	4 000	2,65	**3216 A**	–
	170	68,3	182	156	6	2 400	3 400	6,80	**3316 A**	–
	170	68,3	190	196	7,35	2 400	3 400	7,55	**3316 DMA**	–
85	150	49,2	124	110	4,4	2 600	3 600	3,40	**3217 A**	–
	180	73	195	176	6,55	2 200	3 200	8,30	**3317 A**	–
90	160	52,4	130	120	4,55	2 400	3 400	4,15	**3218 A**	–
	190	73	195	180	6,4	2 000	3 000	9,25	**3318 A**	–
	190	73	225	250	8,8	2 000	3 000	10,0	**3318 DMA**	–
95	170	55,6	159	146	5,4	2 200	3 200	5,00	**3219 A**	–
	200	77,8	225	216	7,5	1 900	2 800	11,0	**3319 A**	–
	200	77,8	242	275	9,5	1 900	2 800	12,0	**3319 DMA**	–
100	180	60,3	178	166	6	2 000	3 000	6,10	**3220 A**	–
	215	82,6	255	255	8,65	1 800	2 600	13,5	**3320 A**	–
110	200	69,8	212	212	7,2	1 900	2 800	8,80	**3222 A**	–
	240	92,1	291	305	9,8	1 700	2 400	19,0	**3322 A**	–

⋆ SKF Explorer bearing
1) For dimensions of snap ring groove and snap ring ➔ **table 1** on **page 433**
2) For available final variants ➔ **matrix 1** on **page 437**



Dimensions					**Abutment and fillet dimensions**		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	a	d_a min	D_a max	r_a max
mm					mm		
55	63,2	92,3	1,5	57	64	91	1,5
	68,4	109,4	2	72	66	109	2
	81,6	106,5	2	97	66	109	2
	81,3	104,4	2	114	66	109	2
60	74,4	96,2	1,5	63	69	101	1,5
	84,2	110	2,1	78	72	118	2
65	85	103	1,5	71	74	111	1,5
	89,8	116	2,1	84	77	128	2
	95,1	126	2,1	114	77	128	2
70	88,5	107	1,5	74	79	116	1,5
	84,2	139	2,1	89	82	138	2
75	91,9	112	1,5	77	84	121	1,5
	88,8	147	2,1	97	87	148	2
80	97,7	120	2	82	91	129	2
	108	143	2,1	101	92	158	2
	114	145	2,1	158	92	158	2
85	104	128	2	88	96	139	2
	116	153	3	107	99	166	2,5
90	111	139	2	94	101	149	2
	123	160	3	112	104	176	2,5
	130	167	3	178	104	176	2,5
95	119	147	2,1	101	107	158	2
	127	168	3	118	109	186	2,5
	138	177	3	189	109	186	2,5
100	125	155	2,1	107	112	168	2
	136	180	3	127	114	201	2,5
110	139	173	2,1	119	122	188	2
	153	200	3	142	124	226	2,5

Sealed double row angular contact ball bearings
d **10 – 60** mm



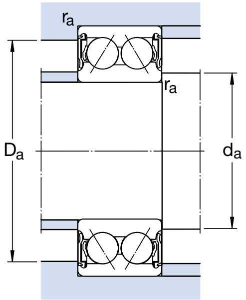
2Z

2RS1

Principal dimensions d	D	B	**Basic load ratings** dynamic C	static C_0	**Fatigue load limit** P_u	**Limiting speed**	**Mass**	**Designations**[1)] Bearing with shields	seals
mm			kN		kN	r/min	kg	–	
10	30	14	7,61	4,3	0,183	16 000	0,051	**3200 A-2Z**	**3200 A-2RS1**
12	32	15,9	10,1	5,6	0,24	15 000	0,058	**3201 A-2Z**	**3201 A-2RS1**
15	35	15,9	11,2	6,8	0,285	12 000	0,066	**3202 A-2Z**	**3202 A-2RS1**
	42	19	15,1	9,3	0,4	10 000	0,13	**3302 A-2Z**	**3302 A-2RS1**
17	40	17,5	14,3	8,8	0,365	10 000	0,10	**3203 A-2Z**	**3203 A-2RS1**
	47	22,2	21,6	12,7	0,54	9 500	0,18	**3303 A-2Z**	**3303 A-2RS1**
20	47	20,6	20	12	0,51	9 000	0,16	★ **3204 A-2Z**	★ **3204 A-2RS1**
	52	22,2	23,6	14,6	0,62	8 500	0,22	★ **3304 A-2Z**	★ **3304 A-2RS1**
25	52	20,6	21,6	14,3	0,6	8 000	0,18	★ **3205 A-2Z**	★ **3205 A-2RS1**
	62	25,4	32	20,4	0,865	7 500	0,35	★ **3305 A-2Z**	★ **3305 A-2RS1**
30	62	23,8	30	20,4	0,865	7 000	0,29	★ **3206 A-2Z**	★ **3206 A-2RS1**
	72	30,2	41,5	27,5	1,16	6 300	0,52	★ **3306 A-2Z**	★ **3306 A-2RS1**
35	72	27	40	28	1,18	6 000	0,44	★ **3207 A-2Z**	★ **3207 A-2RS1**
	80	34,9	52	35,5	1,5	5 600	0,73	★ **3307 A-2Z**	★ **3307 A-2RS1**
40	80	30,2	47,5	34	1,43	5 600	0,57	★ **3208 A-2Z**	★ **3208 A-2RS1**
	90	36,5	64	44	1,86	5 000	0,93	★ **3308 A-2Z**	★ **3308 A-2RS1**
45	85	30,2	51	39	1,63	5 000	0,63	★ **3209 A-2Z**	★ **3209 A-2RS1**
	100	39,7	75	53	2,24	4 500	1,25	★ **3309 A-2Z**	★ **3309 A-2RS1**
50	90	30,2	51	39	1,66	4 800	0,65	★ **3210 A-2Z**	★ **3210 A-2RS1**
	110	44,4	90	64	2,75	4 000	1,70	★ **3310 A-2Z**	★ **3310 A-2RS1**
55	100	33,3	60	47,5	2	4 300	0,91	★ **3211 A-2Z**	★ **3211 A-2RS1**
	120	49,2	112	81,5	3,45	3 600	2,65	★ **3311 A-2Z**	★ **3311 A-2RS1**
60	110	36,5	73,5	58,5	2,5	4 000	1,20	★ **3212 A-2Z**	★ **3212 A-2RS1**
	130	54	127	95	4,05	3 400	2,80	★ **3312 A-2Z**	–

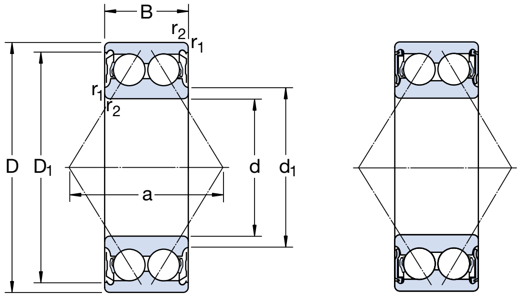
★ SKF Explorer bearing
[1)] For available final variants ➔ **matrix 1** on **page 437**. The bearings in the 32 A and 33 A series are identical to the corresponding bearings in the 52 A and 53 A series

SKF



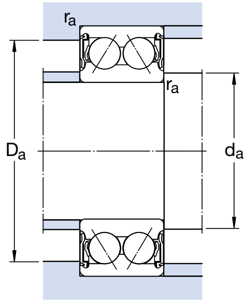
Dimensions					**Abutment and fillet dimensions**			
d	d_1 ~	D_1 ~	$r_{1,2}$ min	a	d_a min	d_a max	D_a max	r_a max
mm					mm			
10	15,8	25	0,6	16	14,4	15,5	25,6	0,6
12	17,2	27,7	0,6	19	16,4	17	27,7	0,6
15	20,2	30,7	0,6	21	19,4	20	30,7	0,6
	23,7	35,7	1	24	20,6	23,5	36,4	1
17	23,3	35	0,6	23	21,4	23	35,6	0,6
	25,7	40,2	1	28	22,6	25,5	41,4	1
20	27,7	40,9	1	28	25,6	27,5	41,4	1
	29,9	44	1,1	30	27	29,5	45	1
25	32,7	45,9	1	30	30,6	32,5	46,4	1
	35,7	53,4	1,1	36	32	35,5	55	1
30	38,7	55,2	1	36	35,6	38,5	56,4	1
	39,8	64,1	1,1	42	37	39,5	65	1
35	45,4	63,9	1,1	42	42	45	65	1
	44,6	70,5	1,5	47	44	44,5	71	1,5
40	47,8	72,1	1,1	46	47	47	73	1
	50,8	80,5	1,5	53	49	50,5	81	1,5
45	52,8	77,1	1,1	49	52	52,5	78	1
	55,6	90	1,5	58	54	55,5	91	1,5
50	57,8	82,1	1,1	52	57	57,5	83	1
	62	99,5	2	65	61	61,5	99	2
55	63,2	92,3	1,5	57	63	63	91	1,5
	68,4	109	2	72	66	68	109	2
60	68,8	101	1,5	63	68,5	68,5	101	1,5
	73,4	118	2,1	78	72	73	118	2

Sealed double row angular contact ball bearings
d **65 – 75** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Limiting speed	Mass	Designations[1)] Bearing with shields	seals
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min	kg	–	
65	120	38,1	80,6	73,5	3,1	3 400	1,75	**3213 A-2Z**	**3213 A-2RS1**
	140	58,7	146	110	4,55	3 200	4,10	⋆**3313 A-2Z**	**–**
70	125	39,7	88,4	80	3,4	3 200	1,90	**3214 A-2Z**	**–**
	150	63,5	153	125	5	3 000	5,05	**3314 A-2Z**	**–**
75	130	41,3	95,6	88	3,75	3 200	2,10	**3215 A-2Z**	**–**
	160	68,3	176	140	5,5	2 600	5,60	⋆**3315 A-2Z**	**–**

⋆ SKF Explorer bearing
1) For available final variants → **matrix 1** on **page 437**. The bearings in the 32 A and 33 A series are identical to the corresponding bearings in the 52 A and 53 A series



Dimensions					Abutment and fillet dimensions			
d	d_1 ~	D_1 ~	$r_{1,2}$ min	a	d_a min	d_a max	D_a max	r_a max
mm					mm			
65	76,3	113	1,5	71	74	76	111	1,5
	78,5	130	2,1	84	77	78,5	128	2
70	82	118	1,5	74	79	82	116	1,5
	84,2	139	2,1	89	82	84	138	2
75	84,6	123	1,5	77	84	84	121	1,5
	88,8	147	2,1	97	87	88,5	148	2


SKF

Four-point contact ball bearings

Designs

Four-point contact ball bearings are radial single row angular contact ball bearings with raceways that are designed to support axial loads acting in both directions. Radial loads can be supported up to a certain fraction of the axial load. These bearings take up considerably less axial space than double row bearings.

The standard range of SKF four-point contact ball bearings comprises bearings in the QJ2 and QJ3 series (➔ **fig** 1). They are available as

- basic design bearings or
- bearings with locating slots.

In addition, SKF four-point contact ball bearings are available in other dimension series, designs, and sizes. For information on these bearings, consult the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com.

Basic design bearings

Four-point contact ball bearings shown in this catalogue have a 35° contact angle and are designed to accommodate predominantly axial loads. The inner ring is split. This allows a large number of balls to be incorporated in the bearing thus giving the bearing high load carrying capacity. The bearings are separable, i.e. the outer ring with ball and cage assembly can be mounted separately from the two inner ring halves.

Bearings with locating slots

In many applications a radial bearing is used in combination with a four-point contact ball bearing which acts as a pure thrust bearing and is mounted with radial clearance in the housing (➔ **fig** 2). To restrain the outer ring from turning in the circumferential direction, bearings with two locating slots (designation suffix N2) in the outer ring positioned at 180° to each other are available (➔ **fig** 3).

Fig 1

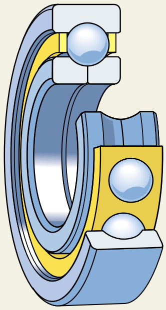


Fig 2

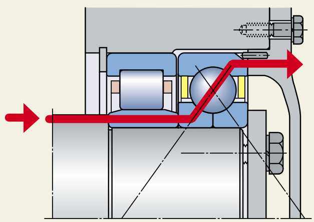
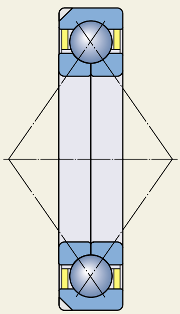


Fig 3



Bearing data – general

Dimensions
The boundary dimensions of SKF four-point contact ball bearings are in accordance with ISO 15:1998.

Tolerances
SKF four-point contact ball bearings are produced as standard to Normal tolerances. Some sizes are also available with enhanced precision to tolerance class P6 specifications.

The values for tolerances correspond to ISO 492:2002 and can be found in **tables** 3 and 4 on **pages 125** and **126**.

Internal clearance
SKF four-point contact ball bearings are supplied with Normal axial internal clearance as standard, but some sizes are available with greater or smaller clearance, or with reduced clearance limits.

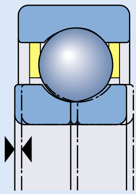
The actual clearance limits are given in **table** 1 and are valid for bearings before mounting under zero measuring load.

Misalignment
The ability of four-point contact ball bearings to tolerate misalignment of the inner ring with respect to the outer ring, and consequently the ability to compensate for misalignment in the application or to tolerate shaft deflections is limited. It depends on the internal clearance in operation, bearing size and the magnitude of the forces and moments acting on the bearing. The interrelationship of these factors is complex and no general rules can be given.

Any misalignment will lead to increased running noise, cage stresses and reduced bearing service life.

Table 1

Axial internal clearance of four-point contact ball bearings



Bore diameter d		Axial internal clearance C2		Normal		C3		C4	
over	incl.	min	max	min	max	min	max	min	max
mm		µm							
10	**17**	15	55	45	85	75	125	115	165
17	**40**	26	66	56	106	96	146	136	186
40	**60**	36	86	76	126	116	166	156	206
60	**80**	46	96	86	136	126	176	166	226
80	**100**	56	106	96	156	136	196	186	246
100	**140**	66	126	116	176	156	216	206	266
140	**180**	76	156	136	196	176	246	226	296
180	**220**	96	176	156	226	206	276	256	326

Influence of operating temperature on bearing material

SKF four-point contact ball bearings undergo a special heat treatment. When equipped with a steel or brass cage, they can operate at temperatures of up to +150 °C.

Cages

SKF four-point contact ball bearings are fitted with a machined brass cage, which is centred in the outer ring (➔ **fig** 4).

Minimum load

In order to provide satisfactory operation, four-point contact 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 inertia forces of the balls and cage, and the friction in the lubricant, can have a detrimental influence on the rolling conditions in the bearing and may cause sliding damaging movements to occur between the balls and raceways.

The requisite minimum load to be applied to four-point contact ball bearings can be estimated using

$$F_{am} = k_a \frac{C_0}{1\,000} \left(\frac{n\, d_m}{100\,000}\right)^2$$

where

F_{am} = minimum axial load, kN
k_a = minimum axial load factor
1 for bearings in the QJ 2 series
1,1 for bearings in the QJ 3 series
C_0 = basic static load rating, kN (➔ product table)
n = rotational speed, r/min
d_m = bearing mean diameter = 0,5 (d + D), mm

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 four-point contact ball bearing must be subjected to an additional axial load, for example, by means of springs.

Equivalent dynamic bearing load

If four-point contact ball bearings are arranged as locating bearings and have to accommodate both radial and axial loads, the equivalent dynamic bearing load is obtained from

$$P = F_r + 0,66\, F_a \quad \text{when } F_a/F_r \leq 0,95$$
$$P = 0,6\, F_r + 1,07\, F_a \quad \text{when } F_a/F_r > 0,95$$

It should be noted that four-point contact ball bearings will only function properly when the ball contacts at only one point on the outer ring raceway and at one point on the inner ring raceway. This is the case if the axial load $F_a \geq 1,27\, F_r$.

If the four-point contact ball bearing is arranged with radial freedom in the housing to act as a thrust bearing in combination with a radial bearing (the usual arrangement for these bearings, ➔ **fig** 2 on **page 448**), then the equivalent dynamic bearing load becomes

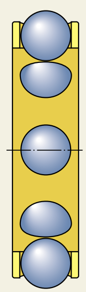
$$P = 1,07\, F_a$$

Equivalent static bearing load

For statically loaded four-point contact ball bearings

$$P_0 = F_r + 0,58\, F_a$$

Fig 4



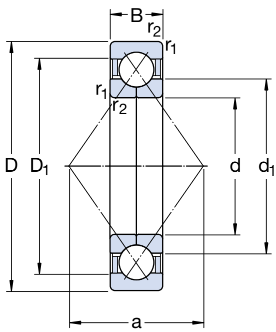
Supplementary designations
The designation suffixes used to identify certain features of SKF four-point contact ball bearings are explained in the following.

B20	Reduced width tolerance
C2	Axial internal clearance smaller than Normal
C2H	Axial internal clearance in the upper half of the C2 range
C2L	Axial internal clearance in the lower half of the C2 range
C3	Axial internal clearance greater than Normal
C4	Axial internal clearance greater than C3
CNL	Axial internal clearance in the lower half of the Normal range
FA	Machined steel cage, outer ring centred
MA	Machined brass cage, outer ring centred
N2	Two locating slots in the outer ring positioned at 180° to each other
PHA	Injection moulded PEEK cage, outer ring centred
P6	Increased dimensional and running accuracy to ISO tolerance class 6
P63	P6 + C3
P64	P6 + C4
S1	Bearing rings dimensionally stabilized up to +200 °C
344524	C2H + CNL

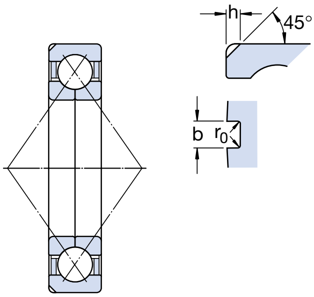
Design of bearing arrangements

The outer rings of bearings, which are arranged as thrust bearings with radial clearance in the housing, should not be clamped (➔ **fig 2**, **page 448**). Otherwise the outer ring cannot compensate for thermal movements, which will cause additional force in the bearing. If clamping the outer ring cannot be avoided, the outer ring must be at least carefully centred during mounting.

Four-point contact ball bearings
d **15 – 75** mm

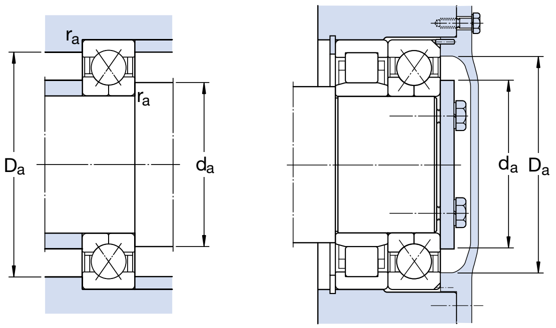


Basic design



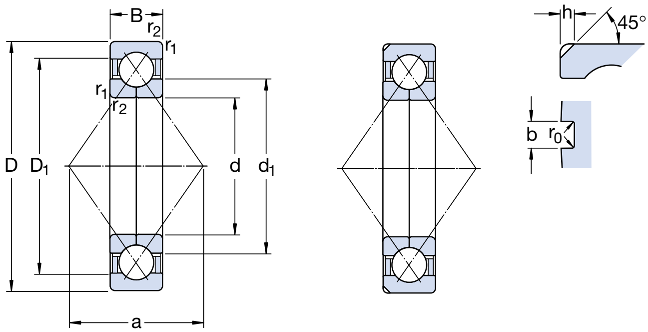
Bearing with locating slots

Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designations** Bearing with locating slots	without locating slots
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
15	35	11	12,7	8,3	0,36	22 000	36 000	0,062	**QJ 202 N2MA**	**–**
17	40	12	15,9	10,6	0,45	19 000	30 000	0,082	**QJ 203 N2MA**	**QJ 203 MA**
	47	14	23,4	15	0,64	17 000	28 000	0,14	**QJ 303 N2MA**	**–**
20	52	15	29,6	20	0,85	15 000	24 000	0,18	**QJ 304 N2MA**	**QJ 304 MA**
25	52	15	25,1	20	0,83	14 000	22 000	0,16	**QJ 205 N2MA**	**QJ 205 MA**
	62	17	39	28	1,18	12 000	20 000	0,29	**QJ 305 N2MA**	**QJ 305 MA**
30	62	16	35,1	28,5	1,2	12 000	19 000	0,24	**QJ 206 N2MA**	**QJ 206 MA**
	72	19	49,4	38	1,63	10 000	17 000	0,42	**QJ 306 N2MA**	**QJ 306 MA**
35	72	17	46,2	39	1,63	10 000	17 000	0,36	**QJ 207 N2MA**	**QJ 207 MA**
	80	21	59,2	46,5	1,96	9 500	15 000	0,57	**QJ 307 N2MA**	**QJ 307 MA**
40	80	18	52,7	45	1,9	9 000	15 000	0,45	**QJ 208 N2MA**	**QJ 208 MA**
	90	23	71,5	58,5	2,45	8 500	14 000	0,78	**QJ 308 N2MA**	**QJ 308 MA**
45	85	19	58,5	51	2,16	8 500	14 000	0,52	**–**	**QJ 209 MA**
	100	25	93,6	76,5	3,25	7 500	12 000	1,05	**QJ 309 N2MA**	**QJ 309 MA**
50	90	20	61,8	56	2,4	7 500	13 000	0,59	**QJ 210 N2MA**	**QJ 210 MA**
	110	27	111	91,5	3,9	6 700	11 000	1,35	**–**	**QJ 310 MA**
55	100	21	79,3	76,5	3,2	7 000	11 000	0,77	**QJ 211 N2MA**	**QJ 211 MA**
	120	29	127	108	4,55	6 000	10 000	1,75	**QJ 311 N2MA**	**QJ 311 MA**
60	110	22	92,3	86,5	3,65	6 300	10 000	0,99	**QJ 212 N2MA**	**QJ 212 MA**
	130	31	146	125	5,3	5 600	9 000	2,15	**QJ 312 N2MA**	**QJ 312 MA**
65	120	23	104	104	4,4	5 600	9 500	1,20	**QJ 213 N2MA**	**QJ 213 MA**
	140	33	165	146	6,1	5 300	8 500	2,70	**–**	**QJ 313 MA**
70	125	24	114	114	4,8	5 600	9 000	1,32	**QJ 214 N2MA**	**QJ 214 MA**
	150	35	186	166	6,7	4 800	8 000	3,15	**QJ 314 N2MA**	**QJ 314 MA**
75	130	25	117	122	5,2	5 300	8 500	1,45	**QJ 215 N2MA**	**QJ 215 MA**
	160	37	199	186	7,35	4 500	7 500	3,90	**QJ 315 N2MA**	**–**



Dimensions					Slot dimensions			Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	a	b	h	r_0	d_a min	D_a max	r_a max
mm					mm			mm		
15	22	28,1	0,6	18	3	2,2	0,5	19,2	30,8	0,6
17	25,7	32,5	0,6	20	3,5	2,5	0,5	21,2	35,8	0,6
	27,7	36,3	1	22	4,5	3,5	0,5	22,6	41,4	1
20	31,2	40,8	1,1	25	4,5	3,5	0,5	27	45	1
25	35	43	1	27	4,5	3	0,5	30,6	46,4	1
	38	49	1,1	30	4,5	3,5	0,5	32	55	1
30	41,2	50,8	1	32	4,5	3,5	0,5	35,6	56,4	1
	45,8	58,2	1,1	36	4,5	3,5	0,5	37	65	1
35	47,9	59	1,1	37	4,5	3,5	0,5	42	65	1
	50,7	64,3	1,5	40	5,5	4	0,5	44	71	1,5
40	54	66	1,1	42	5,5	4	0,5	47	73	1
	57,5	72,5	1,5	46	5,5	4	0,5	49	81	1,5
45	58,5	72	1,1	46	–	–	–	52	78	1
	63,8	81,2	1,5	51	6,5	5	0,5	54	91	1,5
50	63,5	76,5	1,1	49	5,5	4	0,5	57	83	1
	70	90	2	56	–	–	–	61	99	2
55	70,3	84,7	1,5	54	6,5	5	0,5	64	91	1,5
	77,2	97,8	2	61	6,5	8,1	0,5	66	109	2
60	77	93	1,5	60	6,5	5	0,5	69	101	1,5
	84	106	2,1	67	6,5	8,1	0,5	72	118	2
65	84,5	101	1,5	65	6,5	6,5	0,5	74	111	1,5
	90	115	2,1	72	–	–	–	77	128	2
70	89	106	1,5	68	6,5	6,5	0,5	79	116	1,5
	97,3	123	2,1	77	8,5	10,1	2	82	138	2
75	93,8	112	1,5	72	6,5	6,5	0,5	84	121	1,5
	104	131	2,1	82	8,5	10,1	2	87	148	2

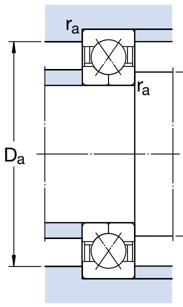
Four-point contact ball bearings
d **80 – 200** mm

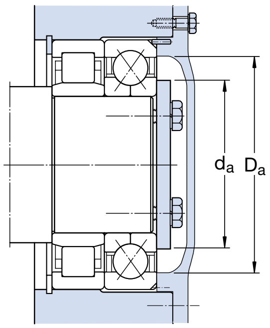


Basic design

Bearing with locating slots

Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designations Bearing with locating slots	without locating slots
mm			kN		kN	r/min		kg	–	
80	140	26	138	146	5,85	4 800	8 000	1,85	**QJ 216 N2MA**	**QJ 216 MA**
	170	39	216	208	8	4 300	7 000	4,60	**QJ 316 N2MA**	**–**
85	150	28	148	160	6,2	4 500	7 500	2,25	**QJ 217 N2MA**	**QJ 217 MA**
	180	41	234	236	8,65	4 000	6 700	5,45	**QJ 317 N2MA**	**–**
90	160	30	174	186	6,95	4 300	7 000	2,75	**QJ 218 N2MA**	**–**
	190	43	265	285	10,2	3 800	6 300	6,45	**QJ 318 N2MA**	**–**
95	170	32	199	212	7,8	4 000	6 700	3,35	**QJ 219 N2MA**	**–**
	200	45	286	315	11	3 600	6 000	7,45	**QJ 319 N2MA**	**–**
100	180	34	225	240	8,65	3 800	6 300	4,05	**QJ 220 N2MA**	**–**
	215	47	307	340	11,6	3 400	5 600	9,30	**QJ 320 N2MA**	**–**
110	200	38	265	305	10,4	3 400	5 600	5,60	**QJ 222 N2MA**	**–**
	240	50	390	475	15	3 000	4 800	12,5	**QJ 322 N2MA**	**–**
120	215	40	286	340	11,2	3 200	5 000	6,95	**QJ 224 N2MA**	**–**
	260	55	390	490	15	2 800	4 500	16,0	**QJ 324 N2MA**	**–**
130	230	40	296	365	11,6	2 800	4 800	7,75	**QJ 226 N2MA**	**–**
	280	58	423	560	16,6	2 600	4 000	19,5	**QJ 326 N2MA**	**–**
140	250	42	325	440	13,2	2 600	4 300	9,85	**QJ 228 N2MA**	**–**
	300	62	468	640	18,6	2 400	3 800	24,0	**QJ 328 N2MA**	**–**
150	270	45	377	530	15,3	2 400	4 000	12,5	**QJ 230 N2MA**	**–**
	320	65	494	710	19,6	2 200	3 600	29,0	**QJ 330 N2MA**	**–**
160	290	48	423	620	17,6	2 200	3 800	15,5	**QJ 232 N2MA**	**–**
	340	68	540	815	21,6	2 000	3 400	34,5	**QJ 332 N2MA**	**–**
170	310	52	436	670	18,3	2 200	3 400	19,5	**QJ 234 N2MA**	**–**
	360	72	618	965	25	1 900	3 200	41,5	**QJ 334 N2MA**	**–**
180	320	52	449	710	19	2 000	3 400	20,5	**QJ 236 N2MA**	**–**
	380	75	637	1 020	26	1 800	3 000	47,5	**QJ 336 N2MA**	**–**
190	400	78	702	1 160	28,5	1 700	2 800	49,0	**QJ 338 N2MA**	**–**
200	360	58	540	915	23,2	1 800	3 000	28,5	**QJ 240 N2MA**	**–**





Dimensions					Slot dimensions			Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	a	b	h	r_0	d_a min	D_a max	r_a max
mm					mm			mm		
80	100	120	2	77	6,5	8,1	1	91	129	2
	111	139	2,1	88	8,5	10,1	2	92	158	2
85	108	128	2	83	6,5	8,1	1	96	139	2
	117	148	3	93	10,5	11,7	2	99	166	2,5
90	114	136	2	88	6,5	8,1	1	101	149	2
	124	156	3	98	10,5	11,7	2	104	176	2,5
95	120	145	2,1	93	6,5	8,1	1	107	158	2
	131	165	3	103	10,5	11,7	2	109	186	2,5
100	127	153	2,1	98	8,5	10,1	2	112	168	2
	139	176	3	110	10,5	11,7	2	114	201	2,5
110	141	169	2,1	109	8,5	10,1	2	122	188	2
	154	196	3	123	10,5	11,7	2	124	226	2,5
120	152	183	2,1	117	10,5	11,7	2	132	203	2
	169	211	3	133	10,5	11,7	2	134	246	2,5
130	165	195	3	126	10,5	11,7	2	144	216	2,5
	182	227	4	144	10,5	12,7	2	147	263	3
140	179	211	3	137	10,5	11,7	2	154	236	2,5
	196	244	4	154	10,5	12,7	2	157	283	3
150	194	226	3	147	10,5	11,7	2	164	256	2,5
	211	259	4	165	10,5	12,7	2	167	303	3
160	206	243	3	158	10,5	12,7	2	174	276	2,5
	224	276	4	175	10,5	12,7	2	177	323	3
170	221	258	4	168	10,5	12,7	2	187	293	3
	237	293	4	186	10,5	12,7	2	187	343	3
180	231	269	4	175	10,5	12,7	2	197	303	3
	252	309	4	196	10,5	12,7	2	197	363	3
190	263	326	5	207	10,5	12,7	2	210	380	4
200	258	302	4	196	10,5	12,7	2	217	363	3


SKF

Double row cam rollers

Designs

SKF double row cam rollers (➔ **fig 1**) have been developed from double row angular contact ball bearings and have a 25° contact angle. They are ready-to-mount pre-greased units and are used for all types of cam drives, conveyor systems etc. They are fitted with pressed steel shields which form a long sealing gap with the inner ring shoulder to keep the lubricant in and contamination out.
Double row SKF cam rollers are available in two designs:

- with a crowned runner surface, series 3058(00) C-2Z or
- with a cylindrical (flat) runner surface, series 3057(00) C-2Z.

Cam rollers with crowned runner surfaces should be used where there is angular misalignment with respect to the track and where edge stresses need to be minimized . In addition to the double row cam rollers, the SKF standard range of track runner bearings contains other cam rollers, support rollers, and cam followers. These are, for example

- single row cam rollers, series 3612(00) R (➔ **page 399**),
- support rollers based on needle roller or cylindrical roller bearings, and
- cam followers based on needle roller or cylindrical roller bearings.

For additional information on support rollers and cam followers, consult the catalogue "Needle roller bearings" or the "SKF Interactive Engineering Catalogue" on CD-ROM or online at www.skf.com.

Fig **1**

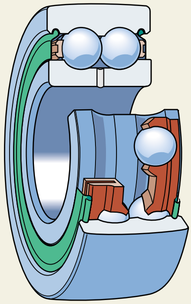
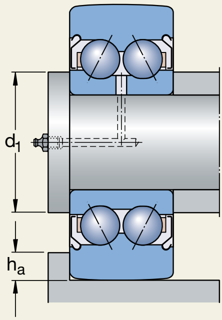


Fig **2**



Cam roller data – general

Dimensions
Except for the outside diameter, boundary dimensions of SKF double row cam rollers are in accordance with ISO 15:1998 for bearings in the 32 dimension series.

Tolerances
SKF double row cam rollers are produced to Normal tolerances as standard, except for the tolerance of the diameter of the crowned runner surface, which is twice the Normal tolerance.
The values for tolerances correspond to ISO 492:2002 and can be found in **table 3** on **page 125**.

Internal clearance
Double row cam rollers are produced with the Normal axial internal clearance of double row angular contact ball bearings (➔ **table 2** on **page 434**).

Cages

Double row cam rollers incorporate two snap-type cages of polyamide 6,6, which can be used for operating temperatures up to +120 °C.

Load carrying ability

In contrast to normal ball bearings, where the outer ring is supported over its entire outside diameter surface in the bore of a housing, the outer ring of a cam roller has only a small contact area with the surface against which it runs, e.g. a rail or cam. The actual contact area depends on the applied radial load and whether the runner surface is crowned or cylindrical. The deformation of the outer ring caused by this limited contact alters the force distribution in the bearing and thus has an influence on load carrying ability. The basic load ratings given in the product table take this into account.

The ability to carry dynamic loads depends on the requisite life, but with reference to the deformation and the strength of the outer ring, the value of the maximum dynamic radial load F_r must not be exceeded.

The permissible static load for a cam roller is determined by the smaller of the values of F_{0r} and C_0. If requirements regarding smooth running are below normal, the static load may exceed C_0 but should never exceed the maximum permissible static radial load F_{0r}.

Axial load carrying capacity

Cam rollers are intended for predominantly radial loads. If an axial load acts on the outer ring, as when the cam roller runs against a guide flange, it will produce a tilting moment and the service life of the cam roller may be reduced as a consequence.

Design of associated components

Pins

With few exceptions, cam rollers operate with outer ring rotation. If easy displacement of the inner ring is required, the pin or shaft should be machined to a g6 tolerance. If, however, a tighter fit is required, then the pin or shaft should be machined to a j6 tolerance.

For cam rollers subjected to higher axial loads, the inner ring should be supported over its entire side face (➔ **fig** 2). The diameter of the supporting surface should be the same as the face diameter d_1 of the inner ring.

Guide flanges

For rails or cams with guide flanges (➔ **fig** 2), the recommended flange height h_a should not exceed

$$h_a = 0,5\,(D - D_1)$$

This helps to avoid damage to shields fitted in the outer ring. The values for the outer ring diameters D and D_1 are listed in the product table.

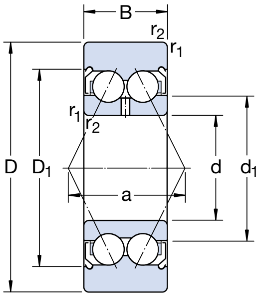
Lubrication

SKF double row cam rollers are filled with a lithium base grease with an NGLI consistency of 3. This grease has good rust inhibiting properties and is suitable for operating temperatures from –30 to +120 °C. The base oil viscosity is 74 mm^2/s at 40 °C and 8,5 mm^2/s at 100 °C.

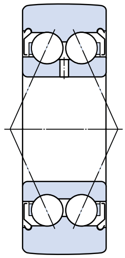
Under normal operating conditions, these cam rollers are maintenance-free. However, if they are subjected to moisture or solid contaminants, or if they run for long periods at temperatures above 70 °C they should be relubricated. The inner ring has a lubrication hole for this purpose. A lithium base grease should be used for relubrication, preferably the SKF LGMT 3 grease. The grease should be applied slowly to avoid damaging the shields.

Double row cam rollers

D **32 – 80** mm



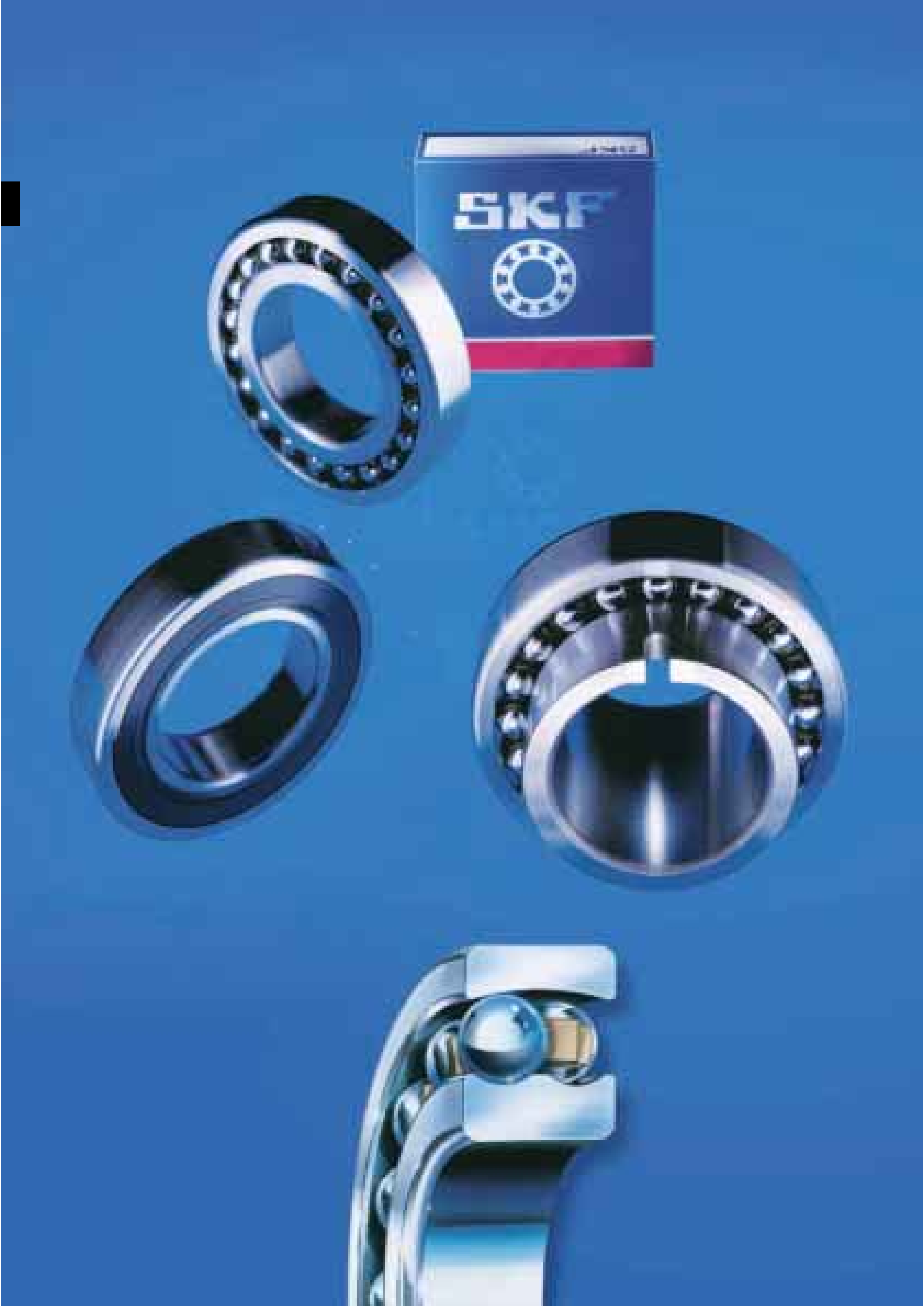
3057(00) C-2Z



3058(00) C-2Z

Dimensions							**Limiting speed**	**Mass**	**Designations** Cam roller with crowned runner surface	cylindrical runner surface
D	B	d	d_1 ~	D_1 ~	$r_{1,2}$ min	a				
mm							r/min	kg	–	
32	14	10	17,7	25	0,6	15	16 000	0,062	**305800 C-2Z**	**–**
35	15,9	12	19,1	27,7	0,6	16,5	14 000	0,078	**305801 C-2Z**	**305701 C-2Z**
40	15,9	15	22,1	30,7	0,6	18	12 000	0,10	**305802 C-2Z**	**305702 C-2Z**
47	17,5	17	25,2	35	0,6	20	11 000	0,16	**305803 C-2Z**	**305703 C-2Z**
52	20,6	20	29,4	40,9	1	24	9 500	0,22	**305804 C-2Z**	**305704 C-2Z**
62	20,6	25	34,4	45,9	1	26,5	8 000	0,32	**305805 C-2Z**	**305705 C-2Z**
72	23,8	30	41,4	55,2	1	31	6 700	0,49	**305806 C-2Z**	**305706 C-2Z**
80	27	35	48,1	63,9	1,1	36,5	5 600	0,65	**305807 C-2Z**	**305707 C-2Z**

Outside diameter	Basic load ratings		Fatigue load limit	Maximum radial loads	
	dynamic	static		dynamic	static
D	C	C_0	P_u	F_r	F_{0r}
mm	kN		kN	kN	
32	7,15	3,8	0,16	4,4	6,3
35	9,56	4,9	0,208	3,8	5,4
40	10,6	5,85	0,25	5,85	8,5
47	13,5	7,8	0,325	9,3	13,4
52	17,2	10	0,425	8,3	12
62	19,5	12,5	0,53	15,3	21,6
72	27,6	18,6	0,8	17	24
80	33,2	21,2	0,9	15,6	22,4


SKF

Self-aligning ball bearings

Designs

The self-aligning ball bearing was invented by SKF. It has two rows of balls and a common sphered raceway in the outer ring. The bearing is consequently self-aligning and insensitive to angular misalignments of the shaft relative to the housing. It is particularly suitable for applications where considerable shaft deflections or misalignment are to be expected. Additionally, the self-aligning ball bearing has the lowest friction of all rolling bearings, which allows it to run cooler even at high speeds.

SKF produces self-aligning ball bearings to several designs. These are

- open bearings of the basic design (➔ **fig** 1),
- sealed bearings (➔ **fig** 2), and
- bearings with extended inner ring (➔ **fig** 3).

Basic design

The basic design self-aligning ball bearing is available with a cylindrical bore or, in certain size ranges, with a tapered bore (taper 1:12).

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

The balls of some bearings in the 12 and 13 series protrude from the sides of the bearing. The values of the protrusion are given in **table** 1 and should be considered when designing the associated components of the bearing arrangement.

Sealed bearings

SKF self-aligning ball bearings are also available in a sealed version with contact seals on both sides – designation suffix 2RS1 (➔ **fig** 5). These sheet steel reinforced seals are made of oil and wear resistant acrylonitrile butadiene rubber (NBR). The permissible operating temperature range for these seals is –40 to +100 °C and up to +120 °C for brief

Fig 1

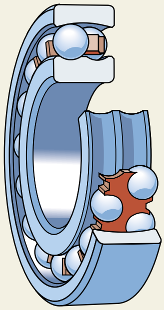


Fig 2

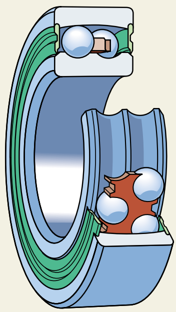
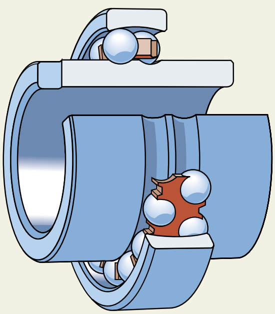


Fig 3



SKF

Fig 4

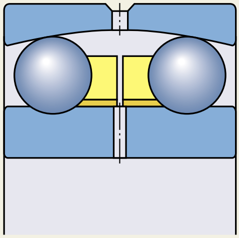
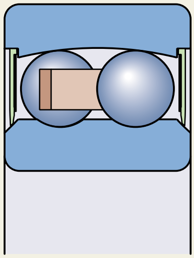


Fig 5



periods. The seal lip contacts a smooth chamfer on the inner ring with light pressure.

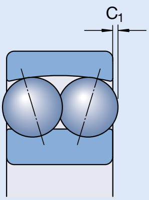
Sealed bearings are lubricated as standard with a lithium base grease which has good rust inhibiting properties and other characteristics according to **table** 2.

SKF sealed self-aligning ball bearings are available with a cylindrical bore. Some sizes are also available with a tapered bore (taper 1:12).

Note:
Sealed bearings are lubricated for life and require no maintenance. They should not be heated above 80 °C before mounting and should not be washed.

Table 1

Protrusion of balls from bearing side faces



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

Table 2

SKF standard grease filling for sealed self-aligning ball bearings

Technical specification	**SKF greases MT47**	**MT33**
Bearing outside diameter, mm	≤ 62	>62
Thickener	Lithium soap	Lithium soap
Base oil type	Mineral oil	Mineral oil
NLGI consistency class	2	3
Operating temperature, °C	–30 to +110	–30 to +120
Base oil viscosity, mm^2/s		
at 40 °C	70	74
at 100 °C	7,3	8,5

Bearings with extended inner ring
Self-aligning ball bearings with extended inner ring are designed for less demanding applications using commercial grade shafting. The special bore tolerance allows easy mounting and dismounting.

Self-aligning ball bearings with extended inner ring are axially located on the shaft by means of a pin or shouldered screw (➔ **fig** 6), which engages in a slot at one side of the inner ring and also prevents the inner ring from turning on the shaft.

When two self-aligning ball bearings with extended inner ring are used to support a shaft, they should be positioned so that the inner ring slots either face each other, or are at the outboard positions of the bearings (➔ **fig** 7). If this is not the case, the shaft is axially located in one direction only.

Fig 6

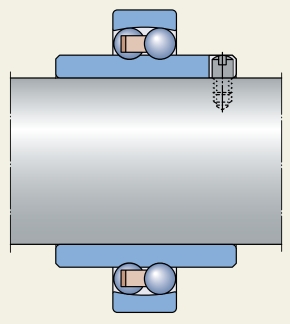
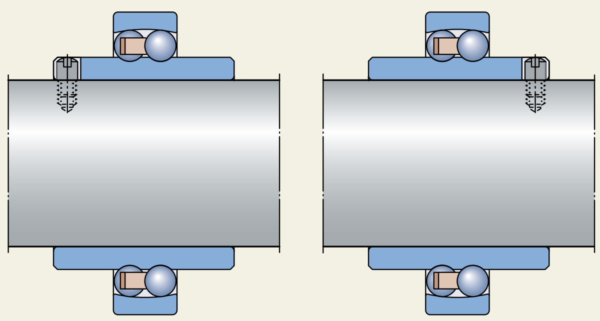


Fig 7



Bearings on sleeves

Adapter and withdrawal sleeves are used to secure bearings with a tapered bore onto cylindrical shaft seats. They facilitate bearing mounting and dismounting and often simplify bearing arrangement design.

Adapter sleeves (➔ **figs** 8 and 9) are more popular than withdrawal sleeves (➔ **fig** 10) as they do not require axial locating devices on the shaft. That is why only adapter sleeves are shown together with suitable bearings in the product table, starting on **page 490**.

SKF adapter sleeves are slotted and are supplied complete with lock nut and locking device. The adapter sleeves for use with sealed self-aligning ball bearings are equipped with a special locking washer which has a protrusion on the side facing the bearing in order to prevent the seal from being damaged (➔ **fig** 11). These sleeves are identified by the suffix C.

Fig 8

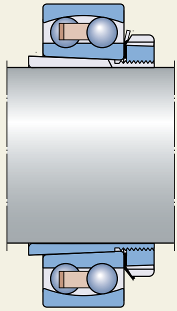


Fig 9

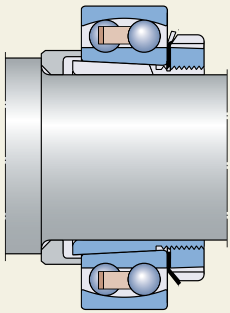


Fig 11

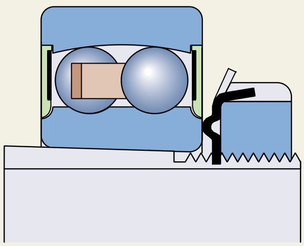
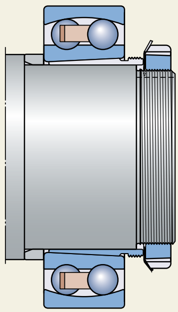


Fig 10



Self-aligning ball bearing kits

To facilitate procurement and to provide the correct bearing/sleeve combination, SKF offers the most popular self-aligning ball bearings together with the suitable adapter sleeve as a kit (➔ **fig 12**).

Mounting can easily be performed with the help of the SKF lock nut spanner set TMHN 7 (➔ **page 1066**).

The range of these kits is shown in **table 3**.

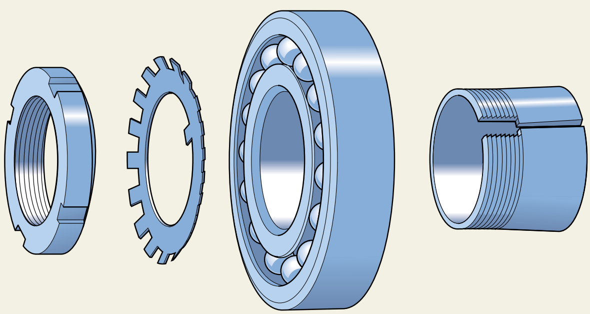
Table 3

SKF self-aligning ball bearing/adapter sleeve kits

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

The technical data are given in the product table on **pages 490** to **493**

Fig 12



Appropriate bearing housings

Self-aligning ball bearings with cylindrical bore or with a tapered bore and adapter sleeve can be mounted in a variety of housings:

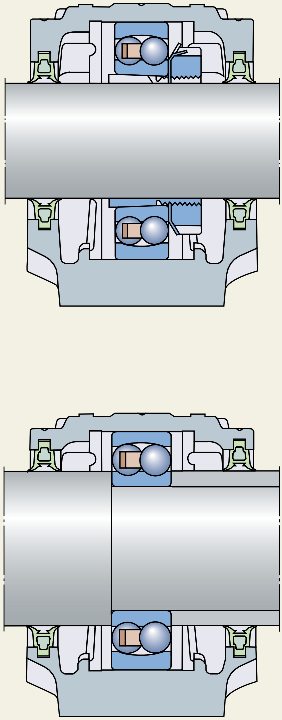
- SNL plummer (pillow) block housings in the 2,3, 5 and 6 series (➔ **fig** 13),
- TVN housings,
- 7225(00) flanged housings, and
- SAF plummer (pillow) block housings for inch-size shafts.

Bearings with extended inner ring can be mounted in specially designed housings:

- TN housings and
- I-1200(00) flanged housings.

A brief description of these housings is provided in the section "Bearing housings", starting on **page 1027**. Detailed information on these housings can be found in the "SKF Interactive Engineering Catalogue" on CD-ROM or online at www.skf.com.

Fig 13



Bearing data – general

Dimensions

The boundary dimensions of SKF self-aligning ball bearings, with the exception of those with extended inner ring, are in accordance with ISO 15:1998. The dimensions of the bearings with extended inner ring follow DIN 630, part 2, withdrawn in 1993.

Tolerances

SKF self-aligning ball bearings are manufactured as standard to Normal tolerances, except the bore of the bearings with extended inner ring, which is produced to tolerance JS7.

The values of the Normal tolerances are in accordance with ISO 492:2002 and can be found in **table** 3 on **page 125**.

Misalignment

The design of self-aligning ball bearings is such that angular misalignment between the outer and the inner ring can be accommodated without any effect on bearing performance.

Guideline values for the permissible angular misalignment between outer and inner rings under normal operating conditions are given in **table** 4. Whether these values can be fully exploited depends on the bearing arrangement design and the type of seal used.

Internal clearance

SKF self-aligning ball bearings are produced as standard with Normal radial internal clearance and most are also available with the greater C3 clearance. Many bearings can also be supplied with the smaller C2 clearance or the much greater C4 clearance.

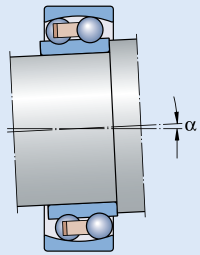
Bearings in the 130 and 139 series have C3 radial internal clearance as standard.

Bearings with extended inner ring have a radial internal clearance which lies in the C2 + Normal range.

Clearance values are given in **table** 5 and are in accordance with ISO 5753:1991. They are valid for unmounted bearings under zero measuring loads.

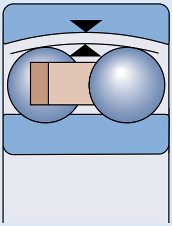
Table 4

Permissible angular misalignment



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

Radial internal clearance of self-aligning ball bearings



Bore diameter d		Radial internal clearance C2		Normal		C3		C4	
over	incl.	min	max	min	max	min	max	min	max
mm		µm							
Bearings with cylindrical bore									
2,5	**6**	1	8	5	15	10	20	15	25
6	**10**	2	9	6	17	12	25	19	33
10	**14**	2	10	6	19	13	26	21	35
14	**18**	3	12	8	21	15	28	23	37
18	**24**	4	14	10	23	17	30	25	39
24	**30**	5	16	11	24	19	35	29	46
30	**40**	6	18	13	29	23	40	34	53
40	**50**	6	19	14	31	25	44	37	57
50	**65**	7	21	16	36	30	50	45	69
65	**80**	8	24	18	40	35	60	54	83
80	**100**	9	27	22	48	42	70	64	96
100	**120**	10	31	25	56	50	83	75	114
120	**140**	10	38	30	68	60	100	90	135
140	**150**	–	–	–	–	70	120	–	–
150	**180**	–	–	–	–	80	130	–	–
180	**200**	–	–	–	–	90	150	–	–
200	**220**	–	–	–	–	100	165	–	–
220	**240**	–	–	–	–	110	180	–	–
Bearings with tapered bore									
18	**24**	7	17	13	26	20	33	28	42
24	**30**	9	20	15	28	23	39	33	50
30	**40**	12	24	19	35	29	46	40	59
40	**50**	14	27	22	39	33	52	45	65
50	**65**	18	32	27	47	41	61	56	80
65	**80**	23	39	35	57	50	75	69	98
80	**100**	29	47	42	68	62	90	84	116
100	**120**	35	56	50	81	75	108	100	139

Please refer to **page 137** for definition of radial internal clearance

Cages

SKF self-aligning ball bearings incorporate one of the following cage designs (→ fig 14) as standard, depending on bearing series and size:

- a one-piece pressed steel cage (**a**), no designation suffix,
- a two-piece pressed steel cage (**b**), no designation suffix,
- a one-piece (**c**) or two-piece polyamide 6,6 cage with glass fibre reinforcement, designation suffix TN9,
- a one-piece (**c**) or two-piece polyamide 6,6 cage, designation suffix TN,
- a one-piece or two-piece (**d**) machined brass cage, designation suffix M.

Contact SKF for availability of bearings with non-standard cages.

Note:
Self-aligning ball bearings with polyamide 6,6 cages can be operated at temperatures up to +120 °C. The lubricants generally used for rolling bearings do not have a detrimental effect on cage properties, with the exception of a few synthetic oils and greases with a synthetic oil base, and lubricants containing a high proportion of EP additives when used at high temperatures.

For bearing arrangements, which are to be operated at continuously high temperatures or under arduous conditions, it is recommended to use bearings with pressed steel or machined brass cage.

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

Axial load carrying capacity

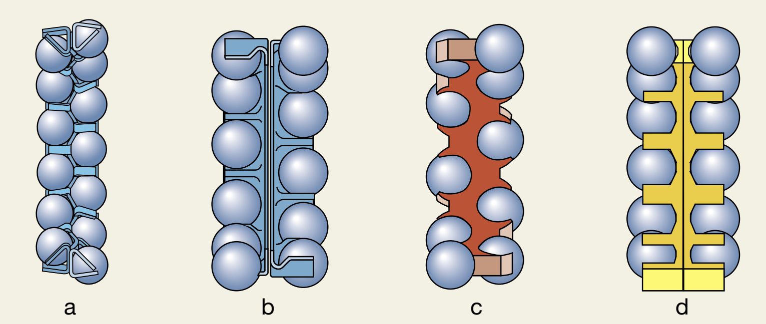
The ability of a self-aligning ball bearing mounted on an adapter sleeve on smooth shafts without an integral shoulder to carry axial loads, depends on the friction between the sleeve and shaft. The permissible axial load can be approximately determined from

$$F_{ap} = 0{,}003\ B\ d$$

where

F_{ap} = maximum permissible axial load, kN
B = bearing width, mm
d = bearing bore diameter, mm

Fig 14



Minimum load

In order to provide satisfactory operation, self-aligning 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, 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 load to be applied to self-aligning ball bearings can be estimated using

$$P_{0m} = 0{,}01\ C_0$$

where

P_{0m} = minimum equivalent static bearing load, kN

C_0 = basic static load rating, kN (➔ product tables)

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 self-aligning ball bearing must be subjected to an additional radial load, for example, by increasing belt tension or by similar means.

Equivalent dynamic bearing load

For dynamically loaded self-aligning ball bearings

$$P = F_r + Y_1F_a \quad \text{when } F_a/F_r \le e$$
$$P = 0{,}65\ F_r + Y_2F_a \quad \text{when } F_a/F_r > e$$

Values of Y_1, Y_2 and e will be found in the product tables.

Equivalent static bearing load

For statically loaded self-aligning ball bearings

$$P_0 = F_r + Y_0F_a$$

Values of Y_0 will be found in the product tables.

Supplementary designations

The designation suffixes used to identify certain features of SKF self-aligning ball bearings are explained in the following.

C3 Radial internal clearance greater than Normal
E Optimized internal design
K Tapered bore, taper 1:12
M Machined brass cage
TN Injection moulded polyamide 6,6 cage
TN9 Injection moulded glass fibre reinforced polyamide 6,6 cage
2RS1 Contact seal of acrylonitrile butadiene rubber (NBR) with sheet steel reinforcement on both sides of the bearing

Mounting bearings with tapered bore

Self-aligning ball bearings with a tapered bore are always mounted with an interference fit on a tapered shaft seating or an adapter or withdrawal sleeve. As a measure of the degree of interference of the fit, either the reduction in radial internal clearance of the bearing or the axial displacement of the inner ring on its tapered seating is used.

Suitable methods for mounting self-aligning ball bearings with tapered bore are:

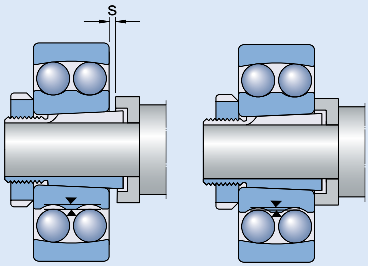
- measuring the clearance reduction,
- measuring the lock nut tightening angle,
- measuring the axial drive-up.

Measuring the clearance reduction

When mounting basic design self-aligning ball bearings with the relatively small Normal radial internal clearance, it is generally sufficient to check clearance during the drive-up by turning and swivelling out the outer ring. When the bearing is properly mounted the outer ring can be easily turned but there should be a slight resistance when the outer ring is swivelled out. The bearing will then have the requisite interference fit. In some cases the residual internal clearance may be too small for the application, and a bearing with C3 radial internal clearance should be used instead.

Table 6

Mounting self-aligning ball bearings with a tapered bore



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

[1] Valid for bearings with Normal radial clearance. For bearings with C3 radial clearance the guideline values can be increased by approximately 15 to 20°

Measuring the lock nut tightening angle

The procedure for using the nut tightening angle α (➔ **fig** 15) represents an easy method for mounting self-aligning ball bearings with a tapered bore correctly. Guideline values for the nut tightening angle α are given in **table** 6.

Before starting the final tightening procedure, the bearing should be pushed up on the tapered seating until the bore of the bearing is in contact with the shaft seating or the sleeve around its whole circumference. By turning the nut through the given angle α the bearing will be pressed up over the proper distance on the tapered seating. The residual clearance of the bearing should be checked by turning and swivelling out the outer ring.

Lock the nut by bending one of the tabs of the locking washer down into one of the nut slots.

Measuring the axial drive-up

Mounting bearings with a tapered bore can be done by measuring the axial drive-up s of the inner ring on its seating. Guideline values for the required axial drive-up s for general applications are given in **table** 6.

The most suitable method in this case is the SKF Drive-up Method. This mounting method provides a very reliable and easy way to determine the starting position for a bearing from which the axial displacement is to be measured. For that, the following mounting tools (➔ **fig** 16) must be used:

- an SKF hydraulic nut of the HMV .. E design (**a**),
- a hydraulic pump (**b**) with
- a pressure gauge (**c**), appropriate to the mounting conditions, and
- a dial gauge (**d**).

Fig 15

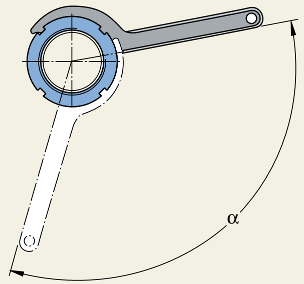
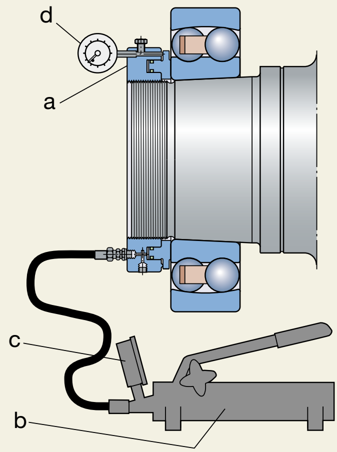


Fig 16



The drive-up method uses hydraulic pressure in the hydraulic nut to push the bearing up on its seating from an undefined "zero" position to a starting position as defined by the oil pressure in the hydraulic nut (➔ **fig** 17). The bearing is then driven up from the defined starting position through a given distance to its final position. The axial displacement s_s can be accurately determined using the dial gauge mounted on the hydraulic nut.

SKF has determined values of the requisite oil pressure and the axial displacement for the individual bearings. These values apply to bearing arrangements (➔ **fig** 18) with

- one sliding interface (**a** and **b**) or
- two sliding interfaces (**c**).

Additional mounting information

Additional information on mounting self-aligning ball bearings in general or with the aid of the SKF Drive-up Method can be found

- in the handbook "SKF Drive-up Method" on CD-ROM,
- in the "SKF Interactive Engineering Catalogue" on CD-ROM or online at www.skf.com or
- online at www.skf.com/mount.

Fig 17

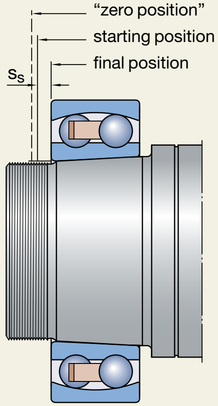
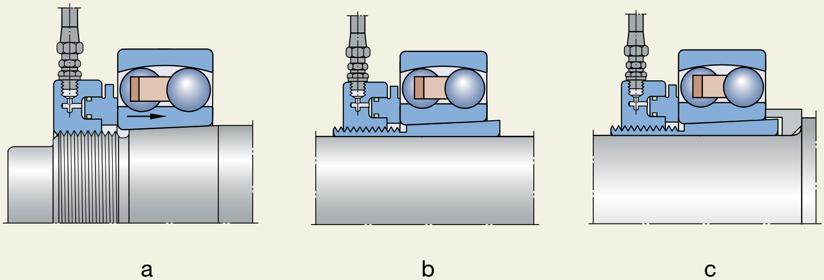
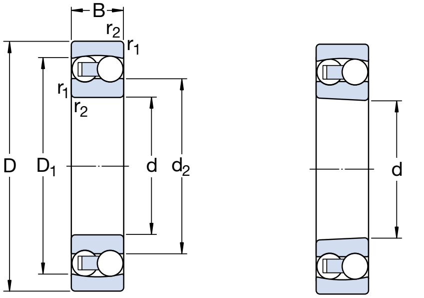


Fig 18



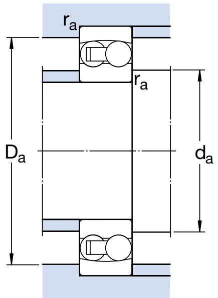
Self-aligning ball bearings
d **5 – 25** mm



Cylindrical bore

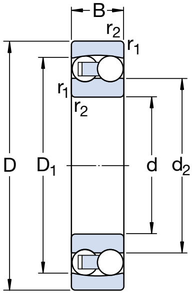
Tapered bore
taper 1 : 12 on diameter

Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designations Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
5	19	6	2,51	0,48	0,025	63 000	45 000	0,009	**135 TN9**	–
6	19	6	2,51	0,48	0,025	70 000	45 000	0,009	**126 TN9**	–
7	22	7	2,65	0,56	0,029	63 000	40 000	0,014	**127 TN9**	–
8	22	7	2,65	0,56	0,029	60 000	40 000	0,014	**108 TN9**	–
9	26	8	3,90	0,82	0,043	60 000	38 000	0,022	**129 TN9**	–
10	30	9	5,53	1,18	0,061	56 000	36 000	0,034	**1200 ETN9**	–
	30	14	8,06	1,73	0,090	50 000	34 000	0,047	**2200 ETN9**	–
12	32	10	6,24	1,43	0,072	50 000	32 000	0,040	**1201 ETN9**	–
	32	14	8,52	1,90	0,098	45 000	30 000	0,053	**2201 ETN9**	–
	37	12	9,36	2,16	0,12	40 000	28 000	0,067	**1301 ETN9**	–
	37	17	11,7	2,70	0,14	38 000	28 000	0,095	**2301**	–
15	35	11	7,41	1,76	0,09	45 000	28 000	0,049	**1202 ETN9**	–
	35	14	8,71	2,04	0,11	38 000	26 000	0,060	**2202 ETN9**	–
	42	13	10,8	2,60	0,14	34 000	24 000	0,094	**1302 ETN9**	–
	42	17	11,9	2,90	0,15	32 000	24 000	0,12	**2302**	–
17	40	12	8,84	2,20	0,12	38 000	24 000	0,073	**1203 ETN9**	–
	40	16	10,6	2,55	0,14	34 000	24 000	0,088	**2203 ETN9**	–
	47	14	12,7	3,40	0,18	28 000	20 000	0,12	**1303 ETN9**	–
	47	19	14,6	3,55	0,19	30 000	22 000	0,16	**2303**	–
20	47	14	12,7	3,4	0,18	32 000	20 000	0,12	**1204 ETN9**	**1204 EKTN9**
	47	18	16,8	4,15	0,22	28 000	20 000	0,14	**2204 ETN9**	–
	52	15	14,3	4	0,21	26 000	18 000	0,16	**1304 ETN9**	–
	52	21	18,2	4,75	0,24	26 000	19 000	0,22	**2304 TN**	–
25	52	15	14,3	4	0,21	28 000	18 000	0,14	**1205 ETN9**	**1205 EKTN9**
	52	18	16,8	4,4	0,23	26 000	18 000	0,16	**2205 ETN9**	**2205 EKTN9**
	62	17	19	5,4	0,28	22 000	15 000	0,26	**1305 ETN9**	**1305 EKTN9**
	62	24	24,2	6,55	0,34	22 000	16 000	0,36	**2305**	–
	62	24	27	7,1	0,37	22 000	16 000	0,34	**2305 ETN9**	–

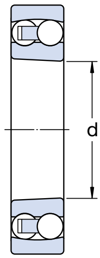


Dimensions				Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm				mm			–			
5	10,3	15,4	0,3	7,4	16,6	0,3	0,33	1,9	3	2
6	10,3	15,4	0,3	8,4	16,6	0,3	0,33	1,9	3	2
7	12,6	17,6	0,3	9,4	19,6	0,3	0,33	1,9	3	2
8	12,6	17,6	0,3	10,4	19,6	0,3	0,33	1,9	3	2
9	14,8	21,1	0,6	13,2	21,8	0,6	0,33	1,9	3	2
10	16,7	24,4	0,6	14,2	25,8	0,6	0,33	1,9	3	2
	15,3	24,3	0,6	14,2	25,8	0,6	0,54	1,15	1,8	1,3
12	18,2	26,4	0,6	16,2	27,8	0,6	0,33	1,9	3	2
	17,5	26,5	0,6	16,2	27,8	0,6	0,50	1,25	2	1,3
	20	30,8	1	17,6	31,4	1	0,35	1,8	2,8	1,8
	18,6	31	1	17,6	31,4	1	0,60	1,05	1,6	1,1
15	21,2	29,6	0,6	19,2	30,8	0,6	0,33	1,9	3	2
	20,9	30,2	0,6	19,2	30,8	0,6	0,43	1,5	2,3	1,6
	23,9	35,3	1	20,6	36,4	1	0,31	2	3,1	2,2
	23,2	35,2	1	20,6	36,4	1	0,52	1,2	1,9	1,3
17	24	33,6	0,6	21,2	35,8	0,6	0,31	2	3,1	2,2
	23,8	34,1	0,6	21,2	35,8	0,6	0,43	1,5	2,3	1,6
	28,9	41	1	22,6	41,4	1	0,30	2,1	3,3	2,2
	25,8	39,4	1	22,6	41,4	1	0,52	1,2	1,9	1,3
20	28,9	41	1	25,6	41,4	1	0,30	2,1	3,3	2,2
	27,4	41	1	25,6	41,4	1	0,40	1,6	2,4	1,6
	33,3	45,6	1,1	27	45	1	0,28	2,2	3,5	2,5
	28,8	43,7	1,1	27	45	1	0,52	1,2	1,9	1,3
25	33,3	45,6	1	30,6	46,4	1	0,28	2,2	3,5	2,5
	32,3	46,1	1	30,6	46,4	1	0,35	1,8	2,8	1,8
	37,8	52,5	1,1	32	55	1	0,28	2,2	3,5	2,5
	35,5	53,0	1,1	32	55	1	0,44	1,4	2,2	1,5

Self-aligning ball bearings
d **30 – 65** mm

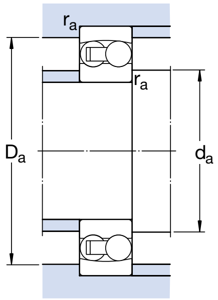


Cylindrical bore



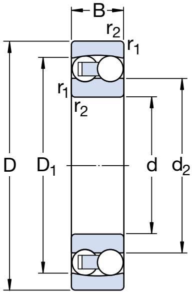
Tapered bore
taper 1 : 12 on diameter

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	–	
30	62	16	15,6	4,65	0,24	24 000	15 000	0,22	**1206 ETN9**	**1206 EKTN9**
	62	20	23,8	6,7	0,35	22 000	15 000	0,26	**2206 ETN9**	**2206 EKTN9**
	72	19	22,5	6,8	0,36	19 000	13 000	0,39	**1306 ETN9**	**1306 EKTN9**
	72	27	31,2	8,8	0,45	18 000	13 000	0,50	**2306**	**2306 K**
35	72	17	19	6	0,31	20 000	13 000	0,32	**1207 ETN9**	**1207 EKTN9**
	72	23	30,7	8,8	0,46	18 000	12 000	0,40	**2207 ETN9**	**2207 EKTN9**
	80	21	26,5	8,5	0,43	16 000	11 000	0,51	**1307 ETN9**	**1307 EKTN9**
	80	31	39,7	11,2	0,59	18 000	12 000	0,68	**2307 ETN9**	**2307 EKTN9**
40	80	18	19,9	6,95	0,36	18 000	11 000	0,42	**1208 ETN9**	**1208 EKTN9**
	80	23	31,9	10	0,51	16 000	11 000	0,51	**2208 ETN9**	**2208 EKTN9**
	90	23	33,8	11,2	0,57	14 000	9 500	0,68	**1308 ETN9**	**1308 EKTN9**
	90	33	54	16	0,82	14 000	10 000	0,93	**2308 ETN9**	**2308 EKTN9**
45	85	19	22,9	7,8	0,40	17 000	11 000	0,47	**1209 ETN9**	**1209 EKTN9**
	85	23	32,5	10,6	0,54	15 000	10 000	0,55	**2209 ETN9**	**2209 EKTN9**
	100	25	39	13,4	0,70	12 000	8 500	0,96	**1309 ETN9**	**1309 EKTN9**
	100	36	63,7	19,3	1	13 000	9 000	1,25	**2309 ETN9**	**2309 EKTN9**
50	90	20	26,5	9,15	0,48	16 000	10 000	0,53	**1210 ETN9**	**1210 EKTN9**
	90	23	33,8	11,2	0,57	14 000	9 500	0,60	**2210 ETN9**	**2210 EKTN9**
	110	27	43,6	14	0,72	12 000	8 000	1,20	**1310 ETN9**	**1310 EKTN9**
	110	40	63,7	20	1,04	14 000	9 500	1,65	**2310**	**2310 K**
55	100	21	27,6	10,6	0,54	14 000	9 000	0,71	**1211 ETN9**	**1211 EKTN9**
	100	25	39	13,4	0,70	12 000	8 500	0,81	**2211 ETN9**	**2211 EKTN9**
	120	29	50,7	18	0,92	11 000	7 500	1,60	**1311 ETN9**	**1311 EKTN9**
	120	43	76,1	24	1,25	11 000	7 500	2,10	**2311**	**2311 K**
60	110	22	31,2	12,2	0,62	12 000	8 500	0,90	**1212 ETN9**	**1212 EKTN9**
	110	28	48,8	17	0,88	11 000	8 000	1,10	**2212 ETN9**	**2212 EKTN9**
	130	31	58,5	22	1,12	9 000	6 300	1,95	**1312 ETN9**	**1312 EKTN9**
	130	46	87,1	28,5	1,46	9 500	7 000	2,60	**2312**	**2312 K**
65	120	23	35,1	14	0,72	11 000	7 000	1,15	**1213 ETN9**	**1213 EKTN9**
	120	31	57,2	20	1,02	10 000	7 000	1,45	**2213 ETN9**	**2213 EKTN9**
	140	33	65	25,5	1,25	8 500	6 000	2,45	**1313 ETN9**	**1313 EKTN9**
	140	48	95 6	32,5	1,66	9 000	6 300	3,25	**2313**	**2313 K**

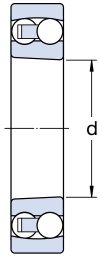


Dimensions				Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm				mm			–			
30	40,1	53	1	35,6	56,4	1	0,25	2,5	3,9	2,5
	38,8	55	1	35,6	56,4	1	0,33	1,9	3	2
	44,9	60,9	1,1	37	65	1	0,25	2,5	3,9	2,5
	41,7	60,9	1,1	37	65	1	0,44	1,4	2,2	1,4
35	47	62,3	1,1	42	65	1	0,23	2,7	4,2	2,8
	45,3	64,2	1,1	42	65	1	0,31	2	3,1	2,2
	51,5	69,5	1,5	44	71	1,5	0,25	2,5	3,9	2,5
	46,5	68,4	1,5	44	71	1,5	0,46	1,35	2,1	1,4
40	53,6	68,8	1,1	47	73	1	0,22	2,9	4,5	2,8
	52,4	71,6	1,1	47	73	1	0,28	2,2	3,5	2,5
	61,5	81,5	1,5	49	81	1,5	0,23	2,7	4,2	2,8
	53,7	79,2	1,5	49	81	1,5	0,40	1,6	2,4	1,6
45	57,5	73,7	1,1	52	78	1	0,21	3	4,6	3,2
	55,3	74,6	1,1	52	78	1	0,26	2,4	3,7	2,5
	67,7	89,5	1,5	54	91	1,5	0,23	2,7	4,2	2,8
	60,1	87,4	1,5	54	91	1,5	0,33	1,9	3	2
50	61,7	79,5	1,1	57	83	1	0,21	3	4,6	3,2
	61,5	81,5	1,1	57	83	1	0,23	2,7	4,2	2,8
	70,3	95	2	61	99	2	0,24	2,6	4,1	2,8
	65,8	94,4	2	61	99	2	0,43	1,5	2,3	1,6
55	70,1	88,4	1,5	64	91	1,5	0,19	3,3	5,1	3,6
	67,7	89,5	1,5	64	91	1,5	0,23	2,7	4,2	2,8
	77,7	104	2	66	109	2	0,23	2,7	4,2	2,8
	72	103	2	66	109	2	0,40	1,6	2,4	1,6
60	78	97,6	1,5	69	101	1,5	0,19	3,3	5,1	3,6
	74,5	98,6	1,5	69	101	1,5	0,24	2,6	4,1	2,8
	91,6	118	2,1	72	118	2	0,22	2,9	4,5	2,8
	76,9	112	2,1	72	118	2	0,33	1,9	3	2
65	85,3	106	1,5	79	111	1,5	0,18	3,5	5,4	3,6
	80,7	107	1,5	79	111	1,5	0,24	2,6	4,1	2,8
	99	127	2,1	77	128	2	0,22	2,9	4,5	2,8
	85,5	122	2,1	77	128	2	0,37	1,7	2,6	1,8

Self-aligning ball bearings
d **70 – 120** mm

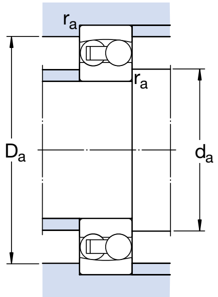


Cylindrical bore



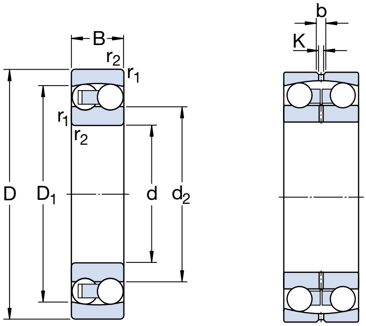
Tapered bore
taper 1 : 12 on diameter

Principal dimensions d	D	B	**Basic load ratings** dynamic C	static C_0	**Fatigue load limit** P_u	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designations** Bearing with cylindrical bore	tapered bore
mm			kN		kN	r/min		kg	–	
70	125	24	35,8	14,6	0,75	11 000	7 000	1,25	**1214 ETN9**	**–**
	125	31	44,2	17	0,88	10 000	6 700	1,50	**2214**	**–**
	150	35	74,1	27,5	1,34	8 500	6 000	3,00	**1314**	**–**
	150	51	111	37,5	1,86	8 000	6 000	3,90	**2314**	**–**
75	130	25	39	15,6	0,80	10 000	6 700	1,35	**1215**	**1215 K**
	130	31	58,5	22	1,12	9 000	6 300	1,60	**2215 ETN9**	**2215 EKTN9**
	160	37	79,3	30	1,43	8 000	5 600	3,55	**1315**	**1315 K**
	160	55	124	43	2,04	7 500	5 600	4,70	**2315**	**2313 K**
80	140	26	39,7	17	0,83	9 500	6 000	1,65	**1216**	**1216 K**
	140	33	65	25,5	1,25	8 500	6 000	2,00	**2216 ETN9**	**2216 EKTN9**
	170	39	88,4	33,5	1,50	7 500	5 300	4,20	**1316**	**1316 K**
	170	58	135	49	2,24	7 000	5 300	6,10	**2316**	**2316 K**
85	150	28	48,8	20,8	0,98	9 000	5 600	2,05	**1217**	**1217 K**
	150	36	58,5	23,6	1,12	8 000	5 600	2,50	**2217**	**2217 K**
	180	41	97,5	38	1,70	7 000	4 800	5,00	**1317**	**1317 K**
	180	60	140	51	2,28	6 700	4 800	7,05	**2317**	**2317 K**
90	160	30	57,2	23,6	1,08	8 500	5 300	2,50	**1218**	**1218 K**
	160	40	70,2	28,5	1,32	7 500	5 300	3,40	**2218**	**2218 K**
	190	43	117	44	1,93	6 700	4 500	5,80	**1318**	**1318 K**
	190	64	153	57	2,50	6 300	4 500	8,45	**2318 M**	**2318 KM**
95	170	32	63,7	27	1,20	8 000	5 000	3,10	**1219**	**1219 K**
	170	43	83,2	34,5	1,53	7 000	5 000	4,10	**2219 M**	**2219 KM**
	200	45	133	51	2,16	6 300	4 300	6,70	**1319**	**1319 K**
	200	67	165	64	2,75	6 000	4 500	9,80	**2319 M**	**–**
100	180	34	68,9	30	1,29	7 500	4 800	3,70	**1220**	**1220 K**
	180	46	97,5	40,5	1,76	6 700	4 800	5,00	**2220 M**	**2220 KM**
	215	47	143	57	2,36	6 000	4 000	8,30	**1320**	**1320 K**
	215	73	190	80	3,25	5 600	4 000	12,5	**2320 M**	**2320 KM**
110	200	38	88,4	39	1,60	6 700	4 300	5,15	**1222**	**1222 K**
	200	53	124	52	2,12	6 000	4 300	7,10	**2222 M**	**2222 KM**
	240	50	163	72	2,75	5 300	3 600	12,0	**1322 M**	**1322 KM**
120	215	42	119	53	2,12	6 300	4 000	6,75	**1224 M**	**1224 KM**

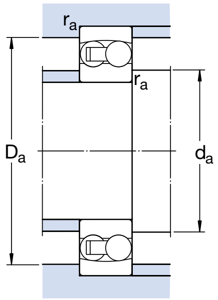


Dimensions				Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm				mm			–			
70	87,4	109	1,5	79	116	1,5	0,18	3,5	5,4	3,6
	87,5	111	1,5	79	116	1,5	0,27	2,3	3,6	2,5
	97,7	129	2,1	82	138	2	0,22	2,9	4,5	2,8
	91,6	130	2,1	82	138	2	0,37	1,7	2,6	1,8
75	93	116	1,5	84	121	1,5	0,17	3,7	5,7	4
	91,6	118	1,5	84	121	1,5	0,22	2,9	4,5	2,8
	104	138	2,1	87	148	2	0,22	2,9	4,5	2,8
	97,8	139	2,1	87	148	2	0,37	1,7	2,6	1,8
80	101	125	2	91	129	2	0,16	3,9	6,1	4
	99	127	2	91	129	2	0,22	2,9	4,5	2,8
	109	147	2,1	92	158	2	0,22	2,9	4,5	2,8
	104	148	2,1	92	158	2	0,37	1,7	2,6	1,8
85	107	134	2	96	139	2	0,17	3,7	5,7	4
	105	133	2	96	139	2	0,25	2,5	3,9	2,5
	117	155	3	99	166	2,5	0,22	2,9	4,5	2,8
	115	157	3	99	166	2,5	0,37	1,7	2,6	1,8
90	112	142	2	101	149	2	0,17	3,7	5,7	4
	112	142	2	101	149	2	0,27	2,3	3,6	2,5
	122	165	3	104	176	2,5	0,22	2,9	4,5	2,8
	121	164	3	104	176	2,5	0,37	1,7	2,6	1,8
95	120	151	2,1	107	158	2	0,17	3,7	5,7	4
	118	151	2,1	107	158	2	0,27	2,3	3,6	2,5
	127	174	3	109	186	2,5	0,23	2,7	4,2	2,8
	128	172	3	109	186	2,5	0,37	1,7	2,6	1,8
100	127	159	2,1	112	168	2	0,17	3,7	5,7	4
	124	160	2,1	112	168	2	0,27	2,3	3,6	2,5
	136	185	3	114	201	2,5	0,23	2,7	4,2	2,8
	135	186	3	114	201	2,5	0,37	1,7	2,6	1,8
110	140	176	2,1	122	188	2	0,17	3,7	5,7	4
	137	177	2,1	122	188	2	0,28	2,2	3,5	2,5
	154	206	3	124	226	2,5	0,22	2,9	4,5	2,8
120	149	190	2,1	132	203	2	0,19	3,3	5,1	3,6

Self-aligning ball bearings
d **130 – 240** mm

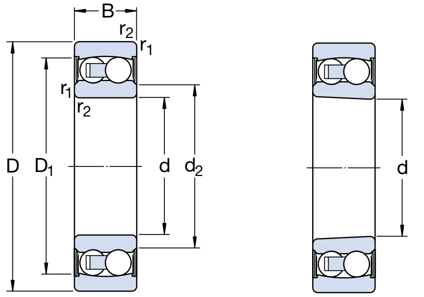


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
130	230	46	127	58,5	2,24	5 600	3 600	8,30	**1226 M**
150	225	56	57,2	23,6	0,88	5 600	3 400	7,50	**13030**
180	280	74	95,6	40	1,34	4 500	2 800	16,0	**13036**
200	280	60	60,5	29	0,97	4 300	2 600	10,7	**13940**
220	300	60	60,5	30,5	0,97	3 800	2 400	11,0	**13944**
240	320	60	60,5	32	0,97	3 800	2 200	11,3	**13948**



Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
130	163	204	–	–	3	144	216	2,5	0,19	3,3	5,1	3,6
150	175	203	8,3	4,5	2,1	161	214	2	0,24	2,6	4,1	2,8
180	212	249	13,9	7,5	2,1	191	269	2	0,25	2,5	3,9	2,5
200	229	258	8,3	4,5	2,1	211	269	2	0,19	3,3	5,1	3,6
220	249	278	8,3	4,5	2,1	231	289	2	0,18	3,5	5,4	3,6
240	269	298	8,3	4,5	2,1	251	309	2	0,16	3,9	6,1	4

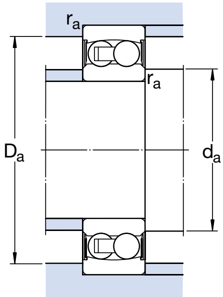
Sealed self-aligning ball bearings
d **10 – 70** mm



Cylindrical bore

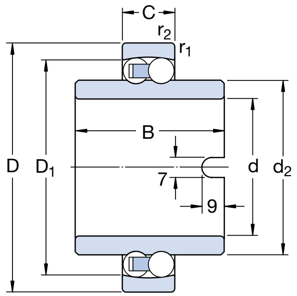
Tapered bore
taper 1 : 12 on diameter

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

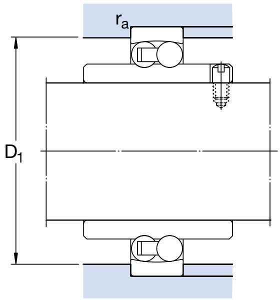


Dimensions				Abutment and fillet dimensions				Calculation factors			
d	d_2	D_1	$r_{1,2}$ min	d_a min	d_a max	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm				mm				–			
10	14	24,8	0,6	14	14	25,8	0,6	0,33	1,9	3	2
12	15,5	27,4	0,6	15,5	15,5	27,8	0,6	0,33	1,9	3	2
15	19,1	30,4	0,6	19	19	30,8	0,6	0,33	1,9	3	2
	20,3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

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

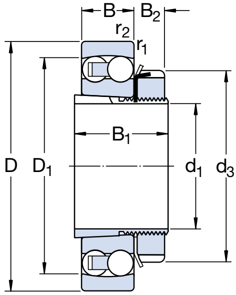


Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Limiting speed**	**Mass**	**Designation**
d	D	C	C	C_0	P_u			
mm			kN		kN	r/min	kg	–
20	47	14	12,7	3,4	0,17	9 000	0,18	**11204 ETN9**
25	52	15	14,3	4	0,21	8 000	0,22	**11205 ETN9**
30	62	16	15,6	4,65	0,24	6 700	0,35	**11206 TN9**
35	72	17	15,9	5,1	0,27	5 600	0,54	**11207 TN9**
40	80	18	19	6,55	0,34	5 000	0,72	**11208 TN9**
45	85	19	21,6	7,35	0,38	4 500	0,77	**11209 TN9**
50	90	20	22,9	8,15	0,42	4 300	0,85	**11210 TN9**
60	110	22	30,2	11,6	0,60	3 400	1,15	**11212 TN9**

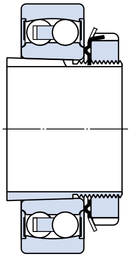


Dimensions					Abutment and fillet dimensions		Calculation factors			
d	d_2 ~	D_1 ~	B	$r_{1,2}$ min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm					mm		–			
20	28,9	41	40	1	41,4	1	0,30	2,1	3,3	2,2
25	33,3	45,6	44	1	46,4	1	0,28	2,2	3,5	2,5
30	40,1	53,2	48	1	56,4	1	0,25	2,5	3,9	2,5
35	47,7	60,7	52	1,1	65	1	0,23	2,7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

Self-aligning ball bearings on adapter sleeve
d_1 **17 – 45** mm



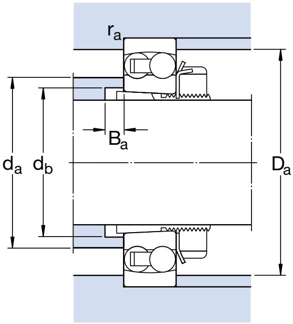
Open bearing



Sealed bearing

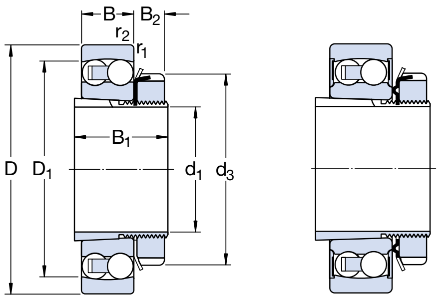
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass** Bearing + sleeve	**Designations** Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
17	47	14	12,7	3,4	0,18	32 000	20 000	0,16	**1204 EKTN9**	**H 204**
20	52	15	14,3	4	0,21	28 000	18 000	0,21	**1205 EKTN9**	**H 205**
	52	18	16,8	4,4	0,23	26 000	18 000	0,23	**2205 EKTN9**	**H 305**
	52	18	14,3	4	0,21	–	9 000	0,23	**2205 E-2RS1KTN9**	**H 305 C**
	62	17	19	5,4	0,28	22 000	15 000	0,33	**1305 EKTN9**	**H 305**
25	62	16	15,6	4,65	0,24	24 000	15 000	0,32	► **1206 EKTN9**	**H 206**
	62	20	23,8	6,7	0,35	22 000	15 000	0,36	**2206 EKTN9**	**H 306**
	62	20	15,6	4,65	0,24	–	7 500	0,36	**2206 E-2RS1KTN9**	**H 306 C**
	72	19	22,5	6,8	0,36	19 000	13 000	0,49	**1306 EKTN9**	**H 306**
	72	27	31,2	8,8	0,45	18 000	13 000	0,61	**2306 K**	**H 2306**
30	72	17	19	6	0,31	20 000	13 000	0,44	► **1207 EKTN9**	**H 207**
	72	23	30,7	8,8	0,46	18 000	12 000	0,54	**2207 EKTN9**	**H 307**
	72	23	19	6	0,31	–	6 300	0,55	**2207 E-2RS1KTN9**	**H 307 C**
	80	21	26,5	8,5	0,43	16 000	11 000	0,65	**1307 EKTN9**	**H 307**
	80	31	39,7	11,2	0,59	18 000	12 000	0,84	**2307 EKTN9**	**H 2307**
35	80	18	19,9	6,95	0,36	18 000	11 000	0,58	► **1208 EKTN9**	**H 208**
	80	23	31,9	10	0,51	16 000	11 000	0,58	**2208 EKTN9**	**H 308**
	80	23	19,9	6,95	0,36	–	5 600	0,67	**2208 E-2RS1KTN9**	**H 308 C**
	90	23	33,8	11,2	0,57	14 000	9 500	0,85	**1308 EKTN9**	**H 308**
	90	33	54	16	0,82	14 000	10 000	1,10	**2308 EKTN9**	**H 2308**
40	85	19	22,9	7,8	0,40	17 000	11 000	0,68	► **1209 EKTN9**	**H 209**
	85	23	32,5	10,6	0,54	15 000	10 000	0,78	**2209 EKTN9**	**H 309**
	85	23	22,9	7,8	0,40	–	5 300	1,20	**2209 E-2RS1KTN9**	**H 309 C**
	100	25	39	13,4	0,70	12 000	8 500	1,20	**1309 EKTN9**	**H 309**
	100	36	63,7	19,3	1	13 000	9 000	1,40	**2309 EKTN9**	**H 2309**
45	90	20	26,5	9,15	0,48	16 000	10 000	0,77	► **1210 EKTN9**	**H 210**
	90	23	33,8	11,2	0,57	14 000	9 500	0,87	**2210 EKTN9**	**H 310**
	90	23	22,9	8,15	0,42	–	4 800	0,84	**2210 E-2RS1KTN9**	**H 310 C**
	110	27	43,6	14	0,72	12 000	8 000	1,45	**1310 EKTN9**	**H 310**
	110	40	63,7	20	1 04	14 000	9 500	1,90	**2310 K**	**H 2310**

► Bearings and sleeves also available as KAM self-aligning ball bearing kits (→ **page 468**)



Dimensions						Abutment and fillet dimensions					Calculation factors			
d_1	d_3	D_1 ~	B_1	B_2	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm						mm					–			
17	32	41	24	7	1	28,5	23	41,2	5	1	0,30	2,1	3,3	2,2
20	38	45,6	26	8	1	33	28	46,2	5	1	0,28	2,2	3,5	2,5
	38	46,1	29	8	1	32	28	46,2	5	1	0,35	1,8	2,8	1,8
	38	46,3	29	8,5	1	31	28	46,2	5	1	0,28	2,2	3,5	2,5
	38	52,5	29	8	1,1	37	28	55	6	1	0,28	2,2	3,5	2,5
25	45	53	27	8	1	40	33	56,2	5	1	0,25	2,5	3,9	2,5
	45	55	31	8	1	38	33	56,2	5	1	0,33	1,9	3	2
	45	54,1	31	8,5	1	36	33	56,2	5	1	0,25	2,5	3,9	2,5
	45	60,9	27	8	1,1	44	33	65	6	1	0,25	2,5	3,9	2,5
	45	60,9	38	8	1,1	41	35	65	5	1	0,44	1,4	2,2	1,4
30	52	62,3	29	9	1,1	47	38	65	-	1	0,23	2,7	4,2	2,8
	52	64,2	35	9	1,1	45	39	65	5	1	0,31	2	3,1	2,2
	52	62,7	35	9,5	1,1	42	39	65	5	1	0,23	2,7	4,2	2,8
	52	69,5	35	9	1,5	51	39	71	7	1,5	0,25	2,5	3,9	2,5
	52	68,4	43	9	1,5	46	40	71	5	1,5	0,46	1,35	2,1	1,4
35	58	68,8	31	10	1,1	53	43	73	6	1	0,22	2,9	4,5	2,8
	58	71,6	36	10	1,1	52	44	73	6	1	0,28	2,2	3,5	2,5
	58	69,8	36	10,5	1,1	49	44	73	6	1	0,22	2,9	4,5	2,8
	58	81,5	36	10	1,5	61	44	81	6	1,5	0,23	2,7	4,2	2,8
	58	79,2	46	10	1,5	53	45	81	6	1,5	0,40	1,6	2,4	1,6
40	65	73,7	33	11	1,1	57	48	78	6	1	0,21	3	4,6	3,2
	65	74,6	39	11	1,1	55	50	78	8	1	0,26	2,4	3,7	2,5
	65	75,3	39	11,5	1,1	53	50	78	8	1	0,21	3	4,6	3,2
	65	89,5	39	11	1,5	67	50	91	6	1,5	0,23	2,7	4,2	2,8
	65	87,4	50	11	1,5	60	50	91	6	1,5	0,33	1,9	3	2
45	70	79,5	35	12	1,1	62	53	83	6	1	0,21	3	4,6	3,2
	70	81,5	42	12	1,1	61	55	83	10	1	0,23	2,7	4,2	2,8
	70	79,5	42	12,5	1,1	58	55	83	10	1	0,20	3,2	4,9	3,2
	70	95	42	12	2	70	55	99	6	2	0,24	2,6	4,1	2,8
	70	94,4	55	12	2	65	56	99	6	2	0,43	1,5	2,3	1,6

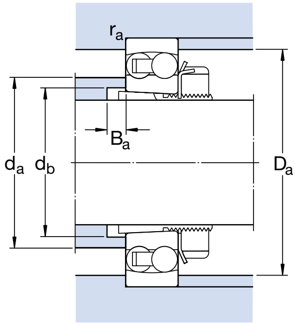
Self-aligning ball bearings on adapter sleeve
d_1 **50 – 85** mm



Open bearing Sealed bearing

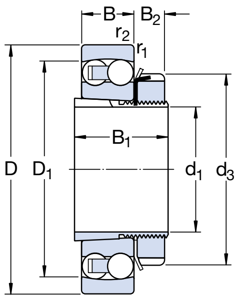
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass** Bearing + sleeve	**Designations** Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
50	100	21	27,6	10,6	0,54	14 000	9 000	0,99	▸ **1211 EKTN9**	**H 211**
	100	25	39	13,4	0,70	12 000	8 500	1,15	**2211 EKTN9**	**H 311**
	100	25	27,6	10,6	0,54	–	4 300	1,10	**2211 E-2RS1KTN9**	**H 311 C**
	120	29	50,7	18	0,92	11 000	7 500	1,90	**1311 EKTN9**	**H 311**
	120	43	76,1	24	1,25	11 000	7 500	2,40	**2311 K**	**H 2311**
55	110	22	31,2	12,2	0,62	12 000	8 500	1,20	**1212 EKTN9**	**H 212**
	110	28	48,8	17	0,88	11 000	8 000	1,40	**2212 EKTN9**	**H 312**
	130	31	58,5	22	1,12	9 000	6 300	2,15	**1312 EKTN9**	**H 312**
	130	46	87,1	28,5	1,46	9 500	7 000	2,95	**2312 K**	**H 2312**
60	120	23	35,1	14	0,72	11 000	7 000	1,45	**1213 EKTN9**	**H 213**
	120	31	57,2	20	1,02	10 000	7 000	1,80	**2213 EKTN9**	**H 313**
	120	31	35,1	14	0,72	–	3 600	1,75	**2213 E-2RS1KTN9**	**H 313 C**
	140	33	65	25,5	1,25	8 500	6 000	2,85	**1313 EKTN9**	**H 313**
	140	48	95,6	32,5	1,66	9 000	6 300	3,60	**2313 K**	**H 2313**
65	130	25	39	15,6	0,80	10 000	6 700	2,00	**1215 K**	**H 215**
	130	31	58,5	22	1,12	9 000	6 300	2,30	**2215 EKTN9**	**H 315**
	160	37	79,3	30	1,43	8 000	5 600	4,20	**1315 K**	**H 315**
	160	55	124	43	2,04	7 500	5 600	5,55	**2315 K**	**H 2315**
70	140	26	39,7	17	0,83	9 500	6 000	2,40	**1216 K**	**H 216**
	140	33	65	25,5	1,25	8 500	6 000	2,85	**2216 EKTN9**	**H 316**
	170	39	88,4	33,5	1,50	7 500	5 300	5,00	**1316 K**	**H 316**
	170	58	135	49	2,24	7 000	5 300	7,10	**2316 K**	**H 2316**
75	150	28	48,8	20,8	0,98	9 000	5 600	2,95	**1217 K**	**H 217**
	150	36	58,5	23,6	1,12	8 000	5 600	3,30	**2217 K**	**H 317**
	180	41	97,5	38	1,70	7 000	4 800	6,00	**1317 K**	**H 317**
	180	60	140	51	2,28	6 700	4 800	8,15	**2317 K**	**H 2317**
80	160	30	57,2	23,6	1,08	8 500	5 300	3,50	**1218 K**	**H 218**
	160	40	70,2	28,5	1,32	7 500	5 300	5,50	**2218 K**	**H 318**
	190	43	117	44	1,93	6 700	4 500	6,90	**1318 K**	**H 318**
	190	64	153	57	2,50	6 300	4 500	9,80	**2318 KM**	**H 2318**
85	170	32	63,7	27	1,20	8 000	5 000	4,25	**1219 K**	**H 219**
	170	43	83,2	34,5	1,53	7 000	5 000	5,30	**2219 KM**	**H 319**
	200	45	133	51	2,16	6 300	4 300	7,90	**1319 K**	**H 319**

▸ Bearings and sleeves also available as KAM self-aligning ball bearing kits (→ **page 468**)

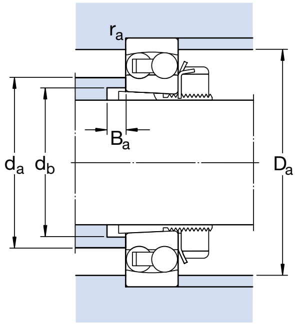


Dimensions						Abutment and fillet dimensions					Calculation factors			
d_1	d_3	D_1 ~	B_1	B_2	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm						mm					–			
50	75	88,4	37	12,5	1,5	70	60	91	7	1,5	0,19	3,3	5,1	3,6
	75	89,5	45	12,5	1,5	67	60	91	11	1,5	0,23	2,7	4,2	2,8
	75	88,5	45	12,5	1,5	65	60	91	11	1,5	0,19	3,3	5,1	3,6
	75	104	45	12,5	2	77	60	109	7	2	0,23	2,7	4,2	2,8
	75	103	59	12,5	2	72	61	109	7	2	0,40	1,6	2,4	1,6
55	80	97,6	38	13	1,5	78	64	101	7	1,5	0,19	3,3	5,1	3,6
	80	98,6	47	13	1,5	74	65	101	9	1,5	0,24	2,6	4,1	2,8
	80	118	47	13	2,1	87	65	118	7	2	0,22	2,9	4,5	2,8
	80	112	62	13	2,1	76	66	118	7	2	0,33	1,9	3	2
60	85	106	40	14	1,5	85	70	111	7	1,5	0,18	3,5	5,4	3,6
	85	107	50	14	1,5	80	70	111	9	1,5	0,24	2,6	4,1	2,8
	85	106	50	14	1,5	79	70	111	7	1,5	0,18	3,5	5,4	3,6
	85	127	50	14	2,1	89	70	128	7	2	0,22	2,9	4,5	2,8
	85	122	65	14	2,1	85	72	128	7	2	0,37	1,7	2,6	1,8
65	98	116	43	15	1,5	93	80	121	7	1,5	0,17	3,7	5,7	4
	98	118	55	15	1,5	93	80	121	13	1,5	0,22	2,9	4,5	2,8
	98	138	55	15	2,1	104	80	148	7	2	0,22	2,9	4,5	2,8
	98	139	73	15	2,1	97	82	148	7	2	0,37	1,7	2,6	1,8
70	105	125	46	17	2	101	85	129	7	2	0,16	3,9	6,1	4
	105	127	59	17	2	99	85	129	13	2	0,22	2,9	4,5	2,8
	105	147	59	17	2,1	109	85	158	7	2	0,22	2,9	4,5	2,8
	105	148	78	17	2,1	104	88	158	7	2	0,37	1,7	2,6	1,8
75	110	134	50	18	2	107	90	139	8	2	0,17	3,7	5,7	4
	110	133	63	18	2	105	91	139	13	2	0,25	2,5	3,9	2,5
	110	155	63	18	3	117	91	166	8	2,5	0,22	2,9	4,5	2,8
	110	157	82	18	3	111	94	166	8	2,5	0,37	1,7	2,6	1,8
80	120	142	52	18	2	112	95	149	8	2	0,17	3,7	5,7	4
	120	142	65	18	2	112	96	149	11	2	0,27	2,3	3,6	2,5
	120	165	65	18	3	122	96	176	8	2,5	0,22	2,9	4,5	2,8
	120	164	86	18	3	115	100	176	8	2,5	0,37	1,7	2,6	1,8
85	125	151	55	19	2,1	120	100	158	8	2	0,17	3,7	5,7	4
	125	151	68	19	2,1	118	102	158	10	2	0,27	2,3	3,6	2,5
	125	174	68	19	3	127	102	186	8	2,5	0,23	2,7	4,2	2,8

Self-aligning ball bearings on adapter sleeve
d_1 **90 – 110** mm



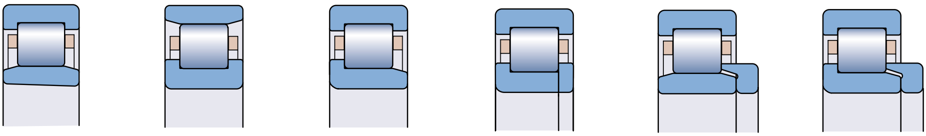
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
90	180	34	68,9	30	1,29	7 500	4 800	5,00	**1220 K**	**H 220**
	180	46	97,5	40,5	1,76	6 700	4 800	6,40	**2220 KM**	**H 320**
	215	47	143	57	2,36	6 000	4 000	9,65	**1320 K**	**H 320**
	215	73	190	80	3,25	5 600	4 000	14,0	**2320 KM**	**H 2320**
100	200	38	88,4	39	1,60	6 700	4 300	6,80	**1222 K**	**H 222**
	200	53	124	52	2,12	6 000	4 300	8,85	**2222 KM**	**H 322**
	240	50	163	72	2,75	5 300	3 600	13,5	**1322 KM**	**H 322**
110	215	42	119	53	2,12	6 300	4 000	8,30	**1224 KM**	**H 3024**

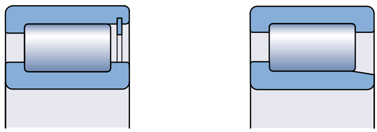


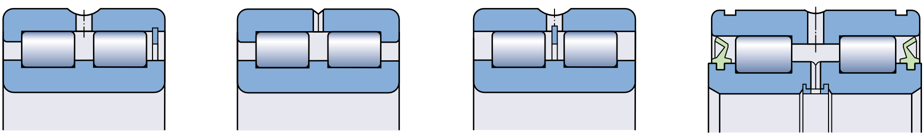
Dimensions						Abutment and fillet dimensions					Calculation factors			
d_1	d_3	D_1 ~	B_1	B_2	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm						mm					–			
90	130	159	58	20	2,1	127	106	168	8	2	0,17	3,7	5,7	4
	130	160	71	20	2,1	124	108	168	9	2	0,27	2,3	3,6	2,5
	130	185	71	20	3	136	108	201	8	2,5	0,23	2,7	4,2	2,8
	130	186	97	20	3	130	110	201	8	2,5	0,37	1,7	2,6	1,8
100	145	176	63	21	2,1	140	116	188	8	2	0,17	3,7	5,7	4
	145	177	77	21	2,1	137	118	188	8	2	0,28	2,2	3,5	2,5
	145	206	77	21	3	154	118	226	10	2,5	0,22	2,9	4,5	2,8
110	145	190	72	22	2,1	150	127	203	12	2	0,19	3,3	5,1	3,6


SKF

Cylindrical roller bearings







SKF produces cylindrical roller bearings in many designs, dimension series and sizes. The majority are single row bearings with a cage, shown in this catalogue. Single and double row full complement bearings (without cage) complete the SKF standard assortment for general engineering. Bearings with a cage can accommodate heavy radial loads and operate at high speeds. Full complement bearings are suitable for very heavy radial loads at moderate speeds.

For SKF cylindrical roller bearings the rollers are a key component. Their geometry, the so-called logarithmic profile, provides an optimum stress distribution in the contact zones in the bearing. Their surface finish maximizes lubricant film formation and optimizes rolling motion of the rollers. The benefits derived from this compared with traditional designs include enhanced operational reliability and a greater insensitivity to misalignment.

In addition to the standard assortment the comprehensive SKF range of cylindrical roller bearings consists of:

- single row high-precision all-steel or hybrid cylindrical roller bearings (➔ **fig** 1),
- double row high-precision all-steel or hybrid cylindrical roller bearings (➔ **fig** 2),
- cylindrical roller bearings and bearing units for railway axleboxes (➔ **fig** 3),
- single row cylindrical roller bearings for traction motors for railway applications,
- open and sealed multi-row cylindrical roller bearings for rolling mills (➔ **fig** 4),
- backing bearings for cold rolling mills of the cluster type (➔ **fig** 5),
- indexing roller units for continuous furnaces (➔ **fig** 6).

Details of these bearings will be found in the "SKF Interactive Engineering Catalogue" available on CD-ROM or online at www.skf.com.

Fig 1

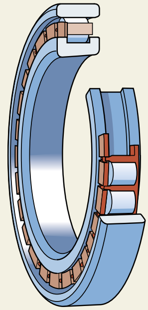


Fig 2

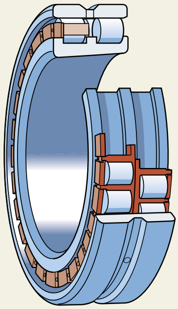


Fig 3

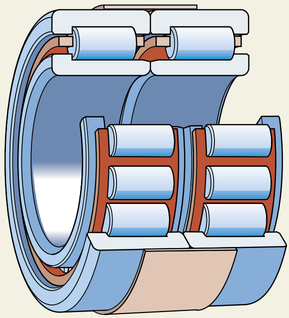


Fig 4

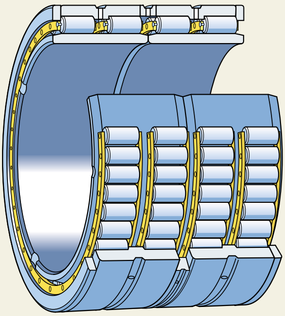


Fig 5

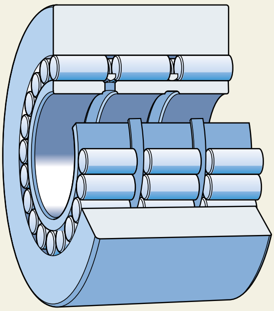
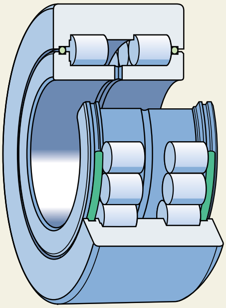


Fig 6



Other cylindrical roller bearings for special applications include a special electrical insulated coating, called INSOCOAT®. Details of these bearings will be found in this catalogue in the section “Engineering products”, starting on **page 889**.


SKF

Single row cylindrical roller bearings

Designs

Standard designs

In a single row cylindrical roller bearing (➔ **fig** 1) the rollers are always guided between the integral "open flanges" on one of the rings. These "open flanges" combined with the specially designed and surface finished roller ends, provide improved lubrication, reduced friction and consequently lower operating temperature.

The ring with the integral flanges together with the cylindrical roller and cage assembly can be separated from the other ring. This results in easy mounting and dismounting, particularly where the load conditions are such that interference fits are required for both rings.

SKF single row cylindrical roller bearings can accommodate heavy radial loads and high speeds. They are manufactured in several different designs, the main difference being in the configuration of the flanges. The most popular designs (➔ **fig** 2) are described below and listed in the product table starting on **page 516**.

NU design
The outer ring of an NU-design bearing has two integral flanges while the inner ring has no flanges (**a**). Axial displacement of the shaft with respect to the housing can be accommodated in both directions.

N design
The inner ring of an N-design bearing has two integral flanges while the outer ring has no flanges (**b**). Axial displacement of the shaft with respect to the housing can be accommodated in both directions.

NJ design
The outer ring of an NJ-design bearing has two integral flanges and the inner ring has one integral flange (**c**). These bearings can therefore locate the shaft axially in one direction.

NUP design
The outer ring of an NUP-design bearing has two integral flanges and the inner ring has one integral flange and one non-integral flange in the form of a loose flange ring (**d**). These bearings can be used as locating bearings to locate the shaft axially in both directions.

Fig 1

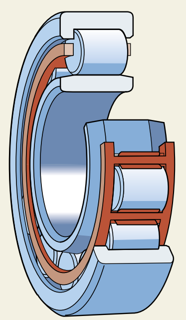
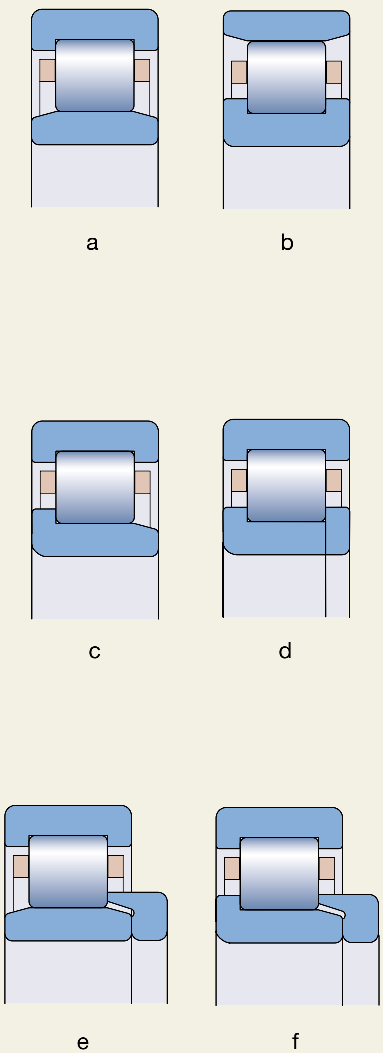


Fig 2



Angle rings

Angle rings, series designation HJ, are designed to stabilize NU- and NJ-type cylindrical roller bearings in the axial direction (➔ **fig 2** **e** and **f**). They are used in high load applications instead of an NUP-type bearing because the full width inner ring of the NU- or NJ-type bearing provides a more stable seat than the shorter inner ring and loose flange of an NUP-type bearing. Also, angle rings very often simplify mounting and dismounting.

SKF angle rings, manufactured from carbon chromium steel are hardened and ground. The maximum allowable side face runout conforms to the Normal tolerance class for radial bearings (➔ **table 3** on **page 125**). The HJ angle rings, where available, are listed in the product table with their designation and dimensions together with the relevant bearing.

NU + HJ execution

NU-design bearings combined with an HJ angle ring (**e**) can be used to locate the shaft axially in one direction.

NJ + HJ execution

NJ-design bearings combined with an HJ angle ring (**f**) can also be used as locating bearings to provide axial shaft location in both directions.

Special designs

The SKF programme also includes a selection of NU-design cylindrical roller bearings without an inner ring (➔ **fig** 3) – designation prefix RNU – and N-design bearings without an outer ring (➔ **fig** 4) – designation prefix RN. These bearings provide a solution for applications where hardened and ground raceways are provided on the shaft or in the housing bore (➔ section "Raceways on shafts and in housings" on **page 198**). Because RNU bearings, for example, do not need an inner ring, the shaft diameter can be larger to provide a stronger, stiffer arrangement. Additionally, the possible axial displacement of the shaft relative to the housing is only limited by the width of the raceway on the shaft.

Other single row cylindrical roller bearings included in the SKF programme are bearings with flange configurations that differ from the standard bearing designs (➔ **fig** 5) and drawing number bearings with non-standard dimensions. Details of these bearings will be found in the "SKF Interactive Engineering Catalogue" available on CD-ROM or online at www.skf.com.

Fig 3

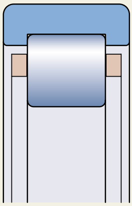


Fig 4

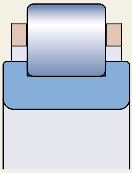
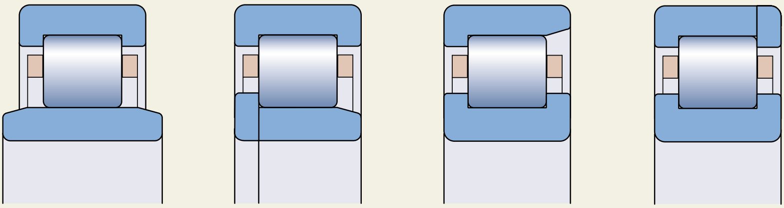


Fig 5



Bearings with a tapered bore

SKF single row cylindrical roller bearings are generally produced with a cylindrical bore. However, some bearings with a tapered bore 1:12 can be supplied (➔ **fig** 6). Bearings with a tapered bore have a somewhat larger radial internal clearance than corresponding bearings with a cylindrical bore and are identified by the designation suffix K. Contact SKF for availability.

Bearings with a snap ring groove

Some single row cylindrical roller bearings are also produced with a snap ring groove in the outer ring (➔ **fig** 7). These bearings are identified by the designation suffix N. Because they can be located axially in the housing bore by a retaining or snap ring, the arrangement design can be simplified and made more compact. Contact SKF for availability before ordering.

The dimensions of the snap ring groove and of the chamfer adjacent to the groove are in accordance with ISO 464:1995, which also specifies suitable snap ring dimensions.

Bearings with locating slots

In some applications where it is essential that mounting and dismounting can be done easily, outer rings have to be mounted with clearance fits in the housing. To restrain the outer ring from turning in the circumferential direction, some single row cylindrical roller bearings are also produced with

- one locating slot, designation suffix N1, or
- two locating slots positioned at 180° to each other, designation suffix N2,

in one outer ring side face (➔ **fig** 8). Please contact SKF for availability before ordering.

The dimensions of the locating slots are in accordance with DIN 5412-1:2000.

Fig 6

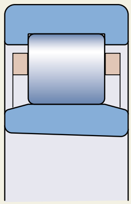


Fig 7

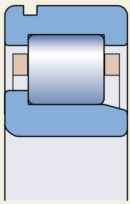
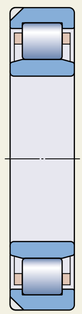


Fig 8



SKF Explorer class bearings

Cylindrical roller bearings in the SKF Explorer performance class are shown with an asterisk in the product table. SKF Explorer bearings retain the designation of earlier standard bearings, e.g. NU 216 ECP. However, each bearing and its box are marked with the name “EXPLORER”, to avoid confusion.

Bearing data – general

Dimensions
The dimensions of SKF single row cylindrical roller bearings are in accordance with ISO 15:1998.

The dimensions of the HJ angle rings correspond to those specified in ISO 246: 1995.

Tolerances
SKF single row cylindrical roller bearings are manufactured to Normal tolerances for dimensional accuracy and to P6 tolerances for running accuracy as standard.

The tolerances are in accordance with ISO 492: 2002 and can be found in **tables** 3 and 4 on **pages 125** and **126**.

Radial internal clearance
SKF single row cylindrical roller bearings are manufactured with Normal radial internal clearance as standard and most of the bearings are also available with C3 radial internal clearance. Some of the bearings can even be supplied with the smaller C2 or the appreciably greater C4 clearance. In addition some bearings are produced with special reduced clearances. This special clearance corresponds to a section of a standard clearance range or to sections of two adjacent clearance ranges.

Bearings with non-standard clearance or with the special reduced clearances can be supplied to special order.

The actual clearance limits for bearings with a cylindrical bore are provided in **table** 1 and are in accordance with ISO 5753: 1991. They are valid for unmounted bearings under zero measuring load.

The separable components of all SKF bearings with standard clearance as well as those with reduced clearance are interchangeable.

Axial internal clearance
NUP-design cylindrical roller bearings, which can locate a shaft axially in both directions, are manufactured with an axial internal clearance as shown in **table** 2. The axial internal clearance of NJ-design bearings when combined with an HJ angle ring is specified in **table** 3.

The clearance limits quoted in **tables** 2 and 3 should be considered as guideline values. When axial internal clearance is measured, the rollers may tilt, causing an enlargement of the axial clearance, which may be as much as

- the radial internal clearance of bearings in the 2, 3 and 4 series or
- 2/3 of the radial internal clearance for bearings in the 22 and 23 series, for example.

Misalignment
The ability of single row cylindrical roller bearings to accommodate angular misalignment of the inner ring with respect to the outer ring is limited to a few minutes of arc. The actual values are

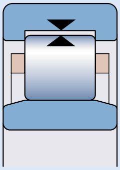
- 4 minutes of arc for bearings in the 10, 12, 2, 3 and 4 series, and
- 3 minutes of arc for bearings in the 20, 22 and 23 series.

These guideline values apply to non-locating bearings, provided the positions of the shaft and housing axes remain constant. Larger misalignments may be possible but may result in shorter bearing service life. In such cases, it is advisable to contact the SKF application engineering service.

When the bearings are used to locate the shaft axially, guideline values must be reduced, as uneven flange loading can lead to increased wear and possibly even to flange fracture.

The maximum values for misalignment do not apply to bearings of the NUP design or bearings of the NJ design with an HJ angle ring. Because these bearings have two inner

Radial internal clearance of cylindrical roller bearings with cylindrical bore

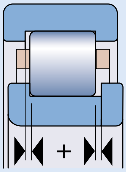


Bore diameter d		Radial internal clearance C2		Normal		C3		C4		C5	
over	incl.	min	max	min	max	min	max	min	max	min	max
mm		µm									
–	**24**	0	25	20	45	35	60	50	75	65	90
24	**30**	0	25	20	45	35	60	50	75	70	95
30	**40**	5	30	25	50	45	70	60	85	80	105
40	**50**	5	35	30	60	50	80	70	100	95	125
50	**65**	10	40	40	70	60	90	80	110	110	140
65	**80**	10	45	40	75	65	100	90	125	130	165
80	**100**	15	50	50	85	75	110	105	140	155	190
100	**120**	15	55	50	90	85	125	125	165	180	220
120	**140**	15	60	60	105	100	145	145	190	200	245
140	**160**	20	70	70	120	115	165	165	215	225	275
160	**180**	25	75	75	125	120	170	170	220	250	300
180	**200**	35	90	90	145	140	195	195	250	275	330
200	**225**	45	105	105	165	160	220	220	280	305	365
225	**250**	45	110	110	175	170	235	235	300	330	395
250	**280**	55	125	125	195	190	260	260	330	370	440
280	**315**	55	130	130	205	200	275	275	350	410	485
315	**355**	65	145	145	225	225	305	305	385	455	535
355	**400**	100	190	190	280	280	370	370	460	510	600
400	**450**	110	210	210	310	310	410	410	510	565	665
450	**500**	110	220	220	330	330	440	440	550	625	735
500	**560**	120	240	240	360	360	480	480	600	690	810
560	**630**	140	260	260	380	380	500	500	620	780	900
630	**710**	145	285	285	425	425	565	565	705	865	1 005
710	**800**	150	310	310	470	470	630	630	790	975	1 135
800	**900**	180	350	350	520	520	690	690	860	1 095	1 265

Please refer to **page 137** for definition of radial internal clearance

Table 2

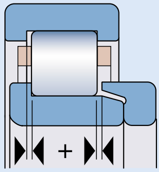
Axial internal clearance of NUP cylindrical roller bearings



Bearing Bore diameter	Size code	Axial internal clearance of bearings of series NUP 2 min	max	NUP 3 min	max	NUP 22 min	max	NUP 23 min	max
mm	–	µm							
15	**02**	–	–	–	–	–	–	–	–
17	**03**	37	140	37	140	37	140	47	155
20	**04**	37	140	37	140	47	155	47	155
25	**05**	37	140	47	155	47	155	47	155
30	**06**	37	140	47	155	47	155	47	155
35	**07**	47	155	47	155	47	155	62	180
40	**08**	47	155	47	155	47	155	62	180
45	**09**	47	155	47	155	47	155	62	180
50	**10**	47	155	47	155	47	155	62	180
55	**11**	47	155	62	180	47	155	62	180
60	**12**	47	155	62	180	62	180	87	230
65	**13**	47	155	62	180	62	180	87	230
70	**14**	47	155	62	180	62	180	87	230
75	**15**	47	155	62	180	62	180	87	230
80	**16**	47	155	62	180	62	180	87	230
85	**17**	62	180	62	180	62	180	87	230
90	**18**	62	180	62	180	62	180	87	230
95	**19**	62	180	62	180	62	180	87	230
100	**20**	62	180	87	230	87	230	120	315
105	**21**	62	180	–	–	–	–	–	–
110	**22**	62	180	87	230	87	230	120	315
120	**24**	62	180	87	230	87	230	120	315
130	**26**	62	180	87	230	87	230	120	315
140	**28**	62	180	87	230	87	230	120	315
150	**30**	62	180	–	–	87	230	120	315
160	**32**	87	230	–	–	–	–	–	–
170	**34**	87	230	–	–	–	–	–	–
180	**36**	87	230	–	–	–	–	–	–
190	**38**	87	230	–	–	–	–	–	–
200	**40**	87	230	–	–	–	–	–	–
220	**44**	95	230	–	–	–	–	–	–
240	**48**	95	250	–	–	–	–	–	–
260	**52**	95	250	–	–	–	–	–	–

Table 3

Axial internal clearance of NJ + HJ cylindrical roller bearings



Bearing Bore diameter	Size code	Axial internal clearance for bearings of series NJ 2+HJ 2 min	max	NJ 3+HJ 3 min	max	NJ 4+HJ 4 min	max	NJ 22+HJ 22 min	max	NJ 23+HJ 23 min	max
mm	–	µm									
15	**02**	42	165	42	165	–	–	–	–	–	–
17	**03**	42	165	42	165	–	–	42	165	52	183
20	**04**	42	165	42	165	–	–	52	185	52	183
25	**05**	42	165	52	185	–	–	52	185	52	183
30	**06**	42	165	52	185	60	200	52	185	52	183
35	**07**	52	185	52	185	60	200	52	185	72	215
40	**08**	52	185	52	185	60	200	52	185	72	215
45	**09**	52	185	52	185	60	200	52	185	72	215
50	**10**	52	185	52	185	80	235	52	185	72	215
55	**11**	52	185	72	215	80	235	52	185	72	215
60	**12**	52	185	72	215	80	235	72	215	102	275
65	**13**	52	185	72	215	80	235	72	215	102	275
70	**14**	52	185	72	215	80	235	72	215	102	275
75	**15**	52	185	72	215	80	235	72	215	102	275
80	**16**	52	185	72	215	80	235	72	215	102	275
85	**17**	72	215	72	215	110	290	72	215	102	275
90	**18**	72	215	72	215	110	290	72	215	102	275
95	**19**	72	215	72	215	110	290	72	215	102	275
100	**20**	72	215	102	275	110	290	102	275	140	375
105	**21**	72	215	102	275	110	290	102	275	140	375
110	**22**	72	215	102	275	110	290	102	275	140	375
120	**24**	72	215	102	275	110	310	102	275	140	375
130	**26**	72	215	102	275	110	310	102	275	140	375
140	**28**	72	215	102	275	140	385	102	275	140	375
150	**30**	72	215	102	275	140	385	102	275	140	375
160	**32**	102	275	102	275	–	–	140	375	140	375
170	**34**	102	275	–	–	–	–	140	375	–	–
180	**36**	102	275	–	–	–	–	140	375	–	–
190	**38**	102	275	–	–	–	–	–	–	–	–
200	**40**	102	275	–	–	–	–	–	–	–	–
220	**44**	110	290	–	–	–	–	–	–	–	–
240	**48**	110	310	–	–	–	–	–	–	–	–
260	**52**	110	310	–	–	–	–	–	–	–	–
280	**56**	110	310	–	–	–	–	–	–	–	–

and two outer ring flanges and the axial internal clearance is relatively small, axial stresses may be induced in the bearing. In case of doubt, it is advisable to contact the SKF application engineering service.

Axial displacement
Cylindrical roller bearings with flangeless inner or outer rings, NU and N designs, and NJ-design bearings with one integral flange at the inner ring can accommodate axial displacement of the shaft with respect to the housing as a result of thermal expansion within certain limits (➔ **fig** 9). As the axial displacement takes place within the bearing and not between the ring and shaft or housing bore, there is practically no increase in friction as the bearing rotates. Values for the permissible axial displacement s from the normal position of one bearing ring relative to the other are given in the product table.

Influence of operating temperature on bearing material
SKF cylindrical roller bearings undergo a special heat treatment. When equipped with a steel or brass cage, they can operate at temperatures of up to +150 °C.

Cages
Depending on size and design, SKF single row cylindrical roller bearings are equipped as standard with one of the cages described below and shown in **fig** 10. Bearings included in the SKF standard programme are also available with a choice of up to four different cages (➔ product table).

The various cages used for single row cylindrical roller bearings are

- moulded glass fibre reinforced polyamide 6,6 cage, roller centred, designation suffix P (**a**),
- unhardened pressed steel cage, roller centred, designation suffix J (**b**),
- one-piece window-type brass cage, inner or outer ring centred, designation suffixes ML and MP (**c**),
- two-piece machined brass cage, roller centred, designation suffix MA, or outer ring centred, designation suffix MA, or inner ring centred, designation suffix MB (**d**).

Fig 9

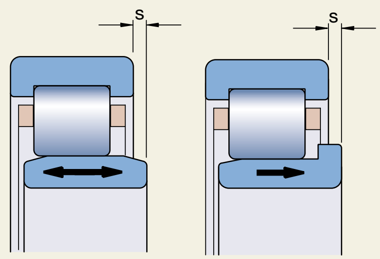
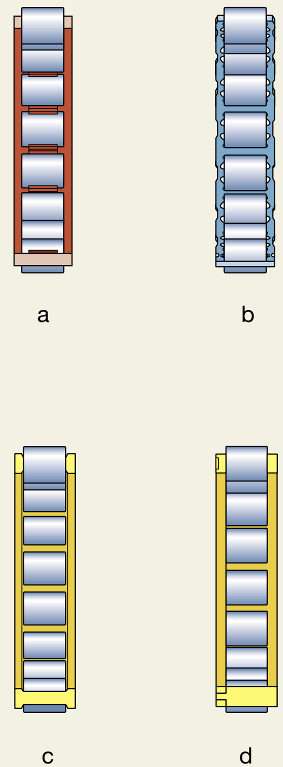


Fig 10



Note:
Single row cylindrical roller bearings with a polyamide cage can be operated at operating temperatures up to +120 °C. The lubricants generally used for rolling bearings do not have a detrimental effect on cage properties, with the exception for a few synthetic oils and greases with synthetic base oil as well as some 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 difficult conditions, the use of bearings with metallic cages is recommended. For applications in equipment using refrigerants such as ammonia or freon replacements, bearings with a polyamide cage can be used for operating temperatures up to 70 °C. At higher operating temperatures bearings incorporating a machined brass or steel cage should 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**.

Speed ratings

The limiting speeds are determined by certain criteria that include the form stability and the strength of cage as mentioned in section "Limiting speeds". The values listed in the product table are valid for the standard cage. To facilitate the estimation of the limiting speed for bearings with an alternative cage or vice-versa, **table 4** provides the appropriate conversion factors.

Table 4

Conversion factors for limiting speeds

Bearing with standard cage	**alternative standard cage** P, J, M, MR	MA, MB	ML, MP
P, J, M, MR	1	1,3	1,5
MA, MB	0,75	1	1,2
ML, MP	0,65	0,85	1

Minimum load

In order to provide satisfactory operation, single row cylindrical roller 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.

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

$$F_{rm} = k_r \left(6 + \frac{4\,n}{n_r}\right) \left(\frac{d_m}{100}\right)^2$$

where
F_{rm} = minimum radial load, kN
k_r = minimum load factor (➔ product table)
n = rotational speed, r/min
n_r = reference speed (➔ product table), r/min
d_m = bearing mean diameter = 0,5 (d + D), mm

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 single row cylindrical roller bearing must be subjected to an additional radial load.

Dynamic axial load carrying capacity
Bearings with flanges on both inner and outer rings can support axial loads in addition to radial loads. Their axial load carrying capacity is primarily determined by the ability of the sliding surfaces of the roller end/flange contact to support loads. Factors having the greatest effect on this ability are the lubrication, operating temperature and heat dissipation from the bearing.

Assuming the conditions cited below, the permissible axial load can be calculated with sufficient accuracy from

$$F_{ap} = \frac{k_1\, C_0\, 10^4}{n\,(d + D)} - k_2\, F_r$$

where
F_{ap} = maximum permissible axial load, kN
C_0 = basic static load rating, kN
F_r = actual radial bearing load, kN
n = rotational speed, r/min
d = bearing bore diameter, mm
D = bearing outside diameter, mm
k_1 = a factor
1,5 for oil lubrication
1 for grease lubrication
k_2 = a factor
0,15 for oil lubrication
0,1 for grease lubrication

The above equation is based on conditions that are considered typical for normal bearing operation:

- a difference of 60 °C between the bearing operating temperature and the ambient temperature;
- a specific heat loss from the bearing of 0,5 mW/mm^2 °C; with reference to the bearing outside diameter surface (π D B);
- a viscosity ratio $\kappa = 2$.

For grease lubrication the base oil viscosity of the grease may be used. If κ is less than 2, the friction will increase and there will be more wear. These effects can be reduced at low speeds, for example, by using oils with anti-wear and appropriate EP additives.

Where bearings are grease lubricated and axial loads act for longer periods, it is advisable to use grease that has good oil bleeding properties at the operating temperatures (> 3 % according to DIN 51 817). Frequent relubrication is also recommended.

The values of the permissible load F_{ap} obtained from the equation are valid for a continuously acting constant axial load and adequate lubricant supply to the roller end/flange contacts. Where axial loads act only for short periods, the values may be multiplied by 2, or for axially acting shock loads by 3.

To avoid any risk of flange breakage, the constantly acting axial load F_a applied to the bearing should never exceed the numerical value of

- 0,0045 $D^{1,5}$ for bearings of series 2, and
- 0,0023 $D^{1,7}$ for bearings of other series.

Where the axial load acts only occasionally and for brief periods, F_a should never be greater than the numerical value of

- 0,013 $D^{1,5}$ for bearings of series 2, and
- 0,007 $D^{1,7}$ for bearings of other series.

where
F_a = the constantly or occasionally acting axial load, kN
D = bearing outside diameter, mm

To obtain an even flange load and sufficient running accuracy of the shaft when cylindrical roller bearings are subjected to heavy axial loads, the axial runout and the size of the abutment surfaces of the adjacent components should be given particular attention. For the axial runout see the recommendations provided in the section “Dimensional, form and running accuracy of bearing seatings and abutments” on **page 194**. As to the diameter of the abutment surfaces, SKF recommends supporting the inner ring at a height corresponding to half of the flange height (➔ **fig** 11). For the inner ring flange, for example, the abutment diameter can be obtained using

$d_{as} = 0,5\ (d_1 + F)$

where

d_{as} = shaft abutment diameter, mm

d_1 = inner ring flange diameter, mm

F = inner ring raceway diameter, mm

Where the misalignment between the inner and outer rings exceeds 1 minute of arc, the action of the load on the flange changes considerably. The safety factors included in the guideline values may be inadequate. In these cases, please contact the SKF application engineering service.

Equivalent dynamic bearing load

When dynamically loaded cylindrical roller bearings are used as non-locating bearings

$P = F_r$

If bearings with flanges on both inner and outer rings are used to locate a shaft in one or both directions, the equivalent dynamic bearing load should be calculated using

$P = F_r$ when $F_a/F_r \leq e$

$P = 0,92F_r + YF_a$ when $F_a/F_r > e$

where

e = limiting value

= 0,2 for bearings in the 10, 2, 3 and 4 series

= 0,3 for bearings in other series

Y = axial load factor

= 0,6 for bearings in the 10, 2, 3 and 4 series

= 0,4 for bearings in other series

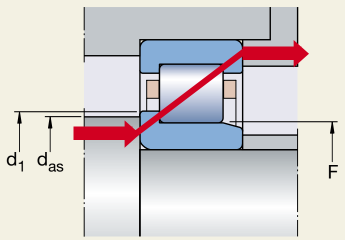
Since axially loaded cylindrical roller bearings only operate satisfactorily when they are subjected to a simultaneously acting radial load, the ratio F_a/F_r should not exceed 0,5.

Equivalent static bearing load

For statically loaded cylindrical roller bearings

$P_0 = F_r$

Fig 11



Supplementary designations

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

CN Normal radial internal clearance; generally only appears in connection with one of the following letters for reduced or displaced clearance range
- **H** Reduced clearance range corresponding to the upper half of the actual range
- **L** Reduced clearance range corresponding to the lower half of the actual range
- **R** Reduced clearance range corresponding to “paired rings” specified in ISO 5753:1981.

The above letters are also used together with the clearance class suffixes C2, C3 and C4

C2 Radial internal clearance smaller than Normal

C3 Radial internal clearance greater than Normal

C4 Radial internal clearance greater than C3

C5 Radial internal clearance greater than C4

EC Optimised internal design incorporating more and/or larger rollers and with modified roller end/flange contact

HA3 Inner ring of case-hardening steel

HB1 Bainite hardened inner and outer ring

HN1 Inner and outer ring with special surface heat treatment

J Pressed steel cage, roller centred, unhardened

K Tapered bore, taper 1:12

M Two-piece machined brass cage, roller centred

MA Two-piece machined brass cage, outer ring centred

MB Two-piece machined brass cage, inner ring centred

ML One-piece form-turned window-type brass cage, inner or outer ring centred

MP One-piece window-type brass cage with milled, reamed or broached pockets, inner or outer ring centred

MR One-piece form-turned window-type brass cage, roller centred

N Snap ring groove in the outer ring outside diameter

NR Snap ring groove in the outer ring, with snap ring

N1 One locating slot in one outer ring side face

N2 Two locating slots at 180 ° to each other in one outer ring side face

P Injection moulded cage of glass fibre reinforced polyamide 6,6, roller centred

PH Injection moulded PEEK cage, roller centred

PHA Injection moulded PEEK cage, outer ring centred

S1 Rings dimensionally stabilised for operating temperatures up to +200 °C

S2 Rings dimensionally stabilised for operating temperatures up to +250 °C

VA301 Bearing for railway vehicle traction motors

VA305 VA301 + special inspection routines

VA3091 VA301 + VL0241

VA350 Bearing for railway axleboxes

VA820 Bearing for railway axleboxes according to EN 12080:1998, class 1

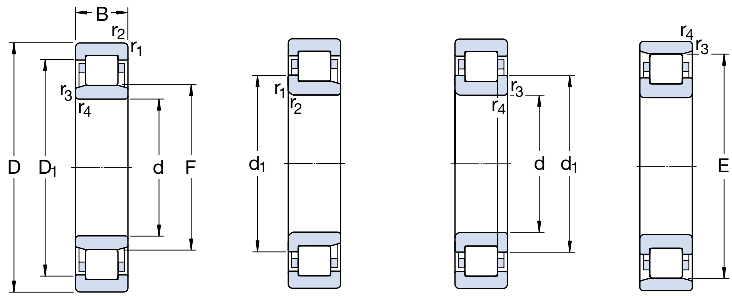
VC025 Bearing with specially wear-resistant raceways for applications in heavily contaminated environments

VL0241 Aluminium-oxide coated outside surface of the outer ring for electrical resistance up to 1 000 V DC

VL2071 Aluminium-oxide coated outside surface of the inner ring for electrical resistance up to 1 000 V DC

VQ015 Inner ring with crowned raceway for increased permissible misalignment

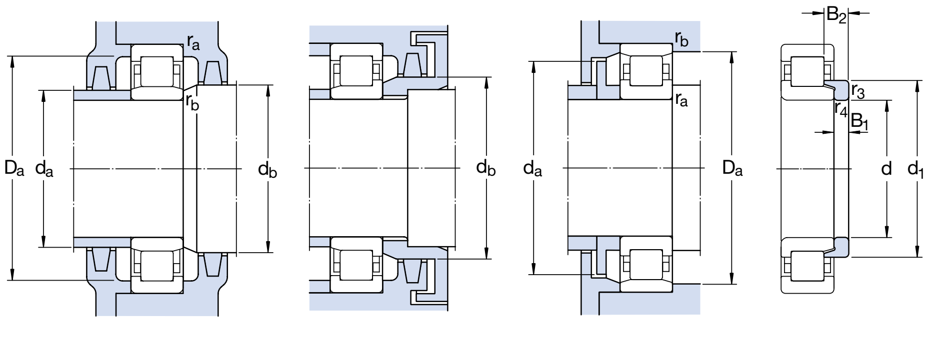
Single row cylindrical roller bearings
d **15–25** mm



NU NJ NUP N

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing with standard cage	Bearing with standard cage	Alternative standard cage designs[1)]
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
15	35	11	12,5	10,2	1,22	22 000	26 000	0,047	**NU 202 ECP**	**–**
	35	11	12,5	10,2	1,22	22 000	26 000	0,049	**NJ 202 ECP**	**–**
17	40	12	17,2	14,3	1,73	19 000	22 000	0,068	**NU 203 ECP**	**ML**
	40	12	17,2	14,3	1,73	19 000	22 000	0,070	**NJ 203 ECP**	**ML**
	40	12	17,2	14,3	1,73	19 000	22 000	0,073	**NUP 203 ECP**	**ML**
	40	12	17,2	14,3	1,73	19 000	22 000	0,066	**N 203 ECP**	
	40	16	23,8	21,6	2,65	19 000	22 000	0,092	**NU 2203 ECP**	**–**
	40	16	23,8	21,6	2,65	19 000	22 000	0,095	**NJ 2203 ECP**	**–**
	40	16	23,8	21,6	2,65	19 000	22 000	0,097	**NUP 2203 ECP**	**–**
	47	14	24,6	20,4	2,55	15 000	20 000	0,12	**NU 303 ECP**	**–**
	47	14	24,6	20,4	2,55	15 000	20 000	0,12	**NJ 303 ECP**	**–**
	47	14	24,6	20,4	2,55	15 000	20 000	0,12	**N 303 ECP**	**–**
20	47	14	25,1	25,2	2,75	16 000	19 000	0,11	**NU 204 ECP**	**ML**
	47	14	25,1	25,2	2,75	16 000	19 000	0,11	**NJ 204 ECP**	**ML**
	47	14	25,1	25,2	2,75	16 000	19 000	0,12	**NUP 204 ECP**	**ML**
	47	14	25,1	25,2	2,75	16 000	19 000	0,11	**N 204 ECP**	**–**
	47	18	29,7	27,5	3,45	16 000	19 000	0,14	**NU 2204 ECP**	**–**
	47	18	29,7	27,5	3,45	16 000	19 000	0,14	**NJ 2204 ECP**	**–**
	52	15	35,5	26	3,25	15 000	18 000	0,17	⋆ **NU 304 ECP**	**–**
	52	15	35,5	26	3,25	15 000	18 000	0,17	⋆ **NJ 304 ECP**	**–**
	52	15	35,5	26	3,25	15 000	18 000	0,16	⋆ **NUP 304 ECP**	**–**
	52	15	35,5	26	3,25	15 000	18 000	0,15	⋆ **N 304 ECP**	**–**
	52	21	47,5	38	4,8	14 000	18 000	0,21	⋆ **NU 2304 ECP**	**–**
	52	21	47,5	38	4,8	14 000	18 000	0,22	⋆ **NJ 2304 ECP**	**–**
	52	21	47,5	38	4,8	14 000	18 000	0,22	⋆ **NUP 2304 ECP**	**–**
25	47	12	14,2	13,2	1,4	18 000	18 000	0,084	**NU 1005**	**–**
	52	15	28,6	27	3,35	14 000	16 000	0,14	**NU 205 ECP**	**J, ML**
	52	15	28,6	27	3,35	14 000	16 000	0,15	**NJ 205 ECP**	**J, ML**
	52	15	28,6	27	3,35	14 000	16 000	0,14	**NUP 205 ECP**	**ML**
	52	15	28,6	27	3,35	14 000	16 000	0,13	**N 205 ECP**	**–**

⋆ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 203 ECP becomes NU 203 ECML (for speed ratings ➔ **page 511**)

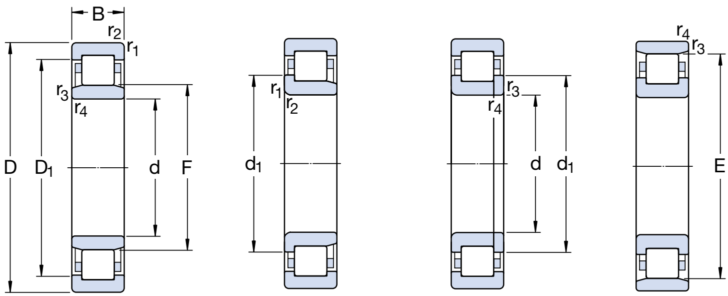


Angle ring

Dimensions							**Abutment and fillet dimensions**						**Calculation factor**	**Angle ring**			
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r	Designation	Mass	Dimensions B_1	B_2
mm							mm						–	–	kg	mm	
15	–	27,9	19,3	0,6	0,3	1	17,4	18	21	30,8	0,6	0,3	0,15	–			
	21,9	27,9	19,3	0,6	0,3	1	19,2	18	23	30,8	0,6	0,3	0,15	–			
17	–	32,4	22,1	0,6	0,3	1	19,4	21	24	35,8	0,6	0,3	0,15	–			
	25	32,4	22,1	0,6	0,3	1	21	21	27	35,8	0,6	0,3	0,15	–			
	25	32,4	22,1	0,6	0,3	–	21,2	–	27	35,8	0,6	0,3	0,15	–			
	25	–	35,1	0,6	0,3	1	21,2	33	37	37,6	0,6	0,3	0,15	–			
	–	32,4	22,1	0,6	0,3	1,5	19,4	21	24	35,8	0,6	0,3	0,20	–			
	25	32,4	22,1	0,6	0,3	1,5	21	21	27	35,8	0,6	0,3	0,20	–			
	25	32,4	22,1	0,6	0,3	–	21,2	–	27	35,8	0,6	0,3	0,20	–			
	–	37	24,2	1	0,6	1	21,2	23	26	41,4	1	0,6	0,15	–			
	27,7	37	24,2	1	0,6	1	22,6	23	29	41,4	1	0,6	0,15	–			
	27,7	–	40,2	1	0,6	1	22,6	38	42	42,8	1	0,6	0,15	–			
20	–	38,8	26,5	1	0,6	1	24,2	25	28	41,4	1	0,6	0,15	–			
	29,7	38,8	26,5	1	0,6	1	25	25	31	41,4	1	0,6	0,15	–			
	29,7	38,8	26,5	1	0,6	–	25,6	–	31	41,4	1	0,6	0,15	–			
	29,7	–	41,5	1	0,6	1	25,6	40	43	42,8	1	0,6	0,15	–			
	–	38,8	26,5	1	0,6	2	24,2	25	28	41,4	1	0,6	0,20	–			
	29,7	38,8	26,5	1	0,6	2	25	25	31	41,4	1	0,6	0,20	–			
	31,2	42,4	27,5	1,1	0,6	0,9	24,2	26	29	45	1	0,6	0,15	**HJ 304 EC**	0,017	4	6,5
	31,2	42,4	27,5	1,1	0,6	0,9	27	29	33	45	1	0,6	0,15	**HJ 304 EC**	0,017	4	6,5
	31,2	42,4	27,5	1,1	0,6	–	27	–	33	45	1	0,6	0,15	–			
	31,2	–	45,5	1,1	0,6	0,9	27	44	47	47,8	1	0,6	0,15	–			
	–	42,4	27,5	1,1	0,6	1,9	24,2	26	29	45	1	0,6	0,29	–			
	31,2	42,4	27,5	1,1	0,6	1,9	26	26	33	45	1	0,6	0,29	–			
	31,2	42,4	27,5	1,1	0,6	–	27	–	33	45	1	0,6	0,29	–			
25	–	38,8	30,5	0,6	0,3	2	27	29	32	43,8	0,6	0,3	0,1	–			
	34,7	43,8	31,5	1	0,6	1,3	29,2	30	33	46,4	1	0,6	0,15	**HJ 205 EC**	0,014	3	6
	34,7	43,8	31,5	1	0,6	1,3	30	30	36	46,4	1	0,6	0,15	**HJ 205 EC**	0,014	3	6
	34,7	43,8	31,5	1	0,6	–	30,6	–	36	46,4	1	0,6	0,15	–			
	34,7	–	46,5	1	0,6	1,3	30,6	45	48	47,8	1	0,6	0,15	–			

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

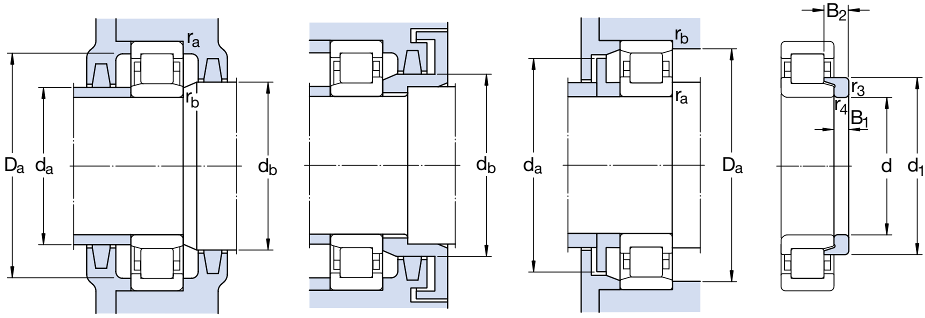
Single row cylindrical roller bearings
d **25 – 30** mm



NU NJ NUP N

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing with standard cage	Bearing with standard cage	Alternative standard cage designs[1)]
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
25	52	18	34,1	34	4,25	14 000	16 000	0,17	**NU 2205 ECP**	**ML**
cont.	52	18	34,1	34	4,25	14 000	16 000	0,18	**NJ 2205 ECP**	**ML**
	52	18	34,1	34	4,25	14 000	16 000	0,17	**NUP 2205 ECP**	**ML**
	62	17	46,5	36,5	4,55	12 000	15 000	0,28	⋆ **NU 305 ECP**	**J, ML**
	62	17	46,5	36,5	4,55	12 000	15 000	0,29	⋆ **NJ 305 ECP**	**J, ML**
	62	17	46,5	36,5	4,55	12 000	15 000	0,25	⋆ **NUP 305 ECP**	**J, ML**
	62	17	46,5	36,5	4,55	12 000	15 000	0,24	⋆ **N 305 ECP**	**–**
	62	24	64	55	6,95	12 000	15 000	0,38	⋆ **NU 2305 ECP**	**J, ML**
	62	24	64	55	6,95	12 000	15 000	0,39	⋆ **NJ 2305 ECP**	**ML**
	62	24	64	55	6,95	12 000	15 000	0,38	⋆ **NUP 2305 ECP**	**ML**
30	55	13	17,9	17,3	1,86	14 000	15 000	0,12	**NU 1006**	**–**
	62	16	44	36,5	4,55	13 000	14 000	0,23	⋆ **NU 206 ECP**	**J, ML**
	62	16	44	36,5	4,55	13 000	14 000	0,24	⋆ **NJ 206 ECP**	**J, ML**
	62	16	44	36,5	4,55	13 000	14 000	0,22	⋆ **NUP 206 ECP**	**ML**
	62	16	44	36,5	4,55	13 000	14 000	0,20	⋆ **N 206 ECP**	**–**
	62	20	55	49	6,1	13 000	14 000	0,26	⋆ **NU 2206 ECP**	**J, ML**
	62	20	55	49	6,1	13 000	14 000	0,27	⋆ **NJ 2206 ECP**	**J, ML**
	62	20	55	49	6,1	13 000	14 000	0,27	⋆ **NUP 2206 ECP**	**ML**
	72	19	58,5	48	6,2	11 000	12 000	0,40	⋆ **NU 306 ECP**	**J, M, ML**
	72	19	58,5	48	6,2	11 000	12 000	0,41	⋆ **NJ 306 ECP**	**J, M, ML**
	72	19	58,5	48	6,2	11 000	12 000	0,38	⋆ **NUP 306 ECP**	**J, M, ML**
	72	19	58,5	48	6,2	11 000	12 000	0,36	⋆ **N 306 ECP**	**–**
	72	27	83	75	9,65	11 000	12 000	0,53	⋆ **NU 2306 ECP**	**ML**
	72	27	83	75	9,65	11 000	12 000	0,54	⋆ **NJ 2306 ECP**	**ML**
	72	27	83	75	9,65	11 000	12 000	0,55	⋆ **NUP 2306 ECP**	**ML**
	90	23	60,5	53	6,8	9 000	11 000	0,75	**NU 406**	**–**
	90	23	60,5	53	6,8	9 000	11 000	0,77	**NJ 406**	**–**

⋆ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 2205 ECP becomes NU 2205 ECML (for speed ratings ➔ **page 511**)

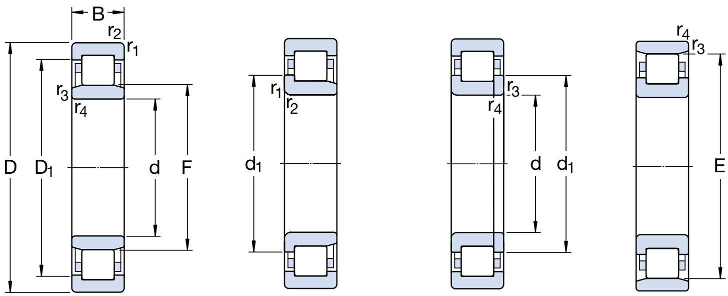


Angle ring

Dimensions							Abutment and fillet dimensions						Calculation factor	Angle ring Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
25	34,7	43,8	31,5	1	0,6	1,8	29,2	30	33	46,4	1	0,6	0,20	**HJ 2205 EC**	0,014	3	6,5
cont.	34,7	43,8	31,5	1	0,6	1,8	30	30	36	46,4	1	0,6	0,20	**HJ 2205 EC**	0,014	3	6,5
	34,7	43,8	31,5	1	0,6	–	30,6	–	36	46,4	1	0,6	0,20	**–**			
	38,1	50,7	34	1,1	1,1	1,3	32	32	36	55	1	1	0,15	**HJ 305 EC**	0,023	4	7
	38,1	50,7	34	1,1	1,1	1,3	32	32	40	55	1	1	0,15	**HJ 305 EC**	0,023	4	7
	38,1	50,7	34	1,1	1,1	–	32	–	40	55	1	1	0,15	**–**			
	38,1	–	54	1,1	1,1	1,3	32	52	56	55	1	1	0,15	**–**			
	38,1	50,7	34	1,1	1,1	2,3	32	32	36	55	1	1	0,25	**HJ 2305 EC**	0,025	4	8
	38,1	50,7	34	1,1	1,1	2,3	32	32	40	55	1	1	0,25	**HJ 2305 EC**	0,025	4	8
	38,1	50,7	34	1,1	1,1	–	32	–	40	55	1	1	0,25	**–**			
30	–	45,6	36,5	1	0,6	2,1	33,2	35	38	50,4	1	0,6	0,1	**–**			
	41,2	52,5	37,5	1	0,6	1,3	34,2	36	39	56,4	1	0,6	0,15	**HJ 206 EC**	0,025	4	7
	41,2	52,5	37,5	1	0,6	1,3	35,6	36	43	56,4	1	0,6	0,15	**HJ 206 EC**	0,025	4	7
	41,2	52,5	37,5	1	0,6	–	35,6	–	43	56,4	1	0,6	0,15	**–**			
	41,2	–	55,5	1	0,6	1,3	35,6	54	57	57,8	1	0,6	0,15	**–**			
	–	52,5	37,5	1	0,6	1,8	34	36	39	57	1	0,6	0,2	**–**			
	41,2	52,5	37,5	1	0,6	1,8	34	36	43	57	1	0,6	0,2	**–**			
	41,2	52,5	37,5	1	0,6	–	34	–	43	57	1	0,6	0,2	**–**			
	–	58,9	40,5	1,1	1,1	1,4	37	39	42	65	1	1	0,15	**–**			
	45	58,9	40,5	1,1	1,1	1,4	37	39	47	65	1	1	0,15	**–**			
	45	58,9	40,5	1,1	1,1	–	37	–	47	65	1	1	0,15	**–**			
	45	–	62,5	1,1	1,1	1,4	37	60	64	65	1	1	0,15	**–**			
	–	58,9	40,5	1,1	1,1	2,4	37	39	42	65	1	1	0,25	**–**			
	45	58,9	40,5	1,1	1,1	2,4	37	39	47	65	1	1	0,25	**–**			
	45	58,9	40,5	1,1	1,1	–	37	–	47	65	1	1	0,25	**–**			
	50,5	66,6	45	1,5	1,5	1,6	41	43	47	79	1,5	1,5	0,15	**HJ 406**	0,080	7	11,5
	50,5	66,6	45	1,5	1,5	1,6	41	43	47	79	1,5	1,5	0,15	**HJ 406**	0,080	7	11,5

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

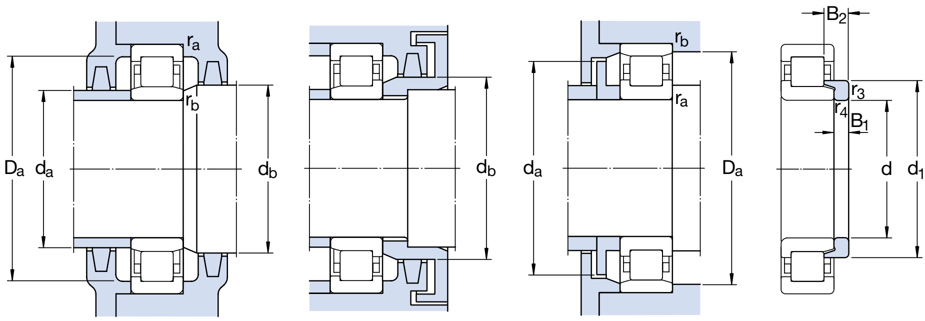
Single row cylindrical roller bearings
d **35 – 40** mm



NU NJ NUP N

Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
mm			kN		kN	r/min		kg	–	
35	62	14	35,8	38	4,55	12 000	13 000	0,16	**NU 1007 ECP**	–
	72	17	56	48	6,1	11 000	12 000	0,33	⋆ **NU 207 ECP**	**J, M, ML**
	72	17	56	48	6,1	11 000	12 000	0,33	⋆ **NJ 207 ECP**	**J, M, ML**
	72	17	56	48	6,1	11 000	12 000	0,31	⋆ **NUP 207 ECP**	**J, M, ML**
	72	17	56	48	6,1	11 000	12 000	0,30	⋆ **N 207 ECP**	–
	72	23	69,5	63	8,15	11 000	12 000	0,40	⋆ **NU 2207 ECP**	**J, ML**
	72	23	69,5	63	8,15	11 000	12 000	0,41	⋆ **NJ 2207 ECP**	**J, ML**
	72	23	69,5	63	8,15	11 000	12 000	0,42	⋆ **NUP 2207 ECP**	**ML**
	80	21	75	63	8,15	9 500	11 000	0,54	⋆ **NU 307 ECP**	**J, M, ML**
	80	21	75	63	8,15	9 500	11 000	0,55	⋆ **NJ 307 ECP**	**J, M, ML**
	80	21	75	63	8,15	9 500	11 000	0,51	⋆ **NUP 307 ECP**	**J, M, ML**
	80	21	75	63	8,15	9 500	11 000	0,48	⋆ **N 307 ECP**	–
	80	31	106	98	12,7	9 500	11 000	0,72	⋆ **NU 2307 ECP**	**J**
	80	31	106	98	12,7	9 500	11 000	0,73	⋆ **NJ 2307 ECP**	–
	80	31	106	98	12,7	9 500	11 000	0,75	⋆ **NUP 2307 ECP**	–
	100	25	76,5	69,5	9	8 000	9 500	1,00	**NU 407**	–
	100	25	76,5	69,5	9	8 000	9 500	1,05	**NJ 407**	–
40	68	15	25,1	26	3	11 000	18 000	0,22	**NU 1008 ML**	–
	80	18	62	53	6,7	9 500	11 000	0,42	⋆ **NU 208 ECP**	**J, M, ML**
	80	18	62	53	6,7	9 500	11 000	0,43	⋆ **NJ 208 ECP**	**J, M, ML**
	80	18	62	53	6,7	9 500	11 000	0,40	⋆ **NUP 208 ECP**	**J, M, ML**
	80	18	62	53	6,7	9 500	11 000	0,37	⋆ **N 208 ECP**	–
	80	23	81,5	75	9,65	9 500	11 000	0,54	⋆ **NU 2208 ECP**	**J, ML**
	80	23	81,5	75	9,65	9 500	11 000	0,55	⋆ **NJ 2208 ECP**	**J, ML**
	80	23	81,5	75	9,65	9 500	11 000	0,56	⋆ **NUP 2208 ECP**	**J, ML**
	90	23	93	78	10,2	8 000	9 500	0,73	⋆ **NU 308 ECP**	**J, M, ML**
	90	23	93	78	10,2	8 000	9 500	0,75	⋆ **NJ 308 ECP**	**J, M, ML**
	90	23	93	78	10,2	8 000	9 500	0,68	⋆ **NUP 308 ECP**	**M, ML**
	90	23	93	78	10,2	8 000	9 500	0,64	⋆ **N 308 ECP**	–

⋆ SKF Explorer bearing
[1)] When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 207 ECP becomes NU 207 ECML (for speed ratings ➔ **page 511**)

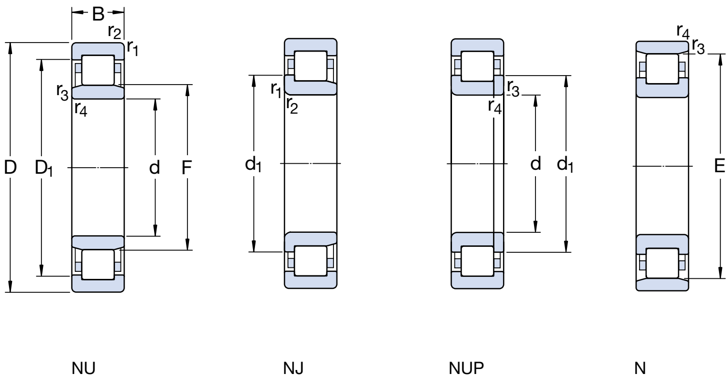


Angle ring

Dimensions							**Abutment and fillet dimensions**						**Calcu-lation factor**	**Angle ring** Designation	Mass	Dimen-sions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
35	–	54,5	42	1	0,6	1	38,2	41	44	56	1	0,6	0,1	–			
	48,1	60,7	44	1,1	0,6	1,3	39,2	42	46	65	1	0,6	0,15	**HJ 207 EC**	0,033	4	7
	48,1	60,7	44	1,1	0,6	1,3	42	42	50	65	1	0,6	0,15	**HJ 207 EC**	0,033	4	7
	48,1	60,7	44	1,1	0,6	–	42	–	50	65	1	0,6	0,15	–			
	48,1	–	64	1,1	0,6	1,3	42	62	66	67,8	1	0,6	0,15	–			
	–	60,7	44	1,1	0,6	2,8	39,2	42	46	65	1	0,6	0,2	–			
	48,1	60,7	44	1,1	0,6	2,8	42	42	50	65	1	0,6	0,2	–			
	48,1	60,7	44	1,1	0,6	–	42	–	48	65	1	0,6	0,2	–			
	51	66,3	46,2	1,5	1,1	1,2	42	44	48	71	1,5	1	0,15	**HJ 307 EC**	0,058	6	9,5
	51	66,3	46,2	1,5	1,1	1,2	44	44	53	71	1,5	1	0,15	**HJ 307 EC**	0,058	6	9,5
	51	66,3	46,2	1,5	1,1	–	44	–	53	71	1,5	1	0,15	–			
	51	–	70,2	1,5	1,1	1,2	44	68	72	73	1,5	1	0,15	–			
	–	66,3	46,2	1,5	1,1	2,7	42	44	48	71	1,5	1	0,25	–			
	51	66,3	46,2	1,5	1,1	2,7	44	44	53	71	1,5	1	0,25	–			
	51	66,3	46,2	1,5	1,1	–	44	–	53	71	1,5	1	0,25	–			
	–	76,1	53	1,5	1,5	1,7	46	50	55	89	1,5	1,5	0,15	–			
	59	76,1	53	1,5	1,5	1,7	46	50	61	89	1,5	1,5	0,15	–			
40	–	57,6	47,6	1	0,6	2,4	43,2	45	49	63,4	1	0,6	0,1	–			
	54	67,9	49,5	1,1	1,1	1,4	47	48	51	73	1	1	0,15	**HJ 208 EC**	0,047	5	8,5
	54	67,9	49,5	1,1	1,1	1,4	47	48	56	73	1	1	0,15	**HJ 208 EC**	0,047	5	8,5
	54	67,9	49,5	1,1	1,1	–	47	–	56	73	1	1	0,15	–			
	54	–	71,5	1,1	1,1	1,4	47	69	73	73	1	1	0,15	–			
	54	67,9	49,5	1,1	1,1	1,9	47	48	51	73	1	1	0,2	**HJ 2208 EC**	0,048	5	9
	54	67,9	49,5	1,1	1,1	1,9	47	48	56	73	1	1	0,2	**HJ 2208 EC**	0,048	5	9
	54	67,9	49,5	1,1	1,1	–	47	–	56	73	1	1	0,2	–			
	57,5	75,6	52	1,5	1,5	1,4	49	50	54	81	1,5	1,5	0,15	**HJ 308 EC**	0,084	7	11
	57,5	75,6	52	1,5	1,5	1,4	49	50	60	81	1,5	1,5	0,15	**HJ 308 EC**	0,084	7	11
	57,5	75,6	52	1,5	1,5	–	49	–	60	81	1,5	1,5	0,15	–			
	57,5	–	80	1,5	1,5	1,4	49	78	82	81	1,5	1,5	0,15	–			

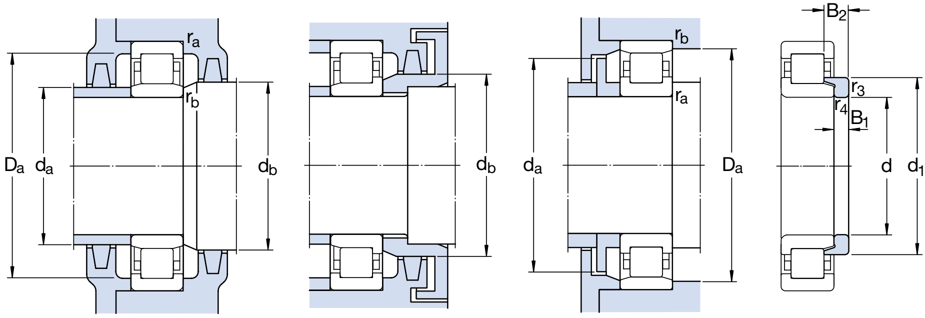
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other

Single row cylindrical roller bearings
d **40 – 50** mm



Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
mm			kN		kN	r/min		kg	–	
40	90	33	129	120	15,3	8 000	9 500	0,94	⋆ **NU 2308 ECP**	**J, M, ML**
cont.	90	33	129	120	15,3	8 000	9 500	0,96	⋆ **NJ 2308 ECP**	**J, M, ML**
	90	33	129	120	15,3	8 000	9 500	0,98	⋆ **NUP 2308 ECP**	**M, ML**
	110	27	96,8	90	11,6	7 000	8 500	1,40	**NU 408**	**–**
	110	27	96,8	90	11,6	7 000	8 500	1,35	**NJ 408**	**–**
45	75	16	44,6	52	6,3	9 500	11 000	0,26	**NU 1009 ECP**	**–**
	85	19	69,5	64	8,15	9 000	9 500	0,48	⋆ **NU 209 ECP**	**J, M, ML**
	85	19	69,5	64	8,15	9 000	9 500	0,49	⋆ **NJ 209 ECP**	**J, M, ML**
	85	19	69,5	64	8,15	9 000	9 500	0,45	⋆ **NUP 209 ECP**	**J, M, ML**
	85	19	69,5	64	8,15	9 000	9 500	0,43	⋆ **N 209 ECP**	**–**
	85	23	85	81,5	10,6	9 000	9 500	0,52	⋆ **NU 2209 ECP**	**J**
	85	23	85	81,5	10,6	9 000	9 500	0,54	⋆ **NJ 2209 ECP**	**J**
	85	23	85	81,5	10,6	9 000	9 500	0,55	⋆ **NUP 2209 ECP**	**–**
	100	25	112	100	12,9	7 500	8 500	1,00	⋆ **NU 309 ECP**	**J, M, ML**
	100	25	112	100	12,9	7 500	8 500	1,05	⋆ **NJ 309 ECP**	**J, M, ML**
	100	25	112	100	12,9	7 500	8 500	0,95	⋆ **NUP 309 ECP**	**J, ML**
	100	25	112	100	12,9	7 500	8 500	0,88	⋆ **N 309 ECP**	**–**
	100	36	160	153	20	7 500	8 500	1,30	⋆ **NU 2309 ECP**	**ML**
	100	36	160	153	20	7 500	8 500	1,35	⋆ **NJ 2309 ECP**	**ML**
	100	36	160	153	20	7 500	8 500	1,35	⋆ **NUP 2309 ECP**	**ML**
	120	29	106	102	13,4	6 700	7 500	1,78	**NU 409**	**–**
	120	29	106	102	13,4	6 700	7 500	1,70	**NJ 409**	**–**
50	80	16	46,8	56	6,7	9 000	9 500	0,27	**NU 1010 ECP**	**–**
	90	20	73,5	69,5	8,8	8 500	9 000	0,49	⋆ **NU 210 ECP**	**J, M, ML**
	90	20	73,5	69,5	8,8	8 500	9 000	0,50	⋆ **NJ 210 ECP**	**J, M, ML**
	90	20	73,5	69,5	8,8	8 500	9 000	0,51	⋆ **NUP 210 ECP**	**J, ML**
	90	20	73,5	69,5	8,8	8 500	9 000	0,48	⋆ **N 210 ECP**	**–**

⋆ SKF Explorer bearing
[1)] When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 2308 ECP becomes NU 2308 ECML (for speed ratings ➔ **page 511**)

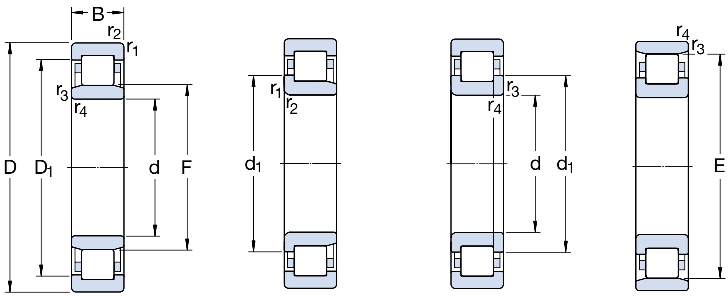


Angle ring

Dimensions							**Abutment and fillet dimensions**						**Calcu-lation factor**	**Angle ring** Designation	Mass	Dimen-sions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
40	–	75,6	52	1,5	1,5	2,9	49	50	54	81	1,5	1,5	0,25	–			
cont.	57,5	75,6	52	1,5	1,5	2,9	49	50	60	81	1,5	1,5	0,25	–			
	57,5	75,6	52	1,5	1,5	–	49	–	60	81	1,5	1,5	0,25	–			
	–	84,2	58	2	2	2,5	53	56	60	97	2	2	0,15	–			
	64,8	84,2	58	2	2	2,5	53	56	67	97	2	2	0,15	–			
45	–	65,3	52,5	1	0,6	0,9	48,2	51	54	70,4	1	0,6	0,1	–			
	59	73	54,5	1,1	1,1	1,2	52	53	56	78	1	1	0,15	**HJ 209 EC**	0,052	5	8,5
	59	73	54,5	1,1	1,1	1,2	52	53	61	78	1	1	0,15	**HJ 209 EC**	0,052	5	8,5
	59	73	54,5	1,1	1,1	–	52	–	61	78	1	1	0,15	–			
	–	73	54,5	1,1	1,1	2,5	52	53	56	78	1	1	0,15	–			
	–	73	54,5	1,1	1,1	1,7	52	53	56	78	1	1	0,2	–			
	59	73	54,5	1,1	1,1	1,7	52	53	56	78	1	1	0,2				
	59	73	54,5	1,1	1,1	–	52	–	61	78	1	1	0,2	–			
	64,4	83,8	58,5	1,5	1,5	1,7	54	56	61	91	1,5	1,5	0,15	**HJ 309 EC**	0,11	7	11,5
	64,4	83,8	58,5	1,5	1,5	1,7	54	56	67	91	1,5	1,5	0,15	**HJ 309 EC**	0,11	7	11,5
	64,4	83,8	58,5	1,5	1,5	–	54	–	67	91	1,5	1,5	0,15	–			
	64,4	–	88,5	1,5	1,5	1,7	54	86	91	91	1,5	1,5	0,15	–			
	–	83,8	58,5	1,5	1,5	3,2	54	56	61	91	1,5	1,5	0,25	–			
	64,4	83,8	58,5	1,5	1,5	3,2	54	56	67	91	1,5	1,5	0,25	–			
	64,4	83,8	58,5	1,5	1,5	–	54	–	67	91	1,5	1,5	0,25	–			
	71,8	92,2	64,5	2	2	2,5	58	62	67	107	2	2	0,15	**HJ 409**	0,18	8	13,5
	71,8	92,2	64,5	2	2	2,5	58	62	67	107	2	2	0,15	**HJ 409**	0,18	8	13,5
50	–	70	57,5	1	0,6	1	53,2	56	60	75,4	1	0,6	0,1	–			
	64	78	59,5	1,1	1,1	1,5	57	57	62	83	1	1	0,15	**HJ 210 EC**	0,058	5	9
	64	78	59,5	1,1	1,1	1,5	57	57	66	83	1	1	0,15	**HJ 210 EC**	0,058	5	9
	64	78	59,5	1,1	1,1	–	57	–	66	83	1	1	0,15	–			
	64	–	81,5	1,1	1,1	1,5	57	79	83,5	83	1	1	0,15	–			

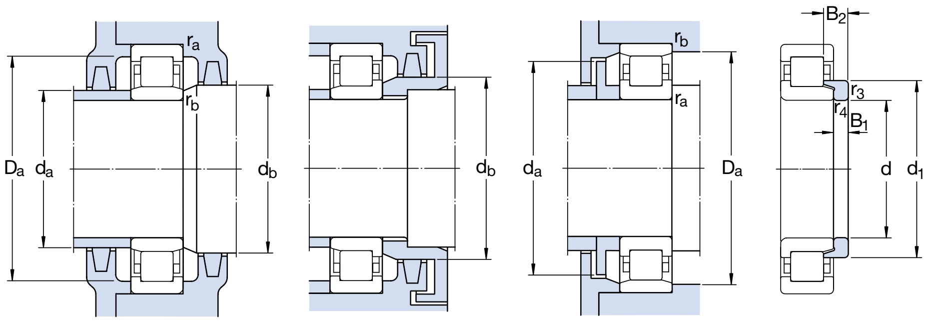
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other

Single row cylindrical roller bearings
d **50 – 55** mm



Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
mm			kN		kN	r/min		kg	–	
50	90	23	90	88	11,4	8 500	9 000	0,56	⋆ **NU 2210 ECP**	**J, M, ML**
cont.	90	23	90	88	11,4	8 500	9 000	0,59	⋆ **NJ 2210 ECP**	**J, M, ML**
	90	23	90	88	11,4	8 500	9 000	0,59	⋆ **NUP 2210 ECP**	**J, ML**
	110	27	127	112	15	6 700	8 000	1,15	⋆ **NU 310 ECP**	**J, M, ML**
	110	27	127	112	15	6 700	8 000	1,15	⋆ **NJ 310 ECP**	**J, M, ML**
	110	27	127	112	15	6 700	8 000	1,20	⋆ **NUP 310 ECP**	**J, M, ML**
	110	27	127	112	15	6 700	8 000	1,15	⋆ **N 310 ECP**	**M**
	110	40	186	186	24,5	6 700	8 000	2,00	⋆ **NU 2310 ECP**	**ML**
	110	40	186	186	24,5	6 700	8 000	1,75	⋆ **NJ 2310 ECP**	**ML**
	110	40	186	186	24,5	6 700	8 000	1,80	⋆ **NUP 2310 ECP**	**ML**
	130	31	130	127	16,6	6 000	7 000	2,00	**NU 410**	**–**
	130	31	130	127	16,6	6 000	7 000	2,05	**NJ 410**	**–**
55	90	18	57,2	69,5	8,3	8 000	8 500	0,40	**NU 1011 ECP**	**–**
	100	21	96,5	95	12,2	7 500	8 000	0,67	⋆ **NU 211 ECP**	**J, M, ML**
	100	21	96,5	95	12,2	7 500	8 000	0,67	⋆ **NJ 211 ECP**	**J, M, ML**
	100	21	96,5	95	12,2	7 500	8 000	0,69	⋆ **NUP 211 ECP**	**J, M, ML**
	100	21	96,5	95	12,2	7 500	8 000	0,66	⋆ **N 211 ECP**	**M**
	100	25	114	118	15,3	7 500	8 000	0,79	⋆ **NU 2211 ECP**	**J, M, ML**
	100	25	114	118	15,3	7 500	8 000	0,81	⋆ **NJ 2211 ECP**	**J, M, ML**
	100	25	114	118	15,3	7 500	8 000	0,82	⋆ **NUP 2211 ECP**	**J, ML**
	120	29	156	143	18,6	6 000	7 000	1,45	⋆ **NU 311 ECP**	**J, M, ML**
	120	29	156	143	18,6	6 000	7 000	1,50	⋆ **NJ 311 ECP**	**J, M, ML**
	120	29	156	143	18,6	6 000	7 000	1,55	⋆ **NUP 311 ECP**	**J, M, ML**
	120	29	156	143	18,6	6 000	7 000	1,45	⋆ **N 311 ECP**	**M**
	120	43	232	232	30,5	6 000	7 000	2,25	⋆ **NU 2311 ECP**	**ML**
	120	43	232	232	30,5	6 000	7 000	2,30	⋆ **NJ 2311 ECP**	**ML**
	120	43	232	232	30,5	6 000	7 000	2,35	⋆ **NUP 2311 ECP**	**ML**
	140	33	142	140	18,6	5 600	6 300	2,50	**NU 411**	**–**
	140	33	142	140	18,6	5 600	6 300	2,55	**NJ 411**	**–**

⋆ SKF Explorer bearing
[1)] When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question e.g. NU 2210 ECP becomes NU 2210 ECML (for speed ratings ➔ **page 511**)

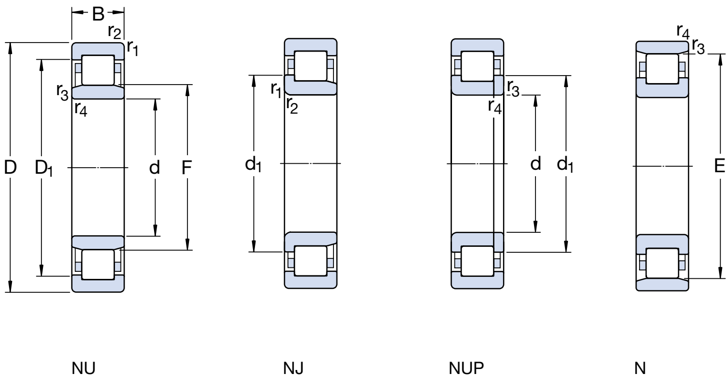


Angle ring

Dimensions							Abutment and fillet dimensions						Calculation factor	Angle ring Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1)]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
50	–	78	59,5	1,1	1,1	1,5	57	57	62	83	1	1	0,2	–			
cont.	64	78	59,5	1,1	1,1	1,5	57	57	66	83	1	1	0,2	–			
	64	78	59,5	1,1	1,1	–	57	–	66	83	1	1	0,2	–			
	71,2	92,1	65	2	2	1,9	61	63	67	99	2	2	0,15	**HJ 310 EC**	0,14	8	13
	71,2	92,1	65	2	2	1,9	61	63	67	99	2	2	0,15	**HJ 310 EC**	0,14	8	13
	71,2	92,1	65	2	2	–	61	–	73	99	2	2	0,15	–			
	71,2	–	97	2	2	1,9	61	95	99	99	2	2	0,15	–			
	–	92,1	65	2	2	3,4	61	63	67	99	2	2	0,25	–			
	71,2	92,1	65	2	2	3,4	61	63	73	99	2	2	0,25	–			
	71,2	92,1	65	2	2	–	61	–	73	99	2	2	0,25	–			
	–	102	70,8	2,1	2,1	2,6	64	68	73	116	2	2	0,15	–			
	78,8	102	70,8	2,1	2,1	2,6	64	68	81	116	2	2	0,15	–			
55	–	79	64,5	1,1	1	0,5	59,6	63	67	84	1	1	0,1	–			
	70,8	86,3	66	1,5	1,1	1	62	64	68	91	1,5	1	0,15	**HJ 211 EC**	0,083	6	9,5
	70,8	86,3	66	1,5	1,1	1	64	64	73	91	1,5	1	0,15	**HJ 211 EC**	0,083	6	9,5
	70,8	86,3	66	1,5	1,1	–	64	–	73	91	1,5	1	0,15	–			
	70,8	–	90	1,5	1,1	1	64	88	92	93	1,5	1	0,15	–			
	70,8	86,3	66	1,5	1,1	1,5	62	64	68	91	1,5	1	0,2	**HJ 2211 EC**	0,085	6	10
	70,8	86,3	66	1,5	1,1	1,5	64	64	73	91	1,5	1	0,2	**HJ 2211 EC**	0,085	6	10
	70,8	86,3	66	1,5	1,1	–	64	–	73	91	1,5	1	0,2	–			
	77,5	101	70,5	2	2	2	66	68	73	109	2	2	0,15	**HJ 311 EC**	0,19	9	14
	77,5	101	70,5	2	2	2	66	68	80	109	2	2	0,15	**HJ 311 EC**	0,19	9	14
	77,5	101	70,5	2	2	–	66	–	80	109	2	2	0,15	–			
	77,5	–	106,5	2	2	2	66	104	109	109	2	2	0,15	–			
	77,5	101	70,5	2	2	3,5	66	68	73	109	2	2	0,25	**HJ 2311 EC**	0,19	9	15,5
	77,5	101	70,5	2	2	3,5	66	68	80	109	2	2	0,25	**HJ 2311 EC**	0,19	9	15,5
	77,5	101	70,5	2	2	–	66	–	80	109	2	2	0,25	–			
	85,2	108	77,2	2,1	2,1	2,6	69	74	79	126	2	2	0,15	–			
	85,2	108	77,2	2,1	2,1	2,6	69	74	88	126	2	2	0,15	–			

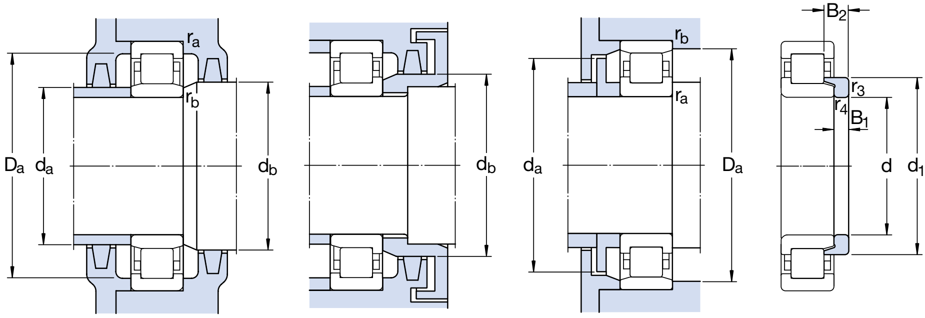
1) Permissible axial displacement from the normal position of one bearing ring in relation to the other

Single row cylindrical roller bearings
d **60 – 65** mm



Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
mm			kN		kN	r/min		kg	–	
60	95	18	37,4	44	5,3	8 000	11 000	0,48	**NU 1012 ML**	**–**
	110	22	108	102	13,4	6 700	7 500	0,81	⋆ **NU 212 ECP**	**J, M, ML**
	110	22	108	102	13,4	6 700	7 500	0,83	⋆ **NJ 212 ECP**	**J, M, ML**
	110	22	108	102	13,4	6 700	7 500	0,86	⋆ **NUP 212 ECP**	**J, ML**
	110	22	108	102	13,4	6 700	7 500	0,81	⋆ **N 212 ECP**	**M**
	110	28	146	153	20	6 700	7 500	1,10	⋆ **NU 2212 ECP**	**J, M, ML**
	110	28	146	153	20	6 700	7 500	1,15	⋆ **NJ 2212 ECP**	**J, M, ML**
	110	28	146	153	20	6 700	7 500	1,15	⋆ **NUP 2212 ECP**	**J, ML**
	130	31	173	160	20,8	5 600	6 700	1,80	⋆ **NU 312 ECP**	**J, M, ML**
	130	31	173	160	20,8	5 600	6 700	1,90	⋆ **NJ 312 ECP**	**J, M, ML**
	130	31	173	160	20,8	5 600	6 700	1,95	⋆ **NUP 312 ECP**	**J, M, ML**
	130	31	173	160	20,8	5 600	6 700	1,80	⋆ **N 312 ECP**	**M**
	130	46	260	265	34,5	5 600	6 700	2,75	⋆ **NU 2312 ECP**	**ML**
	130	46	260	265	34,5	5 600	6 700	2,80	⋆ **NJ 2312 ECP**	**ML**
	130	46	260	265	34,5	5 600	6 700	2,85	⋆ **NUP 2312 ECP**	**ML**
	150	35	168	173	22	5 000	6 000	3,00	**NU 412**	**–**
	150	35	168	173	22	5 000	6 000	3,10	**NJ 412**	**–**
65	100	18	62,7	81,5	9,8	7 000	7 500	0,45	**NU 1013 ECP**	**–**
	120	23	122	118	15,6	6 300	6 700	1,05	⋆ **NU 213 ECP**	**J, M, ML**
	120	23	122	118	15,6	6 300	6 700	1,07	⋆ **NJ 213 ECP**	**J, M, ML**
	120	23	122	118	15,6	6 300	6 700	1,10	⋆ **NUP 213 ECP**	**J, ML**
	120	23	122	118	15,6	6 300	6 700	1,05	⋆ **N 213 ECP**	**–**
	120	31	170	180	24	6 300	6 700	1,40	⋆ **NU 2213 ECP**	**J**
	120	31	170	180	24	6 300	6 700	1,45	⋆ **NJ 2213 ECP**	**J**
	120	31	170	180	24	6 300	6 700	1,50	⋆ **NUP 2213 ECP**	**–**
	140	33	212	196	25,5	5 300	6 000	2,28	⋆ **NU 313 ECP**	**J, M, ML**
	140	33	212	196	25,5	5 300	6 000	2,30	⋆ **NJ 313 ECP**	**J, M, ML**
	140	33	212	196	25,5	5 300	6 000	2,35	⋆ **NUP 313 ECP**	**J, ML**
	140	33	212	196	25,5	5 300	6 000	2,25	⋆ **N 313 ECP**	**M**

⋆ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 212 ECP becomes NU 212 ECML (for speed ratings ➔ **page 511**)

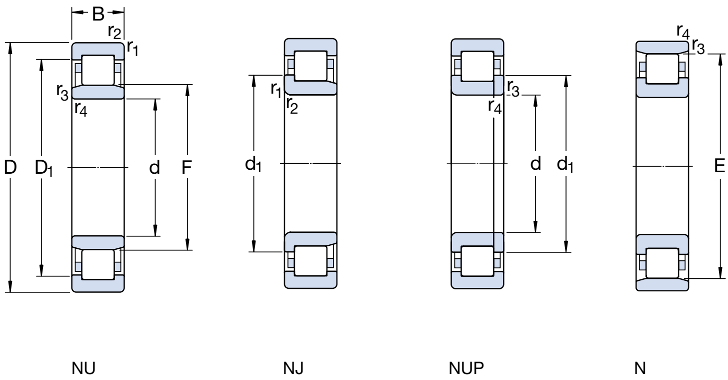


Angle ring

Dimensions							Abutment and fillet dimensions						Calcu-lation factor	Angle ring Designation	Mass	Dimen-sions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
60	–	81,6	69,5	1,1	1	2,9	64,6	68	72	89	1	1	0,1	–			
	77,5	95,7	72	1,5	1,5	1,4	69	70	74	101	1,5	1,5	0,15	**HJ 212 EC**	0,10	6	10
	77,5	95,7	72	1,5	1,5	1,4	69	70	80	101	1,5	1,5	0,15	**HJ 212 EC**	0,10	6	10
	77,5	95,7	72	1,5	1,5	–	69	–	80	101	1,5	1,5	0,15	–			
	77,5	–	100	1,5	1,5	1,4	69	98	102	101	1,5	1,5	0,15	–			
	77,5	95,7	72	1,5	1,5	1,4	69	70	74	101	1,5	1,5	0,2	**HJ 212 EC**	0,10	6	10
	77,5	95,7	72	1,5	1,5	1,4	69	70	80	101	1,5	1,5	0,2	**HJ 212 EC**	0,10	6	10
	77,5	95,7	72	1,5	1,5	–	69	–	80	101	1,5	1,5	0,2	–			
	84,3	110	77	2,1	2,1	2,1	72	74	79	118	2	2	0,15	**HJ 312 EC**	0,22	9	14,5
	84,3	110	77	2,1	2,1	2,1	72	74	87	118	2	2	0,15	**HJ 312 EC**	0,22	9	14,5
	84,3	110	77	2,1	2,1	–	72	–	87	118	2	2	0,15	–			
	84,3	–	115	2,1	2,1	2,1	72	112	118	118	2	2	0,15	–			
	–	110	77	2,1	2,1	3,6	72	74	79	118	2	2	0,25	–			
	84,3	110	77	2,1	2,1	3,6	72	74	87	118	2	2	0,25	–			
	84,3	110	77	2,1	2,1	–	72	–	87	118	2	2	0,25	–			
	–	117	83	2,1	2,1	2,5	74	80	85	136	2	2	0,15	–			
	91,8	117	83	2,1	2,1	2,5	74	80	94	136	2	2	0,15	–			
65	–	88,5	74	1,1	1	1	69,6	72	77	94	1	1	0,1	–			
	84,4	104	78,5	1,5	1,5	1,4	74	76	81	111	1,5	1,5	0,15	**HJ 213 EC**	0,12	6	10
	84,4	104	78,5	1,5	1,5	1,4	74	76	87	111	1,5	1,5	0,15	**HJ 213 EC**	0,12	6	10
	84,4	104	78,5	1,5	1,5	–	74	–	87	111	1,5	1,5	0,15	–			
	84,4	–	108,5	1,5	1,5	1,4	74	106	111	111	1,5	1,5	0,15	–			
	–	104	78,5	1,5	1,5	1,9	74	76	81	111	1,5	1,5	0,2	–			
	84,4	104	78,5	1,5	1,5	1,9	74	76	87	111	1,5	1,5	0,2	–			
	84,4	104	78,5	1,5	1,5	–	74	–	87	111	1,5	1,5	0,2	–			
	90,5	119	82,5	2,1	2,1	2,2	77	80	85	128	2	2	0,15	**HJ 313 EC**	0,27	10	15,5
	90,5	119	82,5	2,1	2,1	2,2	77	80	93	128	2	2	0,15	**HJ 313 EC**	0,27	10	15,5
	90,5	119	82,5	2,1	2,1	–	77	–	93	128	2	2	0,15	–			
	90,5	–	124,5	2,1	2,1	2,2	77	122	127	128	2	2	0,15	–			

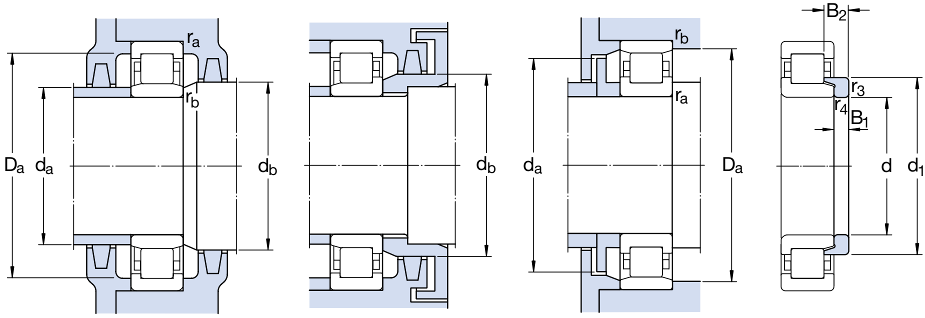
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other

Single row cylindrical roller bearings
d **65 – 75** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
65	140	48	285	290	38	5 300	6 000	3,30	⋆ **NU 2313 ECP**	**ML**
cont.	140	48	285	290	38	5 300	6 000	3,35	⋆ **NJ 2313 ECP**	**ML**
	140	48	285	290	38	5 300	6 000	3,45	⋆ **NUP 2313 ECP**	**ML**
	160	37	183	190	24	4 800	5 600	3,60	**NU 413**	**–**
	160	37	183	190	24	4 800	5 600	3,65	**NJ 413**	**–**
70	110	20	76,5	93	12	6 300	7 000	0,62	**NU 1014 ECP**	**–**
	125	24	137	137	18	6 000	6 300	1,15	⋆ **NU 214 ECP**	**J, M, ML**
	125	24	137	137	18	6 000	6 300	1,15	⋆ **NJ 214 ECP**	**J, M, ML**
	125	24	137	137	18	6 000	6 300	1,20	⋆ **NUP 214 ECP**	**M, ML**
	125	24	137	137	18	6 000	6 300	1,15	⋆ **N 214 ECP**	**–**
	125	31	180	193	25,5	6 000	6 300	1,55	⋆ **NU 2214 ECP**	**J, M, ML**
	125	31	180	193	25,5	6 000	6 300	1,55	⋆ **NJ 2214 ECP**	**M, ML**
	125	31	180	193	25,5	6 000	6 300	1,55	⋆ **NUP 2214 ECP**	**M, ML**
	150	35	236	228	29	4 800	5 600	2,75	⋆ **NU 314 ECP**	**J, M, ML**
	150	35	236	228	29	4 800	5 600	2,80	⋆ **NJ 314 ECP**	**J, M, ML**
	150	35	236	228	29	4 800	5 600	2,85	⋆ **NUP 314 ECP**	**M, ML**
	150	35	236	228	29	4 800	5 600	2,75	⋆ **N 314 ECP**	**M**
	150	51	315	325	41,5	4 800	5 600	4,00	⋆ **NU 2314 ECP**	**ML**
	150	51	315	325	41,5	4 800	5 600	4,05	⋆ **NJ 2314 ECP**	**ML**
	150	51	315	325	41,5	4 800	5 600	4,15	⋆ **NUP 2314 ECP**	**ML**
	180	42	229	240	30	4 300	5 000	5,25	**NU 414**	**–**
	180	42	229	240	30	4 300	5 000	5,35	**NJ 414**	**–**
75	115	20	58,3	71	8,5	6 700	10 000	0,74	**NU 1015 ML**	**–**
	130	25	150	156	20,4	5 600	6 000	1,25	⋆ **NU 215 ECP**	**J, M, ML**
	130	25	150	156	20,4	5 600	6 000	1,30	⋆ **NJ 215 ECP**	**J, M, ML**
	130	25	150	156	20,4	5 600	6 000	1,30	⋆ **NUP 215 ECP**	**M, ML**
	130	25	150	156	20,4	5 600	6 000	1,25	⋆ **N 215 ECP**	**–**

⋆ SKF Explorer bearing
[1)] When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 2313 ECP becomes NU 2313 ECML (for speed ratings ➔ **page 511**)

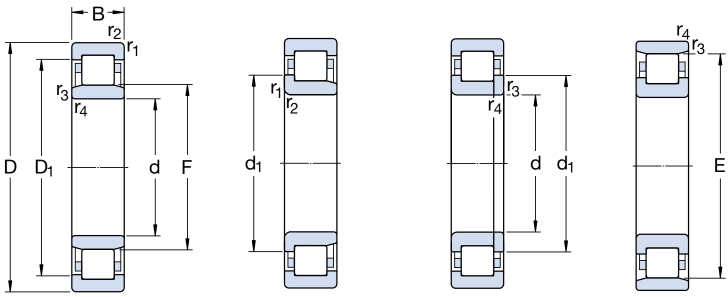


Angle ring

Dimensions							Abutment and fillet dimensions						Calculation factor	Angle ring Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
65	–	119	82,5	2,1	2,1	4,7	77	80	85	128	2	2	0,25	–			
cont.	90,5	119	82,5	2,1	2,1	4,7	77	80	93	128	2	2	0,25	–			
	90,5	119	82,5	2,1	2,1	–	77	–	93	128	2	2	0,25	–			
	98,5	125	89,3	2,1	2,1	2,6	79	86	92	146	2	2	0,15	**HJ 413**	0,42	11	18
	98,5	125	89,3	2,1	2,1	2,6	79	86	92	146	2	2	0,15	**HJ 413**	0,42	11	18
70	84	97,5	79,5	1,1	1	1,3	74,6	78	82	104	1	1	0,1	**HJ 1014 EC**	0,082	5	10
	89,4	109	83,5	1,5	1,5	1,2	79	81	86	116	1,5	1,5	0,15	**HJ 214 EC**	0,15	7	11
	89,4	109	83,5	1,5	1,5	1,2	79	81	92	116	1,5	1,5	0,15	**HJ 214 EC**	0,15	7	11
	89,4	109	83,5	1,5	1,5	–	79	–	92	116	1,5	1,5	0,15	–			
	89,4	–	113,5	1,5	1,5	1,2	79	111	116	116	1,5	1,5	0,15	–			
	–	109	83,5	1,5	1,5	1,7	79	81	86	116	1,5	1,5	0,2	–			
	89,4	109	83,5	1,5	1,5	1,7	79	81	86	116	1,5	1,5	0,2	–			
	89,4	109	83,5	1,5	1,5	–	79	–	92	116	1,5	1,5	0,2	–			
	97,3	127	89	2,1	2,1	1,8	82	86	91	138	2	2	0,15	**HJ 314 EC**	0,32	10	15,5
	97,3	127	89	2,1	2,1	1,8	82	86	100	138	2	2	0,15	**HJ 314 EC**	0,32	10	15,5
	97,3	127	89	2,1	2,1	–	82	–	100	138	2	2	0,15	–			
	97,3	–	133	2,1	2,1	1,8	82	130	136	138	2	2	0,15	–			
	97,3	127	89	2,1	2,1	4,8	82	86	91	138	2	2	0,25	**HJ 2314 EC**	0,34	10	18,5
	97,3	127	89	2,1	2,1	4,8	82	86	100	138	2	2	0,25	**HJ 2314 EC**	0,34	10	18,5
	97,3	127	89	2,1	2,1	–	82	–	100	138	2	2	0,25	–			
	–	140	100	3	3	3,5	86	97	102	164	2,5	2,5	0,15	–			
	110	140	100	3	3	3,5	86	97	113	164	2,5	2,5	0,15	–			
75	–	101	85	1,1	1	3	79,6	83	87	109	1	1	0,1	–			
	94,3	114	88,5	1,5	1,5	1,2	84	86	91	121	1,5	1,5	0,15	**HJ 215 EC**	0,16	7	11
	94,3	114	88,5	1,5	1,5	1,2	84	86	97	121	1,5	1,5	0,15	**HJ 215 EC**	0,16	7	11
	94,3	114	88,5	1,5	1,5	–	84	–	97	121	1,5	1,5	0,15	–			
	94,3	–	118,5	1,5	1,5	1,2	84	116	121	121	1,5	1,5	0,15	–			

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

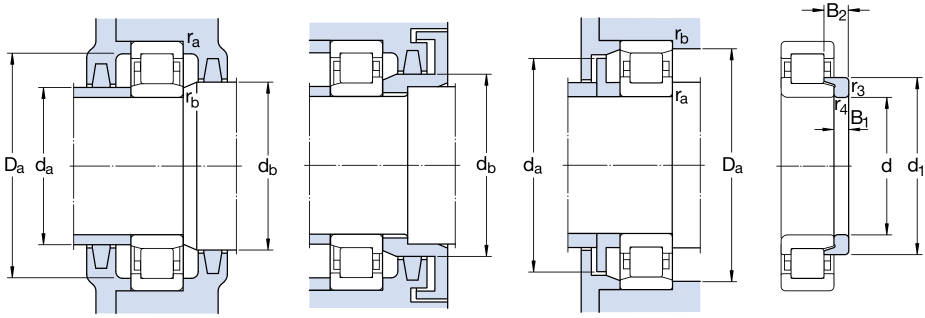
Single row cylindrical roller bearings
d **75 – 80** mm



NU NJ NUP N

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing with standard cage	Bearing with standard cage	Alternative standard cage designs[1)]
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
75	130	31	186	208	27	5 600	6 000	1,60	⋆ **NU 2215 ECP**	**J, ML**
cont.	130	31	186	208	27	5 600	6 000	1,60	⋆ **NJ 2215 ECP**	**J, ML**
	130	31	186	208	27	5 600	6 000	1,65	⋆ **NUP 2215 ECP**	**J, ML**
	160	37	280	265	33,5	4 500	5 300	3,30	⋆ **NU 315 ECP**	**J, M, ML**
	160	37	280	265	33,5	4 500	5 300	3,35	⋆ **NJ 315 ECP**	**J, M, ML**
	160	37	280	265	33,5	4 500	5 300	3,45	⋆ **NUP 315 ECP**	**M, ML**
	160	37	280	265	33,5	4 500	5 300	3,30	⋆ **N 315 ECP**	**M**
	160	55	380	400	50	4 500	5 300	4,90	⋆ **NU 2315 ECP**	**J, ML**
	160	55	380	400	50	4 500	5 300	5,00	⋆ **NJ 2315 ECP**	**ML**
	160	55	380	400	50	4 500	5 300	5,10	⋆ **NUP 2315 ECP**	**ML**
	190	45	264	280	34	4 000	4 800	6,75	**NU 415**	**–**
	190	45	264	280	34	4 000	4 800	6,90	**NJ 415**	**–**
80	125	22	99	127	16,3	5 600	9 500	1,10	**NU 1016 ECML**	**–**
	125	22	66	81,5	10,4	6 300	6 300	1,00	**NU 1016**	**–**
	140	26	160	166	21,2	5 300	5 600	1,50	⋆ **NU 216 ECP**	**J, M, ML**
	140	26	160	166	21,2	5 300	5 600	1,60	⋆ **NJ 216 ECP**	**J, M, ML**
	140	26	160	166	21,2	5 300	5 600	1,65	⋆ **NUP 216 ECP**	**ML**
	140	26	160	166	21,2	5 300	5 600	1,50	⋆ **N 216 ECP**	**–**
	140	33	212	245	31	5 300	5 600	2,00	⋆ **NU 2216 ECP**	**J, M, ML**
	140	33	212	245	31	5 300	5 600	2,05	⋆ **NJ 2216 ECP**	**J, M, ML**
	140	33	212	245	31	5 300	5 600	2,10	⋆ **NUP 2216 ECP**	**M, ML**
	170	39	300	290	36	4 300	5 000	3,95	⋆ **NU 316 ECP**	**J, M, ML**
	170	39	300	290	36	4 300	5 000	4,00	⋆ **NJ 316 ECP**	**J, M, ML**
	170	39	300	290	36	4 300	5 000	4,10	⋆ **NUP 316 ECP**	**M, ML**
	170	39	300	290	36	4 300	5 000	3,90	⋆ **N 316 ECP**	**M**
	170	58	415	440	55	4 300	5 000	5,95	⋆ **NU 2316 ECP**	**M, ML**
	170	58	415	440	55	4 300	5 000	6,00	⋆ **NJ 2316 ECP**	**M, ML**
	170	58	415	440	55	4 300	5 000	6,00	⋆ **NUP 2316 ECP**	**M, ML**
	200	48	303	320	39	3 800	4 500	7,30	**NU 416**	**–**
	200	48	303	320	39	3 800	4 500	8,05	**NJ 416**	**–**

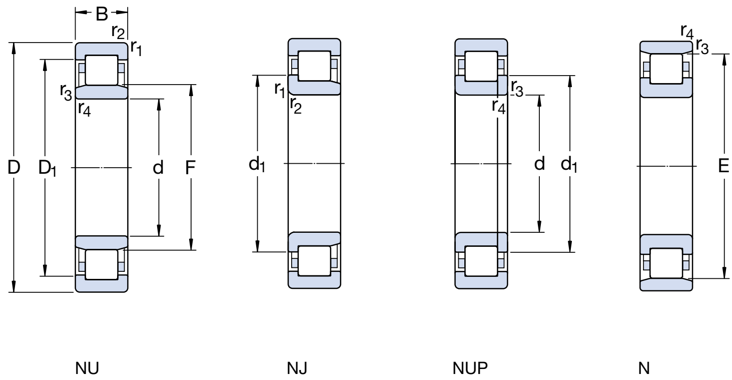
⋆ SKF Explorer bearing
[1)] When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 2215 ECP becomes NU 2215 ECML (for speed ratings ➔ **page 511**)



Angle ring

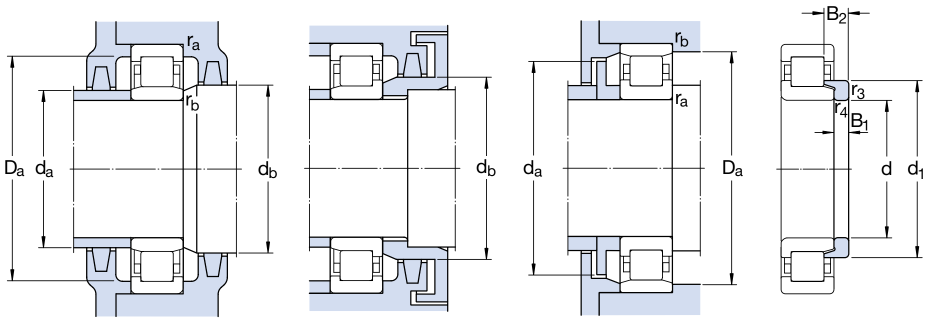
Dimensions							Abutment and fillet dimensions						Calcu-lation factor	Angle ring Designation	Mass	Dimen-sions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
75	–	114	88,5	1,5	1,5	1,7	84	86	91	121	1,5	1,5	0,2	–			
cont.	94,3	114	88,5	1,5	1,5	1,7	84	86	97	121	1,5	1,5	0,2	–			
	94,3	114	88,5	1,5	1,5	–	84	–	97	121	1,5	1,5	0,2	–			
	104	136	95	2,1	2,1	1,8	87	92	97	148	2	2	0,15	**HJ 315 EC**	0,39	11	16,5
	104	136	95	2,1	2,1	1,8	87	92	107	148	2	2	0,15	**HJ 315 EC**	0,39	11	16,5
	104	136	95	2,1	2,1	–	87	–	107	148	2	2	0,15	–			
	104	–	143	2,1	2,1	1,8	87	140	146	148	2	2	0,15	–			
	104	136	95	2,1	2,1	4,8	87	92	97	148	2	2	0,25	**HJ 2315 EC**	0,42	11	19,5
	104	136	95	2,1	2,1	4,8	87	92	107	148	2	2	0,25	**HJ 2315 EC**	0,42	11	19,5
	104	136	95	2,1	2,1	–	87	–	107	148	2	2	0,25	–			
	–	148	104,5	3	3	3,8	91	101	107	174	2,5	2,5	0,15	–			
	116	148	104,5	3	3	3,8	91	101	119	174	2,5	2,5	0,15	–			
80	–	111	91,5	1,1	1	1,5	86	90	94	119	1	1	0,1	–			
	–	109	91,5	1,1	1	3,3	86	90	94	119	1	1	0,1	–			
	101	123	95,3	2	2	1,4	91	93	98	129	2	2	0,15	**HJ 216 EC**	0,21	8	12,5
	101	123	95,3	2	2	1,4	91	93	104	129	2	2	0,15	**HJ 216 EC**	0,21	8	12,5
	101	123	95,3	2	2	–	91	–	104	129	2	2	0,15	–			
	101	–	127,3	2	2	1,4	91	125	130	129	2	2	0,15	–			
	101	123	95,3	2	2	1,4	91	93	98	129	2	2	0,2	**HJ 216 EC**	0,21	8	12,5
	101	123	95,3	2	2	1,4	91	93	104	129	2	2	0,2	**HJ 216 EC**	0,21	8	12,5
	101	123	95,3	2	2	–	91	–	104	129	2	2	0,2	–			
	110	144	101	2,1	2,1	2,1	92	98	104	158	2	2	0,15	**HJ 316 EC**	0,44	11	17
	110	144	101	2,1	2,1	2,1	92	98	113	158	2	2	0,15	**HJ 316 EC**	0,44	11	17
	110	144	101	2,1	2,1	–	92	–	113	158	2	2	0,15	–			
	110	–	151	2,1	2,1	2,1	92	148	154	158	2	2	0,15	–			
	110	144	101	2,1	2,1	5,1	92	98	104	158	2	2	0,25	**HJ 2316 EC**	0,48	11	20
	110	144	101	2,1	2,1	5,1	92	98	113	158	2	2	0,25	**HJ 2316 EC**	0,48	11	20
	110	144	101	2,1	2,1	–	92	–	113	158	2	2	0,25				
	122	157	110	3	3	3,7	96	106	113	184	2,5	2,5	0,15	**HJ 416**	0,78	13	22
	122	157	110	3	3	3,7	96	106	125	184	2,5	2,5	0,15	**HJ 416**	0,78	13	22

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



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designations	
			dynamic	static		Reference speed	Limiting speed	Bearing with standard cage	Bearing with standard cage	Alternative standard cage designs[1)]
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
85	130	22	68,2	86,5	10,8	6 000	9 000	1,05	**NU 1017 ML**	**–**
	150	28	190	200	24,5	4 800	5 300	1,90	★ **NU 217 ECP**	**J, M, ML**
	150	28	190	200	24,5	4 800	5 300	1,95	★ **NJ 217 ECP**	**J, M, ML**
	150	28	190	200	24,5	4 800	5 300	2,00	★ **NUP 217 ECP**	**J, ML**
	150	28	190	200	24,5	4 800	5 300	1,90	★ **N 217 ECP**	**M**
	150	36	250	280	34,5	4 800	5 300	2,45	★ **NU 2217 ECP**	**J, M, ML**
	150	36	250	280	34,5	4 800	5 300	2,55	★ **NJ 2217 ECP**	**J, M, ML**
	150	36	250	280	34,5	4 800	5 300	2,65	★ **NUP 2217 ECP**	**ML**
	180	41	340	335	41,5	4 000	4 800	4,70	★ **NU 317 ECP**	**J, M**
	180	41	340	335	41,5	4 000	4 800	4,80	★ **NJ 317 ECP**	**J, M**
	180	41	340	335	41,5	4 000	4 800	4,90	★ **NUP 317 ECP**	**J, M**
	180	41	340	335	41,5	4 000	4 800	4,70	★ **N 317 ECP**	**M**
	180	60	455	490	60	4 000	4 800	6,85	★ **NU 2317 ECP**	**J, ML**
	180	60	455	490	60	4 000	4 800	7,00	★ **NJ 2317 ECP**	**ML**
	180	60	455	490	60	4 000	4 800	7,00	★ **NUP 2317 ECP**	**ML**
	210	52	319	335	39	3 600	4 300	9,70	**NU 417**	**–**
	210	52	319	335	39	3 800	4 300	8,90	**NJ 417**	**–**
90	140	24	80,9	104	12,7	5 600	8 500	1,35	**NU 1018 ML**	**–**
	160	30	208	220	27	4 500	5 000	2,35	★ **NU 218 ECP**	**J, M, ML**
	160	30	208	220	27	4 500	5 000	2,40	★ **NJ 218 ECP**	**J, M, ML**
	160	30	208	220	27	4 500	5 000	2,45	★ **NUP 218 ECP**	**M, ML**
	160	30	208	220	27	4 500	5 000	2,35	★ **N 218 ECP**	**M**
	160	40	280	315	39	4 500	5 000	3,15	★ **NU 2218 ECP**	**J, M, ML**
	160	40	280	315	39	4 500	5 000	3,20	★ **NJ 2218 ECP**	**M, ML**
	160	40	280	315	39	4 500	5 000	3,30	★ **NUP 2218 ECP**	**–**

★ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 217 ECP becomes NU 217 ECML (for speed ratings ➔ **page 511**)

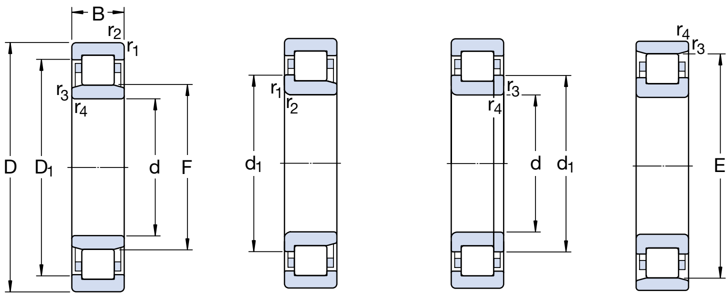


Angle ring

Dimensions							Abutment and fillet dimensions						Calcu-lation factor	Angle ring Designation	Mass	Dimen-sions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1)]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
85	–	114	96,5	1,1	1	3,3	89,6	95	99	124	1	1	0,1	–			
	107	131	100,5	2	2	1,5	96	98	103	139	2	2	0,15	**HJ 217 EC**	0,24	8	12,5
	107	131	100,5	2	2	1,5	96	98	110	139	2	2	0,15	**HJ 217 EC**	0,24	8	12,5
	107	131	100,5	2	2	–	96	–	110	139	2	2	0,15	–			
	107	–	136,5	2	2	1,5	96	134	139	139	2	2	0,15	–			
	–	131	100,5	2	2	2	96	98	103	139	2	2	0,2	–			
	107	131	100,5	2	2	2	96	98	110	139	2	2	0,2	–			
	107	131	100,5	2	2	–	96	–	110	139	2	2	0,2	–			
	117	153	108	3	3	2,3	99	105	111	166	2,5	2,5	0,15	**HJ 317 EC**	0,55		
	117	153	108	3	3	2,3	99	105	120	166	2,5	2,5	0,15	**HJ 317 EC**	0,55		
	117	153	108	3	3	–	99	–	120	166	2,5	2,5	0,15	–			
	117	–	160	3	3	2,3	99	157	163	166	2,5	2,5	0,15	–			
	–	153	108	3	3	5,8	99	105	111	166	2,5	2,5	0,25	–			
	117	153	108	3	3	5,8	99	105	120	166	2,5	2,5	0,25	–			
	117	153	108	3	3	–	99	–	120	166	2,5	2,5	0,25				
	–	163	113	4	4	3,8	105	109	116	190	3	3	0,15	–			
	126	163	113	4	4	3,8	105	109	129	190	3	3	0,15	–			
90	–	122	103	1,5	1,1	3,5	96	101	106	133	1,5	1	0,1	–			
	114	140	107	2	2	1,8	101	104	110	149	2	2	0,15	**HJ 218 EC**	0,31	9	14
	114	140	107	2	2	1,8	101	104	117	149	2	2	0,15	**HJ 218 EC**	0,31	9	14
	114	140	107	2	2	–	101	–	117	149	2	2	0,15	–			
	114	–	145	2	2	1,8	101	142	148	149	2	2	0,15	–			
	–	140	107	2	2	2,6	101	104	110	149	2	2	0,2	–			
	114	140	107	2	2	2,6	101	104	117	149	2	2	0,2	–			
	114	140	107	2	2	–	101	–	117	149	2	2	0,2	–			

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

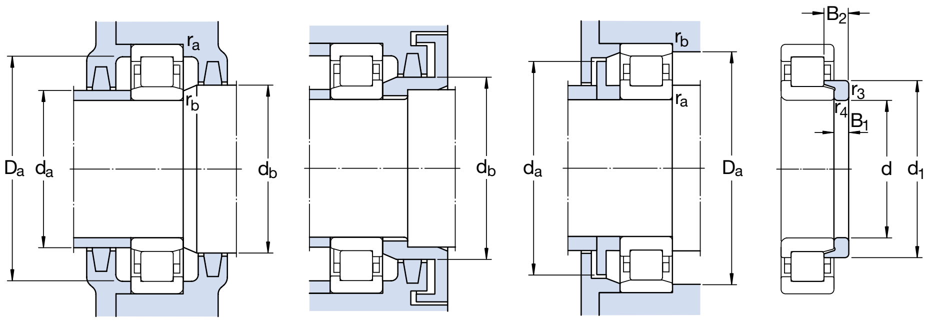
Single row cylindrical roller bearings
d **90 – 95** mm



NU NJ NUP N

Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
mm			kN		kN	r/min		kg	–	
90	190	43	365	360	43	3 800	4 500	5,45	★ **NU 318 ECP**	**J, M, ML**
cont.	190	43	365	360	43	3 800	4 500	5,55	★ **NJ 318 ECP**	**J, M, ML**
	190	43	365	360	43	3 800	4 500	5,65	★ **NUP 318 ECJ**	**M, ML**
	190	43	365	360	43	3 800	4 500	5,40	★ **N 318 ECP**	**M**
	190	64	500	540	65,5	3 800	4 500	8,00	★ **NU 2318 ECP**	**J, ML**
	190	64	500	540	65,5	3 800	4 500	8,15	★ **NJ 2318 ECP**	**J, ML, M**
	190	64	500	540	65,5	3 800	4 500	8,30	★ **NUP 2318 ECP**	**ML**
	225	54	380	415	48	3 400	4 000	11,5	**NU 418**	**–**
95	145	24	84,2	110	13,2	5 300	8 000	1,40	**NU 1019 ML**	**–**
	170	32	255	265	32,5	4 300	4 800	2,85	★ **NU 219 ECP**	**J, M, ML**
	170	32	255	265	32,5	4 300	4 800	2,90	★ **NJ 219 ECP**	**J, M, ML**
	170	32	255	265	32,5	4 300	4 800	3,00	★ **NUP 219 ECP**	**ML**
	170	32	255	265	32,5	4 300	4 800	2,85	★ **N 219 ECP**	**–**
	170	43	325	375	45,5	4 300	4 800	3,85	★ **NU 2219 ECP**	**J, M**
	170	43	325	375	45,5	4 300	4 800	3,95	★ **NJ 2219 ECP**	**J, M**
	170	43	325	375	45,5	4 300	4 800	4,00	★ **NUP 2219 ECP**	**–**
	200	45	390	390	46,5	3 600	4 300	6,25	★ **NU 319 ECP**	**J, M, ML**
	200	45	390	390	46,5	3 600	4 300	6,45	★ **NJ 319 ECP**	**J, M, ML**
	200	45	390	390	46,5	3 600	4 300	6,25	★ **NUP 319 ECP**	**M, ML**
	200	45	390	390	46,5	3 600	4 300	6,25	★ **N 319 ECP**	**M**
	200	67	530	585	69,5	3 600	4 300	9,65	★ **NU 2319 ECP**	**J, ML**
	200	67	530	585	69,5	3 600	4 300	9,85	★ **NJ 2319 ECP**	**J, ML**
	200	67	530	585	69,5	3 600	4 300	9,75	★ **NUP 2319 ECP**	**J, ML**
	240	55	413	455	52	3 200	3 600	13,5	**NU 419 M**	**–**

★ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 318 ECP becomes NU 318 ECML (for speed ratings ➔ **page 511**)

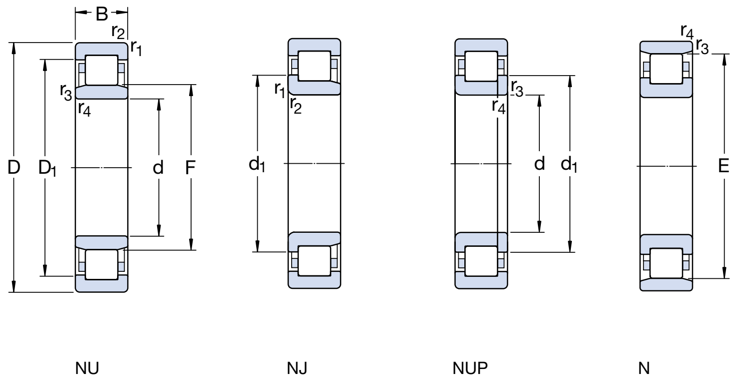


Angle ring

Dimensions							**Abutment and fillet dimensions**						**Calculation factor**	**Angle ring** Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1)]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
90	124	162	113,5	3	3	2,5	104	110	116	176	2,5	2,5	0,15	**HJ 318 EC**	0,60	12	18,5
cont.	124	162	113,5	3	3	2,5	104	110	127	176	2,5	2,5	0,15	**HJ 318 EC**	0,60	12	18,5
	124	162	113,5	3	3	–	104	–	127	176	2,5	2,5	0,15	**–**			
	124	–	169,5	3	3	2,5	104	166	173	176	2,5	2,5	0,15	**–**			
	124	162	113,5	3	3	6	104	110	116	176	2,5	2,5	0,25	**–**			
	124	162	113,5	3	3	6	104	110	127	176	2,5	2,5	0,25	**–**			
	124	162	113,5	3	3	–	104	110	127	176	2,5	2,5	0,25	**–**			
	–	176	123,5	4	4	4,9	106	120	126	209	3	3	0,15	**–**			
95	–	127	108	1,5	1,1	3,5	101	106	111	138	1,5	1	0,1	**–**			
	120	149	112,5	2,1	2,1	1,7	107	110	115	158	2	2	0,15	**HJ 219 EC**	0,33	9	14
	120	149	112,5	2,1	2,1	1,7	107	110	123	158	2	2	0,15	**HJ 219 EC**	0,33	9	14
	120	149	112,5	2,1	2,1	–	107	–	123	158	2	2	0,15	**–**			
	120	–	154,5	2,1	2,1	1,7	107	152	157	158	2	2	0,15	**–**			
	–	149	112,5	2,1	2,1	3	107	110	115	158	2	2	0,2	**–**			
	120	149	112,5	2,1	2,1	3	107	110	123	158	2	2	0,2	**–**			
	120	149	112,5	2,1	2,1	–	107	–	123	158	2	2	0,2	**–**			
	132	170	121,5	3	3	2,9	109	118	124	186	2,5	2,5	0,15	**HJ 319 EC**	0,76	13	20,5
	132	170	121,5	3	3	2,9	109	118	135	186	2,5	2,5	0,15	**HJ 319 EC**	0,76	13	20,5
	132	170	121,5	3	3	–	109	–	135	186	2,5	2,5	0,15	**–**			
	132	–	177,5	3	3	2,9	109	174	181	186	2,5	2,5	0,15	**–**			
	132	170	121,5	3	3	6,9	109	118	124	186	2,5	2,5	0,25	**HJ 2319 EC**	0,81	13	24,5
	132	170	121,5	3	3	6,9	109	118	135	186	2,5	2,5	0,25	**HJ 2319 EC**	0,81	13	24,5
	132	170	121,5	3	3	–	109	–	135	186	2,5	2,5	0,25	**–**			
	–	186	133,5	4	4	5	115	130	136	220	3	3	0,15	**–**			

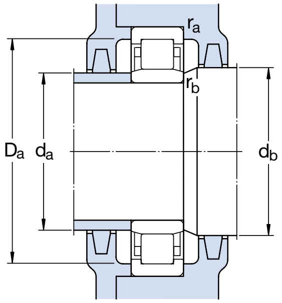
1) Permissible axial displacement from the normal position of one bearing ring in relation to the other

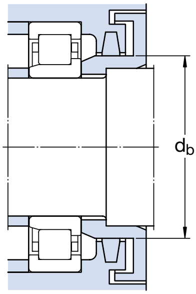
Single row cylindrical roller bearings
d **100 – 105** mm

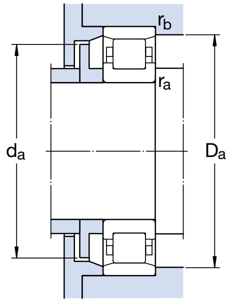


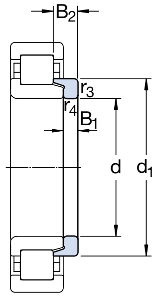
Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
mm			kN		kN	r/min		kg	–	
100	150	24	85,8	114	13,7	5 000	7 500	1,45	**NU 1020 ML**	**M**
	180	34	285	305	36,5	4 000	4 500	3,45	★ **NU 220 ECP**	**J, M, ML**
	180	34	285	305	36,5	4 000	4 500	3,50	★ **NJ 220 ECP**	**J, M, ML**
	180	34	285	305	36,5	4 000	4 500	3,60	★ **NUP 220 ECP**	**ML**
	180	34	285	305	36,5	4 000	4 500	3,45	★ **N 220 ECP**	**–**
	180	46	380	450	54	4 000	4 500	4,75	★ **NU 2220 ECP**	**J, ML**
	180	46	380	450	54	4 000	4 500	4,80	★ **NJ 2220 ECP**	**J, ML**
	180	46	380	450	54	4 000	4 500	4,90	★ **NUP 2220 ECP**	**ML**
	215	47	450	440	51	3 200	3 800	7,85	★ **NU 320 ECP**	**J, M, ML**
	215	47	450	440	51	3 200	3 800	7,65	★ **NJ 320 ECP**	**J, M, ML**
	215	47	450	440	51	3 200	3 800	7,80	★ **NUP 320 ECJ**	**ML**
	215	47	450	440	51	3 200	3 800	7,55	★ **N 320 ECP**	**M**
	215	73	670	735	85	3 200	3 800	12,0	★ **NU 2320 ECP**	**J, ML**
	215	73	670	735	85	3 200	3 800	12,2	★ **NJ 2320 ECP**	**J, ML**
	215	73	670	735	85	3 200	3 800	12,5	★ **NUP 2320 ECP**	**J, ML**
	250	58	429	475	53	3 000	3 600	14,0	**NU 420 M**	**–**
105	160	26	101	137	16	4 800	7 500	1,85	**NU 1021 ML**	**M**
	190	36	300	315	36,5	3 800	4 300	4,00	★ **NU 221 ECP**	**J, ML**
	190	36	300	315	36,5	3 800	4 300	4,10	★ **NJ 221 ECP**	**ML**
	190	36	300	315	36,5	3 800	4 300	4,20	★ **NUP 221 ECP**	**ML**
	190	36	300	315	36,5	3 800	4 300	3,95	★ **N 221 ECP**	**–**
	225	49	500	500	57	3 200	3 800	8,75	★ **NU 321 ECP**	**J, ML**
	225	49	500	500	57	3 200	3 800	9,00	★ **NJ 321 ECJ**	**ML**
	225	49	500	500	57	3 200	3 800	8,65	★ **N 321 ECP**	**–**
	260	60	501	570	64	2 800	3 400	19,0	**NU 421 M**	**–**

★ SKF Explorer bearing
[1)] When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 220 ECP becomes NU 220 ECML (for speed ratings ➔ **page 511**)







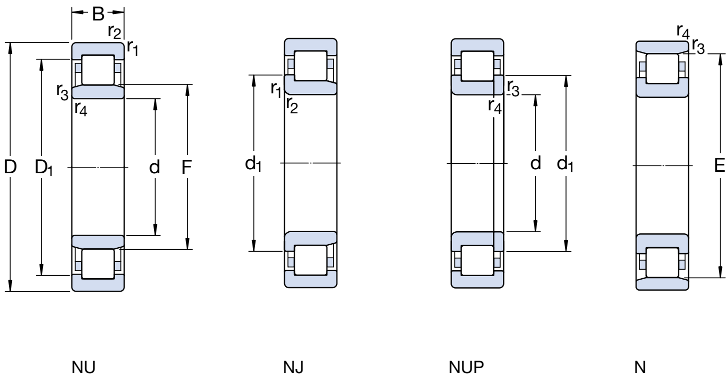


Angle ring

Dimensions							Abutment and fillet dimensions						Calculation factor	Angle ring Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1)]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
100	–	132	113	1,5	1,1	3,5	106	111	116	143	1,5	1	0,1	–			
	127	157	119	2,1	2,1	1,7	112	116	122	168	2	2	0,15	**HJ 220 EC**	0,42	10	15
	127	157	119	2,1	2,1	1,7	112	116	130	168	2	2	0,15	**HJ 220 EC**	0,42	10	15
	127	157	119	2,1	2,1	–	112	–	130	168	2	2	0,15	–			
	127	–	163	2,1	2,1	1,7	112	160	166	168	2	2	0,15	–			
	127	157	119	2,1	2,1	2,5	112	116	122	168	2	2	0,2	**HJ 2220 EC**	0,43	10	16
	127	157	119	2,1	2,1	2,5	112	116	130	168	2	2	0,2	**HJ 2220 EC**	0,43	10	16
	127	157	119	2,1	2,1	–	112	–	130	168	2	2	0,2	–			
	139	182	127,5	3	3	2,9	114	124	130	201	2,5	2,5	0,15	**HJ 320 EC**	0,87	13	20,5
	139	182	127,5	3	3	2,9	114	124	142	201	2,5	2,5	0,15	**HJ 320 EC**	0,87	13	20,5
	139	182	127,5	3	3	–	114	–	142	201	2,5	2,5	0,15	–			
	139	–	191,5	3	3	2,9	114	188	195	201	2,5	2,5	0,15	–			
	139	182	127,5	3	3	5,9	114	124	130	201	2,5	2,5	0,25	**HJ 2320 EC**	0,93	13	23,5
	139	182	127,5	3	3	5,9	114	124	142	201	2,5	2,5	0,25	**HJ 2320 EC**	0,93	13	23,5
	139	182	127,5	3	3	–	114	–	142	201	2,5	2,5	0,25	–			
	–	195	139	4	4	4,9	120	135	142	230	3	3	0,15	–			
105	–	140	119,5	2	1,1	3,8	111	117	122	151	2	1	0,1	–			
	–	164	125	2,1	2,1	2	117	122	128	178	2	2	0,15	–			
	134	164	125	2,1	2,1	2	117	122	137	178	2	2	0,15	–			
	134	164	125	2,1	2,1	–	117	–	137	178	2	2	0,15	–			
	134	–	173	2,1	2,1	2	117	170	176	178	2	2	0,15	–			
	–	190	133	3	3	3,4	119	130	136	211	2,5	2,5	0,15	–			
	145	190	133	3	3	3,4	119	130	148	211	2,5	2,5	0,15	–			
	145	–	201	3	3	3,4	119	198	203	211	2,5	2,5	0,15	–			
	–	203	144,5	4	4	4,9	125	140	147	240	3	3	0,15	–			

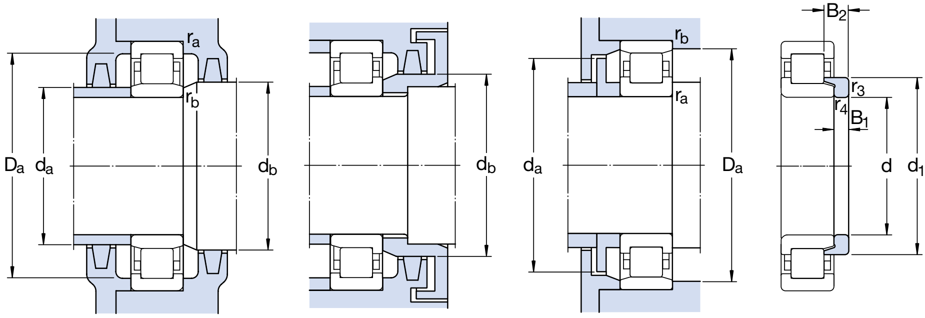
1) Permissible axial displacement from the normal position of one bearing ring in relation to the other

Single row cylindrical roller bearings
d **110 – 120** mm



Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
mm			kN		kN	r/min		kg	–	
110	170	28	128	166	19,3	4 500	7 000	2,30	**NU 1022 ML**	**M**
	200	38	335	365	42,5	3 600	4 000	4,80	⋆ **NU 222 ECP**	**J, M, ML**
	200	38	335	365	42,5	3 600	4 000	4,90	⋆ **NJ 222 ECP**	**J, M, ML**
	200	38	335	365	42,5	3 600	4 000	5,00	⋆ **NUP 222 ECP**	**ML**
	200	38	335	365	42,5	3 600	4 000	4,80	⋆ **N 222 ECP**	**M**
	200	53	440	520	61	3 600	4 000	6,70	⋆ **NU 2222 ECP**	**J, ML**
	200	53	440	520	61	3 600	4 000	6,85	⋆ **NJ 2222 ECP**	**J, ML**
	200	53	440	520	61	3 600	4 000	7,00	⋆ **NUP 2222 ECP**	**ML**
	240	50	530	540	61	3 000	3 400	10,8	⋆ **NU 322 ECP**	**J, M, ML**
	240	50	530	540	61	3 000	3 400	11,1	⋆ **NJ 322 ECP**	**J, M, ML**
	240	50	530	540	61	3 000	3 400	11,2	⋆ **NUP 322 ECP**	**J, ML**
	240	50	530	540	61	3 000	3 400	10,5	⋆ **N 322 ECP**	**M**
	240	80	780	900	102	3 000	3 400	17,0	⋆ **NU 2322 ECP**	**MA**
	240	80	780	900	102	3 000	3 400	18,9	⋆ **NJ 2322 ECP**	**MA**
	240	80	780	900	102	3 000	3 400	18,9	⋆ **NUP 2322 ECP**	**MA**
	280	65	532	585	64	2 600	3 200	20,0	**NU 422**	**–**
	280	65	532	585	64	2 600	3 200	20,3	**NJ 422**	**–**
120	180	28	134	183	20,8	4 000	6 300	2,45	**NU 1024 ML**	**M**
	215	40	390	430	49	3 400	3 600	5,75	⋆ **NU 224 ECP**	**J, M, ML**
	215	40	390	430	49,	3 400	3 600	5,85	⋆ **NJ 224 ECP**	**J, M, ML**
	215	40	390	430	49	3 400	3 600	6,00	⋆ **NUP 224 ECJ**	**ML**
	215	40	390	430	49	3 400	3 600	5,75	⋆ **N 224 ECP**	**M**
	215	58	520	630	72	3 400	3 600	8,30	⋆ **NU 2224 ECP**	**J, M, ML**
	215	58	520	630	72	3 400	3 600	8,50	⋆ **NJ 2224 ECP**	**J, M, ML**
	215	58	520	630	72	3 400	3 600	9,00	⋆ **NUP 2224 ECP**	**ML**
	260	55	610	620	69,5	2 800	3 200	13,3	⋆ **NU 324 ECP**	**J, M, ML**
	260	55	610	620	69,5	2 800	3 200	13,5	⋆ **NJ 324 ECP**	**J, M, ML**
	260	55	610	620	69,5	2 800	3 200	13,7	⋆ **NUP 324 ECP**	**ML**
	260	55	610	620	69,5	2 800	3 200	13,2	⋆ **N 324 ECP**	**M**

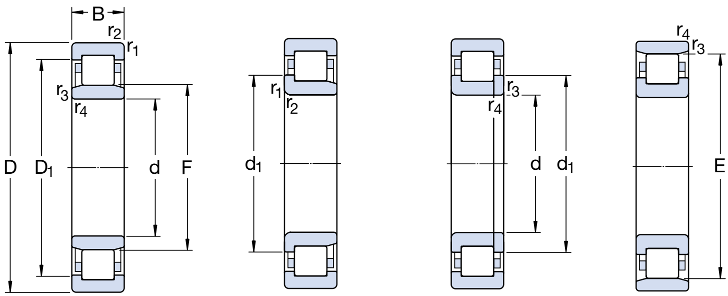
⋆ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 222 ECP becomes NU 222 ECML (for speed ratings ➔ **page 511**)



Angle ring

Dimensions							**Abutment and fillet dimensions**						**Calculation factor**	**Angle ring** Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1)]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
110	–	149	125	2	1,1	3,8	116	123	128	161	2	1	0,1	**–**			
	141	174	132,5	2,1	2,1	2,1	122	130	135	188	2	2	0,15	**HJ 222 EC**	0,60	11	17
	141	174	132,5	2,1	2,1	2,1	122	130	145	188	2	2	0,15	**HJ 222 EC**	0,60	11	17
	141	174	132,5	2,1	2,1	–	122	–	145	188	2	2	0,15	**–**			
	141	–	180,5	2,1	2,1	2,1	122	177	183	188	2	2	0,15	**–**			
	–	174	132,5	2,1	2,1	3,7	122	129	135	188	2	2	0,2	**–**			
	141	174	132,5	2,1	2,1	3,7	122	129	145	188	2	2	0,2	**–**			
	141	174	132,5	2,1	2,1	–	122	–	145	188	2	2	0,2	**–**			
	155	201	143	3	3	3	124	139	146	226	2,5	2,5	0,15	**HJ 322 EC**	1,20	14	22
	155	201	143	3	3	3	124	139	159	226	2,5	2,5	0,15	**HJ 322 EC**	1,20	14	22
	155	201	143	3	3	–	124	–	159	226	2,5	2,5	0,15	**–**			
	155	–	211	3	3	3	124	208	215	226	2,5	2,5	0,15	**–**			
	–	201	143	3	3	7,5	124	139	146	226	2,5	2,5	0,25	**–**			
	155	201	143	3	3	7,5	124	139	146	226	2,5	2,5	0,25	**–**			
	155	201	143	3	3	–	124	–	159	226	2,5	2,5	0,25	**–**			
	171	217	155	4	4	4,8	130	150	158	260	3	3	0,15	**HJ 422**	2,10	17	29,5
	171	217	155	4	4	4,8	130	150	174	260	3	3	0,15	**HJ 422**	2,10	17	29,5
120	–	159	135	2	1,1	3,8	126	133	138	171	2	1	0,1	**–**			
	153	188	143,5	2,1	2,1	1,9	132	140	146	203	2	2	0,15	**HJ 224 EC**	0,69	11	17
	153	188	143,5	2,1	2,1	1,9	132	140	156	203	2	2	0,15	**HJ 224 EC**	0,69	11	17
	153	188	143,5	2,1	2,1	–	132	–	156	203	2	2	0,15	**–**			
	153	–	195,5	2,1	2,1	1,9	132	192	199	203	2	2	0,15	**–**			
	153	188	143,5	2,1	2,1	3,8	132	140	146	203	2	2	0,2	**HJ 2224 EC**	0,74	11	20
	153	188	143,5	2,1	2,1	3,8	132	140	156	203	2	2	0,2	**HJ 2224 EC**	0,74	11	20
	153	188	143,5	2,1	2,1	–	132	–	156	203	2	2	0,2	**–**			
	168	219	154	3	3	3,7	134	150	157	246	2,5	2,5	0,15	**HJ 324 EC**	1,40	14	22,5
	168	219	154	3	3	3,7	134	150	171	246	2,5	2,5	0,15	**HJ 324 EC**	1,40	14	22,5
	168	219	154	3	3	–	134	–	171	246	2,5	2,5	0,15	**–**			
	168	–	230	3	3	3,7	134	226	234	246	2,5	2,5	0,15	**–**			

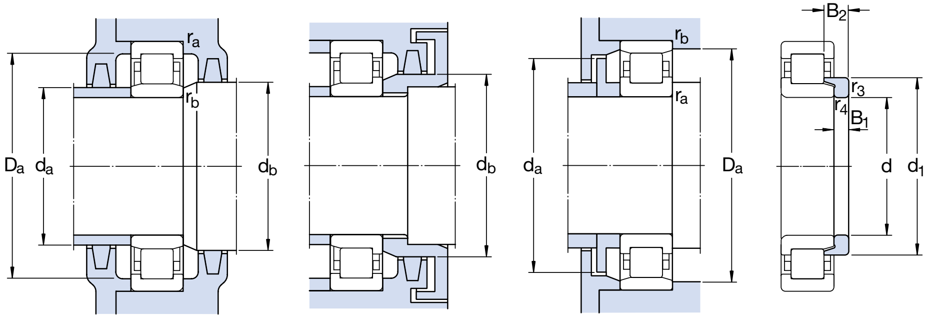
[1)] Permissible axial displacement from the normal position of one bearing ring in relation to the other



NU NJ NUP N

Principal dimensions			**Basic load ratings**		**Fatigue load limit**	**Speed ratings**		**Mass**		**Designations**	
			dynamic	static		Reference speed	Limiting speed	Bearing with standard cage		Bearing with standard cage	Alternative standard cage designs[1)]
d	D	B	C	C_0	P_u						
mm			kN		kN	r/min		kg		–	
120	260	86	915	1 040	116	2 800	4 300	24,0	⋆	**NU 2324 ECMA**	**–**
cont.	260	86	915	1 040	116	2 800	4 300	24,3	⋆	**NJ 2324 ECMA**	**M**
	260	86	915	1 040	116	2 800	4 300	24,3	⋆	**NUP 2324 ECMA**	**–**
	310	72	644	735	78	2 400	2 800	28,0		**NU 424**	**–**
130	200	33	165	224	25	3 800	5 600	3,80		**NU 1026 ML**	**M**
	230	40	415	455	51	3 200	3 400	6,45	⋆	**NU 226 ECP**	**J, M, ML**
	230	40	415	455	51	3 200	3 400	6,60	⋆	**NJ 226 ECP**	**J, M, ML**
	230	40	415	455	51	3 200	3 400	6,75	⋆	**NUP 226 ECP**	**J, ML**
	230	40	415	455	51	3 200	3 400	6,30	⋆	**N 226 ECP**	**–**
	230	64	610	735	83	3 200	3 400	10,5	⋆	**NU 2226 ECP**	**ML**
	230	64	610	735	83	3 200	3 400	12,2	⋆	**NJ 2226 ECP**	**ML**
	230	64	610	735	83	3 200	3 400	12,2	⋆	**NUP 2226 ECP**	**ML**
	280	58	720	750	81,5	2 400	3 000	16,5	⋆	**NU 326 ECP**	**J, M, ML**
	280	58	720	750	81,5	2 400	3 000	18,4	⋆	**NJ 326 ECP**	**J, M, ML**
	280	58	720	750	81,5	2 400	3 000	19,6	⋆	**NUP 326 ECP**	**ML**
	280	58	720	750	81,5	2 400	3 000	18,5	⋆	**N 326 ECP**	**M**
	280	93	1 060	1 250	137	2 400	3 000	30,0	⋆	**NU 2326 ECMA**	**–**
	280	93	1 060	1 250	137	2 400	3 000	30,5	⋆	**NJ 2326 ECMA**	**–**
	280	93	1 060	1 250	137	2 400	3 000	31,0	⋆	**NUP 2326 ECMA**	**–**
140	210	33	172	245	27	3 600	5 300	4,05		**NU 1028 ML**	**M**
	250	42	450	510	57	2 800	3 200	8,50	⋆	**NU 228 ECM**	**J, ML**
	250	42	450	510	57	2 800	3 200	8,75	⋆	**NJ 228 ECM**	**J, ML**
	250	42	450	510	57	2 800	3 200	8,90	⋆	**NUP 228 ECM**	**ML**
	250	68	655	830	93	2 800	4 800	15,0	⋆	**NU 2228 ECML**	**–**
	250	68	655	830	93	2 800	4 800	15,3	⋆	**NJ 2228 ECML**	**–**
	250	68	655	830	93	2 800	4 800	15,6	⋆	**NUP 2228 ECML**	**–**
	300	62	780	830	88	2 400	2 800	22,7	⋆	**NU 328 ECM**	**J, ML**
	300	62	780	830	88	2 400	2 800	23,0	⋆	**NJ 328 ECM**	**J, ML**
	300	62	780	830	88	2 400	2 800	23,5	⋆	**NUP 328 ECM**	**ML**

⋆ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 226 ECP becomes NU 226 ECML (for speed ratings ➔ **page 511**)

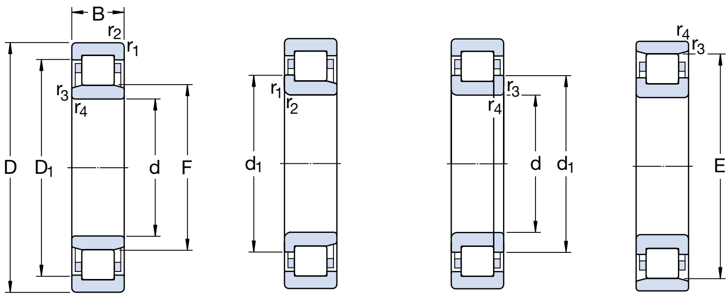


Angle ring

Dimensions							**Abutment and fillet dimensions**						**Calculation factor**	**Angle ring** Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1)]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
120	–	219	154	3	3	7,2	134	150	157	246	2,5	2,5	0,25	**HJ 2324 EC**	1,45	14	26
cont.	168	219	154	3	3	7,2	134	150	171	246	2,5	2,5	0,25	**HJ 2324 EC**	1,45	14	26
	168	219	154	3	3	–	134	–	171	246	2,5	2,5	0,25	**–**			
	188	240	170	5	5	6,3	144	165	173	286	4	4	0,15	**HJ 424**	2,60	17	30,5
130	–	175	148	2	1,1	4,7	136	145	151	191	2	1	0,1	**–**			
	164	202	153,5	3	3	2,1	144	150	156	216	2,5	2,5	0,15	**HJ 226 EC**	0,75	11	17
	164	202	153,5	3	3	2,1	144	150	167	216	2,5	2,5	0,15	**HJ 226 EC**	0,75	11	17
	164	202	153,5	3	3	–	144	–	167	216	2,5	2,5	0,15	**–**			
	164	–	209,5	3	3	2,1	144	206	213	216	2,5	2,5	0,15	**–**			
	164	202	153,5	3	3	4,3	144	149	156	216	2,5	2,5	0,2	**HJ 2226 EC**	0,83	11	21
	164	202	153,5	3	3	4,3	144	149	167	216	2,5	2,5	0,2	**HJ 2226 EC**	0,83	11	21
	164	202	153,5	3	3	–	144	–	167	216	2,5	2,5	0,2				
	181	236	167	4	4	3,7	147	163	170	263	3	3	0,15	**HJ 326 EC**	1,60	14	23
	181	236	167	4	4	3,7	147	163	185	263	3	3	0,15	**HJ 326 EC**	1,60	14	23
	181	236	167	4	4	–	147	–	185	263	3	3	0,15	**–**			
	181	–	247	4	4	3,7	147	243	251	263	3	3	0,15	**–**			
	–	236	167	4	4	8,7	147	163	170	263	3	3	0,25	**HJ 2326 EC**	1,70	14	28
	181	236	167	4	4	8,7	147	163	185	263	3	3	0,25	**HJ 2326 EC**	1,70	14	28
	181	236	167	4	4	–	147	–	185	263	3	3	0,25	**–**			
140	–	185	158	2	1,1	4,4	146	155	161	201	2	1	0,1	**–**			
	–	217	169	3	3	2,5	154	166	172	236	2,5	2,5	0,15	**–**			
	179	217	169	3	3	2,5	154	166	183	236	2,5	2,5	0,15	**–**			
	179	217	169	3	3	–	154	–	183	236	2,5	2,5	0,15	**–**			
	179	217	169	3	3	4,4	154	164	172	236	2,5	2,5	0,2	**HJ 2228 EC**	1,05	11	23
	179	217	169	3	3	4,4	154	164	183	236	2,5	2,5	0,2	**HJ 2228 EC**	1,05	11	23
	179	217	169	3	3	–	154	–	183	236	2,5	2,5	0,2	**–**			
	195	252	180	4	4	3,7	157	176	183	283	3	3	0,15	**HJ 328 EC**	2,00	15	25
	195	252	180	4	4	3,7	157	176	199	283	3	3	0,15	**HJ 328 EC**	2,00	15	25
	195	252	180	4	4	–	157	–	199	283	3	3	0,15	**–**			

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

Single row cylindrical roller bearings
d **140 – 160** mm

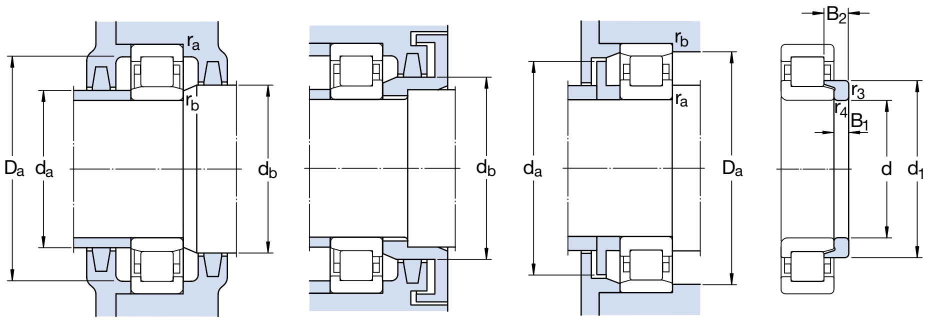


NU NJ NUP N

Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage designs[1)]
mm			kN		kN	r/min		kg	–	
140	300	102	1 200	1 430	150	2 400	3 600	37,0	★ **NU 2328 ECMA**	**–**
cont.	300	102	1 200	1 430	150	2 400	3 600	37,5	★ **NJ 2328 ECMA**	**–**
	300	102	1 200	1 430	150	2 400	3 600	38,0	★ **NUP 2328 ECMA**	**–**
150	225	35	194	275	30	3 200	5 000	4,85	**NU 1030 ML**	**M**
	270	45	510	600	64	2 600	2 800	11,8	★ **NU 230 ECM**	**J, ML**
	270	45	510	600	64	2 600	2 800	12,0	★ **NJ 230 ECM**	**J, ML**
	270	45	510	600	64	2 600	2 800	12,2	★ **NUP 230 ECM**	**ML**
	270	73	735	930	100	2 600	2 800	20,0	★ **NU 2230 ECM**	**–**
	270	73	735	930	100	2 600	2 800	20,3	★ **NJ 2230 ECM**	**–**
	320	65	900	965	100	2 200	2 600	27,5	★ **NU 330 ECM**	**MA**
	320	65	900	965	100	2 200	2 600	28,0	★ **NJ 330 ECM**	**MA**
	320	108	1 370	1 630	166	2 200	3 400	45,5	★ **NU 2330 ECMA**	**–**
	320	108	1 370	1 630	166	2 200	3 400	46,0	★ **NJ 2330 ECMA**	**–**
	320	108	1 370	1 630	166	2 200	3 400	46,5	★ **NUP 2330 ECMA**	**–**
160	240	38	229	325	35,5	3 000	4 800	5,95	**NU 1032 ML**	**M**
	290	48	585	680	72	2 400	2 600	14,5	★ **NU 232 ECM**	**ML**
	290	48	585	680	72	2 400	2 600	15,0	★ **NJ 232 ECM**	**ML**
	290	48	585	680	72	2 400	2 600	15,5	★ **NUP 232 ECM**	**ML**
	290	48	585	680	72	2 400	2 600	15,5	★ **N 232 ECM**	**–**
	290	80	930	1 200	129	2 400	3 600	24,0	★ **NU 2232 ECMA**	**–**
	290	80	930	1 200	129	2 400	3 600	24,5	★ **NJ 2232 ECMA**	**–**
	340	68	1 000	1 080	112	2 000	2 400	33,0	★ **NU 332 ECM**	**MA**
	340	68	1 000	1 080	112	2 000	2 400	33,5	★ **NJ 332 ECM**	**MA**
	340	114	1 250	1 730	173	1 800	2 800	53,0	**NU 2332 ECMA**	**–**
	340	114	1 250	1 730	173	1 800	2 800	53,5	**NJ 2332 ECMA**	**–**

★ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 1030 ML becomes NU 1030 M (for speed ratings ➔ **page 511**)

SKF

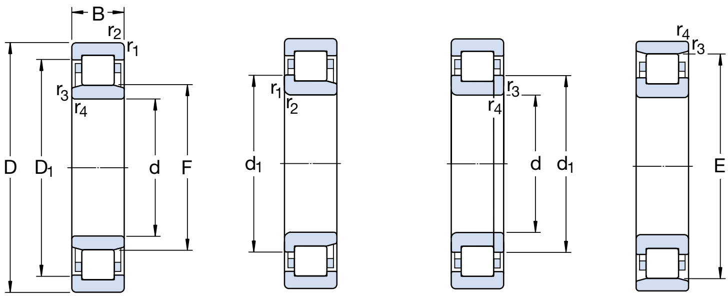


Angle ring

Dimensions							Abutment and fillet dimensions						Calcu-lation factor	Angle ring Designation	Mass	Dimen-sions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
140	195	252	180	4	4	9,7	157	176	183	283	3	3	0,25	**HJ 2338 EC**			
cont.	195	252	180	4	4	9,7	157	176	199	283	3	3	0,25	**HJ 2338 EC**			
	195	252	180	4	4	–	157	–	199	283	3	3	0,25	–			
150	–	198	169,5	2,1	1,5	4,9	157	167	173	215	2	1,5	0,1	–			
	193	234	182	3	3	2,5	163	178	185	256	2,5	2,5	0,15	**HJ 230 EC**	1,25	12	19,5
	193	234	182	3	3	2,5	164	178	197	256	2,5	2,5	0,15	**HJ 230 EC**	1,25	12	19,5
	193	234	182	3	3	–	164	–	197	256	2,5	2,5	0,15	–			
	194	234	182	3	3	4,9	164	179	185	256	2,5	2,5	0,2	**HJ 2230 EC**	1,35	12	24,5
	194	234	182	3	3	4,9	164	179	197	256	2,5	2,5	0,2	**HJ 2230 EC**	1,35	12	24,5
	–	270	193	4	4	4	167	189	196	303	3	3	0,15	–			
	209	270	193	4	4	4	167	189	213	303	3	3	0,15	–			
	209	270	193	4	4	10,5	167	189	196	303	3	3	0,25	–			
	209	270	193	4	4	10,5	167	189	213	303	3	3	0,25	–			
	209	270	193	4	4	–	167	–	213	303	3	3	0,25	–			
160	188	211	180	2,1	1,5	5,2	167	177	183	230	2	1,5	0,1	**HJ 1032**	0,65	10	19
	–	250	195	3	3	2,7	174	191	198	276	2,5	2,5	0,15	–			
	206	250	195	3	3	2,7	174	191	210	276	2,5	2,5	0,15	–			
	206	250	195	3	3	–	174	–	210	276	2,5	2,5	0,15	–			
	206	–	259	3	3	2,7	174	255	263	276	2,5	2,5	0,15	–			
	205	252	193	3	3	4,5	174	188	196	276	2,5	2,5	0,2	**HJ 2232 EC**	1,55	12	24,5
	205	252	193	3	3	4,5	174	188	209	276	2,5	2,5	0,2	**HJ 2232 EC**	1,55	12	24,5
	221	286	204	4	4	4	177	200	207	323	3	3	0,15	**HJ 332 EC**	2,55	15	25
	221	286	204	4	4	4	177	200	225	323	3	3	0,15	**HJ 332 EC**	2,55	15	25
	–	286	204	4	4	11	177	200	207	323	3	3	0,25	–			
	221	286	204	4	4	11	177	200	225	323	3	3	0,25	–			

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

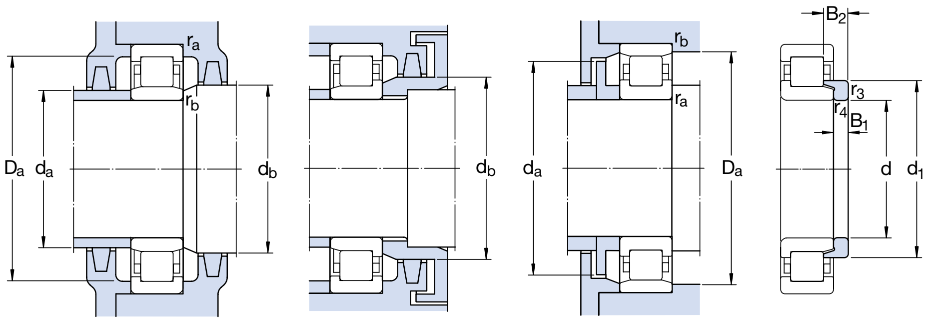
Single row cylindrical roller bearings
d **170 – 190** mm



NU NJ NUP N

Principal dimensions			**Basic load ratings**		**Fatigue load limit**	**Speed ratings**		**Mass**	**Designations**	
			dynamic	static		Reference speed	Limiting speed	Bearing with standard cage	Bearing with standard cage	Alternative standard cage design[1)]
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
170	260	42	275	400	41,5	2 800	4 300	8,15	**NU 1034 ML**	**M**
	310	52	695	815	85	2 200	2 400	19,0	⋆ **NU 234 ECM**	**MA**
	310	52	695	815	85	2 200	2 400	19,5	⋆ **NJ 234 ECM**	**MA**
	310	52	695	815	85	2 200	2 400	20,0	⋆ **NUP 234 ECM**	**MA**
	310	86	1 060	1 340	140	2 200	3 200	30,0	⋆ **NU 2234 ECMA**	**–**
	360	72	952	1 180	116	1 700	2 200	37,5	**NU 334 ECM**	**MA**
	360	72	952	1 180	116	1 700	2 200	38,5	**N 334 ECM**	**–**
	360	120	1 450	2 040	204	1 700	3 000	62,0	**NU 2334 ECMA**	**–**
	360	120	1 450	2 040	204	1 700	3 000	63,0	**NJ 2334 ECMA**	**–**
180	280	46	336	475	51	2 600	4 000	10,5	**NU 1036 ML**	**M**
	320	52	720	850	88	2 200	3 200	19,5	⋆ **NU 236 ECMA**	**–**
	320	52	720	850	88	2 200	3 200	20,2	⋆ **NJ 236 ECMA**	**–**
	320	52	720	850	88	2 200	3 200	21,0	⋆ **NUP 236 ECMA**	**–**
	320	86	1 100	1 430	146	2 200	3 200	31,5	⋆ **NU 2236 ECMA**	**M**
	320	86	1 100	1 430	146	2 200	3 200	32,0	⋆ **NJ 2236 ECMA**	**M**
	380	75	1 020	1 290	125	1 600	2 200	44,0	**NU 336 ECM**	**–**
	380	126	1 610	2 240	216	1 600	2 800	71,5	**NU 2336 ECMA**	**–**
190	290	46	347	500	53	2 600	3 800	11,0	**NU 1038 ML**	**–**
	340	55	800	965	98	2 000	3 000	24,0	⋆ **NU 238 ECMA**	**M**
	340	55	800	965	98	2 000	3 000	24,5	⋆ **NJ 238 ECMA**	**M**
	340	55	800	965	98	2 000	3 000	25,0	⋆ **NUP 238 ECMA**	**M**
	340	92	1 220	1 600	160	2 000	3 000	39,0	⋆ **NU 2238 ECMA**	**–**
	400	78	1 140	1 500	143	1 500	2 000	50,0	**NU 338 ECM**	**–**
	400	132	1 830	2 550	236	1 500	2 600	82,5	**NU 2338 ECMA**	**–**

⋆ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question, e.g. NU 1034 ML becomes NU 1034 M (for speed ratings ➔ **page 511**)

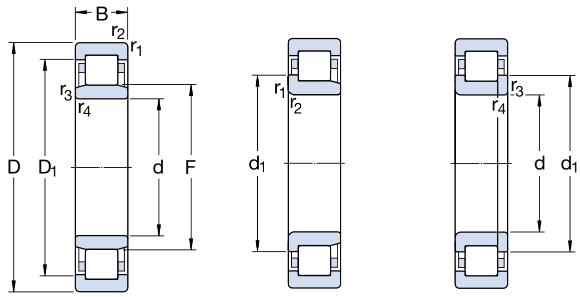


Angle ring

Dimensions							Abutment and fillet dimensions						Calculation factor	Angle ring Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F, E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b, D_a min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
170	201	227	193	2,1	2,1	5,8	180	190	196	250	2	2	0,1	**HJ 1034**	0,94	11	21
	220	268	207	4	4	2,9	187	203	210	293	3	3	0,15	**HJ 234 EC**	1,65	12	20
	220	268	207	4	4	2,9	187	203	224	293	3	3	0,15	**HJ 234 EC**	1,65	12	20
	220	268	207	4	4	–	187	–	224	293	3	3	0,15	**–**			
	–	270	205	4	4	4,2	187	200	208	293	3	3	0,2	**–**			
	–	303	218	4	4	4,6	187	214	221	343	3	3	0,15	**–**			
	236	–	318	4	4	4,6	187	313	323	343	3	3	0,15	**–**			
	–	301	216	4	4	10	187	211	220	343	3	3	0,25	**–**			
	234	301	216	4	4	10	187	211	238	343	3	3	0,25	**–**			
180	–	244	205	2,1	2,1	6,1	190	202	208	270	2	2	0,1	**–**			
	230	279	217	4	4	2,9	197	213	220	303	3	3	0,15	**HJ 236 EC**	1,70	12	20
	230	279	217	4	4	2,9	197	213	234	303	3	3	0,15	**HJ 236 EC**	1,70	12	20
	230	279	217	4	4	–	197	–	234	303	3	3	0,15	**–**			
	–	280	215	4	4	4,2	197	210	218	303	3	3	0,2	**–**			
	229	280	215	4	4	4,2	197	210	233	303	3	3	0,2	**–**			
	–	319	231	4	4	4,2	197	223	235	363	3	3	0,15	**–**			
	–	320	231	4	4	8,2	197	223	235	363	3	3	0,25	**–**			
190	–	254	215	2,1	2,1	6,1	200	212	218	280	2	2	0,1	**–**			
	244	295	230	4	4	3	207	226	234	323	3	3	0,15	**HJ 238 EC**	2,10	13	21,5
	244	295	230	4	4	3	207	226	248	323	3	3	0,15	**HJ 238 EC**	2,10	13	21,5
	244	295	230	4	4	–	207	–	248	323	3	3	0,15	**–**			
	–	297	228	4	4	5	207	222	232	323	3	3	0,2	**–**			
	264	338	245	5	5	4,3	210	240	249	380	4	4	0,15	**HJ 338 EC**	4,30	18	29
	–	341	240	5	5	9,5	210	235	244	380	4	4	0,25	**–**			

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

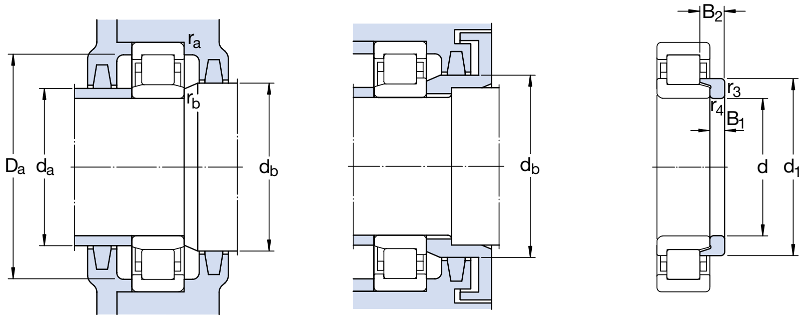
Single row cylindrical roller bearings
d **200 – 240** mm



NU NJ NUP

Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing with standard cage	Designations Bearing with standard cage	Alternative standard cage design[1)]
mm			kN		kN	r/min		kg	–	
200	310	51	380	570	58,5	2 400	3 000	14,5	**NU 1040 MA**	**M**
	360	58	850	1 020	100	1 900	2 800	28,5	⋆ **NU 240 ECMA**	**M**
	360	58	850	1 020	100	1 900	2 800	29,0	⋆ **NJ 240 ECMA**	**M**
	360	58	850	1 020	100	1 900	2 800	29,5	⋆ **NUP 240 ECMA**	**M**
	360	98	1 370	1 800	180	1 900	2 800	46,0	⋆ **NU 2240 ECMA**	**–**
	420	80	1 230	1 630	150	1 400	2 400	56,0	**NU 340 ECMA**	**–**
	420	138	1 980	2 800	255	1 400	2 400	97,0	**NU 2340 ECMA**	**–**
	420	138	1 980	2 800	255	1 400	2 400	98,0	**NJ 2340 ECMA**	**–**
220	340	56	495	735	73,5	2 200	2 800	19,0	**NU 1044 MA**	**M**
	400	65	1 060	1 290	125	1 600	2 400	38,5	⋆ **NU 244 ECMA**	**M**
	400	65	1 060	1 290	125	1 600	2 400	39,0	⋆ **NJ 244 ECMA**	**M**
	400	65	1 060	1 290	125	1 600	2 400	39,5	⋆ **NUP 244 ECMA**	**M**
	400	108	1 570	2 280	212	1 600	2 400	62,5	**NU 2244 ECMA**	**–**
	460	88	1 210	1 630	150	1 500	1 700	72,5	**NU 344 M**	**–**
	460	88	1 210	1 630	150	1 500	1 700	73,5	**NJ 344 M**	**–**
	460	145	2 380	3 450	310	1 300	2 200	120	**NU 2344 ECMA**	**–**
240	360	56	523	800	78	2 000	2 600	20,0	**NU 1048 MA**	**–**
	440	72	952	1 370	129	1 600	2 200	51,5	**NU 248 MA**	**–**
	440	72	952	1 370	129	1 600	2 200	52,5	**NJ 248 MA**	**–**
	440	72	952	1 370	129	1 600	2 200	53,5	**NUP 248 MA**	**–**
	440	120	1 450	2 360	216	1 500	2 200	84,0	**NU 2248 MA**	**–**
	440	120	1 450	2 360	216	1 500	2 200	85,0	**NJ 2248 MA**	**–**
	500	95	1 450	2 000	180	1 300	1 600	94,5	**NU 348 M**	**–**
	500	95	1 450	2 000	180	1 300	2 000	98,5	**NJ 348 MA**	**–**
	500	155	2 600	3 650	320	1 200	2 000	155	**NU 2348 ECMA**	**–**

⋆ SKF Explorer bearing
1) When ordering bearings with an alternative standard cage the suffix of the standard cage has to be replaced by the suffix of the cage in question. e.g. NU 1040 MA becomes NU 1040 M (for speed ratings ➔ **page 511**)

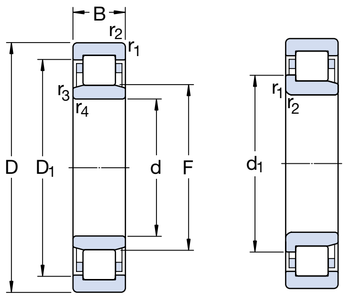


Angle ring

Dimensions							Abutment and fillet dimensions						Calcu-lation factor	Angle ring Designation	Mass	Dimen-sions	
d	d_1 ~	D_1 ~	F	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
200	239	269	229	2,1	2,1	7	210	225	233	299	2	2	0,1	**HJ 1040**	1,65	13	25,5
	258	312	243	4	4	2,6	217	239	247	343	3	3	0,15	**HJ 240 EC**	2,55	14	23
	258	312	243	4	4	2,6	217	239	262	343	3	3	0,15	**HJ 240 EC**	2,55	14	23
	258	312	243	4	4	–	217	–	262	343	3	3	0,15	–			
	–	313	241	4	4	5,1	217	235	245	343	3	3	0,2	–			
	–	337	260	5	5	4	220	253	264	400	4	4	0,15	–			
	–	353	247	5	5	9,4	220	241	251	400	4	4	0,25	–			
	278	353	247	5	5	9,4	220	241	280	400	4	4	0,25	–			
220	262	297	250	3	3	7,5	233	246	254	327	2,5	2,5	0,1	**HJ 1044**	2,10	14	27
	–	344	268	4	4	2,3	237	264	270	383	3	3	0,15	–			
	284	344	268	4	4	2,3	237	264	288	383	3	3	0,15	–			
	284	344	268	4	4	–	237	–	288	383	3	3	0,15	–			
	–	349	259	4	4	7,9	237	255	264	383	3	3	0,2	–			
	–	371	284	5	5	5,2	240	277	288	440	4	4	0,15	–			
	307	371	284	5	5	5,2	240	277	311	440	4	4	0,15	–			
	–	384	277	5	5	10,4	240	268	280	440	4	4	0,25	–			
240	282	317	270	3	3	7,5	253	266	274	347	2,5	2,5	0,1	**HJ 1048**	2,25	14	27
	–	365	295	4	4	3,4	257	288	299	423	3	3	0,15	–			
	316	365	295	4	4	3,4	257	288	317	423	3	3	0,15	–			
	316	365	295	4	4	–	257	–	317	423	3	3	0,15	–			
	–	365	295	4	4	4,3	257	284	299	423	3	3	0,2	–			
	–	365	295	4	4	4,3	257	284	299	423	3	3	0,2	–			
	335	401	310	5	5	5,6	260	302	314	480	4	4	0,15	**HJ 348**	8,90	22	39,5
	335	401	310	5	5	5,6	260	302	314	480	4	4	0,15	**HJ 348**	8,90	22	39,5
	–	426	299	5	5	10,3	260	295	305	480	4	4	0,25	–			

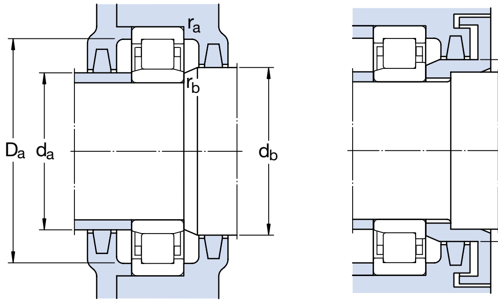
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other

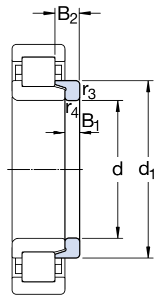
Single row cylindrical roller bearings
d **260 – 380** mm



NU NJ

Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
260	400	65	627	965	96,5	1 800	2 400	29,5	**NU 1052 MA**
	480	80	1 170	1 700	156	1 400	2 000	68,5	**NU 252 MA**
	480	80	1 170	1 700	156	1 400	2 000	70,0	**NJ 252 MA**
	480	80	1 170	1 700	156	1 400	2 000	72,0	**NUP 252 MA**
	480	130	1 790	3 000	265	1 300	2 000	110	**NU 2252 MA**
	480	130	1 790	3 000	265	1 300	2 000	112	**NJ 2252 MA**
	540	102	1 940	2 700	236	1 100	1 800	125	**NU 352 ECMA**
280	420	65	660	1 060	102	1 700	2 200	32,5	**NU 1056 MA**
	500	80	1 140	1 700	153	1 400	1 900	71,5	**NU 256 MA**
	500	80	1 140	1 700	153	1 400	1 900	73,0	**NJ 256 MA**
	500	130	2 200	3 250	285	1 200	1 900	115	**NU 2256 ECMA**
	580	175	2 700	4 300	365	1 000	1 700	230	**NU 2356 MA**
300	460	74	858	1 370	129	1 500	2 000	46,5	**NU 1060 MA**
	460	74	858	1 370	129	1 500	2 000	47,0	**NJ 1060 MA**
	540	85	1 420	2 120	183	1 300	1 800	89,5	**NU 260 MA**
	540	140	2 090	3 450	300	1 200	1 800	145	**NU 2260 MA**
320	480	74	880	1 430	132	1 400	1 900	48,5	**NU 1064 MA**
	480	74	880	1 430	132	1 400	1 900	49,0	**NJ 1064 MA**
	580	92	1 610	2 450	204	1 200	1 600	115	**NU 264 MA**
	580	150	3 190	5 000	415	1 000	1 600	180	**NU 2264 ECMA**
340	520	82	1 080	1 760	156	1 300	1 700	65,0	**NU 1068 MA**
	520	82	1 080	1 760	156	1 300	1 700	68,0	**NJ 1068 MA**
	620	165	2 640	4 500	365	1 000	1 500	220	**NU 2268 MA**
360	540	82	1 100	1 830	163	1 3000	1 600	67,5	**NU 1072 MA**
	650	170	2 920	4 900	400	950	1 400	250	**NU 2272 MA**
380	560	82	1 140	1 930	170	1 200	1 600	71,0	**NU 1076 MA**
	560	82	1 140	1 930	170	1 200	1 600	73,0	**NJ 1076 MA**
	680	175	3 140	5 500	440	900	1 600	275	**NU 2276 ECMA**



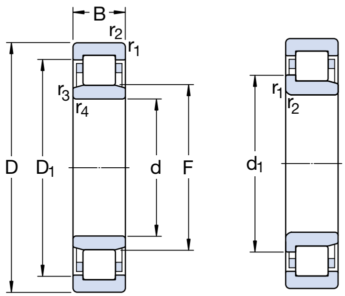


Angle ring

Dimensions							Abutment and fillet dimensions						Calculation factor	Angle ring Designation	Mass	Dimensions	
d	d_1 ~	D_1 ~	F	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
260	309	349	296	4	4	8	276	291	300	384	3	3	0,1	**HJ 1052**	3,30	16	31,5
	340	397	320	5	5	3,4	280	313	324	460	4	4	0,15	**HJ 252**	6,20	18	33
	340	397	320	5	5	3,4	280	313	344	460	4	4	0,15	**HJ 252**	6,20	18	33
	340	397	320	5	5	–	280	–	344	460	4	4	0,15	**–**			
	–	397	320	5	5	4,3	280	309	324	460	4	4	0,2	**–**			
	340	397	320	5	5	4,3	280	309	324	460	4	4	0,2	**–**			
	–	455	337	6	6	4,2	286	330	341	514	5	5	0,15	**–**			
280	329	369	316	4	4	8	295	311	320	405	3	3	0,1	**HJ 1056**	3,55	16	31,5
	–	417	340	5	5	3,8	300	333	344	480	4	4	0,15	**–**			
	360	417	340	5	5	3,8	300	333	364	480	4	4	0,15	**–**			
	350	433	327	5	5	10,2	300	320	331	480	4	4	0,2	**HJ 2256 EC**	6,75	18	38
	–	467	362	6	6	6,6	306	347	366	554	5	5	0,25	**–**			
300	–	402	340	4	4	9,7	317	335	344	443	3	3	0,1	**HJ 1060**	5,30	19	36
	356	402	340	4	4	9,7	317	335	344	443	3	3	0,1	**HJ 1060**	5,30	19	36
	–	451	364	5	5	4,8	320	358	368	520	4	4	0,15	**–**			
	–	451	364	5	5	5,6	320	352	368	520	4	4	0,2	**–**			
320	376	422	360	4	4	9,7	335	355	364	465	3	3	0,1	**HJ 1064**	5,65	19	36
	376	422	360	4	4	9,7	335	355	380	465	3	3	0,1	**HJ 1064**	5,65	19	36
	–	485	390	5	5	5,3	340	383	394	560	4	4	0,15	**–**			
	–	485	390	5	5	5,9	340	377	394	560	4	4	0,2	**–**			
340	403	455	385	5	5	6,5	358	380	389	502	4	4	0,1	**HJ 1068**	7,40	21	39,5
	403	455	385	5	5	6,5	358	380	408	502	4	4	0,1	**HJ 1068**	7,40	21	39,5
	–	515	416	6	6	8	366	401	421	594	5	5	0,2	**–**			
360	423	475	405	5	5	6,5	378	400	410	522	4	4	0,1	**HJ 1072**	7,75	21	39,5
	–	542	437	6	6	16,7	386	428	442	624	5	5	0,2	**–**			
380	443	495	425	5	5	10,8	398	420	430	542	4	4	0,1	**HJ 1076**	8,25	21	39,5
	443	495	425	5	5	10,8	398	420	430	542	4	4	0,1	**HJ 1076**	8,25	21	39,5
	–	595	451	6	6	8,3	406	447	455	654	5	5	0,2	**–**			

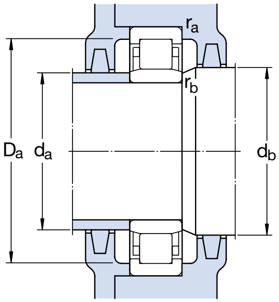
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other

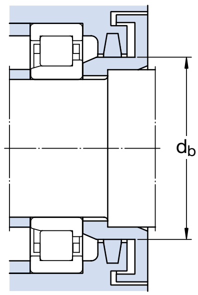
Single row cylindrical roller bearings
d **400 – 800** mm

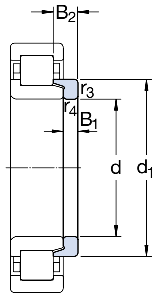


NU NJ

Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation
mm			kN		kN	r/min		kg	–
400	600	90	1 380	2 320	204	1 100	1 500	92,5	**NU 1080 MA**
420	620	90	1 420	2 450	212	1 100	1 400	96,0	**NU 1084 MA**
440	650	94	1 510	2 650	212	1 000	1 300	105	**NU 1088 MA**
460	680	100	1 650	2 850	224	950	1 200	115	**NJ 1092 MA**
	830	165	4 180	6 800	510	750	1 100	415	**NU 1292 MA**
	830	212	5 120	8 650	655	700	1 100	530	**NU 2292 MA**
480	700	100	1 680	3 000	232	900	1 200	130	**NU 1096 MA**
500	720	100	1 720	3 100	236	900	1 100	135	**NU 10/500 MA**
	920	185	5 280	8 500	620	670	950	585	**NU 12/500 MA**
530	780	112	2 290	4 050	305	800	1 000	190	**NU 10/530 MA**
	780	145	3 740	7 350	550	670	1 000	255	**NU 20/530 ECMA**
560	820	115	2 330	4 250	310	750	1 000	210	**NU 10/560 MA**
	820	150	3 800	7 650	560	630	1 000	290	**NU 20/560 ECMA**
	1 030	206	7 210	11 200	780	560	800	805	**NU 12/560 MA**
600	870	118	2 750	5 100	365	700	900	245	**NU 10/600 N2MA**
	870	155	4 180	8 000	570	600	900	325	**NU 20/600 ECMA**
	1 090	155	5 610	9 800	670	480	850	710	**NU 2/600 ECMA/HB1**
630	920	128	3 410	6 200	430	630	1 000	285	**NU 10/630 ECN2MA**
	920	170	4 730	9 500	670	560	850	400	**NU 20/630 ECMA**
	1 150	230	8 580	13 700	915	450	700	1 100	**NU 12/630 ECMA**
670	980	136	3 740	6 800	465	530	800	350	**NU 10/670 ECMA**
	980	180	5 390	11 000	750	500	800	480	**NU 20/670 ECMA**
710	1 030	140	4 680	8 500	570	500	750	415	**NU 10/710 ECN2MA**
	1 030	185	5 940	12 000	815	480	700	540	**NU 20/710 ECMA**
750	1 090	150	4 730	8 800	585	430	670	490	**NU 10/750 ECN2MA**
	1 090	195	7 040	14 600	980	430	670	635	**NU 20/750 ECMA**
800	1 150	200	7 040	14 600	950	400	630	715	**NU 20/800 ECMA**







Angle ring

Dimensions							**Abutment and fillet dimensions**						**Calcu-lation factor**	**Angle ring** Designation	Mass	Dimen-sions	
d	d_1 ~	D_1 ~	F	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_a max	d_b min	D_a max	r_a max	r_b max	k_r			B_1	B_2
mm							mm						–	–	kg	mm	
400	470	527	450	5	5	14	418	446	455	582	4	4	0,1	**HJ 1080**	9,75	23	43
420	490	547	470	5	5	14	438	466	475	602	4	4	0,1	**HJ 1084**	10,0	23	43
440	512	574	493	6	6	14,7	463	488	498	627	5	5	0,1	**HJ 1088**	11,5	24	45
460	537	600	516	6	6	15,9	483	511	521	657	5	5	0,1	**HJ 1092**	14,0	25	48
	–	715	554	7,5	7,5	6,4	492	542	559	798	6	6	0,14	**–**			
	–	706	554	7,5	7,5	16,5	492	542	559	798	6	6	0,2	**–**			
480	557	620	536	6	6	15,9	503	531	541	677	5	5	0,1	**HJ 1096**	14,5	25	48
500	577	640	556	6	6	11,2	523	550	561	697	5	5	0,1	**HJ 10/500**	15,0	25	48
	–	728	576	7,5	7,5	14,5	532	564	581	798	6	6	0,21	**–**			
530	–	692	593	6	6	10,4	553	585	598	757	5	5	0,1	**–**			
	–	704	591	6	6	6,8	553	587	596	757	5	5	0,14	**–**			
560	648	726	625	6	6	12,3	583	617	630	797	5	5	0,1	**HJ 10/560**	21,0	27,5	53
	–	726	625	6	6	12,3	583	617	630	797	5	5	0,1	**–**			
	–	741	626	6	6	6,7	583	616	631	797	5	5	0,14	**–**			
600	695	779	667	6	6	14	623	658	672	847	5	5	0,1	**HJ 10/600**	27,5	31	55
	–	793	661	6	6	6,1	623	652	667	847	5	5	0,14	**–**			
	–	925	749	9,5	9,5	3	640	743	755	1 050	8	8	0,17	**–**			
630	–	837	702	7,5	7,5	6,2	658	691	706	892	6	6	0,1	**–**			
	–	832	699	7,5	7,5	8,7	658	690	705	892	6	6	0,14	**–**			
	–	1 005	751	12	12	13,5	678	735	757	1 102	10	10	0,17	**–**			
670	–	891	747	7,5	7,5	7,9	698	736	753	952	6	6	0,1	**–**			
	–	890	746	7,5	7,5	7	698	736	752	952	6	6	0,14	**–**			
710	–	939	778	7,5	7,5	8	738	769	783	1 002	6	6	0,1	**–**			
	–	939	787	7,5	7,5	10	738	774	793	1 002	6	6	0,14	**–**			
750	–	993	832	7,5	7,5	3	778	823	838	1 062	6	6	0,1	**–**			
	–	993	832	7,5	7,5	2	778	823	838	1 062	6	6	0,14	**–**			
800	–	1 051	882	7,5	7,5	2	828	868	888	1 122	6	6	0,14	**–**			

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


SKF

Single row full complement cylindrical roller bearings

Designs

Full complement cylindrical roller bearings incorporate a maximum number of rollers and are therefore suitable for very heavy radial loads. However, they cannot operate at the same high speeds as caged type cylindrical roller bearings. The standard SKF range of single row full complement cylindrical roller bearings consist of the NCF and NJG designs.

NCF design
NCF-design bearings (➔ **fig** 1) have two integral flanges on the inner ring and one integral flange on the outer ring and can thus support axial loads acting in one direction and provide axial shaft location in one direction. A retaining ring at the flangeless side of the outer ring holds the bearing assembly together. The axial internal clearance in the bearing is given in the product table and is designed to permit small axial displacements of the shaft in relation to the housing, e.g. as a result of thermal expansion of the shaft, to be accommodated in the bearing.

NJG design
NJG-design bearings (➔ **fig** 2) comprise the heavy dimension series 23 and are intended for very heavily loaded, slow speed applications. These bearings have two integral flanges on the outer ring and one integral flange on the inner ring and can thus support axial loads acting in one direction and provide axial shaft location in one direction. In contrast to the other full complement bearing designs, NJG-design bearings have a self-retaining roller complement. The outer ring with its two integral flanges together with the roller complement can therefore be withdrawn from the inner ring, without having to take any precautions to prevent the rollers from falling out. This simplifies mounting and dismounting.

Fig 1

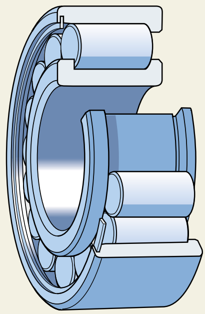
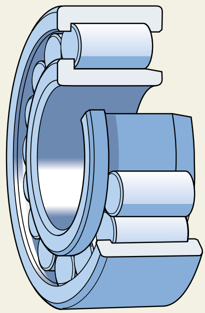


Fig 2



Bearing data – general

Dimensions
The boundary dimensions of SKF single row full complement cylindrical roller bearings are in accordance with ISO 15:1998.

Tolerances
SKF single row full complement cylindrical roller bearings are produced to Normal tolerances. The values for the tolerances correspond to ISO 492:2002 and can be found in **table** 3 on **page 125**.

Radial internal clearance
SKF single row full complement cylindrical roller bearings are produced with Normal radial internal clearance as standard. The majority of the bearings are also available with the greater C3 radial internal clearance. The values correspond to ISO 5753:1991 and are given in **table** 1 on **page 507**. The clearance limits apply to unmounted bearings under zero measuring load.

Misalignment
The ability of single row full complement cylindrical roller bearings to accommodate angular misalignment of the inner ring with respect to the outer ring is limited to a few minutes of arc. The actual values are

- 4 minutes of arc for bearings of the narrow dimension series 18, and
- 3 minutes of arc for bearings of the wide dimension series 22, 23, 28, 29 and 30.

The above guideline values apply provided the position of the shaft and housing axes remains constant. A larger misalignment is possible, but may result in reduced bearing service life. In such cases, please contact the SKF application engineering service.

Influence of operating temperature on bearing material
SKF single row full complement cylindrical roller bearings undergo a special heat treatment. They can operate at temperatures of up to +150 °C.

Minimum load
In order to provide satisfactory operation, single row full complement cylindrical roller bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly if they are to operate at relatively high speeds (n > 0,5 times the reference speed) 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 the friction in the lubricant, can have a detrimental effect on the rolling conditions in the bearing arrangement and may cause damaging sliding movements and to occur between the rollers and raceways.

The requisite minimum load to be applied to single row full complement cylindrical roller bearings can be estimated using

$$F_{rm} = k_r \left(6 + \frac{4\,n}{n_r}\right)\left(\frac{d_m}{100}\right)^2$$

where
F_{rm} = minimum radial load, kN
k_r = minimum load factor
0,1 for bearing series 18
0,11 for bearing series 28
0,2 for bearing series 29
0,3 for bearing series 30 and 22
0,35 for bearing series 23
n = rotational speed, r/min
n_r = reference speed (➔ product table), r/min
d_m = bearing mean diameter = 0,5 (d + D), mm

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 single row full complement cylindrical roller bearing must be subjected to an additional radial load.

Dynamic axial load carrying capacity

Full complement cylindrical roller bearings with flanges on both inner and outer rings can support axial loads in one direction. Their axial load carrying capacity is primarily determined by the ability of the sliding surfaces of the roller end/flange contact to support loads. Factors having the greatest effect on this ability are the lubrication, operating temperature and heat dissipation from the bearing. Assuming the conditions cited below, the permissible axial load can be calculated with sufficient accuracy from

$$F_{ap} = \frac{k_1\,C_0\,10^4}{n\,(d+D)} - k_2\,F_r$$

where
F_{ap} = maximum permissible axial load, kN
C_0 = basic static load rating, kN
F_r = actual radial bearing load, kN
n = rotational speed, r/min
d = bearing bore diameter, mm
D = bearing outside diameter, mm
k_1 = a factor
1,0 for oil lubrication
0,5 for grease lubrication
k_2 = a factor
0,3 for oil lubrication
0,15 for grease lubrication

The above equation is based on conditions that are considered typical for normal bearing operation:

- a difference of 60 °C between the bearing operating temperature and the ambient temperature;
- a specific heat loss from the bearing of 0,5 mW/mm^2 °C with reference to the bearing outside diameter surface (π D B);
- a viscosity ratio $\kappa \geq 2$.

For grease lubrication the viscosity of the base oil in the grease may be used. If κ is less than 2, friction will increase and there will be more wear. These effects can be reduced at low speeds, for example, by using oils with AW (anti-wear) and EP (extreme pressure) additives.

Where axial loads act for longer periods and the bearings are grease lubricated, it is advisable to use a grease that has good oil bleeding properties at the operating temperatures (> 3 % according to DIN 51 817). Frequent relubrication is also recommended.

The values of the permissible load F_{ap} obtained from the heat balance equation are valid for a continuously acting constant axial load and adequate lubricant supply to the roller end/flange contacts. Where axial loads act only for short periods, the values can be multiplied by 2, or for shock loads by 3, provided the limits given in the following with regard to flange strength are not exceeded.

To avoid any risk of flange breakage, the constantly acting axial load should never exceed

$$F_{ap} = 0{,}0023\,D^{1,7}$$

and occasional shock loads should never be greater than the numerical value of

$$F_{ap} = 0{,}007\,D^{1,7}$$

where
F_{ap} = maximum permissible axial load, kN
D = bearing outside diameter, mm

To obtain an even flange load and provide sufficient running accuracy of the shaft when single row full complement cylindrical roller bearings are subjected to heavy axial loads, the axial runout of the abutment surfaces of the associated components should be given particular attention.

If shaft deflection occurs together with an axial load, the inner ring flange should only be supported to half its height (➔ **fig 3**) so that it is not subjected to damaging alternating stresses. The recommended shaft abutment diameter d_{as} can be obtained from the product table.

Where misalignment between the inner and outer rings exceeds 1 minute of arc, the action of the load on the flange changes considerably. As a result, the safety factors implicit in the guideline values may not be adequate. In these cases, contact the SKF application engineering service.

Equivalent dynamic bearing load

For dynamically loaded single row full complement cylindrical roller bearings used as non-locating bearings

$$P = F_r$$

If the bearings are used to locate a shaft in one direction, the equivalent dynamic bearing load should be calculated using

$$P = F_r \qquad \text{when } F_a/F_r \leq e$$
$$P = 0{,}92\,F_r + YF_a \qquad \text{when } F_a/F_r > e$$

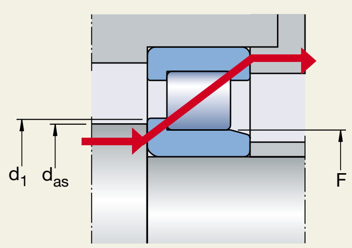
where

e = limiting value
  = 0,2 for bearings in the 18 series
  = 0,3 for bearings in the 22, 23, 28, 29 and 30 series

Y = axial load factor
  = 0,6 for bearings in the 18 series
  = 0,4 for bearings in the 22, 23, 28, 29 and 30 series

Since axially loaded single row full complement cylindrical roller bearings only operate satisfactorily when they are subjected to a simultaneously acting radial load, the ratio F_a/F_r should not exceed 0,5.

Fig 3



Equivalent static bearing load

For statically loaded single row full complement cylindrical roller bearings

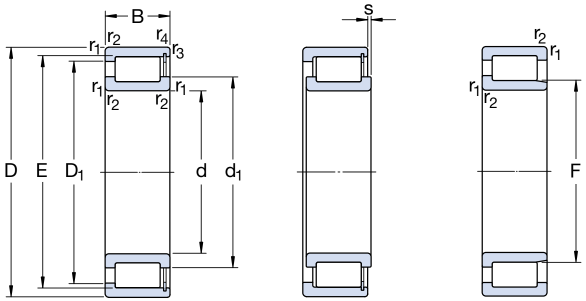
$$P_0 = F_r$$

Supplementary designations

The designation suffixes used to identify certain features of SKF single row full complement cylindrical roller bearings are explained in the following.

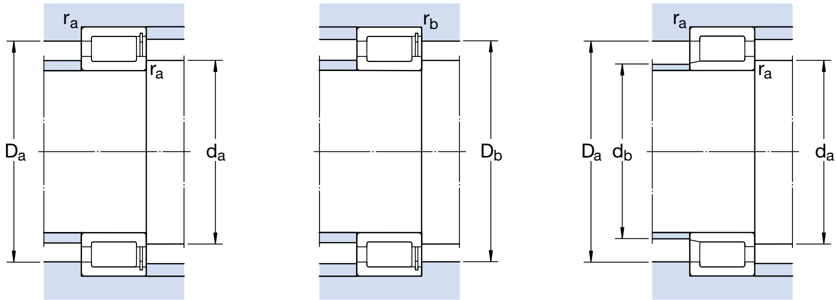
- **CV** Modified internal design, full complement roller set
- **C3** Radial internal clearance greater than Normal
- **HA1** Inner and outer rings of case-hardening steel
- **HB1** Bainite hardened inner and outer rings
- **L4B** Bearing rings and rolling elements with special surface coating
- **L5B** Rolling elements with special surface coating
- **V** Full complement roller set (without cage)
- **VH** Full complement roller set (without cage), self-retaining

Single row full complement cylindrical roller bearings
d **20 – 75** mm



NCF NJG

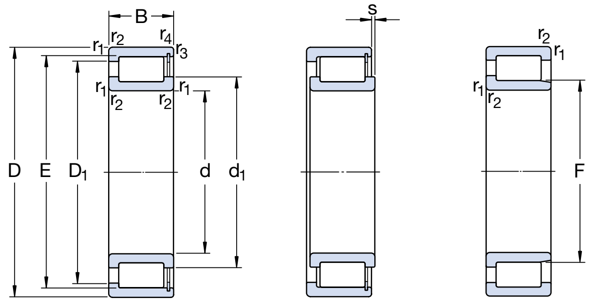
Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation
mm			kN		kN	r/min		kg	–
20	42	16	28,1	28,5	3,1	8 500	10 000	0,11	**NCF 3004 CV**
25	47	16	31,9	35,5	3,8	7 000	9 000	0,12	**NCF 3005 CV**
	62	24	68,2	68	8,5	4 500	5 600	0,38	**NJG 2305 VH**
30	55	19	39,6	44	5	6 000	7 500	0,20	**NCF 3006 CV**
	72	27	84,2	86,5	11	4 000	4 800	0,56	**NJG 2306 VH**
35	62	20	48,4	56	6,55	5 300	6 700	0,26	**NCF 3007 CV**
	80	31	108	114	14,3	3 400	4 300	0,75	**NJG 2307 VH**
40	68	21	57,2	69,5	8,15	4 800	6 000	0,31	**NCF 3008 CV**
	90	33	145	156	20	3 000	3 600	1,00	**NJG 2308 VH**
45	75	23	60,5	78	9,15	4 300	5 300	0,40	**NCF 3009 CV**
	100	36	172	196	25,5	2 800	3 400	1,45	**NJG 2309 VH**
50	80	23	76,5	98	11,8	4 000	5 000	0,43	**NCF 3010 CV**
55	90	26	105	140	17,3	3 400	4 300	0,64	**NCF 3011 CV**
	120	43	233	260	33,5	2 200	2 800	2,30	**NJG 2311 VH**
60	85	16	55	80	9,15	3 600	4 500	0,29	**NCF 2912 CV**
	95	26	106	146	18,3	3 400	4 000	0,69	**NCF 3012 CV**
65	90	16	58,3	88	10,2	3 200	4 000	0,31	**NCF 2913 CV**
	100	26	112	163	20	3 000	3 800	0,73	**NCF 3013 CV**
	140	48	303	360	46,5	1 900	2 400	3,55	**NJG 2313 VH**
70	100	19	76,5	116	13,7	3 000	3 800	0,49	**NCF 2914 CV**
	110	30	128	173	22,4	2 800	3 600	1,02	**NCF 3014 CV**
	150	51	336	400	50	1 800	2 200	4,40	**NJG 2314 VH**
75	105	19	79,2	125	14,6	2 800	3 600	0,52	**NCF 2915 CV**
	115	30	134	190	24,5	2 600	3 200	1,06	**NCF 3015 CV**
	160	55	396	480	60	1 600	2 000	5,35	**NJG 2315 VH**



Dimensions							Abutment and fillet dimensions						
d	d_1 ~	D_1 ~	E, F	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_{as}[2] rec.	d_b max	D_a max	D_b max	r_a max	r_b max
mm							mm						
20	29	33	36,8	0,6	0,6	1,5	24	26,9	–	38	40	0,6	0,6
25	34	39	42,5	0,6	0,6	1,5	29	32,3	–	43	45	0,6	0,6
	36,1	48,2	31,74	1,1	–	1,7	32	33,9	30	55	–	1	–
30	40	45	49,6	1	1	2	35	37,8	–	50	52	1	1
	43,2	56,4	38,36	1,1	–	1,8	37	40,8	36	65	–	1	–
35	45	51	55,5	1	1	2	40	42,8	–	57	59	1	1
	50,4	65,8	44,75	1,5	–	2	44	47,6	42	71	–	1,5	–
40	50	58	61,7	1	1	2	45	47,9	–	63	65	1	1
	57,6	75,2	51,15	1,5	–	2,4	49	54,4	49	81	–	1,5	–
45	55	62	66,9	1	1	2	50	53	–	70	72	1	1
	62,5	80,1	56,14	1,5	–	2,4	54	59,3	54	91	–	1,5	–
50	59	68	72,3	1	1	2	55	56,7	–	75	77	1	1
55	68	79	83,5	1,1	1,1	2	61	65,8	–	84	86	1	1
	75,5	98,6	67,14	2	–	2,6	66	71,3	–	109	–	2	–
60	69	75	78,5	1	1	1	65	66,8	–	80	80	1	1
	71	82	86,7	1,1	1,1	2	66	68,9	–	89	91	1	1
65	75	81	85	1	1	1	70	73	–	85	85	1	1
	78	88	93,1	1,1	1,1	2	71	75,6	–	94	96	1	1
	89,9	116	80,71	2,1	–	3	77	85,3	78	128	–	2	–
70	81	88	92,3	1	1	1	75	78,7	–	95	95	1	1
	81	95	100,3	1,1	1,1	3	76	78,7	–	104	106	1	1
	93,8	121	84,22	2,1	–	3	82	89	81	138	–	2	–
75	86	93	97,5	1	1	1	80	83,8	–	100	100	1	1
	89	103	107,9	1,1	1,1	3	81	86,5	–	109	111	1	1
	101	131	91,24	2,1	–	3	87	96,1	88	148	–	2	–

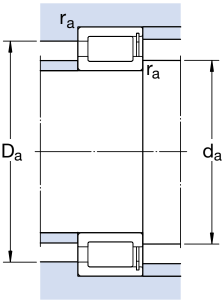
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 556**

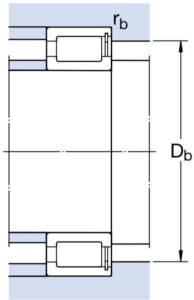
Single row full complement cylindrical roller bearings
d **80 – 150** mm

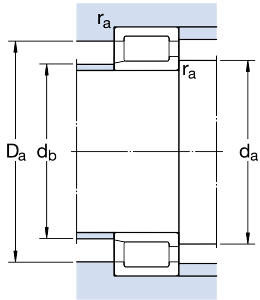


NCF NJG

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	–
80	110	19	80,9	132	15,6	2 600	3 400	0,55	**NCF 2916 CV**
	125	34	165	228	29	2 400	3 000	1,43	**NCF 3016 CV**
	170	58	457	570	71	1 500	1 900	6,40	**NJG 2316 VH**
85	120	22	102	166	20	2 600	3 200	0,81	**NCF 2917 CV**
	130	34	172	236	30	2 400	3 000	1,51	**NCF 3017 CV**
	180	60	484	620	76,5	1 400	1 800	7,40	**NJG 2317 VH**
90	125	22	106	176	20,8	2 400	3 000	0,84	**NCF 2918 CV**
	140	37	198	280	35,5	2 200	2 800	1,97	**NCF 3018 CV**
	190	64	528	670	81,5	1 400	1 800	8,75	**NJG 2318 VH**
100	140	24	128	200	24,5	2 200	2 600	1,14	**NCF 2920 CV**
	150	37	209	310	37,5	2 000	2 600	2,15	**NCF 3020 CV**
	215	73	682	865	104	1 200	1 500	13,0	**NJG 2320 VH**
110	150	24	134	220	26	1 900	2 400	1,23	**NCF 2922 CV**
	170	45	275	400	47,5	1 800	2 200	3,50	**NCF 3022 CV**
	240	80	858	1 060	122	1 100	1 300	17,5	**NJG 2322 VH**
120	165	27	172	290	34,5	1 800	2 200	1,73	**NCF 2924 CV**
	180	46	292	440	52	1 700	2 000	3,80	**NCF 3024 CV**
	215	58	512	735	85	1 400	1 700	9,05	**NCF 2224 V**
	260	86	952	1 250	140	1 000	1 200	22,5	**NJG 2324 VH**
130	180	30	205	360	40,5	1 600	2 000	2,33	**NCF 2926 CV**
	200	52	413	620	72	1 500	1 900	5,80	**NCF 3026 CV**
	280	93	1 080	1 430	156	950	1 200	28,0	**NJG 2326 VH**
140	190	30	220	390	43	1 500	1 900	2,42	**NCF 2928 CV**
	210	53	440	680	78	1 400	1 800	6,10	**NCF 3028 CV**
	250	68	693	1 020	114	1 200	1 500	14,5	**NCF 2228 V**
	300	102	1 210	1 600	173	850	1 100	35,5	**NJG 2328 VH**
150	210	36	292	490	55	1 400	1 700	3,77	**NCF 2930 CV**
	225	56	457	710	80	1 300	1 600	7,50	**NCF 3030 CV**
	270	73	792	1 180	132	1 100	1 400	18,4	**NCF 2230 V**
	320	108	1 450	1 930	196	800	1 000	42,5	**NJG 2330 VH**



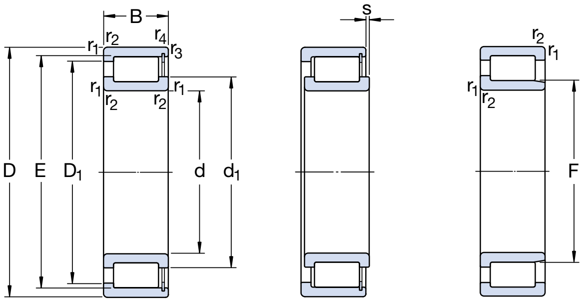




Dimensions							**Abutment and fillet dimensions**						
d	d_1 ~	D_1 ~	E, F	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_{as}[2] rec.	d_b max	D_a max	D_b max	r_a max	r_b max
mm							mm						
80	91	98	102,5	1	1	1	85	88,8	–	105	105	1	1
	95	111	117	1,1	1,1	4	86	92	–	119	121	1	1
	109	141	98,26	2,1	–	4	92	104	95	158	–	2	–
85	96	105	109,5	1,1	1,1	1	91	93,8	–	114	114	1	1
	99	116	121,4	1,1	1,1	4	91	96,2	–	124	126	1	1
	118	149	107	3	–	4	99	113	104	166	–	2,5	–
90	102	111	115,3	1,1	1,1	1	96	99,7	–	119	119	1	1
	106	124	130,1	1,5	1,5	4	97	103	–	133	135	1,5	1,5
	117	152	105,3	3	–	4	104	111	105	176	–	2,5	–
100	114	126	130,5	1,1	1,1	1,5	106	111	–	134	134	1	1
	115	134	139,7	1,5	1,5	4	107	112	–	143	145	1,5	1,5
	133	173	119,3	3	–	4	114	126	119	201	–	2,5	–
110	124	136	141	1,1	1,1	1,5	116	122	–	144	144	1	1
	127	149	156,1	2	2	5,5	120	124	–	160	165	2	2
	151	198	134,3	3	–	5	124	143	130	226	–	2,5	–
120	135	149	153,8	1,1	1,1	1,5	126	132	–	159	159	1	1
	139	160	167,6	2	2	5,5	130	135	–	170	175	2	2
	150	184	192,32	2,1	2,1	4	131	145	–	204	204	2	2
	164	213	147,4	3	–	5	134	156	142	246	–	2,5	–
130	146	161	166,5	1,5	1,5	2	137	143	–	173	173	1,5	1,5
	149	175	183	2	1	5,5	140	148	–	190	195	2	1
	175	226	157,9	4	–	6	147	166	153	263	–	3	–
140	157	174	179,3	1,5	1,5	2	147	154	–	183	183	1,5	1,5
	163	189	197	2	1	5,5	150	159	–	200	205	2	1
	173	212	221,9	3	3	5	143	167	–	127	127	2,5	2,5
	187	245	168,5	4	–	6,5	157	178	163	283	–	3	–
150	169	189	196	2	2	2,5	160	166	–	200	200	2	2
	170	198	206	2,1	1,1	7	161	167	–	214	234	2	1
	184	227	236,7	3	3	6	153	178	–	137	137	2,5	2,5
	202	261	182,5	4	–	6,5	167	192	178	303	–	3	–

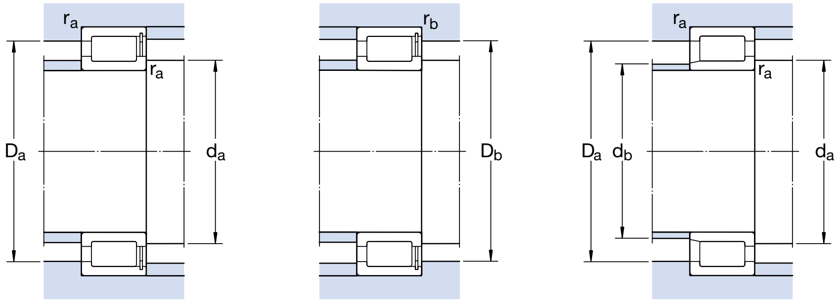
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 556**

Single row full complement cylindrical roller bearings
d **160 – 260** mm



NCF NJG

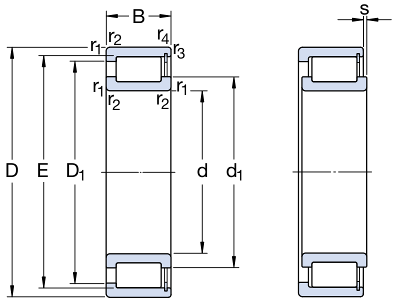
Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation
mm			kN		kN	r/min		kg	–
160	220	36	303	530	58,5	1 300	1 600	4,00	**NCF 2932 CV**
	240	60	512	800	90	1 200	1 500	9,10	**NCF 3032 CV**
	290	80	990	1 500	160	950	1 200	23,0	**NCF 2232 V**
170	230	36	314	560	60	1 200	1 500	4,30	**NCF 2934 CV**
	260	67	671	1 060	118	1 100	1 400	12,5	**NCF 3034 CV**
	310	86	1 100	1 700	176	900	1 100	28,7	**NCF 2234 V**
	360	120	1 760	2 450	236	700	900	59,5	**NJG 2334 VH**
180	250	42	391	695	75	1 100	1 400	6,20	**NCF 2936 CV**
	280	74	781	1 250	134	1 100	1 300	16,5	**NCF 3036 CV**
	380	126	1 870	2 650	255	670	800	69,5	**NJG 2336 VH**
190	260	42	440	780	81,5	1 100	1 400	6,50	**NCF 2938 CV**
	290	75	792	1 290	140	1 000	1 300	17,0	**NCF 3038 CV**
	340	92	1 250	1 900	196	800	1 000	35,7	**NCF 2238 V**
	400	132	2 160	3 000	280	630	800	80,0	**NJG 2338 VH**
200	250	24	176	335	32,5	1 100	1 400	2,60	**NCF 1840 V**
	280	48	528	965	100	1 000	1 300	9,10	**NCF 2940 CV**
	310	82	913	1 530	160	950	1 200	22,5	**NCF 3040 CV**
	420	138	2 290	3 200	290	600	750	92,0	**NJG 2340 VH**
220	270	24	183	365	34,5	1 000	1 200	2,85	**NCF 1844 V**
	300	48	550	1 060	108	950	1 200	9,90	**NCF 2944 CV**
	340	90	1 080	1 800	186	850	1 100	29,5	**NCF 3044 CV**
	400	108	1 830	2 750	255	700	850	58,0	**NCF 2244 V**
	460	145	2 550	3 550	320	530	670	111	**NJG 2344 VH**
240	300	28	260	510	47,5	900	1 100	4,40	**NCF 1848 V**
	320	48	583	1 140	114	850	1 100	10,6	**NCF 2948 CV**
	360	92	1 140	1 960	200	800	1 000	32,0	**NCF 3048 CV**
	500	155	2 810	3 900	345	500	630	147	**NJG 2348 VH**
260	320	28	270	550	50	800	1 000	4,75	**NCF 1852 V**
	360	60	748	1 430	143	750	950	18,5	**NCF 2952 CV**
	400	104	1 540	2 550	250	700	900	46,5	**NCF 3052 CV**
	540	165	3 410	4 800	415	430	530	177	**NJG 2352 VH**



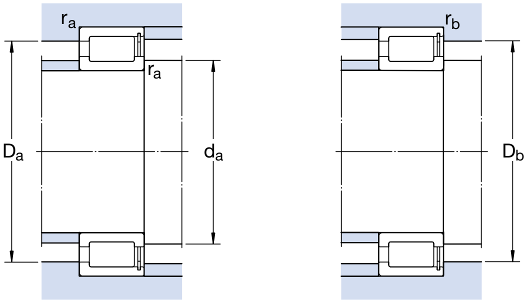
Dimensions							Abutment and fillet dimensions						
d	d_1 ~	D_1 ~	E, F	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_{as}[2] rec.	d_b max	D_a max	D_b max	r_a max	r_b max
mm							mm						
160	180	200	207	2	2	2,5	170	177	–	210	210	2	2
	185	215	224	2,1	1,1	7	171	180	–	229	304	2	1
	208	255	266,4	3	3	6	163	201	–	147	147	2,5	2,5
170	191	211	217,8	2	2	2,5	180	187	–	220	220	2	2
	198	232	242	2,1	1,1	7	181	192	–	249	274	2	1
	219	269	281,1	4	4	7	185	212	–	295	295	3	3
	227	291	203,55	4	–	7	187	214	200	343	–	3	–
180	201	224	231,3	2	2	2,5	190	197	–	240	240	2	2
	212	248	260	2,1	2,1	7	191	206	–	269	269	2	2
	245	309	221,7	4	–	8	197	232	216	363	–	3	–
190	212	235	243,3	2	2	2,5	200	208	–	250	250	2	2
	222	258	269	2,1	2,1	9	201	216	–	279	279	2	2
	243	296	310,6	4	4	7	205	235	–	325	325	3	3
	250	326	224,5	5	–	8	210	237	222	380	–	4	–
200	218	231	237,5	1,5	1,1	1,8	207	215	–	243	245	1,5	1
	225	252	260,75	2,1	2,1	3	211	221	–	269	269	2	2
	237	275	287	2,1	2,1	9	211	230	–	299	299	2	2
	266	342	238,6	5	–	9	220	252	232	400	–	4	–
220	238	252	258	1,5	1,1	1,8	227	235	–	263	265	1,5	1
	246	273	281,75	2,1	2,1	3	231	242	–	289	289	2	2
	255	298	312	3	3	9	233	248	–	327	327	2,5	2,5
	274	334	354	4	4	8	235	260	–	385	385	3	3
	295	395	266,7	5	–	10	240	281	260	440	–	4	–
240	263	279	287	2	1,1	1,8	250	259	–	290	295	2	1
	267	294	302,75	2,1	2,1	3	251	263	–	309	309	2	2
	278	321	335	3	3	11	253	271	–	347	347	2,5	2,5
	310	416	280,6	5	–	10	260	302	282	480	–	4	–
260	283	299	307,2	2	1,1	1,8	270	279	–	310	315	2	1
	291	323	333	2,1	2,1	3,5	271	286	–	349	349	2	2
	304	358	376	4	4	11	275	295	–	385	385	3	3
	349	456	315,9	6	–	11	286	332	309	514	–	5	–

[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 556**

Single row full complement cylindrical roller bearings
d **280 – 440** mm



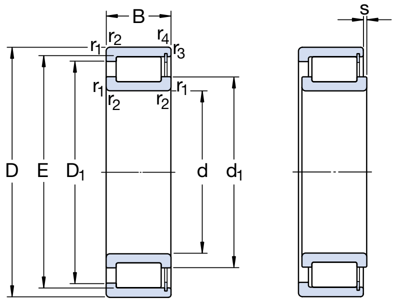
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
280	350	33	341	695	64	750	950	7,10	**NCF 1856 V**
	380	60	880	1 730	166	700	900	19,7	**NCF 2956 CV**
	420	106	1 570	2 650	260	670	850	50,0	**NCF 3056 CV**
300	380	38	418	850	75	670	850	10,0	**NCF 1860 V**
	420	72	1 120	2 200	208	670	800	31,2	**NCF 2960 CV**
	460	118	1 900	3 250	300	600	750	69,0	**NCF 3060 CV**
320	400	38	440	900	80	630	800	10,5	**NCF 1864 V**
	440	72	1 170	2 360	220	600	750	32,9	**NCF 2964 CV**
	480	121	1 980	3 450	310	560	700	74,5	**NCF 3064 CV**
340	420	38	446	950	83	600	750	11,0	**NCF 1868 V**
	460	72	1 190	2 500	228	560	700	35,0	**NCF 2968 CV**
	520	133	2 380	4 150	355	530	670	100	**NCF 3068 CV**
360	440	38	402	900	76,5	560	700	11,5	**NCF 1872 V**
	480	72	1 230	2 600	240	530	670	36,5	**NCF 2972 CV**
	540	134	2 420	4 300	365	500	630	105	**NCF 3072 CV**
380	480	46	627	1 290	114	530	670	19,5	**NCF 1876 V**
	520	82	1 570	3 250	300	500	630	52,5	**NCF 2976 CV**
	560	135	2 510	4 550	380	480	600	110	**NCF 3076 CV**
400	500	46	627	1 340	118	500	630	20,5	**NCF 1880 V**
	540	82	1 650	3 450	310	480	600	54,5	**NCF 2980 CV**
	600	148	2 970	5 500	450	450	560	145	**NCF 3080 CV**
420	520	46	660	1 430	122	480	600	21,0	**NCF 1884 V**
	560	82	1 650	3 600	315	450	560	57,0	**NCF 2984 CV**
	620	150	3 030	5 700	455	430	530	150	**NCF 3084 CV**
440	540	46	671	1 460	125	450	560	22,0	**NCF 1888 V**
	540	60	968	2 360	204	450	560	29,0	**NCF 2888 V**
	600	95	2 010	4 400	380	430	530	80,5	**NCF 2988 V**
	650	157	3 580	6 550	520	400	500	175	**NCF 3088 CV**



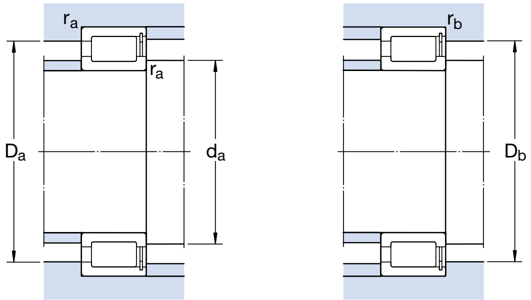
Dimensions							**Abutment and fillet dimensions**					
d	d_1 ~	D_1 ~	E	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_{as}[2] rec.	D_a max	D_b max	r_a max	r_b max
mm							mm					
280	307	325	334	2	1,1	2,5	290	303	340	345	2	1
	314	348	358,75	2,1	2,1	3,5	291	308	369	369	2	2
	319	373	391	4	4	11	295	310	405	405	3	3
300	331	353	363	2,1	1,5	3	311	326	369	373	2	1,5
	338	377	389,25	3	3	5	313	332	407	407	2,5	2,5
	355	413	433	4	4	14	315	344	445	445	3	3
320	351	373	383	2,1	1,5	3	331	346	389	393	2	1,5
	358	397	409,75	3	3	5	333	352	427	427	2,5	2,5
	368	434	449	4	4	14	335	359	465	465	3	3
340	371	393	403	2,1	1,5	3	351	366	409	413	2	1,5
	383	415	431	3	3	5	353	375	447	447	2,5	2,5
	395	468	485	5	5	14	358	384	502	502	4	4
360	388	413	418,9	2,1	1,5	4,5	371	384	429	433	2	1,5
	403	436	451,5	3	3	5	373	395	467	467	2,5	2,5
	412	486	503	5	5	14	378	402	522	522	4	4
380	416	448	458	2,1	1,5	3,5	391	411	469	473	2	1,5
	427	473	488	4	4	5	395	420	505	505	3	3
	431	504	521	5	5	14	398	420	542	542	4	4
400	433	465	475	2,1	1,5	3,5	411	428	489	493	2	1,5
	450	496	511	4	4	5	415	443	525	525	3	3
	460	540	558	5	5	14	418	449	582	582	4	4
420	457	489	499	2,1	1,5	3,5	431	452	509	513	2	1,5
	463	509	524	4	4	5	435	456	545	545	3	3
	480	559	577	5	5	15	438	469	602	602	4	4
440	474	506	516	2,1	1,5	3,5	451	469	529	533	2	1,5
	474	508	516	2,1	1,5	3,5	451	469	529	533	2	1,5
	502	545	565,5	4	4	6	455	492	585	585	3	3
	500	590	611	6	6	16	463	488	627	627	5	5

[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 556**

Single row full complement cylindrical roller bearings
d **460 – 670** mm



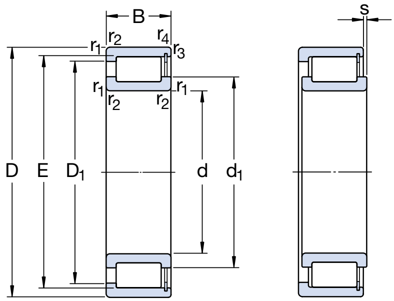
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
460	580	56	913	1 960	163	430	530	34,0	**NCF 1892 V**
	580	72	1 300	3 050	260	430	530	44,0	**NCF 2892 V**
	620	95	2 050	4 500	390	400	500	83,5	**NCF 2992 V**
	680	163	3 690	6 950	540	380	480	195	**NCF 3092 CV**
480	600	56	935	2 040	170	400	500	35,5	**NCF 1896 V**
	600	72	1 320	3 150	265	400	500	46,0	**NCF 2896 V**
	650	100	2 290	4 900	405	380	480	98,0	**NCF 2996 V**
	700	165	3 740	7 200	550	360	450	205	**NCF 3096 CV**
500	620	56	952	2 120	173	380	480	36,5	**NCF 18/500 V**
	620	72	1 340	3 350	275	380	480	48,0	**NCF 28/500 V**
	670	100	2 330	5 000	415	380	450	100	**NCF 29/500 V**
	720	167	3 800	7 500	570	360	450	215	**NCF 30/500 CV**
530	650	56	990	2 240	180	360	450	38,5	**NCF 18/530 V**
	650	72	1 400	3 450	285	360	450	49,5	**NCF 28/530 V**
	710	106	2 640	6 100	480	340	430	120	**NCF 29/530 V**
	780	185	5 230	10 600	780	320	400	300	**NCF 30/530 V**
560	680	56	1 020	2 360	186	340	430	40,5	**NCF 18/560 V**
	680	72	1 420	3 650	300	340	430	54,0	**NCF 28/560 V**
	750	112	3 080	6 700	500	320	400	140	**NCF 29/560 V**
	820	195	5 830	11 800	865	300	380	345	**NCF 30/560 V**
600	730	60	1 050	2 550	196	320	400	51,5	**NCF 18/600 V**
	730	78	1 570	4 300	340	320	400	67,5	**NCF 28/600 V**
	800	118	3 190	7 100	520	300	380	170	**NCF 29/600 V**
630	780	69	1 250	2 900	232	300	360	72,5	**NCF 18/630 V**
	780	88	1 870	5 000	390	300	360	92,5	**NCF 28/630 V**
	850	128	3 740	8 650	610	280	340	205	**NCF 29/630 V**
670	820	69	1 300	3 150	245	280	340	76,5	**NCF 18/670 V**
	820	88	1 940	5 300	415	280	340	97,5	**NCF 28/670 V**
	900	136	3 910	9 000	630	260	320	245	**NCF 29/670 V**



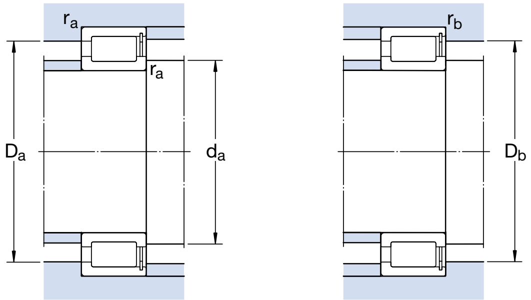
Dimensions							Abutment and fillet dimensions					
d	d_1 ~	D_1 ~	E	$r_{1,2}$ min	$r_{3,4}$ min	s [1]	d_a min	d_{as} [2] rec.	D_a max	D_b max	r_a max	r_b max
mm							mm					
460	501	541	553	3	3	5	473	495	567	567	2,5	2,5
	501	543	553	3	3	5	473	495	567	567	2,5	2,5
	516	558	579	4	4	6	475	506	605	605	3	3
	522	611	635	6	6	16	483	511	657	657	5	5
480	522	561	573,5	3	3	5	493	516	587	587	2,5	2,5
	520	562	573,5	3	3	5	493	515	587	587	2,5	2,5
	540	603	614	5	5	7	498	529	632	632	4	4
	546	628	654	6	6	16	503	532	677	677	5	5
500	542	582	594	3	3	5	513	536	607	607	2,5	2,5
	541	582	594	3	3	2,4	513	536	607	607	2,5	2,5
	552	614	629	5	5	7	518	543	652	652	4	4
	565	650	676	6	6	16	523	553	697	697	5	5
530	573	612	624,5	3	3	5	543	567	637	637	2,5	2,5
	572	614	624,5	3	3	5	543	566	637	637	2,5	2,5
	598	661	676	5	5	7	548	589	692	692	4	4
	610	702	732,3	6	6	16	553	595	757	757	5	5
560	603	643	655	3	3	5	573	597	667	667	2,5	2,5
	606	637	655	3	3	4,3	573	599	667	667	2,5	2,5
	628	700	718	5	5	7	578	617	732	732	4	4
	642	738	770	6	6	16	583	626	797	797	5	5
600	644	684	696	3	3	7	613	638	717	717	2,5	2,5
	644	685	696	3	3	6	613	638	717	717	2,5	2,5
	662	726	754	5	5	7	618	652	782	782	4	4
630	681	725	739	4	4	8	645	674	765	765	3	3
	680	728	739	4	4	8	645	674	765	765	3	3
	709	788	807	6	6	8	653	698	827	827	5	5
670	725	769	783	4	4	8	685	718	805	805	3	3
	724	772	783	4	4	8	685	718	805	805	3	3
	748	827	846	6	6	10	693	737	877	877	5	5

[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 556**

Single row full complement cylindrical roller bearings
d **710 – 1 120** 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	–
710	870	74	1 540	3 750	285	260	320	92,5	**NCF 18/710 V**
	870	95	2 330	6 300	480	260	320	115	**NCF 28/710 V**
	950	140	4 290	10 000	695	240	300	275	**NCF 29/710 V**
750	920	78	1 870	4 500	335	240	300	110	**NCF 18/750 V**
	920	100	2 640	6 950	520	240	300	140	**NCF 28/750 V**
	1 000	145	4 460	10 600	710	220	280	315	**NCF 29/750 V**
800	980	82	1 940	4 800	345	220	280	130	**NCF 18/800 V**
	980	106	2 750	7 500	550	220	280	165	**NCF 28/800 V**
	1 060	150	4 950	12 200	800	200	260	360	**NCF 29/800 V**
850	1 030	82	2 010	5 100	365	200	260	135	**NCF 18/850 V**
	1 030	106	2 860	8 000	570	200	260	175	**NCF 28/850 V**
	1 120	155	5 230	12 700	830	190	240	405	**NCF 29/850 V**
900	1 090	85	2 380	6 000	425	190	240	160	**NCF 18/900 V**
	1 090	112	3 190	9 150	655	190	240	208	**NCF 28/900 V**
	1 180	165	5 940	14 600	950	170	220	472	**NCF 29/900 V**
950	1 150	90	2 420	6 300	440	170	220	185	**NCF 18/950 V**
	1 150	118	3 410	9 800	655	170	220	240	**NCF 28/950 V**
	1 250	175	6 600	16 300	1 020	160	200	565	**NCF 29/950 V**
1 000	1 220	100	2 920	7 500	455	160	200	230	**NCF 18/1000 V**
	1 220	128	4 130	11 600	720	160	200	310	**NCF 28/1000 V**
	1 320	185	7 480	18 600	1 160	150	190	680	**NCF 29/1000 V**
1 120	1 360	106	3 740	9 650	585	130	170	298	**NCF 18/1120 V**



Dimensions							Abutment and fillet dimensions					
d	d_1 ~	D_1 ~	E, F	$r_{1,2}$ min	$r_{3,4}$ min	s[1]	d_a min	d_{as}[2] rec.	D_a max	D_b max	r_a max	r_b max
mm							mm					
710	767	815	831	4	4	8	725	759	855	855	3	3
	766	818	831	4	4	8	725	759	855	855	3	3
	790	876	896	6	6	10	733	761	927	927	5	5
750	811	863	882	5	5	8	768	804	902	902	4	4
	805	863	878	5	5	8	768	796	902	902	4	4
	832	918	938	6	6	11	773	803	977	977	5	5
800	863	922	936	5	5	9	818	855	962	962	4	4
	863	922	936	5	5	10	818	855	962	962	4	4
	891	981	1 002	6	6	11	823	860	977	977	5	5
850	911	972	985	5	5	9	868	902	1 012	1 012	4	4
	911	972	986	5	5	10	868	903	1 012	1 012	4	4
	943	1 039	1 061	6	6	13	873	914	1 097	1 097	5	5
900	966	1 029	1 044	5	5	9	918	957	1 072	1 072	4	4
	966	1 029	1 044	5	5	10	918	957	1 072	1 072	4	4
	996	1 096	1 120	6	6	13	923	982	1 127	1 127	5	5
950	1 021	1 087	1 103	5	5	10	968	1 012	1 132	1 132	4	4
	1 021	1 087	1 103	5	5	12	968	1 012	1 132	1 132	4	4
	1 048	1 154	1 179	7,5	7,5	14	978	1 033	1 222	1 222	6	6
1 000	1 073	1 148	1 165	6	6	12	1 023	1 063	1 197	1 197	5	5
	1 073	1 148	1 165	6	6	12	1 023	1 063	1 197	1 197	5	5
	1 113	1 226	1 252	7,5	7,5	14	1 028	1 091	1 292	1 292	6	6
1 120	1 206	1 290	1 310	6	6	12	1 143	1 194	1 337	1 337	5	5

[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 556**


SKF

Double row full complement cylindrical roller bearings

Designs

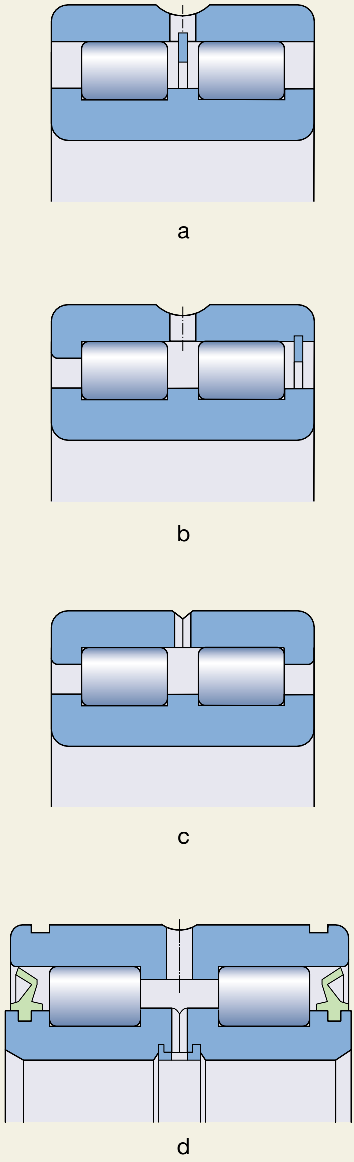
Double row full complement cylindrical roller bearings incorporate a maximum number of rollers and are therefore suitable for very heavy radial loads. However, they cannot operate at the same high speeds as caged cylindrical roller bearings. SKF double row full complement cylindrical roller bearings are produced as standard in four designs, three open designs and one sealed (➔ **fig 1**). All the bearings are non-separable and have an annular groove and three lubrication holes in the outer ring to facilitate efficient lubrication.

NNCL design
NNCL-design bearings (**a**) have an inner ring with three integral flanges and a flangeless outer ring. A retaining ring, inserted in the outer ring between the roller rows, keeps all bearing components together. Axial displacement of the shaft relative to the housing in both directions can be accommodated within the bearing itself. The bearings are therefore suitable for non-locating bearing positions.

NNCF design
NNCF-design bearings (**b**) have three integral flanges on the inner ring and one integral flange on the outer ring enabling the bearing to provide axial location for a shaft in one direction. A retaining ring is inserted in the outer ring at the side opposite the integral flange and serves to hold the bearing together.

NNC design
NNC-design bearings (**c**) are equipped with the same inner ring as bearings of the NNCL and NNCF design. The outer ring is split and held together by retaining elements, which should not be loaded axially. Both parts of the outer ring are identical and carry one integral flange, enabling the bearing to locate the shaft axially in both directions.

Fig 1



NNF design

NNF-design bearings (**d**) in the NNF 50 and 3194(00) series are always sealed on both sides and filled with grease. The two-piece inner ring has three integral flanges and is held together by a retaining ring. The outer ring has an integral central flange. The bearings can be used to locate a shaft axially in both directions. Because of the large distance between the two rows of rollers, the bearings are also able to accommodate tilting moments.

The outer ring of an NNF bearing is 1 mm narrower than the inner ring and has two snap ring grooves in the outside diameter. Therefore it is possible to eliminate spacer rings between the inner ring and adjacent components, for example, in rope sheaves (➔ **fig** 2).

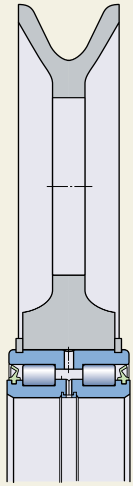
The bearings have contact seals made of polyurethane (AU) on both sides. The seals are retained on the inner ring shoulders, to provide efficient sealing at this position. The outer sealing lip exerts a slight pressure on the outer ring raceway.

The bearings are filled with lithium base grease with diester base oil, which has good rust inhibiting properties. The base oil viscosity is 15 mm^2/s at 40 °C and 3,7 mm^2/s at 100 °C. The grease is suitable for operating temperatures between –55 and +110 °C. However, the permissible operating temperature range is limited by the seal material to –40 to +80 °C.

Under certain conditions, sealed NNF-design bearings are maintenance-free, but if they operate in a moist or contaminated environment, or if speeds are moderate to high, they must be relubricated. This can be done through the inner as well as the outer ring.

If bearings with one or no seals are required, the seals may be removed easily with a screwdriver. For applications where oil lubrication is to be used, the bearings can be delivered without seals and grease if economic quantities are involved. Otherwise the seals should be removed and the bearings washed before use. If oil lubrication is used, the limiting speed quoted in the product tables can be increased by approximately 30 %.

Fig 2



Bearing data – general

Dimensions
The boundary dimensions of SKF double row full complement cylindrical roller bearings are in accordance with ISO 15:1998, except for bearings in the NNF 50 and 3194(00) series. The outer rings of NNF bearings are 1 mm narrower than specified for the ISO Dimension Series 50. The dimensions of series 3194(00) bearings have been dictated by practical application requirements and are not covered by any international or national standard.

Tolerances
Double row full complement cylindrical roller bearings are manufactured to Normal tolerances as standard. The tolerances are in accordance with ISO 492:2002 and can be found in **table** 3 on **page 125**.

Internal clearance
Double row full complement cylindrical roller bearings are manufactured with Normal radial internal clearance as standard. Bearings with the larger C3 or smaller C2 radial internal clearance can be supplied on request.

The clearance limits are in accordance with ISO 5753:1991 and can be found in **table** 1 on **page 507**. The clearance limits apply to unmounted bearings under zero measuring load.

The axial internal clearance of NNC and NNF design bearings, which can axially locate the shaft in both directions, is 0,1 to 0,2 mm for all sizes.

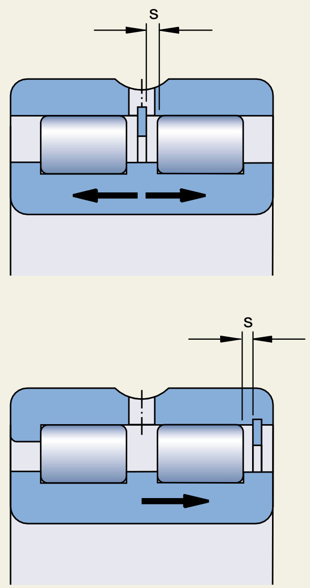
Axial displacement
NNCL and NNCF design bearings can accommodate axial displacement of the shaft with respect to the housing as a result of thermal expansion of the shaft within certain limits (➔ **fig** 3). As the axial displacement is accommodated within the bearing and not between the ring and shaft or housing bore, there is practically no additional friction when the bearing rotates. Values for the permissible axial displacement from the normal position of one bearing ring in relation to the other are given in the product table.

Misalignment
Any angular misalignment of the outer ring relative to the inner ring of double row full complement cylindrical roller bearings produces moment loads in the bearing. The resulting increased bearing load shortens bearing service life.

Influence of operating temperature on bearing material
SKF double row full complement cylindrical roller bearings undergo a special heat treatment. They can be used at temperatures of up to +150 °C.

Minimum load
In order to provide satisfactory operation, double row full complement cylindrical roller bearings, like all ball and roller bearings, must always be subjected to a given minimum load, particularly if they are to operate at relatively high speeds (n > 0,5 times the limiting speed rating) or are subjected to

Fig 3



high accelerations or rapid changes in the direction of load. Under such conditions the inertia forces of the rollers and the friction in the lubricant, can have a detrimental effect on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the rollers and raceways.

The requisite minimum load to be applied to double row full complement cylindrical roller bearings can be estimated using

$$F_{rm} = k_r \left(6 + \frac{4\,n}{n_r}\right)\left(\frac{d_m}{100}\right)^2$$

where
F_{rm} = minimum radial load, kN
k_r = minimum loads of factor
0,2 for bearings of series 48
0,25 for bearings of series 49
0,4 for bearings of series NNF 50 and 3194(00)
0,5 for bearings of series NNCF 50
n = rotational speed, r/min
n_r = speed rating according to the product tables, r/min
– for open bearings use reference speed
– for sealed bearings use $1{,}3 \times$ limiting speed
d_m = bearing mean diameter = 0,5 (d + D), mm

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 double row full complement cylindrical roller bearing must be subjected to an additional radial load.

Dynamic axial load carrying capacity
Double row full complement cylindrical roller bearings with flanges on both the inner and outer rings can support axial loads in addition to radial loads. Their axial load carrying capacity is primarily determined by the ability of the sliding surfaces of the roller end/flange contact to support loads. Factors having the greatest effect on this ability are the lubrication, operating temperature and heat dissipation from the bearing. Assuming the conditions cited below, the permissible axial load can be calculated with sufficient accuracy from

$$F_{ap} = \frac{k_1\, C_0\, 10^4}{n\,(d + D)} - k_2\, F_r$$

where
F_{ap} = maximum permissible axial load, kN
C_0 = basic static load rating, kN
F_r = actual radial bearing load, kN
n = rotational speed, r/min
d = bearing bore diameter, mm
D = bearing outside diameter, mm
k_1 = a factor
0,35 for oil lubrication
0,2 for grease lubrication
k_2 = a factor
0,1 for oil lubrication
0,06 for grease lubrication

The above equation is based on conditions that are considered typical for normal bearing operation:

- a difference of 60 °C between the bearing operating temperature and the ambient temperature;
- a specific heat loss from the bearing of 0,5 mW/mm^2 °C; with reference to the bearing outside diameter surface (π D B);
- a viscosity ratio $\kappa \geq 2$.

For grease lubrication the viscosity of the base oil in the grease may be used. If κ is less than 2, the friction will increase and there will be more wear. These effects can be reduced at low speeds, for example, by using oils with anti-wear and/or EP additives.

Where axial loads act for longer periods and the bearings are grease lubricated, it is advisable to use a grease that has good oil bleeding properties at the operating temperature (> 3 % according to DIN 51 817). Frequent relubrication is also recommended.

The values of the permissible load F_{ap} obtained from the heat balance equation are valid for a continuously acting constant axial load and adequate lubricant supply to the roller end/flange contacts. Where axial loads act only for short periods, the values may be multiplied by 2, or for shock loads by 3, provided the limits given in the following with regard to flange strength are not exceeded.

To avoid any risk of flange breakage, the constantly acting axial load should never exceed

$$F_{ap} = 0{,}0023\ D^{1,7}$$

and occasional shock loads should never be greater than the numerical value of

$$F_{ap} = 0{,}007\ D^{1,7}$$

where

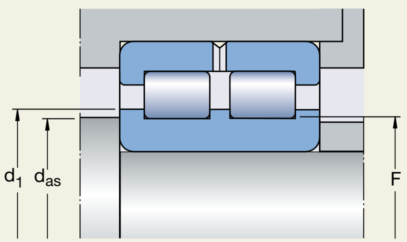
F_{ap} = maximum permissible axial load, kN

D = bearing outside diameter, mm

To obtain an even flange load and provide sufficient running accuracy of the shaft pay particular attention to the axial runout of abutting components specially in applications where double row full complement cylindrical roller bearings are subjected to heavy axial loads.

If shaft deflection occurs together with an axial load, the inner ring flange should only be supported to half its height (→ **fig 4**) so that it is not subjected to damaging alternating stresses. The recommended shaft abutment diameter d_{as} can be obtained from the product tables.

Fig 4



Where misalignment between the inner and outer rings exceeds 1 minute of arc, the action of the load on the flange changes considerably. As a result, the safety factors implicit in the guideline values may not be adequate. In these cases, contact the SKF application engineering service.

Equivalent dynamic bearing load

For dynamically loaded double row full complement cylindrical roller bearings used as non-locating bearings

$$P = F_r$$

If double row full complement cylindrical roller bearings with flanges on both inner and outer rings are used to locate a shaft in one or both directions, the equivalent dynamic bearing load should be calculated using

$$P = F_r \quad \text{when } F_a/F_r \leq 0{,}15$$
$$P = 0{,}92\ F_r + 0{,}4\ F_a \quad \text{when } F_a/F_r > 0{,}15$$

Since axially loaded double row full complement cylindrical roller bearings only operate satisfactorily when they are subjected to a simultaneously acting radial load, the ratio F_a/F_r should not exceed 0,25.

Equivalent static bearing load

For statically loaded double row full complement cylindrical roller bearings

$$P_0 = F_r$$

Supplementary designations

The designation suffixes used to identify certain features of SKF double row full complement cylindrical roller bearings are explained in the following.

DA Modified snap ring grooves in the outer ring; two-piece inner ring held together by a retaining ring

ADA Modified snap ring grooves in the outer ring; two-piece inner ring held together by a retaining ring

CV Modified internal design, full complement roller set

C2 Radial internal clearance smaller than Normal

C3 Radial internal clearance greater than Normal

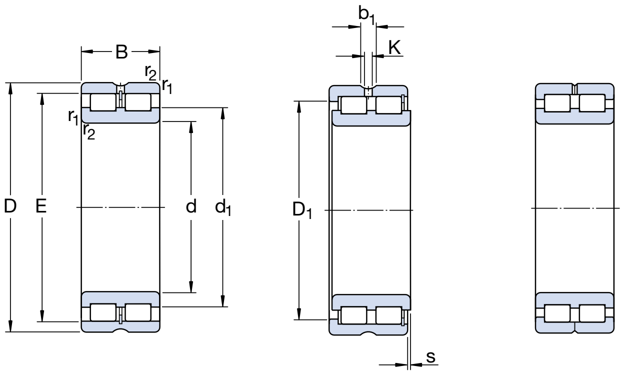
L4B Bearing rings and rolling elements with special surface coating

L5B Rolling elements with special surface coating

V Full complement roller set (without cage)

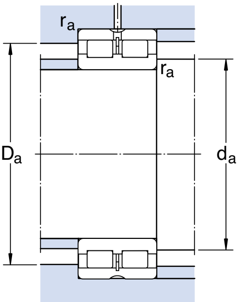
2LS Contact seals of polyurethane (AU) on both sides of the bearing

Double row full complement cylindrical roller bearings
d **20 – 85** mm



NNCL NNCF NNC

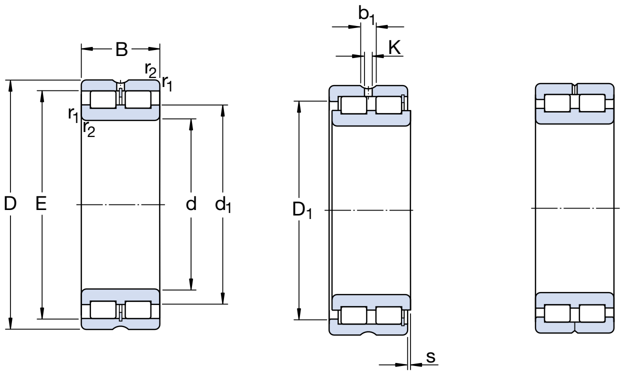
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designation**
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
20	42	30	52,3	57	6,2	8 500	10 000	0,20	**NNCF 5004 CV**
25	47	30	59,4	71	7,65	7 000	9 000	0,23	**NNCF 5005 CV**
30	55	34	73,7	88	10	6 000	7 500	0,35	**NNCF 5006 CV**
35	62	36	89,7	112	12,9	5 300	6 700	0,46	**NNCF 5007 CV**
40	68	38	106	140	16,3	4 800	6 000	0,56	**NNCF 5008 CV**
45	75	40	112	156	18,3	4 300	5 300	0,71	**NNCF 5009 CV**
50	80	40	142	196	23,6	4 000	5 000	0,76	**NNCF 5010 CV**
55	90	46	190	280	34,5	3 400	4 300	1,16	**NNCF 5011 CV**
60	85	25	78,1	137	14,3	3 600	4 500	0,49	**NNCF 4912 CV**
	85	25	78,1	137	14,3	3 600	4 500	0,49	**NNC 4912 CV**
	85	25	78,1	137	14,3	3 600	4 500	0,49	**NNCL 4912 CV**
	95	46	198	300	36,5	3 400	4 000	1,24	**NNCF 5012 CV**
65	100	46	209	325	40	3 000	3 800	1,32	**NNCF 5013 CV**
70	100	30	114	193	22,4	3 000	3 800	0,78	**NNCF 4914 CV**
	100	30	114	193	22,4	3 000	3 800	0,78	**NNC 4914 CV**
	100	30	114	193	22,4	3 000	3 800	0,78	**NNCL 4914 CV**
	110	54	238	345	45	2 800	3 600	1,85	**NNCF 5014 CV**
75	115	54	251	380	49	2 600	3 200	1,93	**NNCF 5015 CV**
80	110	30	121	216	25	2 600	3 400	0,88	**NNCF 4916 CV**
	110	30	121	216	25	2 800	3 400	0,88	**NNC 4916 CV**
	110	30	121	216	25	2 600	3 400	0,88	**NNCL 4916 CV**
	125	60	308	455	58,5	2 400	3 000	2,59	**NNCF 5016 CV**
85	130	60	314	475	60	2 400	3 000	2,72	**NNCF 5017 CV**



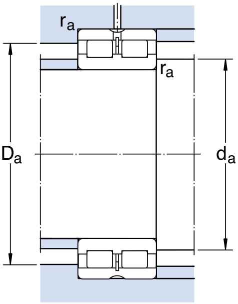
Dimensions								Abutment and fillet dimensions			
d	d_1 ~	D_1 ~	E	b_1	K	$r_{1,2}$ min	s[1]	d_a min	d_{as}[2] rec.	D_a max	r_a max
mm								mm			
20	28,4	33,2	36,81	4,5	3	0,6	1	23,2	26,6	38,8	0,6
25	34,5	38,9	42,51	4,5	3	0,6	1	28,2	28,2	43,8	0,6
30	40	45,3	49,6	4,5	3	1	1,5	34,6	34,6	50,4	1
35	44,9	51,3	55,52	4,5	3	1	1,5	39,6	39,6	57,4	1
40	50,5	57,2	61,74	4,5	3	1	1,5	44,6	44,6	63,4	1
45	55,3	62,5	66,85	4,5	3	1	1,5	49,6	49,6	70,4	1
50	59,1	67,6	72,23	4,5	3	1	1,5	54,6	54,6	75,4	1
55	68,5	78,7	83,54	4,5	3,5	1,1	1,5	61	61	84	1
60	70,5	73,5	77,51	4,5	3,5	1	1	64,6	68,5	80,4	1
	70,5	73,5	77,51	4,5	3,5	1	–	64,6	68,5	80,4	1
	70,5	–	77,51	4,5	3,5	1	1	64,6	68,5	80,4	1
	71,7	81,9	86,74	4,5	3,5	1,1	1,5	66	69,2	89	1
65	78,1	88,3	93,09	4,5	3,5	1,1	1,5	71	71	94	1
70	83	87	91,87	4,5	3,5	1	1	74,6	80,4	95,4	1
	83	87	91,87	4,5	3,5	1	–	74,6	80,4	95,4	1
	83	–	91,87	4,5	3,5	1	1	74,6	80,4	95,4	1
	81,5	95	100,28	5	3,5	1,1	3	76	78,9	104	1
75	89	103	107,9	5	3,5	1,1	3	81	81	109	1
80	91,4	96	97,78	5	3,5	1	1	84,6	87,6	105,4	1
	92	96	100,78	5	3,5	1	–	84,6	89,4	105,4	1
	92	–	100,78	5	3,5	1	1	84,6	89,4	105,4	1
	95	111	116,99	5	3,5	1,1	3,5	86	92	119	1
85	99	117	121,44	5	3,5	1,1	3,5	91	91	124	1

1) Permissible axial displacement from the normal position of one bearing ring in relation to the other
2) Recommended shaft abutment diameter for axially loaded bearings ➔ **page 576**

Double row full complement cylindrical roller bearings
d **90 – 150** mm



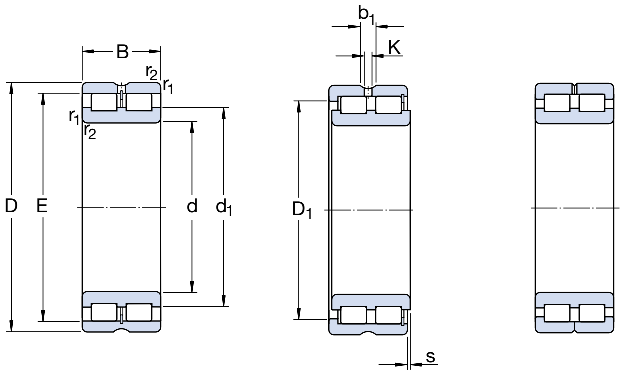
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
90	125	35	161	300	35,5	2 400	3 000	1,35	**NNCF 4918 CV**
	125	35	161	300	35,5	2 400	3 000	1,35	**NNC 4918 CV**
	125	35	161	300	35,5	2 400	3 000	1,35	**NNCL 4918 CV**
	140	67	369	560	69,5	2 200	2 800	3,62	**NNCF 5018 CV**
100	140	40	209	400	46,5	2 000	2 600	2,00	**NNCF 4920 CV**
	140	40	209	400	46,5	2 000	2 600	1,95	**NNC 4920 CV**
	140	40	209	400	46,5	2 000	2 600	1,95	**NNCL 4920 CV**
	150	67	391	620	75	2 000	2 600	3,94	**NNCF 5020 CV**
110	150	40	220	430	49	1 900	2 400	2,15	**NNCF 4922 CV**
	150	40	220	430	49	1 900	2 400	2,15	**NNC 4922 CV**
	150	40	220	430	49	1 900	2 400	2,15	**NNCL 4922 CV**
	170	80	512	800	95	1 800	2 200	6,32	**NNCF 5022 CV**
120	165	45	242	480	53	1 700	2 200	2,95	**NNCF 4924 CV**
	165	45	242	480	53	1 700	2 200	2,95	**NNC 4924 CV**
	165	45	242	480	53	1 700	2 200	2,95	**NNCL 4924 CV**
	180	80	539	880	104	1 700	2 000	6,77	**NNCF 5024 CV**
130	180	50	275	530	60	1 600	2 000	3,95	**NNCF 4926 CV**
	180	50	275	530	60	1 600	2 000	3,95	**NNC 4926 CV**
	180	50	275	530	60	1 600	2 000	3,95	**NNCL 4926 CV**
	200	95	765	1 250	143	1 500	1 900	10,2	**NNCF 5026 CV**
140	190	50	286	570	63	1 500	1 900	4,20	**NNCF 4928 CV**
	190	50	286	570	63	1 500	1 900	4,20	**NNC 4928 CV**
	190	50	286	570	63	1 500	1 900	4,20	**NNCL 4928 CV**
	210	95	809	1 370	156	1 400	1 800	11,1	**NNCF 5028 CV**
150	190	40	255	585	60	1 500	1 800	2,70	**NNCF 4830 CV**
	190	40	255	585	60	1 500	1 800	2,90	**NNC 4830 CV**
	190	40	255	585	60	1 500	1 800	2,70	**NNCL 4830 CV**
	210	60	429	830	91,5	1 400	1 700	6,65	**NNCF 4930 CV**
	210	60	429	830	91,5	1 400	1 700	6,65	**NNC 4930 CV**
	210	60	429	830	91,5	1 400	1 700	6,65	**NNCL 4930 CV**
	225	100	842	1 430	160	1 300	1 700	13,3	**NNCF 5030 CV**



Dimensions								**Abutment and fillet dimensions**			
d	d_1 ~	D_1 ~	E	b_1	K	$r_{1,2}$ min	s[1]	d_a min	d_{as}[2] rec.	D_a max	r_a max
mm								mm			
90	103	111	113,2	5	3,5	1,1	1,5	96	100	119	1
	103	110	115,2	5	3,5	1,1	–	96	101	119	1
	103	–	115,2	5	3,5	1,1	1,5	96	101	119	1
	106	124	130,11	5	3,5	1,5	4	97	103	133	1,5
100	116	125	129,6	5	3,5	1,1	2	106	114	134	1
	116	125	129,6	5	3,5	1,1	–	106	114	134	1
	116	–	129,6	5	3,5	1,1	2	106	114	134	1
	115	134	139,65	6	3,5	1,5	4	107	112	143	1,5
110	124	134	138,2	6	3,5	1,1	2	116	122	144	1
	125	134	138,2	6	3,5	1,1	–	116	123	144	1
	125	–	138,2	6	3,5	1,1	2	116	123	144	1
	127	149	156,13	6	3,5	2	5	120	124	160	2
120	138	149	153,55	6	3,5	1,1	3	126	136	159	1
	139	148	153,55	6	3,5	1,1	–	126	136	159	1
	139	–	153,55	6	3,5	1,1	3	126	136	159	1
	138	161	167,58	6	3,5	2	5	130	135	170	2
130	148	160	165,4	6	3,5	1,5	4	137	146	173	1,5
	149	160	165,4	6	3,5	1,5	–	137	146	173	1,5
	149	–	165,4	6	3,5	1,5	4	137	146	173	1,5
	149	175	183,81	7	4	2	5	140	140	190	2
140	159	171	175,9	6	3,5	1,5	4	147	156	183	1,5
	160	170	175,9	6	3,5	1,5	–	147	157	183	1,5
	160	–	175,9	6	3,5	1,5	4	147	157	183	1,5
	163	189	197,82	7	4	2	5	150	150	200	2
150	166	173	178,3	7	4	1,1	2	156	163	184	1
	166	173	178,3	7	4	1,1	–	156	163	184	1
	166	–	178,3	7	4	1,1	2	160	163	180	1
	170	187	192,77	7	4	2	4	160	167	200	2
	171	187	192,77	7	4	2	–	160	168	200	2
	171	–	192,77	7	4	2	4	160	168	200	2
	170	198	206,8	7	4	2	6	160	160	215	2

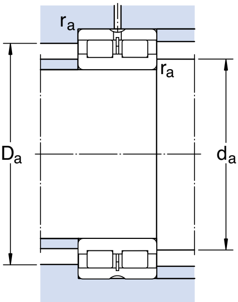
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 576**

Double row full complement cylindrical roller bearings
d **160 – 190** mm



NNCL NNCF NNC

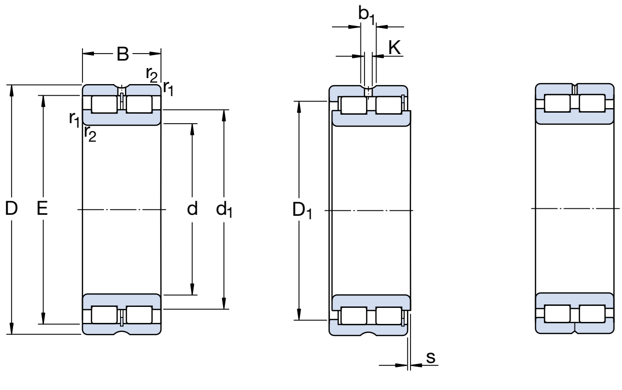
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
160	200	40	260	610	62	1 400	1 700	2,90	**NNCF 4832 CV**
	200	40	260	610	62	1 400	1 700	3,10	**NNC 4832 CV**
	200	40	260	610	62	1 400	1 700	2,90	**NNCL 4832 CV**
	220	60	446	915	96,5	1 300	1 600	7,00	**NNCF 4932 CV**
	220	60	446	915	96,5	1 300	1 600	7,00	**NNC 4932 CV**
	220	60	446	915	96,5	1 300	1 600	7,00	**NNCL 4932 CV**
	240	109	952	1 600	180	1 200	1 500	16,2	**NNCF 5032 CV**
170	215	45	286	655	65,5	1 300	1 600	3,90	**NNCF 4834 CV**
	215	45	286	655	65,5	1 300	1 600	4,10	**NNC 4834 CV**
	215	45	286	655	65,5	1 300	1 600	3,90	**NNCL 4834 CV**
	230	60	457	950	100	1 200	1 500	7,35	**NNCF 4934 CV**
	230	60	457	950	100	1 200	1 500	7,35	**NNC 4934 CV**
	230	60	457	950	100	1 200	1 500	7,35	**NNCL 4934 CV**
	260	122	1 230	2 120	236	1 100	1 400	23,0	**NNCF 5034 CV**
180	225	45	297	695	69,5	1 200	1 500	4,00	**NNCF 4836 CV**
	225	45	297	695	69,5	1 200	1 500	4,30	**NNC 4836 CV**
	225	45	297	695	69,5	1 200	1 500	4,00	**NNCL 4836 CV**
	250	69	594	1 220	127	1 100	1 400	10,8	**NNCF 4936 CV**
	250	69	594	1 220	127	1 100	1 400	10,8	**NNC 4936 CV**
	250	69	594	1 220	127	1 100	1 400	10,8	**NNCL 4936 CV**
	280	136	1 420	2 500	270	1 100	1 300	30,5	**NNCF 5036 CV**
190	240	50	330	750	76,5	1 100	1 400	5,30	**NNCF 4838 CV**
	240	50	330	750	76,5	1 100	1 400	5,65	**NNC 4838 CV**
	240	50	330	750	76,5	1 100	1 400	5,30	**NNCL 4838 CV**
	260	69	605	1 290	132	1 100	1 400	11,2	**NNCF 4938 CV**
	260	69	605	1 290	132	1 100	1 400	11,2	**NNC 4938 CV**
	260	69	605	1 290	132	1 100	1 400	11,2	**NNCL 4938 CV**
	290	136	1 470	2 600	280	1 000	1 300	31,5	**NNCF 5038 CV**



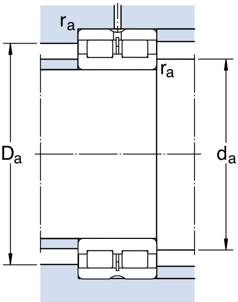
Dimensions								Abutment and fillet dimensions			
d	d_1 ~	D_1 ~	E	b_1	K	$r_{1,2}$ min	s[1]	d_a min	d_{as}[2] rec.	D_a max	r_a max
mm								mm			
160	174	182	186,9	7	4	1,1	2	171	171	189	1
	174	182	186,9	7	4	1,1	–	166	171	194	1
	174	–	186,9	7	4	1,1	2	166	171	194	1
	184	200	206,16	7	4	2	4	170	181	210	2
	185	200	206,16	7	4	2	–	170	182	210	2
	185	–	206,16	7	4	2	4	170	182	210	2
	184	216	224,8	7	4	2,1	6	171	171	229	2
170	187	196	201,3	7	4	1,1	3	176	184	209	1
	187	196	201,3	7	4	1,1	–	176	184	209	1
	187	–	201,3	7	4	1,1	3	176	184	209	1
	193	209	215,08	7	4	2	4	180	190	220	2
	194	209	215,08	7	4	2	–	180	191	220	2
	194	–	215,08	7	4	2	4	180	191	220	2
	198	232	243	7	4	2,1	6	181	181	249	2
180	200	209	214,1	7	4	1,1	3	186	197	219	1
	200	209	214,1	7	4	1,1	–	186	197	219	1
	200	–	214,1	7	4	1,1	3	186	197	219	1
	205	224	230,5	7	4	2	4	190	202	240	2
	206	224	230,5	7	4	2	–	190	202	240	2
	206	–	230,5	7	4	2	4	190	202	240	2
	212	249	260,5	8	4	2,1	8	191	206	269	2
190	209	219	225	7	4	1,5	4	197	206	233	1,5
	209	219	225	7	4	1,5	–	197	206	233	1,5
	209	–	225	7	4	1,5	4	197	206	233	1,5
	215	234	240,7	7	4	2	4	200	212	250	2
	216	233	240,7	7	4	2	–	200	212	250	2
	216	–	240,7	7	4	2	4	200	212	250	2
	222	258	270	8	4	2,1	8	201	201	279	2

1) Permissible axial displacement from the normal position of one bearing ring in relation to the other
2) Recommended shaft abutment diameter for axially loaded bearings ➔ **page 576**

Double row full complement cylindrical roller bearings
d **200 – 260** mm



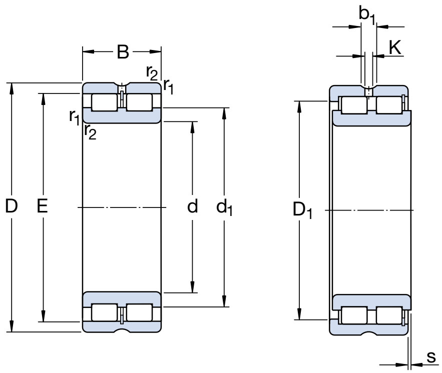
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designation**
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
200	250	50	336	800	80	1 100	1 400	5,50	**NNCF 4840 CV**
	250	50	336	800	80	1 100	1 400	5,90	**NNC 4840 CV**
	250	50	336	800	80	1 100	1 400	5,50	**NNCL 4840 CV**
	280	80	704	1 500	153	1 000	1 300	15,8	**NNCF 4940 CV**
	280	80	704	1 500	153	1 000	1 300	15,8	**NNC 4940 CV**
	280	80	704	1 500	153	1 000	1 300	15,8	**NNCL 4940 CV**
	310	150	1 680	3 050	320	950	1 200	41,0	**NNCF 5040 CV**
220	270	50	352	865	85	1 000	1 200	5,90	**NNCF 4844 CV**
	270	50	352	865	85	1 000	1 200	6,40	**NNC 4844 CV**
	270	50	352	865	85	1 000	1 200	5,90	**NNCL 4844 CV**
	300	80	737	1 600	160	950	1 200	17,2	**NNCF 4944 CV**
	300	80	737	1 600	160	950	1 200	17,2	**NNC 4944 CV**
	300	80	737	1 600	160	950	1 200	17,2	**NNCL 4944 CV**
	340	160	2 010	3 600	375	850	1 100	52,5	**NNCF 5044 CV**
240	300	60	539	1 290	125	900	1 100	9,10	**NNCF 4848 CV**
	300	60	539	1 290	125	900	1 100	10,0	**NNC 4848 CV**
	300	60	539	1 290	125	900	1 100	9,10	**NNCL 4848 CV**
	320	80	781	1 760	173	850	1 100	18,5	**NNCF 4948 CV**
	320	80	781	1 760	173	850	1 100	18,5	**NNC 4948 CV**
	320	80	781	1 760	173	850	1 100	18,5	**NNCL 4948 CV**
	360	160	2 120	3 900	400	800	1 000	56,0	**NNCF 5048 CV**
260	320	60	561	1 400	132	800	1 000	9,70	**NNCF 4852 CV**
	320	60	561	1 400	132	800	1 000	11,0	**NNC 4852 CV**
	320	60	561	1 400	132	800	1 000	9,70	**NNCL 4852 CV**
	360	100	1 170	2 550	245	750	950	32,0	**NNCF 4952 CV**
	360	100	1 170	2 550	245	750	950	32,0	**NNC 4952 CV**
	360	100	1 170	2 550	245	750	950	32,0	**NNCL 4952 CV**
	400	190	2 860	5 200	520	700	900	85,5	**NNCF 5052 CV**



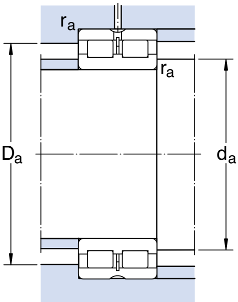
Dimensions								Abutment and fillet dimensions			
d	d_1 ~	D_1 ~	E	b_1	K	$r_{1,2}$ min	s[1]	d_a min	d_{as}[2] rec.	D_a max	r_a max
mm								mm			
200	220	230	235,5	7	4	1,5	4	207	217	243	1,5
	220	230	235,5	7	4	1,5	–	207	217	243	1,5
	220	–	235,5	7	4	1,5	4	207	217	243	1,5
	230	252	259,3	8	4	2,1	5	211	227	269	2
	231	252	259,34	8	4	2,1	–	211	227	269	2
	231	–	259,34	8	4	2,1	5	211	227	269	2
	236	276	288	8	4	2,1	9	211	230	299	2
220	241	251	256,5	7	4	1,5	4	227	238	263	1,5
	241	251	256,5	7	4	1,5	–	227	238	263	1,5
	241	–	256,5	7	4	1,5	4	227	238	263	1,5
	247	269	276,52	8	4	2,1	5	231	244	289	2
	248	269	276,52	8	4	2,1	–	231	244	289	2
	248	–	276,52	8	4	2,1	5	231	244	289	2
	255	300	312	8	6	3	9	235	248	325	2,5
240	261	275	281,9	8	4	2	4	250	257	290	2
	261	275	281,9	8	4	2	–	250	257	290	2
	261	–	281,9	8	4	2	4	250	257	290	2
	270	292	299,46	8	4	2,1	5	251	267	309	2
	271	291	299,1	8	4	2,1	–	251	267	309	2
	271	–	299,46	8	4	2,1	5	251	267	309	2
	278	322	335,6	9,4	5	3	9	255	271	345	2,5
260	283	297	304,2	8	4	2	4	270	280	310	2
	283	297	304,2	8	4	2	–	270	280	310	2
	283	–	304,2	8	4	2	4	270	280	310	2
	294	322	331,33	9,4	5	2,1	6	271	290	349	2
	295	321	331,33	9,4	5	2,1	–	271	290	349	2
	295	–	331,33	9,4	5	2,1	6	271	290	349	2
	304	357	373,5	9,4	5	4	10	278	297	382	3

[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 576**

Double row full complement cylindrical roller bearings
d **280 – 340** mm



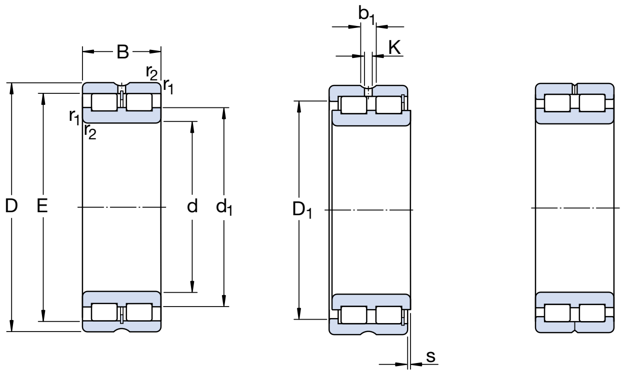
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
280	350	69	737	1 860	173	750	950	15,3	**NNCF 4856 CV**
	350	69	737	1 860	173	750	950	16,0	**NNC 4856 CV**
	350	69	737	1 860	173	750	950	15,3	**NNCL 4856 CV**
	380	100	1 210	2 700	255	700	900	34,0	**NNCF 4956 CV**
	380	100	1 210	2 700	255	700	900	34,0	**NNC 4956 CV**
	380	100	1 210	2 700	255	700	900	34,0	**NNCL 4956 CV**
	420	190	2 920	5 600	540	670	850	90,5	**NNCF 5056 CV**
300	380	80	858	2 120	196	700	850	21,8	**NNCF 4860 CV**
	380	80	858	2 120	196	700	850	23,0	**NNC 4860 CV**
	380	80	858	2 120	196	700	850	21,8	**NNCL 4860 CV**
	420	118	1 680	3 750	355	670	800	53,0	**NNCF 4960 CV**
	420	118	1 680	3 750	355	670	800	53,0	**NNC 4960 CV**
	420	118	1 680	3 750	355	670	800	53,0	**NNCL 4960 CV**
	460	218	3 250	6 550	600	600	750	130	**NNCF 5060 CV**
320	400	80	897	2 280	208	630	800	22,7	**NNCF 4864 CV**
	400	80	897	2 280	208	630	800	24,0	**NNC 4864 CV**
	400	80	897	2 280	208	630	800	22,7	**NNCL 4864 CV**
	440	118	1 760	4 050	375	600	750	56,0	**NNCF 4964 CV**
	440	118	1 760	4 050	375	600	750	56,0	**NNC 4964 CV**
	440	118	1 760	4 050	375	600	750	56,0	**NNCL 4964 CV**
	480	218	3 690	6 950	620	560	700	135	**NNCF 5064 CV**
340	420	80	913	2 400	216	600	750	25,5	**NNCF 4868 CV**
	420	80	913	2 400	216	600	750	25,5	**NNC 4868 CV**
	420	80	913	2 400	216	600	750	25,5	**NNCL 4868 CV**
	460	118	1 790	4 250	390	560	700	59,0	**NNCF 4968 CV**
	460	118	1 790	4 250	390	560	700	59,0	**NNC 4968 CV**
	460	118	1 790	4 250	390	560	700	59,0	**NNCL 4968 CV**
	520	243	4 400	8 300	710	530	670	185	**NNCF 5068 CV**



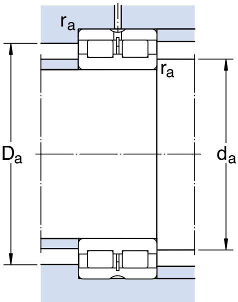
Dimensions								**Abutment and fillet dimensions**			
d	d_1 ~	D_1 ~	E	b_1	K	$r_{1,2}$ min	s[1]	d_a min	d_{as}[2] rec.	D_a max	r_a max
mm								mm			
280	309	326	332,4	8	4	2	4	290	305	340	2
	308	326	332,4	8	4	2	–	290	304	340	2
	309	–	332,4	8	4	2	4	290	305	340	2
	316	344	353,34	9,4	5	2,1	6	291	312	369	2
	317	343	353,34	9,4	5	2,1	–	291	312	369	2
	317	–	353,34	9,4	5	2,1	6	291	312	369	2
	320	372	389	9,4	5	4	10	298	314	402	3
300	329	349	356,7	9,4	5	2,1	6	311	325	369	2
	329	349	356,7	9,4	5	2,1	–	311	325	369	2
	329	–	356,7	9,4	5	2,1	6	311	325	369	2
	340	374	385,51	9,4	5	3	6	315	335	405	2,5
	341	374	385,51	9,4	5	3	–	315	335	405	2,5
	341	–	385,5	9,4	5	3	6	315	335	405	2,5
	352	418	433	9,4	5	4	9	318	343	442	3
320	352	372	379,7	9,4	5	2,1	6	331	348	389	2
	352	372	379,7	9,4	5	2,1	–	331	348	389	2
	352	–	379,7	9,4	5	2,1	6	331	348	389	2
	368	400	412,27	9,4	5	3	6	335	362	425	2,5
	368	400	412,27	9,4	5	3	–	335	362	425	2,5
	368	–	412,3	9,4	5	3	6	335	362	425	2,5
	370	434	449	9,4	5	4	9	338	360	462	3
340	369	389	396,9	9,4	5	2,1	6	351	365	409	2
	369	389	396,9	9,4	5	2,1	–	351	365	409	2
	369	–	396,9	9,4	5	2,1	6	351	365	409	2
	386	418	430,11	9,4	5	3	6	355	380	445	2,5
	386	418	430,11	9,4	5	3	–	355	380	445	2,5
	386	–	430,1	9,4	5	3	6	355	380	445	2,5
	395	468	485	9,4	5	5	11	363	384	497	4

[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 576**

Double row full complement cylindrical roller bearings
d **360 – 400** mm



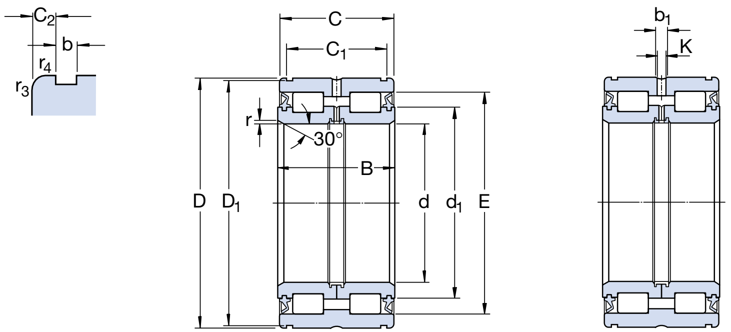
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass	Designation
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
360	440	80	935	2 550	224	560	700	27,0	**NNCF 4872 CV**
	440	80	935	2 550	224	560	700	27,0	**NNC 4872 CV**
	440	80	935	2 550	224	560	700	27,0	**NNCL 4872 CV**
	480	118	1 830	4 500	405	530	670	62,1	**NNCF 4972 CV**
	480	118	1 830	4 500	405	530	670	62,1	**NNC 4972 CV**
	480	118	1 830	4 500	405	530	670	60,8	**NNCL 4972 CV**
	540	243	4 460	8 650	735	500	630	195	**NNCF 5072 CV**
380	480	100	1 400	3 650	315	530	670	45,5	**NNCF 4876 CV**
	480	100	1 400	3 650	315	530	670	45,5	**NNC 4876 CV**
	480	100	1 400	3 650	315	530	670	45,5	**NNCL 4876 CV**
	520	140	2 380	5 700	500	500	630	92,4	**NNCF 4976 CV**
	520	140	2 380	5 700	500	500	630	92,4	**NNC 4976 CV**
	520	140	2 380	5 700	500	500	630	92,4	**NNCL 4976 CV**
	560	243	4 680	9 150	735	480	600	200	**NNCF 5076 CV**
400	500	100	1 420	3 750	325	500	630	46,5	**NNCF 4880 CV**
	500	100	1 420	3 750	325	500	630	46,5	**NNC 4880 CV**
	500	100	1 420	3 750	325	500	630	46,5	**NNCL 4880 CV**
	540	140	2 420	6 000	520	480	600	96,5	**NNCF 4980 CV**
	540	140	2 420	6 000	520	480	600	96,5	**NNC 4980 CV**
	540	140	2 420	6 000	520	480	600	96,5	**NNCL 4980 CV**
	600	272	5 500	11 000	900	450	560	270	**NNCF 5080 CV**



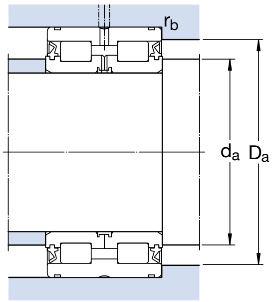
Dimensions								Abutment and fillet dimensions			
d	d_1 ~	D_1 ~	E	b_1	K	$r_{1,2}$ min	s[1]	d_a min	d_{as}[2] rec.	D_a max	r_a max
mm								mm			
360	392	412	419,8	9,4	5	2,1	6	371	388	429	2
	392	412	419,8	9,4	5	2,1	–	371	388	429	2
	392	–	419,8	9,4	5	2,1	6	371	388	429	2
	404	436	448	9,4	5	3	6	375	398	465	2,5
	404	436	448	9,4	5	3	–	375	398	465	2,5
	404	–	448	9,4	5	3	6	375	398	465	2,5
	412	486	503	9,4	5	5	11	383	402	517	4
380	421	446	455,8	9,4	5	2,1	6	391	415	469	2
	421	446	455,8	9,4	5	2,1	–	391	415	469	2
	421	–	455,8	9,4	5	2,1	6	391	415	469	2
	431	468	481,35	9,4	5	4	7	398	424	502	3
	431	468	481,35	9,4	5	4	–	398	424	502	3
	431	–	481,4	9,4	5	4	7	398	424	502	3
	431	504	521	9,4	5	5	11	403	420	537	4
400	435	461	470,59	9,4	5	2,1	6	411	430	489	2
	435	461	470,59	9,4	5	2,1	–	411	430	489	2
	435	–	470,59	9,4	5	2,1	6	411	430	489	2
	451	488	501,74	9,4	5	4	7	418	444	522	3
	451	488	501,74	9,4	5	4	–	418	444	522	3
	451	–	501,7	9,4	5	4	7	418	444	522	3
	460	540	558	9,4	5	5	11	423	449	577	4

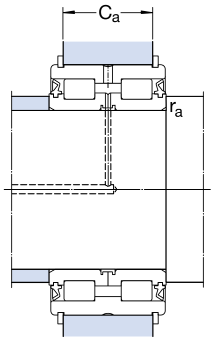
[1] Permissible axial displacement from the normal position of one bearing ring in relation to the other
[2] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 576**

Sealed double row full complement cylindrical roller bearings
d **20 – 120** mm



Principal dimensions d	D	B	C	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Limiting speed	Mass	Designation
mm				kN		kN	r/min	kg	–
20	42	30	29	44	52	5,4	3 600	0,21	**NNF 5004 ADA-2LSV**
25	47	30	29	48,4	62	6,4	3 000	0,23	**NNF 5005 ADA-2LSV**
30	55	34	33	57,2	75	7,8	2 600	0,35	**NNF 5006 ADA-2LSV**
35	62	36	35	70,4	91,5	10,2	2 200	0,45	**NNF 5007 ADA-2LSV**
40	68	38	37	85,8	116	13,4	2 000	0,53	**NNF 5008 ADA-2LSV**
45	75	40	39	102	146	17	1 800	0,68	**NNF 5009 ADA-2LSV**
50	80	40	39	108	160	18,6	1 700	0,73	**NNF 5010 ADA-2LSV**
55	90	46	45	128	193	22,8	1 500	1,10	**NNF 5011 ADA-2LSV**
60	95	46	45	134	208	25	1 400	1,20	**NNF 5012 ADA-2LSV**
65	100	46	45	138	224	26,5	1 300	1,30	**NNF 5013 ADA-2LSV**
70	110	54	53	205	325	40,5	1 200	1,85	**NNF 5014 ADA-2LSV**
75	115	54	53	216	355	44	1 100	2,00	**NNF 5015 ADA-2LSV**
80	125	60	59	251	415	53	1 000	2,70	**NNF 5016 ADA-2LSV**
85	130	60	59	270	430	55	1 000	2,75	**NNF 5017 ADA-2LSV**
90	140	67	66	319	550	69,5	900	3,80	**NNF 5018 ADA-2LSV**
95	145	67	66	330	570	71	900	3,95	**NNF 5019 ADA-2LSV**
100	150	67	66	336	570	68	850	4,05	**NNF 5020 ADA-2LSV**
110	170	80	79	413	695	81,5	750	6,45	**NNF 5022 ADA-2LSV**
120	180	80	79	429	750	86,5	700	6,90	**NNF 5024 ADA-2LSV**

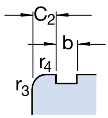


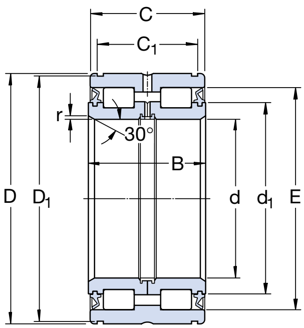


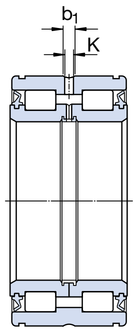
Dimensions											Abutment and fillet dimensions[1]							Approriate snap rings[2] Designation	
d	d_1 ~	D_1 ~	E	C_1 +0,2	C_2	b	b_1	K	r min	$r_{3,4}$ min	d_a min	d_{as}[3] rec.	D_a max	C_{a1} –0,2	C_{a2} –0,2	r_a max	r_b max	Seeger	DIN 471
mm											mm							–	
20	28,1	40	35,6	24,7	2,15	1,9	4,5	3	0,5	0,3	24	26,9	38	21,5	21	0,3	0,3	SW 42	42×1.75
25	33	44,8	40,4	24,7	2,15	1,8	4,5	3	0,5	0,3	29	31,7	45	21,5	21	0,3	0,3	SW 47	47×1.75
30	39	53	47,9	28,2	2,4	2,1	4,5	3	0,5	0,3	34	38	53	25	24	0,3	0,3	SW 55	55×2
35	45	59,8	54,5	30,2	2,4	2,1	4,5	3	0,5	0,3	39	43,3	60	27	26	0,3	0,3	SW 62	62×2
40	50,5	65,8	61	32,2	2,4	2,7	4,5	3	0,8	0,6	44	48,8	63	28	27	0,4	0,6	SW 68	68×2.5
45	56,4	72,8	67,7	34,2	2,4	2,7	4,5	3	0,8	0,6	49	54,6	70	30	29	0,4	0,6	SW 75	75×2.5
50	61,2	77,8	72,5	34,2	2,4	2,7	4,5	3	0,8	0,6	54	59,4	75	30	29	0,4	0,6	SW 80	80×2.5
55	68	87,4	80	40,2	2,4	3,2	4,5	3,5	1	0,6	59,6	66	85	35	34	0,6	0,6	SW 90	90×3
60	73	92,4	85	40,2	2,4	3,2	4,5	3,5	1	0,6	65	71	90	35	34	0,6	0,6	SW 95	95×3
65	78	97,4	90	40,2	2,4	3,2	4,5	3,5	1	0,6	70	76	95	35	34	0,6	0,6	SW 100	100×3
70	85	107	100	48,2	2,4	4,2	5	3,5	1	0,6	75	82,5	105	43	40	0,6	0,6	SW 110	110×4
75	91	112	106	48,2	2,4	4,2	5	3,5	1	0,6	80	88,5	110	43	40	0,6	0,6	SW 115	115×4
80	97	122	113,5	54,2	2,4	4,2	5	3,5	1,5	0,6	86	94,3	120	49	46	1,5	0,6	SW 125	125×4
85	101	127	119,5	54,2	2,4	4,2	5	3,5	1,5	0,6	91	98,3	125	49	46	1,5	0,6	SW 130	130×4
90	109	137	127,5	59,2	3,4	4,2	5	3,5	1,5	0,6	96	106	135	54	51	1,5	0,6	SW 140	140×4
95	113	142	131	59,2	3,4	4,2	6	3,5	1,5	0,6	101	110	140	54	51	1,5	0,6	SW 145	145×4
100	118	147	138	59,2	3,4	4,2	6	3,5	1,5	0,6	106	115	145	54	51	1,5	0,6	SW 150	150×4
110	132	167	154,5	70,2	4,4	4,2	6	3,5	1,8	0,6	117	128	165	65	62	1	0,6	SW 170	170×4
120	141	176	164	71,2	3,9	4,2	6	3,5	1,8	0,6	127	138	175	65	63	1	0,6	SW 180	180×4

[1] The values for C_{a1} apply for SW snap rings, the values for C_{a2} for snap rings according to DIN 471
[2] Snap rings are not supplied with the bearing and must be ordered separately
[3] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 576**

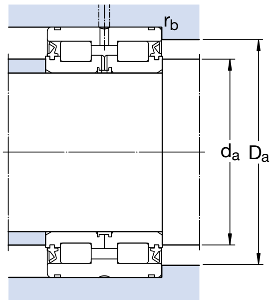
Sealed full complement double row cylindrical roller bearings
d **130 – 240** mm

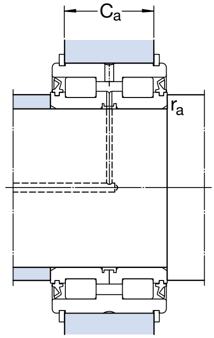






Principal dimensions				**Basic load ratings** dynamic	static	**Fatigue load limit**	**Limiting speed**	**Mass**	**Designation**
d	D	B	C	C	C_0	P_u			
mm				kN		kN	r/min	kg	–
130	190	80	79	446	815	91,5	670	7,50	**319426 DA-2LS**
	200	95	94	616	1 040	120	630	10,5	**NNF 5026 ADA-2LSV**
140	200	80	79	468	865	96,5	630	8,00	**319428 DA-2LS**
	210	95	94	644	1 120	127	600	11,0	**NNF 5028 ADA-2LSV**
150	210	80	79	468	900	96,5	560	8,40	**319430 DA-2LS**
	225	100	99	748	1 290	143	560	13,5	**NNF 5030 ADA-2LSV**
160	220	80	79	501	1 000	106	530	8,80	**319432 DA-2LS**
	240	109	108	781	1 400	153	500	16,5	**NNF 5032 ADA-2LSV**
170	230	80	79	512	1 060	110	530	9,30	**319434 DA-2LS**
	260	122	121	1 010	1 800	193	480	22,5	**NNF 5034 ADA-2LSV**
180	240	80	79	528	1 100	114	500	9,80	**319436 DA-2LS**
	280	136	135	1 170	2 120	228	450	30,0	**NNF 5036 ADA-2LSV**
190	260	80	79	550	1 180	120	450	12,7	**319438 DA-2LS**
	290	136	135	1 190	2 200	236	430	31,5	**NNF 5038 ADA-2LSV**
200	270	80	79	561	1 250	125	430	13,2	**319440 DA-2LS**
	310	150	149	1 450	2 900	300	400	42,0	**NNF 5040 ADA-2LSV**
220	340	160	159	1 610	3 100	315	360	53,5	**NNF 5044 ADA-2LSV**
240	360	160	159	1 680	3 350	335	340	57,5	**NNF 5048 ADA-2LSV**



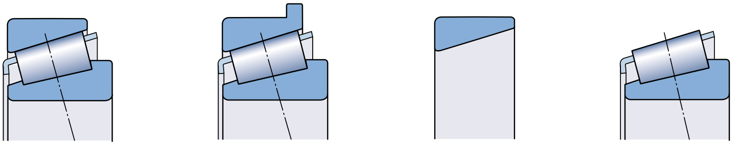


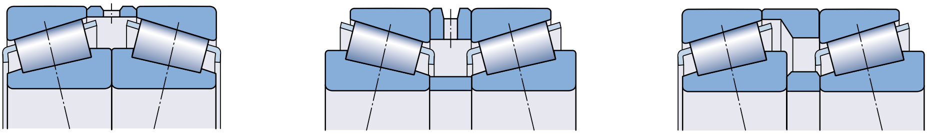
Dimensions											**Abutment and fillet dimensions**[1]							**Approriate snap rings**[2] Designation	
d	d_1 ~	D_1 ~	E	C_1 +0,2	C_2	b	b_1	K	r min	$r_{3,4}$ min	d_a min	d_{as}[3] rec.	D_a max	C_{a1} –0,2	C_{a2} –0,2	r_a max	r_b max	Seeger	DIN 471
mm											mm							–	
130	151	186	173,1	71,2	3,9	4,2	6	3,5	1,8	0,6	137	147	185	65	63	1	0,6	SW 190	190×4
	155	196	183,5	83,2	5,4	4,2	7	4	1,8	0,6	137	150	195	77	75	1	0,6	SW 200	200×4
140	160	196	182,4	71,2	3,9	4,2	7	4	1,8	0,6	147	156	195	65	63	1	0,6	SW 200	200×4
	167	206	195,5	83,2	5,4	5,2	7	4	1,8	0,6	147	162	205	77	73	1	0,6	SW 210	210×5
150	175	206	197	71,2	3,9	5,2	7	4	1,8	0,6	157	171	205	65	61	1	0,6	SW 210	210×5
	177	221	209	87,2	5,9	5,2	7	4	2	0,6	157	172	220	81	77	2	0,6	SW 225	225×5
160	184	216	206,5	71,2	3,9	5,2	7	4	1,8	0,6	167	180	215	65	61	1	0,6	SW 220	220×5
	191	236	222,6	95,2	6,4	5,2	7	4	2	0,6	167	186	235	89	85	2	0,6	SW 240	240×5
170	194	226	216,1	71,2	3,9	5,2	7	4	1,8	0,6	177	190	225	65	61	1	0,6	SW 230	230×5
	203	254	239	107,2	6,9	5,2	7	4	2	0,6	177	197	255	99	97	2	0,6	SW 260	260×5
180	203	236	225,6	71,2	3,9	5,2	7	4	1,8	0,6	177	199	225	65	61	1	0,6	SW 240	240×5
	220	274	259	118,2	8,4	5,2	8	4	2	0,6	187	214	275	110	108	2	0,6	SW 280	280×5
190	218	254	240	73,2	2,9	5,2	7	4	1,8	0,6	197	214	255	65	63	1	0,6	SW 260	260×5
	228	284	267,3	118,2	8,4	5,2	8	4	2	0,6	197	222	285	110	108	2	0,6	SW 290	290×5
200	227	264	249,6	73,2	2,9	5,2	7	4	1,8	0,6	207	223	265	65	63	1	0,6	SW 270	270×5
	245	304	284	128,2	10,4	6,3	8	4	2	0,6	207	239	305	120	116	2	0,6	SW 310	310×6
220	264	334	308,5	138,2	10,4	6,3	8	6	2	1	227	256	334	130	126	2	1	SW 340	340×6
240	283	354	327,5	138,2	10,4	6,3	9,4	6	2	1	247	275	354	130	126	2	1	SW 360	360×6

[1] The values for C_{a1} apply for SW snap rings, the values for C_{a2} for snap rings according to DIN 471
[2] Snap rings are not supplied with the bearing and must be ordered separately
[3] Recommended shaft abutment diameter for axially loaded bearings ➔ **page 576**


SKF

Taper roller bearings





Taper roller bearings are produced by SKF in many designs and sizes to match their many uses. The most prevalent are listed in this catalogue

- single row taper roller bearings (➔ **fig** 1)
- paired single row taper roller bearings (➔ **fig** 2)

The double row and four-row taper roller bearings (➔ **fig** 3), which are mainly used for rolling mill bearing arrangements, round off the comprehensive SKF standard range. Details of these bearings will be found in the "SKF Interactive Engineering Catalogue" available on CD-ROM or online at www.skf.com

SKF also manufactures sealed, greased and preadjusted units based on taper roller bearings, such as

- hub bearing units for passenger cars (➔ **fig** 4),
- hub bearing units for trucks (➔ **fig** 5) and
- tapered bearing units for railbound vehicles (➔ **fig** 6).

Details of these bearings will be found in the special publications, which can be furnished on request.

Fig 1

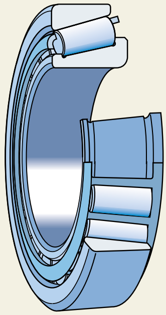


Fig 2

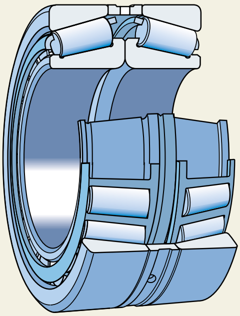


Fig 3

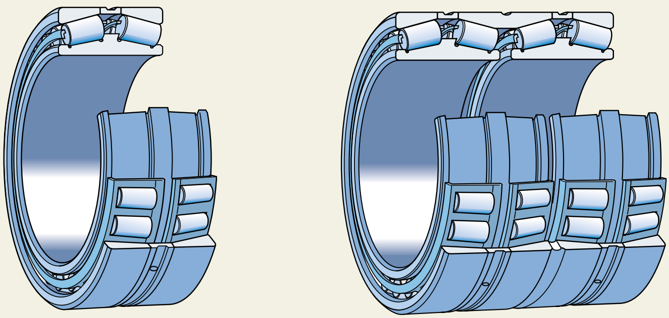


Fig 4

Fig 5

Fig 6

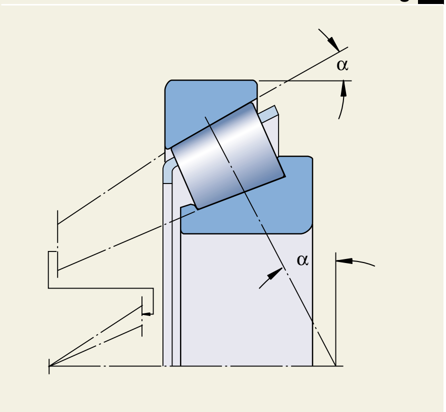
Design features

Taper roller bearings have tapered inner and outer ring raceways between which tapered rollers are arranged. The projection lines of all the tapered surfaces meet at a common point on the bearing axis. Their design makes taper roller bearings particularly suitable for the accommodation of combined (radial and axial) loads. The axial load carrying capacity of the bearings is largely determined by the contact angle α (➔ **fig** 7); the larger α, the higher the axial load carrying capacity. An indication of the angle size is given by the calculation factor e; the larger the value of e, the larger the contact angle and the greater the suitability of the bearing for carrying axial loads.

Taper roller bearings are generally separable, i.e. the cone, consisting of the inner ring with roller and cage assembly, can be mounted separately from the cup (outer ring).

SKF taper roller bearings have the logarithmic contact profile that provides for optimum stress distribution over the roller/raceway contacts. The special design of the sliding surfaces of the guide flange and large roller ends considerably promotes lubricant film formation in the roller end/flange contacts. The resulting benefits include increased operational reliability and reduced sensitivity to misalignment.

Fig 7



Single row taper roller bearings

Bearing designs

Standard design
The SKF standard range of single row taper roller bearings (➔ **fig 1**) covers the popular sizes of metric bearings manufactured to ISO 355:1977 and inch-sized bearings which follow the ANSI/ABMA standard 19.2-1994. The range can be divided into

- bearings for general use,
- high-performance bearings manufactured to the CL7C specifications and
- bearings with a flanged outer ring

as well as “Paired single row taper roller bearings” shown from **page 667** onwards.

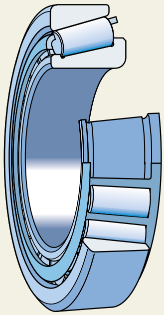
For bearing arrangements operating in particularly difficult environments, for example, where the lubricating oil may be highly contaminated, where high operating temperatures prevail or where heavy deforming loads can be expected, SKF can supply particularly wear-resistant taper roller bearings. Details are available on request.

SKF taper roller bearings for general use, including SKF bearings to Q specifications, have been optimized with regard to the following:

- sliding contact surfaces of the guide flange of the inner ring,
- roller end faces, and
- raceway contact profile.

In addition, highly accurate manufacturing processes make adjustment of the bearings against each other more reliable, which dramatically improves performance especially during the very first hours of operation.

Fig 1



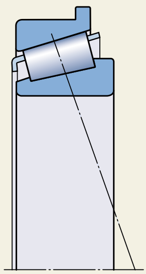
CL7C specification bearings
SKF taper roller bearings produced to the CL7C specifications are intended for bearing arrangements supporting heavy axial loads, for example, gearbox pinion bearing arrangements. These bearings, which are mounted with preload, have special friction characteristics, higher running accuracy and higher axial load carrying capacity to provide a constant, accurate mesh.

In contrast to the bearings for general use, CL7C specification bearings can be adjusted to within narrow limits using the frictional torque method, which considerably simplifies the adjustment process.

With CL7C specification bearings there is practically no running-in wear. As a hydrodynamic lubricant film in the roller end/flange contacts is established from the outset there is virtually no loss of preload and the preload can be maintained at a constant high level throughout operation.

All bearings manufactured to the CL7C specifications are SKF Explorer performance class bearings.

Fig 2



Bearings with flanged outer ring
Certain sizes of SKF single row taper roller bearings are also available with a flange on the outer ring (➔ **fig** 2). Bearings having this external flange can be axially located in the housing to provide a simplified, more compact bearing arrangement. The housing bore is simpler to produce, as no shoulders are required.

SKF Explorer class bearings

High performance taper roller bearings in the SKF Explorer performance class are shown with an asterisk in the product tables. The SKF Explorer bearings retain the designation of the earlier standard bearings, e.g. 32010 X/Q. However, each bearing and its box are marked with the name “EXPLORER”.

Bearing designations

Metric bearings
The designations of metric taper roller bearings with standardized dimensions according to ISO follow one of the following principles

- the series designations established in ISO 355:1977 comprising three symbols, a figure representing the contact angle and two letters for the diameter and width series followed by a three figure bore diameter identification (d in mm). The SKF designations are prefixed by the letter T, e.g. T2ED 045;
- designations established prior to 1977 based on the system shown in **diagram** 1, **page 149,** in the section “Designations”, e.g. 32206.
- metric bearings with a J in the prefix follow the ABMA designation system, which is similar to the system used for inch-size bearings, see ANSI/ABMA Standard 19.2-1994.

Inch-size bearings

Inch-size taper roller bearings are designated according to the ANSI/ABMA standard.

Metric bearings that belong to the same series maintain the same relative cross section regardless of their size. This is not the case with inch size bearings. All inch-size bearings within a series use the same cage and roller assembly but the inner and outer rings can have different sizes and designs.

Any cone (the inner ring with cage and roller assembly) can be assembled with any cup (the outer ring) belonging to the same bearing series. For this reason the cone and cup have individual designations and can be supplied separately or as complete bearings (➔ **fig 3**). The designations of the cones and cups as well as the series consist of a three to six-figure number which may be prefixed by one of the following letters or combination of letters: EL, LL, L, LM, M, HM, H, HH and EH. The prefixes characterize a bearing series from extra light to extra heavy. The basic principles of this system are described in ANSI/ABMA Standard 19.2-1994.

The complete bearing designation consists of the cone designation followed by that of the cup, the two designations being separated by an oblique stroke (➔ **table 1**).

To shorten the complete bearing designations, abbreviations are used (➔ **table 1**).

Fig 3

Table 1

Designations of inch-size taper roller bearings

Designations (Examples)

Cone	Cup	Complete bearing	Series
Complete bearing designation not abbreviated (old ABMA designations)			
4580/2/Q	4535/2/Q	4580/2/4535/2/Q	4500
9285/CL7C	9220/CL7C	9285/9220/CL7C	9200
Abbreviated complete bearing designations (new ABMA designations)			
LM 11749/QVC027	LM 11710/QVC027	LM 11749/710/QVC027	LM 11700
JL 69349 A/Q	JL 69310/Q	JL 69349 A/310/Q	L 69300
HM 89449/2/QCL7C	HM 89410/2/QCL7C	HM 89449/2/410/2/QCL7C	HM 89400
H 913842/CL7C	H 913810/CL7C	H 913842/810/CL7C	H 913800

Bearing data – general

Dimensions

Metric bearings

The boundary dimensions of metric single row taper roller bearings listed in the product tables conform to ISO 355-1977 except for those bearings having a J in the designation prefix. These conform to the ANSI/ABMA Standard 19.1-1987.

Inch-size bearings

The boundary dimensions of inch-size bearings conform to AFBMA Standard 19-1974 (ANSI B3.19-1975). ANSI/ABMA Standard 19.2-1994 has subsequently replaced this standard, but this later standard no longer includes dimensions.

Tolerances

The inner rings with roller and cage assembly and outer rings of SKF taper roller bearings having the same designation are interchangeable. The tolerance for the total abutment width T of the bearing will not be exceeded if the cones and cups are interchanged.

Metric bearings

SKF single row metric taper roller bearings are manufactured to Normal tolerances as standard. Some bearings are also available with reduced width tolerance to tolerance class CLN specifications. Bearings having a J in the prefix are produced as standard to tolerance class CLN specifications.

All bearings having an outside diameter above 420 mm have dimensional accuracy to tolerance class Normal specifications but the running accuracy is better than Normal, being to P6 specifications.

The values for Normal and CLN tolerances correspond to ISO 492:2002 (classes Normal and 6X) and are shown in **tables** 6 and 7 on **pages 128** and **129**. The values for P6 running accuracy are in accordance with DIN 620-3:1964, which was withdrawn in 1988.

Inch-size bearings

SKF single row inch-size taper roller bearings are produced to Normal tolerances as standard. On request, they may be supplied with higher accuracy to CL3 or CL0 tolerance class specifications and/or reduced width tolerances. Cones and cups having a width tolerance that differs from the Normal tolerance are identified by a designation suffix according to **table** 2 where the actual tolerance values are given.

The values for CL3, CL0 and Normal tolerances conform to ANSI/ABMA Standard 19.2-1994 and are listed in **table** 9 on **page 131**. The ISO standard 578:1987, which also covered these tolerance classes, was withdrawn in 1997.

CL7C specification bearings

The tolerances for CL7C specification bearings correspond to Normal tolerances except for the running accuracy which has been tightened considerably. The appropriate values are given together with the Normal tolerances in **table** 6 on **page 128**.

Table 2

Modified width tolerances of cups and cones of inch-size bearings

Designation suffix	**Width tolerance**[1)] max	min
–	mm	
/1	+0,025	0
/1A	+0,038	+0,013
/–1	0	–0,025
/11	+0,025	–0,025
/15	+0,038	–0,038
/2	+0,051	0
/2B	+0,076	+0,025
/2C	+0,102	+0,051
/–2	0	–0,051
/22	+0,051	–0,051
/3	+0,076	0
/–3	0	–0,076
/4	+0,102	0

1) The total width tolerance for a complete bearing is equal to the sum of the tolerances for the cone and cup, e.g. for bearing K-47686/2/K-47620/3 the tolerance is +0,127/0 mm

Internal clearance and preload

The internal clearance of single row taper roller bearings can only be obtained after mounting and is determined by adjustment of the bearing against a second bearing, which provides location in the opposite direction. Further details will be found in the section “Bearing preload”, starting on **page 206**.

Adjustment and running in

When adjusting taper roller bearings against each other, the bearings must be rotated, so that the rollers assume their correct position, i.e. the large end face of the rollers must be in contact with the guide flange.

Conventional taper roller bearings normally have a relatively high friction torque during the first hours of operation, which drops to a lower level after the running-in period. During this running-in period, bearing temperature increases rapidly because of the high initial friction and falls off to an equilibrium level as the running-in phase is completed.

This running-in phase is virtually non-existent with bearings made to the SKF “Q” specification. In these bearings, the initial friction is also much lower, so that temperature increase is almost negligible. This also applies to the high-performance CL7C specification bearings, which are designed for easy adjustment.

Misalignment

The ability of a conventional single row taper roller bearing to accommodate angular misalignment of the inner ring with respect to the outer ring is limited to a few minutes of arc. SKF bearings have the logarithmic contact profile and can tolerate misalignments of approximately 2 to 4 minutes of arc.

These guideline values apply provided the position of the shaft and housing axes are constant. Larger misalignment is possible, depending on the load and requisite service life. For additional information, please contact the SKF application engineering service.

Cages

Single row SKF taper roller bearings are equipped as shown in **fig** 4 with

- a pressed steel window-type cage, no designation suffix or suffixes J1 or J2 (**a**),
- a glass fibre reinforced polyamide 6,6 window-type cage, designation suffix TN9 (**b**).

Note:
Taper roller bearings with a polyamide 6,6 cage can be operated at temperatures up to +120 °C. The lubricants generally used for rolling bearings do not have a detrimental effect on polyamide cage properties, with the exception of a few synthetic oils and greases with a synthetic oil base, and lubricants containing a high proportion of EP additives when used at high temperatures.

For bearing arrangements, which are to be operated at continuously high temperatures or under arduous conditions, SKF recommends using bearings with a pressed steel or high-temperature polymer cage.

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, taper roller 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.

The requisite minimum radial load to be applied to SKF standard taper roller bearings can be estimated from

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

and for SKF Explorer bearings from

$$F_{rm} = 0{,}017\ C$$

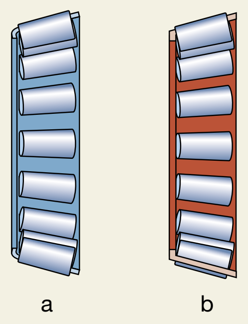
where

F_{rm} = minimum radial load, kN

C = basic dynamic load rating, kN (➔ **product tables**)

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 single row taper roller bearing must be subjected to an additional radial load, which can be achieved easily by applying preload. For additional information, please refer to the section “Bearing preload”, starting on **page 206**.

Fig 4



Equivalent dynamic bearing load
For dynamically loaded taper roller bearings

$P = F_r$ when $F_a/F_r \leq e$
$P = 0{,}4\ F_r + YF_a$ when $F_a/F_r > e$

The values of the calculation factors e and Y will be found in the product tables.

Equivalent static bearing load
For statically loaded taper roller bearings

$P_0 = 0{,}5\ F_r + Y_0F_a$

When $P_0 < 0{,}5\ F_r$, $P_0 = F_r$ should be used. The value of the calculation factor Y_0 will be found in the product tables.

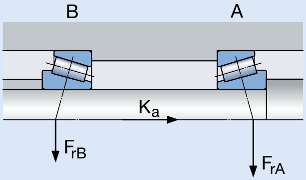
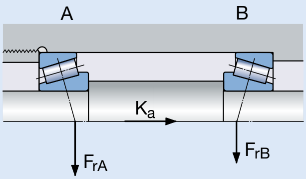
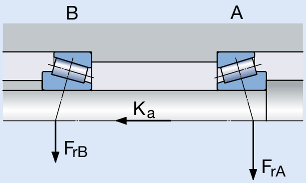
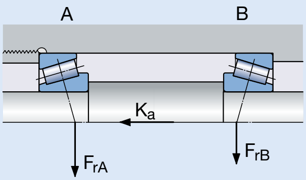
Determining axial force for bearings mounted singly or paired in tandem
When a radial load is applied to a single row taper roller bearing, the load is transmitted from one raceway to the other at an angle to the bearing axis and an internal axial force will be induced in the bearing. This must be considered when calculating the equivalent bearing loads for bearing arrangements consisting of two single bearings and/or bearing pairs arranged in tandem.

The necessary equations are given in **table** 3 for the various bearing arrangements and load cases. The equations are only valid if the bearings are adjusted against each other to practically zero clearance, but without any preload. In the arrangements shown, bearing A is subjected to a radial load F_{rA} and bearing B to radial load F_{rB}. Values of the loads F_{rA} and F_{rB} are always considered positive even when they act in the direction opposite to that shown in the figures. The radial loads act at the pressure centres of the bearings (dimension a in the product tables).

In addition an external force K_a acts on the shaft (or on the housing). Cases 1c and 2c are also valid when $K_a = 0$. Values of the factor Y will be found in the product tables.

Table 3

Axial loading of bearing arrangements incorporating two single row taper roller bearings and/or bearing pairs in tandem

Arrangement	Load case		Axial forces	
Back-to-back  Face-to-face 	1a)	$\frac{F_{rA}}{Y_A} \geq \frac{F_{rB}}{Y_B}$ $K_a \geq 0$	$F_{aA} = \frac{0,5\,F_{rA}}{Y_A}$	$F_{aB} = F_{aA} + K_a$
	1b)	$\frac{F_{rA}}{Y_A} < \frac{F_{rB}}{Y_B}$ $K_a \geq 0,5 \left(\frac{F_{rB}}{Y_B} - \frac{F_{rA}}{Y_A}\right)$	$F_{aA} = \frac{0,5\,F_{rA}}{Y_A}$	$F_{aB} = F_{aA} + K_a$
	1c)	$\frac{F_{rA}}{Y_A} < \frac{F_{rB}}{Y_B}$ $K_a < 0,5 \left(\frac{F_{rB}}{Y_B} - \frac{F_{rA}}{Y_A}\right)$	$F_{aA} = F_{aB} - K_a$	$F_{aB} = \frac{0,5\,F_{rB}}{Y_B}$
Back-to-back  Face-to-face 	2a)	$\frac{F_{rA}}{Y_A} \leq \frac{F_{rB}}{Y_B}$ $K_a \geq 0$	$F_{aA} = F_{aB} + K_a$	$F_{aB} = \frac{0,5\,F_{rB}}{Y_B}$
	2b)	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$ $K_a \geq 0,5 \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$	$F_{aA} = F_{aB} + K_a$	$F_{aB} = \frac{0,5\,F_{rB}}{Y_B}$
	2c)	$\frac{F_{rA}}{Y_A} > \frac{F_{rB}}{Y_B}$ $K_a < 0,5 \left(\frac{F_{rA}}{Y_A} - \frac{F_{rB}}{Y_B}\right)$	$F_{aA} = \frac{0,5\,F_{rA}}{Y_A}$	$F_{aB} = F_{aA} - K_a$

Supplementary designations

The designation suffixes used to identify SKF single row taper roller bearings are explained in the following.

B Larger contact angle than standard design
CLN Reduced tolerances for ring widths and total (abutment) width; corresponds to ISO tolerance class 6X
CL3 Accuracy to ABMA tolerance class 3 for inch-size bearings
CL7A High-performance design for pinion bearing arrangements (superseded by CL7C)
CL7C High-performance design for pinion bearing arrangements
HA1 Inner and outer ring made of case-hardened steel
HA3 Inner ring made of case-hardened steel
HN1 Outer and inner ring with special surface heat treatment
HN3 Inner ring with special surface heat treatment
J Pressed steel window-type cage. A figure following the J indicates a different cage design
P6 Dimensional and running accuracy to old ISO tolerance class 6, better than Normal
Q Optimized contact geometry and surface finish
R Flanged outer ring
TN9 Glass fibre reinforced polyamide 6,6 window-type cage
U. U combined with a one-figure number identifies reduced total width tolerance. Examples:
U2 Total width tolerance +0,05/0 mm
U4 Total width tolerance +0,10/0 mm
VA321 Optimized internal design
VA606 Crowned raceway on bearing rings and special heat treatment
VA607 Crowned raceway on bearing rings and special heat treatment
VB022 Chamfer dimension at large outer ring side face 0,3 mm
VB026 Chamfer dimension at large outer ring side face 3 mm
VB061 Chamfer dimension at large inner ring side face 8 mm
VB134 Chamfer dimension at large inner ring side face1 mm
VB406 Chamfer dimension at large inner ring side face 3 mm and at large outer ring side face 2 mm
VB481 Chamfer dimension at large inner ring side face 8,5 mm
VC027 Modified internal geometry for increased permissible misalignment
VC068 Increased running accuracy and special heat treatment
VE174 Locating slot in outer ring at large outer ring side face, increased running accuracy
VQ051 Modified internal geometry for increased permissible misalignment
VQ267 Reduced inner ring width tolerance, ±0,025 mm
VQ495 As CL7C but with reduced or displaced tolerance for the outside diameter
VQ506 Reduced inner ring width tolerance
VQ507 As CL7C but with reduced or displaced tolerance for the outside diameter
VQ523 As CL7C but with reduced inner ring width tolerance and reduced or displaced tolerance for the outside diameter
VQ601 Accuracy to ABMA tolerance class 0 for inch-size bearings
W Modified ring width tolerance, +0,05/0 mm
X Boundary dimensions changed to conform to ISO

Design of bearing arrangements

When designing bearing arrangements incorporating single row taper roller bearings it is necessary to consider the special characteristics of these bearings. Because of their internal design, they cannot be used singly and a second bearing is required (➔ **fig 5**); alternatively a paired set (➔ **fig 6**) may be used. When the arrangement comprises two single row bearings they must be adjusted against each other as described under "Internal clearance and preload" (➔ **page 604**).

A correctly dimensioned operational clearance or preload is vital to the correct performance of single row taper roller bearings and also to the operational reliability of the arrangement. If the operational clearance is too large, the full load carrying capacity of the bearing will not be exploited. If the preload is too great then frictional losses will increase, as will operating temperature. In both cases the bearing service life could be substantially reduced.

Fits for inch-size bearings
Suitable fits for inch-size taper roller bearings can be obtained based on the recommended fits for metric bearings. However, since inch-size bearings, in contrast to metric bearings, are machined to plus tolerances, the deviations for shaft and housing cannot be applied directly and must be modified to take account of the plus tolerances. Reference should therefore be made to the tables below, which provide the same degree of interference or clearance as the recommended metric tolerances.

- **Table 4**: Modified shaft diameter deviations g6, h6, j5, j6, js6, k5, k6, m5, m6, n6, p6
- **Table 5**: Modified housing bore diameter deviations H7, J7, J6, K6, K7, M6, M7, N7, P7

Fig 5

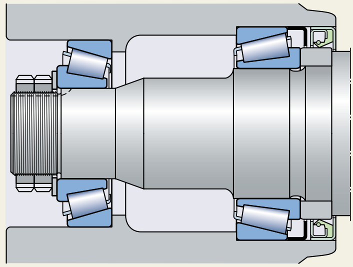


Fig 6

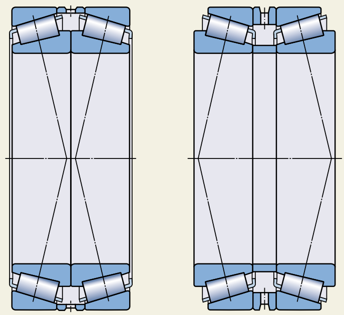


Table 4

Modified shaft diameter deviations for use with inch-size bearings

Nominal diameter Shaft seating Bearing bore over	incl.	Modified deviations for fits with clearance /interference according to g6 high	low	h6 high	low	j5 high	low	j6 high	low	js6 high	low	k5 high	low
mm		µm											
10	**18**	+2	–4	+8	+2	+13	+10	+16	+10	+14	+7	+17	+14
18	**30**	+3	–7	+10	0	+15	+9	+19	+9	+17	+6	+21	+15
30	**50**	+3	–12	+12	–3	+18	+8	+23	+8	+20	+5	+25	+15
50	**76,2**	+5	–16	+15	–6	+21	+6	+27	+6	+25	+3	+30	+15
76,2	**80**	+5	–4	+15	+6	+21	+18	+27	+18	+25	+15	+30	+27
80	**120**	+8	–9	+20	+3	+26	+16	+33	+16	+31	+14	+38	+28
120	**180**	+11	–14	+25	0	+32	+14	+39	+14	+38	+12	+46	+28
180	**250**	+15	–19	+30	–4	+37	+12	+46	+12	+45	+10	+54	+29
250	**304,8**	+18	–24	+35	–7	+42	+9	+51	+9	+51	+9	+62	+29
304,8	**315**	+18	+2	+35	+19	+42	+35	+51	+35	+51	+35	+62	+55
315	**400**	+22	–3	+40	+15	+47	+33	+58	+33	+58	+33	+69	+55
400	**500**	+25	–9	+45	+11	+52	+31	+65	+31	+65	+31	+77	+56
500	**609,6**	+28	–15	+50	+7	–	–	+72	+29	+72	+29	+78	+51
609,6	**630**	+28	+10	+50	+32	–	–	+72	+54	+72	+54	+78	+76
630	**800**	+51	+2	+75	+26	–	–	+100	+51	+100	+51	+107	+76
800	**914,4**	+74	–6	+100	+20	–	–	+128	+48	+128	+48	+136	+76

Nominal diameter Shaft seating Bearing bore over	incl.	Modified deviations for fits with clearance/interference according to k6 high	low	m5 high	low	m6 high	low	n6 high	low	p6 high	low
mm		µm									
10	**18**	+20	+14	+23	+20	+26	+20	+31	+25	+37	+31
18	**30**	+25	+15	+27	+21	+31	+21	+38	+28	+45	+35
30	**50**	+30	+15	+32	+22	+37	+22	+45	+30	+54	+39
50	**76,2**	+36	+15	+39	+24	+45	+24	+54	+33	+66	+45
76,2	**80**	+36	+27	+39	+36	+45	+36	+54	+45	+66	+57
80	**120**	+45	+28	+48	+38	+55	+38	+65	+48	+79	+62
120	**180**	+53	+28	+58	+40	+65	+40	+77	+52	+93	+68
180	**250**	+63	+29	+67	+42	+76	+42	+90	+56	+109	+75
250	**304,8**	+71	+29	+78	+45	+87	+45	+101	+59	+123	+81
304,8	**315**	+71	+55	+78	+71	+87	+71	+101	+85	+123	+107
315	**400**	+80	+55	+86	+72	+97	+72	+113	+88	+138	+113
400	**500**	+90	+56	+95	+74	+108	+74	+125	+91	+153	+119
500	**609,6**	+94	+51	+104	+77	+120	+77	+138	+95	+172	+129
609,6	**630**	+94	+76	+104	+102	+120	+102	+138	+120	+172	+154
630	**800**	+125	+76	+137	+106	+155	+106	+175	+126	+213	+164
800	**914,4**	+156	+76	+170	+110	+190	+110	+212	+132	+256	+176

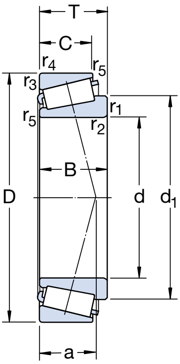
Table 5

Modified housing bore diameter deviations for use with inch-size bearings

Nominal diameter Housing bore seating Bearing outside diameter		**Modified deviations for fits with clearance/interference according to**									
		H7		J7		J6		K6		K7	
over	incl.	high	low	high	low	high	low	high	low	high	low
mm		µm									
30	**50**	+36	+25	+25	+14	+21	+19	+14	+12	+18	+7
50	**80**	+43	+25	+31	+13	+26	+19	+17	+10	+22	+4
80	**120**	+50	+25	+37	+12	+31	+19	+19	+7	+25	0
120	**150**	+58	+25	+44	+11	+36	+18	+22	+4	+30	–3
150	**180**	+65	+25	+51	+11	+43	+18	+29	+4	+37	–3
180	**250**	+76	+25	+60	+9	+52	+18	+35	+1	+43	–8
250	**304,8**	+87	+25	+71	+9	+60	+18	+40	–2	+51	–11
304,8	**315**	+87	+51	+71	+35	+60	+44	+40	+24	+51	+15
315	**400**	+97	+51	+79	+33	+69	+44	+47	+22	+57	+11
400	**500**	+108	+51	+88	+31	+78	+44	+53	+19	+63	+6
500	**609,6**	+120	+51	–	–	–	–	+50	+7	+50	–19
609,6	**630**	+120	+76	–	–	–	–	+50	+32	+50	+6
630	**800**	+155	+76	–	–	–	–	+75	+26	+75	–4
800	**914,4**	+190	+76	–	–	–	–	+100	+20	+100	–14
914,4	**1 000**	+190	+102	–	–	–	–	+100	+46	+100	+12
1 000	**1 219,2**	+230	+102	–	–	–	–	+125	+36	+125	–3

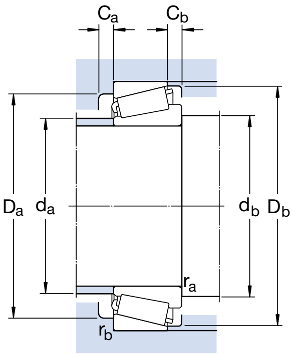
Nominal diameter Housing bore seating Bearing outside diameter		**Modified deviations for fits with clearance/interference according to**							
		M6		M7		N7		P7	
over	incl.	high	low	high	low	high	low	high	low
mm		µm							
30	**50**	+7	+5	+11	0	+3	–8	–6	–17
50	**80**	+8	+1	+13	–5	+4	–14	–8	–26
80	**120**	+9	–3	+15	–10	+5	–20	–9	–34
120	**150**	+10	–8	+18	–15	+6	–27	–10	–43
150	**180**	+17	–8	+25	–15	+13	–27	–3	–43
180	**250**	+22	–12	+30	–21	+16	–35	–3	–54
250	**304,8**	+26	–16	+35	–27	+21	–41	–1	–63
304,8	**315**	+26	+10	+35	–1	+21	–15	–1	–37
315	**400**	+30	+5	+40	–6	+24	–22	–1	–47
400	**500**	+35	+1	+45	–12	+28	–29	0	–57
500	**609,6**	+24	–19	+24	–45	+6	–63	–28	–97
609,6	**630**	+24	+6	+24	–20	+6	–38	–28	–72
630	**800**	+45	–4	+45	–34	+25	–54	–13	–92
800	**914,4**	+66	–14	+66	–48	+44	–70	0	–114
914,4	**1 000**	+66	+12	+66	–22	+44	–44	0	–88
1 000	**1 219,2**	+85	–4	+85	–43	+59	–69	+5	–123

Metric single row taper roller bearings
d **15 – 32** mm



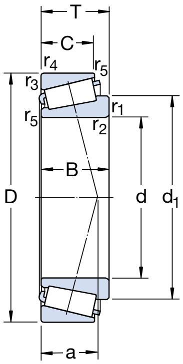
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
d	D	T	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	–
15	42	14,25	22,4	20	2,08	13 000	18 000	0,095	**30302 J2**	2FB
17	40	13,25	19	18,6	1,83	13 000	18 000	0,075	**30203 J2**	2DB
	47	15,25	28,1	25	2,75	12 000	16 000	0,13	**30303 J2**	2FB
	47	20,25	40	33,5	3,65	12 000	16 000	0,17	* **32303 J2/Q**	2FD
20	42	15	28	27	2,7	13 000	16 000	0,097	* **32004 X/Q**	3CC
	47	15,25	32	28	3	12 000	15 000	0,12	* **30204 J2/Q**	2DB
	52	16,25	39	32,5	3,6	12 000	14 000	0,17	* **30304 J2/Q**	2FB
	52	22,25	51	45,5	5	12 000	14 000	0,23	* **32304 J2/Q**	2FD
22	44	15	25,1	29	2,85	11 000	15 000	0,10	**320/22 X**	3CC
25	47	15	31	32,5	3,25	12 000	14 000	0,11	* **32005 X/Q**	4CC
	52	16,25	35,5	33,5	3,45	11 000	13 000	0,15	* **30205 J2/Q**	3CC
	52	19,25	41,5	44	4,65	10 000	13 000	0,19	* **32205 BJ2/Q**	5CD
	52	22	54	56	6	10 000	13 000	0,23	* **33205/Q**	2DE
	62	18,25	44,6	43	4,75	9 000	12 000	0,26	**30305 J2**	2FB
	62	18,25	38	40	4,4	7 500	11 000	0,26	**31305 J2**	7FB
	62	25,25	60,5	63	7,1	8 000	12 000	0,36	**32305 J2**	2FD
28	52	16	36,5	38	4	10 000	13 000	0,15	* **320/28 X/Q**	4CC
	58	17,25	38	41,5	4,4	9 000	12 000	0,25	**302/28 J2**	–
	58	20,25	48	50	5,5	9 500	12 000	0,25	* **322/28 BJ2/Q**	5DD
30	55	17	40,5	44	4,55	10 000	12 000	0,17	* **32006 X/Q**	4CC
	62	17,25	46,5	44	4,8	9 000	11 000	0,23	* **30206 J2/Q**	3DB
	62	21,25	58,5	57	6,3	9 000	11 000	0,28	* **32206 J2/Q**	3DC
	62	21,25	56	58,5	6,55	9 000	11 000	0,30	* **32206 BJ2/QCL7CVA606**	5DC
	62	25	75	76,5	8,5	8 500	11 000	0,37	* **33206/Q**	2DE
	72	20,75	56,1	56	6,4	7 500	10 000	0,39	* **30306 J2/Q**	2FB
	72	20,75	55	50	5,7	7 500	9 500	0,39	* **31306 J2/Q**	7FB
	72	28,75	88	85	9,65	7 500	10 000	0,55	* **32306 J2/Q**	2FD
32	53	14,5	27	35,5	3,65	9 000	12 000	0,11	**JL 26749 F/710**	(L 26700)
	58	17	42,5	46,5	4,8	9 000	11 000	0,19	* **320/32 X/Q**	4CC

* SKF Explorer bearing



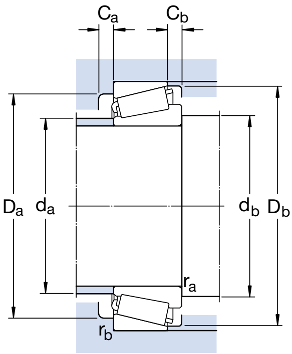
Dimensions							Abutment and fillet dimensions										Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm										–		
15	27,7	13	11	1	1	9	22	21	36	36	38	2	3	1	1	0,28	2,1	1,1
17	28	12	11	1	1	10	23	23	34	34	37	2	2	1	1	0,35	1,7	0,9
	30,4	14	12	1	1	10	25	23	40	41	42	2	3	1	1	0,28	2,1	1,1
	30,7	19	16	1	1	12	24	23	39	41	43	3	4	1	1	0,28	2,1	1,1
20	31,1	15	12	0,6	0,6	10	25	25	36	37	39	2	3	0,6	0,6	0,37	1,6	0,9
	33,2	14	12	1	1	11	27	26	40	41	43	2	3	1	1	0,35	1,7	0,9
	34,3	15	13	1,5	1,5	11	28	27	44	45	47	2	3	1,5	1,5	0,3	2	1,1
	34,5	21	18	1,5	1,5	14	27	27	43	45	47	3	4	1,5	1,5	0,3	2	1,1
22	33,3	15	11,5	0,6	0,6	11	27	27	38	39	41	3	3,5	0,6	0,6	0,40	1,5	0,8
25	36,5	15	11,5	0,6	0,6	11	30	30	40	42	44	3	3,5	0,6	0,6	0,43	1,4	0,8
	37,4	15	13	1	1	12	31	31	44	46	48	2	3	1	1	0,37	1,6	0,9
	40,2	18	15	1	1	16	30	31	41	46	50	3	4	1	1	0,57	1,05	0,6
	38,6	22	18	1	1	14	30	31	43	46	49	4	4	1	1	0,35	1,7	0,9
	41,5	17	15	1,5	1,5	13	34	32	54	55	57	2	3	1,5	1,5	0,3	2	1,1
	45,8	17	13	1,5	1,5	20	34	32	47	55	59	3	5	1,5	1,5	0,83	0,72	0,4
	41,7	24	20	1,5	1,5	15	33	32	52	55	57	3	5	1,5	1,5	0,3	2	1,1
28	40,3	16	12	1	1	12	34	34	45	46	49	3	4	1	1	0,43	1,4	0,8
	41,8	16	14	1	1	13	35	34	50	52	54	2	3	1	1	0,37	1,6	0,9
	43,9	19	16	1	1	17	33	34	46	52	55	3	4	1	1	0,57	1,05	0,6
30	43	17	13	1	1	13	35	36	48	49	52	3	4	1	1	0,43	1,4	0,8
	44,6	16	14	1	1	14	38	36	53	56	57	2	3	1	1	0,37	1,6	0,9
	45,2	20	17	1	1	15	37	36	52	56	58	3	4	1	1	0,37	1,6	0,9
	47,3	20	17	1	1	18	36	36	50	56	60	3	4	1	1	0,57	1,05	0,6
	45,8	25	19,5	1	1	16	36	36	53	56	59	5	5,5	1	1	0,35	1,7	0,9
	48,4	19	16	1,5	1,5	15	41	37	62	65	66	3	4,5	1,5	1,5	0,31	1,9	1,1
	52,7	19	14	1,5	1,5	22	40	37	55	65	68	3	6,5	1,5	1,5	0,83	0,72	0,4
	48,7	27	23	1,5	1,5	18	39	37	59	65	66	3	5,5	1,5	1,5	0,31	1,9	1,1
32	43,6	15	11,5	3,5	1,3	11	38	43	48	46,5	50	2	3	3	1	0.33	1,8	1
	45,6	17	13	1	1	14	38	38	50	52	55	3	4	1	1	0,46	1,3	0,7
														1				

Metric single row taper roller bearings
d **35 – 40** mm



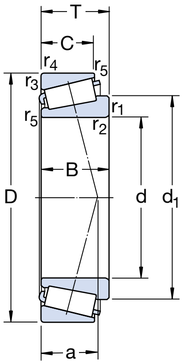
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
d	D	T	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	–
35	62	18	49	54	5,85	8 500	11 000	0,22	* **32007 X/Q**	4CC
	62	18	43	49	5,2	8 500	11 000	0,22	* **32007 J2/Q**	–
	72	18,25	58,5	56	6,1	8 000	9 500	0,32	* **30207 J2/Q**	3DB
	72	24,25	76,5	78	8,5	8 000	9 500	0,43	* **32207 J2/Q**	3DC
	72	28	96,5	106	11,8	7 000	9 500	0,56	* **33207/Q**	2DE
	80	22,75	83	73,5	8,3	7 500	9 000	0,52	* **30307 J2/Q**	2FB
	80	22,75	71	67	7,8	6 300	8 500	0,52	* **31307 J2/Q**	7FB
	80	32,75	95,2	106	12,2	6 700	9 000	0,73	**32307 J2/Q**	2FE
	80	32,75	93,5	114	13,2	6 300	8 500	0,80	**32307 BJ2/Q**	5FE
37	80	32,75	93,5	114	13,2	6 300	8 500	0,85	**32307/37 BJ2/Q**	–
38	63	17	42,5	52	5,4	8 500	11 000	0,20	* **JL 69349 A/310/Q**	(L 69300)
	63	17	42,5	52	5,4	8 500	11 000	0,20	* **JL 69349 X/310/Q**	(L 69300)
	63	17	42,5	52	5,4	8 500	11 000	0,19	* **JL 69349/310/Q**	(L 69300)
	63	17	42,5	52	5,4	8 500	11 000	0,19	* **JL 69345 F/310/Q**	(L 69300)
	68	19	60	71	7,65	7 500	10 000	0,27	* **32008/38 X/Q**	–
40	68	19	60	71	7,65	7 500	9 500	0,27	* **32008 X/Q**	3CD
	68	19	60	71	7,65	7 500	9 500	0,27	* **32008 XTN9/Q**	3CD
	75	26	91,5	104	11,4	7 000	9 000	0,51	* **33108/Q**	2CE
	80	19,75	71	68	7,65	7 000	8 500	0,42	* **30208 J2/Q**	3DB
	80	24,75	85	86,5	9,8	7 000	8 500	0,53	* **32208 J2/Q**	3DC
	80	24,75	86,5	93	10,8	6 700	8 500	0,52	* **32208 BJ2/Q**	5DC
	80	32	120	132	15	6 300	8 500	0,77	* **33208/QCL7C**	2DE
	85	33	121	150	17,3	6 000	9 000	0,90	**T2EE 040/QVB134**	2EE
	90	25,25	100	95	10,8	6 300	8 000	0,72	* **30308 J2/Q**	2FB
	90	25,25	85	81,5	9,5	5 600	7 500	0,72	* **31308 J2/QCL7C**	7FB
	90	35,25	117	140	16	5 300	8 000	1,00	**32308 J2/Q**	2FD

* SKF Explorer bearing



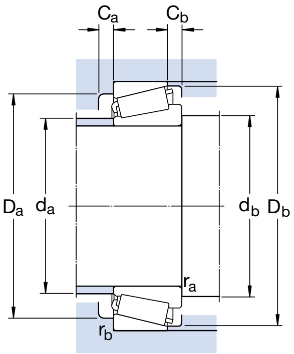
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
35	49,2	18	14	1	1	15	41	41	54	56	59	4	4	1,5	1	0,46	1,3	0,7
	49,5	18	15	1	1	16	41	41	53	56	59	2	3	1,5	1	0,44	1,35	0,8
	51,8	17	15	1,5	1,5	15	44	42	62	65	67	3	3	1,5	1	0,37	1,6	0,9
	52,4	23	19	1,5	1,5	17	43	42	61	65	67	3	5		1	0,37	1,6	0,9
	53,4	28	22	1,5	1,5	18	42	42	61	65	68	5	6	2	1	0,35	1,7	0,9
														2				
	54,5	21	18	2	1,5	16	46	44	70	71	74	3	4,5	2	1,5	0,31	1,9	1,1
	59,6	21	15	2	1,5	25	45	44	62	71	76	3	7,5	2	1,5	0,83	0,72	0,4
	54,8	31	25	2	1,5	20	44	44	66	71	74	4	7,5		1,5	0,31	1,9	1,1
	59,3	31	25	2	1,5	24	42	44	61	71	76	4	7,5	2	1,5	0,54	1,1	0,6
37	54,8	31	25	2	1,5	20	44	44	66	71	74	4	7,5	2	1,5	0,54	1,1	0,6
38	52,2	17	13,5	1,3	1,3	14	44	44	55	56,5	60	3	3,5	1	1	0,43	1,4	0,8
	52,2	17	13,5	2,3	1,3	14	44	47	55	56,5	60	3	3,5	2	1	0,43	1,4	0,8
	52,2	17	13,5	3,6	1,3	14	44	49	55	56,5	60	3	3,5	3,5	1	0,43	1,4	0,8
	52,2	17	13,5	3,6	1,3	14	44	49	55	56,5	60	3	3,5	3,5	1	0,43	1,4	0,8
	54,2	19	14,5	1	1	15	46	44	60	62	65	4	4,5	1	1	0,37	1,6	0,9
40	54,2	19	14,5	1	1	15	46	46	60	62	65	4	4,5	1	1	0,37	1,6	0,9
	54,2	19	14,5	1	1	15	46	46	60	62	65	4	4,5	1	1	0,37	1,6	0,9
	57,5	26	20,5	1,5	1,5	18	47	47	65	68	71	4	5,5	1,5	1,5	0,35	1,7	0,9
	57,5	18	16	1,5	1,5	16	49	47	69	73	74	3	3,5	1,5	1,5	0,37	1,6	0,9
	58,4	23	19	1,5	1,5	19	49	47	68	73	75	3	5,5	1,5	1,5	0,37	1,6	0,9
	60,9	23	19	1,5	1,5	22	49	47	65	73	76	4	5,5	1,5	1,5	0,54	1,1	0,6
	59,7	32	25	1,5	1,5	21	47	47	67	73	76	5	7	1,5	1,5	0,35	1,7	0,9
	61,2	32,5	28	2,5	2	22	48	50	70	75	80	5	5	2	2	0,35	1,7	0,9
	62,5	23	20	2	1,5	19	53	49	77	81	82	3	5	2	1,5	0,35	1,7	0,9
	67,1	23	17	2	1,5	28	51	49	71	81	86	3	8	2	1,5	0,83	0,72	0,4
	62,9	33	27	2	1,5	23	51	49	73	81	82	3	8	2	1,5	0,35	1,7	0,9

Metric single row taper roller bearings
d **45 – 50** mm



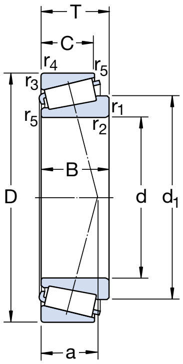
Principal dimensions d	D	T	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
mm			kN		kN	r/min		kg	–	–
45	75	20	67	80	8,8	7 000	8 500	0,34	* **32009 X/Q**	3CC
	80	26	96,5	114	12,9	6 700	8 000	0,56	* **33109/Q**	3CE
	85	20,638	81,5	81,5	9,3	6 700	8 500	0,50	* **358 X/354 X/Q**	(355)
	85	20,75	76,5	76,5	8,65	6 300	8 000	0,48	* **30209 J2/Q**	3DB
	85	24,75	91,5	98	11	6 300	8 000	0,58	* **32209 J2/Q**	3DC
	85	32	108	143	16,3	5 300	7 500	0,82	**33209/Q**	3DE
	90	24,75	95	104	12,2	6 000	8 000	0,65	* **32210/45 BJ2/QVB022**	–
	95	29	104	112	12,7	5 300	7 000	0,92	* **T7FC 045/HN3QCL7C**	7FC
	95	36	106	146	16,6	5 300	8 000	1,20	**T2ED 045**	2ED
	100	27,25	125	120	14,3	5 600	7 000	0,97	* **30309 J2/Q**	2FB
	100	27,25	106	102	12,5	5 000	6 700	0,95	* **31309 J2/QCL7C**	7FB
	100	38,25	140	170	20,4	4 800	7 000	1,35	**32309 J2/Q**	2FD
	100	38,25	156	176	20	5 000	6 700	1,45	* **32309 BJ2/QCL7C**	5FD
46	75	18	58,5	71	7,65	7 000	9 500	0,30	* **LM 503349/310/QCL7C**	(LM 503300)
50	80	20	69,5	88	9,65	6 300	8 000	0,37	* **32010 X/Q**	3CC
	80	20	69,5	88	9,65	6 300	8 000	0,37	* **32010 X/QCL7CVB026**	3CC
	80	24	80	102	11,4	6 300	8 000	0,45	* **33010/Q**	2CE
	82	21,5	83	100	11	6 300	8 500	0,43	* **JLM 104948 AA/910 AA/Q**	(LM 104900)
	85	26	100	122	13,4	6 000	7 500	0,59	* **33110/Q**	3CE
	90	21,75	86,5	91,5	10,4	6 000	7 500	0,54	* **30210 J2/Q**	3DB
	90	24,75	95	100	11,4	6 000	7 500	0,61	* **32210 J2/Q**	3DC
	90	28	122	140	16	6 000	8 000	0,75	* **JM 205149/110/Q**	(M 205100)
	90	28	122	140	16	6 000	8 000	0,75	* **JM 205149/110 A/Q**	(M 205100)
	90	32	114	160	18,3	5 000	7 000	0,90	**33210/Q**	3DE
	100	36	154	200	22,4	5 000	7 500	1,30	**T2ED 050/Q**	2ED
	105	32	125	137	16	4 800	6 300	1,20	* **T7FC 050/QCL7C**	7FC
	110	29,25	143	140	16,6	5 300	6 300	1,25	* **30310 J2/Q**	2FB
	110	29,25	122	120	14,3	4 500	6 000	1,20	* **31310 J2/QCL7C**	7FB
	110	42,25	172	212	24	4 300	6 300	1,80	**32310 J2/Q**	2FD
	110	42,25	172	212	24	4 300	6 300	1,80	**32310 TN9**	2FD
	110	42,25	183	216	24,5	4 500	6 000	1,85	* **32310 BJ2/QCL7C**	5FD

* SKF Explorer bearing



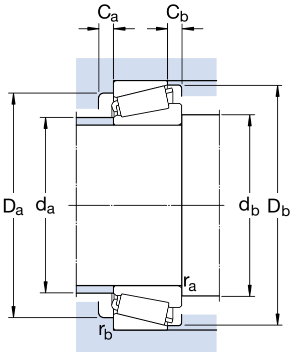
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
45	60,4	20	15,5	1	1	16	52	51	67	69	72	4	4,5	1	1	0,4	1,5	0,8
	62,7	26	20,5	1,5	1,5	19	52	52	69	73	77	4	5,5	1,5	1,5	0,37	1,6	0,9
	62,4	21,692	17,462	2	1,5	16	55	53	76	77	80	3	3	2	1,5	0,31	1,9	1,1
	63	19	16	1,5	1,5	18	54	52	74	78	80	3	4,5	1,5	1,5	0,4	1,5	0,8
	64	23	19	1,5	1,5	20	54	52	73	78	80	3	5,5	1,5	1,5	0,4	1,5	0,8
	65,2	32	25	1,5	1,5	22	52	52	72	78	81	5	7	1,5	1,5	0,4	1,5	0,8
	68,5	23	19	1,5	0,3	21	58	52	78	87	85	3	5,5	1,5	0,3	0,6	1	0,6
	74	26,5	20	2,5	2,5	32	54	56	71	83	91	3	9	2	2	0,88	0,68	0,4
	68,5	35	30	2,5	2,5	23	55	56	80	83	89	6	6	2	2	0,33	1,8	1
	70,1	25	22	2	1,5	21	59	53	86	91	92	3	5	2	1,5	0,35	1,7	0,9
	74,7	25	18	2	1,5	31	57	53	79	91	95	4	9	2	1,5	0,83	0,72	0,4
	70,4	36	30	2	1,5	25	57	53	82	91	93	4	8	2	1,5	0,35	1,7	0,9
	74,8	36	30	2	1,5	30	55	53	76	91	94	5	8	2	1,5	0,54	1,1	0,6
46	60,4	18	14	2,3	1,5	16	53	55	67	67,5	71	2	4	2	1	0,4	1,5	0,8
50	65,6	20	15,5	1	1	18	57	56	72	74	77	4	4,5	1	1	0,43	1,4	0,8
	65,6	20	15,5	1	1	18	57	56	72	74	77	4	4,5	1	1	0,43	1,4	0,8
	64,9	24	19	1	1	17	56	56	72	74	76	4	5	1	1	0,31	1,9	1,1
	65,1	21,5	17	3	0,5	16	57	64	74	79	78	4	4,5	2,5	0,5	0,3	2	1,1
	67,9	26	20	1,5	1,5	20	57	57	74	78	82	4	6	1,5	1,5	0,4	1,5	0,8
	67,9	20	17	1,5	1,5	19	58	57	79	83	85	3	4,5	1,5	1,5	0,43	1,4	0,8
	68,5	23	19	1,5	1,5	21	58	57	78	83	85	3	5,5	1,5	1,5	0,43	1,4	0,8
	68,7	28	23	3	2,5	20	58	64	78	78	85	5	5	2,5	2	0,33	1,8	1
	68,7	28	23	3	0,8	20	58	64	78	85	85	5	5	2,5	0,6	0,33	1,8	1
	70,7	32	24,5	1,5	1,5	23	57	57	77	83	87	5	7,5	1,5	1,5	0,4	1,5	0,8
	73,5	35	30	2,5	2,5	25	59	60	84	88	94	6	6	2	2	0,35	1,7	0,9
	81	29	22	3	3	36	60	62	78	91	100	4	10	2,5	2,5	0,88	0,68	0,4
	77,2	27	23	2,5	2	23	65	60	95	100	102	4	6	2	2	0,35	1,7	0,9
	81,5	27	19	2,5	2	34	62	60	87	100	104	4	10	2	2	0,83	0,72	0,4
	77,7	40	33	2,5	2	27	63	60	90	100	102	5	9	2	2	0,35	1,7	0,9
	77,7	40	33	2,5	2	27	63	60	90	100	102	5	9	2	2	0,35	1,7	0,9
	82,9	40	33	2,5	2	34	62	60	83	100	103	5	9	2	2	0,54	1,1	0,6

Metric single row taper roller bearings
d **55 – 60** mm



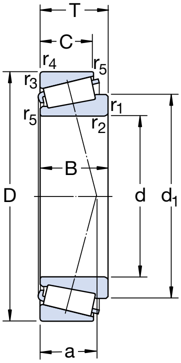
Principal dimensions d	D	T	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
mm			kN		kN	r/min		kg	–	–
55	90	23	93	116	12,9	5 600	7 000	0,55	* **32011 X/Q**	3CC
	90	27	104	137	15,3	5 600	7 000	0,67	* **33011/Q**	2CE
	95	30	110	156	17,6	5 000	6 700	0,86	**33111/Q**	3CE
	100	22,75	104	106	12	5 300	6 700	0,70	* **30211 J2/Q**	3DB
	100	26,75	106	129	15	5 000	6 700	0,83	**32211 J2/Q**	3DC
	100	35	138	190	21,6	4 500	6 300	1,20	**33211/Q**	3DE
	110	39	179	232	26	4 500	6 700	1,70	**T2ED 055/QCLN**	2ED
	115	34	146	163	19,3	4 300	5 600	1,60	* **T7FC 055/QCL7C**	7FC
	120	31,5	166	163	19,3	4 800	5 600	1,55	* **30311 J2/Q**	2FB
	120	31,5	140	137	16,6	4 300	5 600	1,55	* **31311 J2/QCL7C**	7FB
	120	45,5	198	250	28,5	4 000	5 600	2,30	**32311 J2**	2FD
	120	45,5	216	260	30	4 300	5 600	2,50	* **32311 BJ2/QCL7C**	5FD
60	95	23	95	122	13,4	5 300	6 700	0,59	* **32012 X/QCL7C**	4CC
	95	24	96,5	132	15	5 300	7 000	0,63	* **JLM 508748/710/Q**	2CE
	95	27	106	143	16	5 300	6 700	0,71	* **33012/Q**	2CE
	100	30	134	170	19,6	5 300	6 300	0,92	* **33112/Q**	3CE
	110	23,75	112	114	13,2	5 000	6 000	0,88	* **30212 J2/Q**	3EB
	110	29,75	146	160	18,6	5 000	6 000	1,15	* **32212 J2/Q**	3EC
	110	29,75	140	156	19	4 800	6 000	1,15	* **32212 BJ2/Q**	–
	110	38	168	236	26,5	4 000	6 000	1,60	**33212/Q**	3EE
	115	40	194	260	30	4 300	6 300	1,85	**T2EE 060/Q**	2EE
	125	37	176	204	24,5	4 000	5 300	2,05	* **T7FC 060/QCL7C**	7FC
	130	33,5	168	196	23,6	4 000	5 300	1,95	**30312 J2/Q**	2FB
	130	33,5	166	166	20,4	3 800	5 300	1,90	* **31312 J2/QCL7C**	7FB
	130	48,5	229	290	34	3 600	5 300	2,85	**32312 J2/Q**	2FD
	130	48,5	255	305	35,5	3 800	5 000	2,80	* **32312 BJ2/QCL7C**	5FD

* SKF Explorer bearing



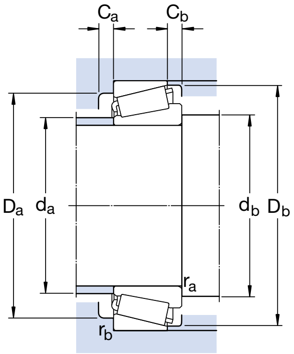
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
55	73,2	23	17,5	1,5	1,5	20	63	62	81	83	86	4	5,5	1,5	1,5	0,4	1,5	0,8
	72,9	27	21	1,5	1,5	19	63	62	81	83	86	5	6	1,5	1,5	0,31	1,9	1,1
	75,1	30	23	1,5	1,5	22	63	62	83	88	91	5	7	1,5	1,5	0,37	1,6	0,9
	74,6	21	18	2	1,5	20	64	64	88	93	94	4	4,5	2	1,5	0,4	1,5	0,8
	75,2	25	21	2	1,5	22	64	64	87	93	95	4	5,5	2	1,5	0,4	1,5	0,8
	77,6	35	27	2	1,5	25	63	64	85	93	96	6	8	2	1,5	0,4	1,5	0,8
	81	39	32	2,5	2,5	27	66	65	93	99	104	7	7	2	2	0,35	1,7	0,9
	90	31	23,5	3	3	39	66	67	86	103	109	4	10,5	2,5	2,5	0,88	0,68	0,4
	84	29	25	2,5	2	24	71	65	104	112	111	4	6,5	2	2	0,35	1,7	0,9
	88,4	29	21	2,5	2	37	68	65	94	112	113	4	10,5	2	2	0,83	0,72	0,4
	84,6	43	35	2,5	2	29	68	65	99	112	111	5	10,5	2	2	0,35	1,7	0,9
	90,5	43	35	2,5	2	36	67	65	91	112	112	5	10,5	2	2	0,54	1,1	0,6
60	77,8	23	17,5	1,5	1,5	21	67	67	85	88	91	4	5	1,5	1,5	0,43	1,4	0,8
	78,4	24	19	5	2,5	21	68	76	84	85	91	4	5	4	2	0,4	1,5	0,8
	77,1	27	21	1,5	1,5	20	67	67	85	88	90	5	6	1,5	1,5	0,33	1,8	1
	80,4	30	23	1,5	1,5	23	67	67	88	93	96	5	7	1,5	1,5	0,4	1,5	0,8
	81,5	22	19	2	1,5	22	70	68	96	103	103	4	4,5	2	1,5	0,4	1,5	0,8
	81,9	28	24	2	1,5	24	69	68	95	103	104	4	5,5	2	1,5	0,4	1,5	0,8
	85,7	28	21	2	1,5	28	69	98	93	103	105	5	8,5	2	1,5	0,57	1,05	0,6
	85,3	38	29	2	1,5	27	69	68	93	103	105	6	9	2	1,5	0,4	1,5	0,8
	85	39	33	2,5	2,5	28	70	71	98	104	109	6	7	2	2	0,33	1,8	1
	97	33,5	26	3	3	41	72	72	94	111	119	4	11	2,5	2,5	0,83	0,72	0,4
	91,9	31	26	3	2,5	26	77	72	112	118	120	5	7,5	2,5	2	0,35	1,7	0,9
	95,9	31	22	3	2,5	39	74	72	103	118	123	5	11,5	2,5	2	0,83	0,72	0,4
	91,7	46	37	3	2,5	31	74	72	107	118	120	6	11,5	2,5	2	0,35	1,7	0,9
	98,1	46	37	3	2,5	38	73	72	99	118	122	6	11,5	2,5	2	0,54	1,1	0,6

Metric single row taper roller bearings
d **65 – 70** mm



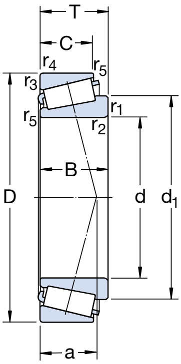
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
d	D	T	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	–
65	100	23	96,5	127	14	5 000	6 000	0,63	⋆ **32013 X/Q**	4CC
	100	27	110	153	17,3	5 000	6 300	0,78	⋆ **33013/Q**	2CE
	110	28	143	283	21,2	4 800	6 300	1,05	⋆ **JM 511946/910/Q**	(M 511900)
	110	31	138	193	22,4	4 300	6 300	1,15	**T2DD 065/Q**	2DD
	110	34	142	208	24	4 300	5 600	1,30	**33113/Q**	3DE
	120	24,75	132	134	16,3	4 500	5 600	1,15	⋆ **30213 J2/Q**	3EB
	120	32,75	151	193	22,8	4 000	5 600	1,50	**32213 J2/Q**	3EC
	120	41	194	270	30,5	3 800	5 300	2,05	**33213/Q**	3EE
	120	41	194	270	30,5	3 800	5 300	2,05	**33213 TN9/Q**	3EE
	130	37	180	216	25,5	3 800	5 000	2,20	⋆ **T7FC 065/QCL7C**	7FC
	140	36	194	228	27,5	3 600	4 800	2,40	**30313 J2/Q**	2GB
	140	36	190	193	23,6	3 600	4 800	2,35	⋆ **31313 J2/QCL7C**	7GB
	140	51	264	335	40	3 400	4 800	3,45	**32313 J2/Q**	2GD
	140	51	285	345	40,5	3 600	4 800	3,35	⋆ **32313 BJ2/QU4CL7CVQ267**	5GD
70	110	25	116	153	17,3	4 500	5 600	0,84	⋆ **32014 X/Q**	4CC
	110	31	130	196	22,8	4 300	5 600	1,10	**33014**	2CE
	120	37	172	250	30	4 000	5 300	1,70	**33114/Q**	3DE
	125	26,25	125	156	18	4 000	5 300	1,25	**30214 J2/Q**	3EB
	125	33,25	157	208	24,5	3 800	5 300	1,60	**32214 J2/Q**	3EC
	125	41	201	285	32,5	3 600	5 000	2,10	**33214/Q**	3EE
	130	43	233	325	38	3 800	5 600	2,45	**T2ED 070/QCLNVB061**	2ED
	140	39	204	240	27,5	3 400	4 500	2,65	⋆ **T7FC 070/QCL7C**	7FC
	150	38	220	260	31	3 400	4 500	2,90	**30314 J2/Q**	2GB
	150	38	216	220	27	3 400	4 500	2,95	⋆ **31314 J2/QCL7C**	7GB
	150	54	297	380	45	3 200	4 500	4,30	**32314 J2/Q**	2GD
	150	54	325	400	46,5	3 400	4 300	4,25	⋆ **32314 BJ2/QCL7C**	5GD

⋆ SKF Explorer bearing



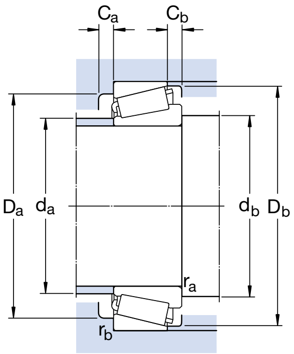
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
65	83,3	23	17,5	1,5	1,5	22	72	72	90	93	97	4	5,5	1,5	1,5	0,46	1,3	0,7
	82,5	27	21	1,5	1,5	21	72	72	89	93	96	5	6	1,5	1,5	0,35	1,7	0,9
	87,8	28	22,5	3	2,5	24	75	77	96	98	104	5	5,5	2,5	2	0,4	1,5	0,8
	85,6	31	25	2	2	23	74	75	97	100	105	5	6	2	2	0,35	1,7	0,9
	87,9	34	26,5	1,5	1,5	26	74	72	96	103	106	6	7,5	1,5	1,5	0,4	1,5	0,8
	89	23	20	2	1,5	23	78	74	106	113	113	4	4,5	2	1,5	0,4	1,5	0,8
	90,3	31	27	2	1,5	27	76	74	104	113	115	4	5,5	2	1,5	0,4	1,5	0,8
	92,1	41	32	2	1,5	29	75	74	102	113	115	6	9	2	1,5	0,4	1,5	0,8
	92,1	41	32	2	1,5	29	75	74	102	113	115	6	9	2	1,5	0,4	1,5	0,8
	102	33,5	26	3	3	44	77	77	98	116	124	4	11	2,5	2,5	0,88	0,68	0,4
	98,6	33	28	3	2,5	28	84	77	122	128	130	5	8	2,5	2	0,35	1,7	0,9
	103	33	23	3	2,5	42	80	77	111	128	132	5	13	2,5	2	0,83	0,72	0,4
	99,2	48	39	3	2,5	33	80	77	117	128	130	6	12	2,5	2	0,35	1,7	0,9
	105	48	39	3	2,5	41	79	77	107	128	131	6	12	2,5	2	0,54	1,1	0,6
70	89,8	25	19	1,5	1,5	23	78	77	98	103	105	5	6	1,5	1,5	0,43	1,4	0,8
	88,8	31	25,5	1,5	1,5	23	78	77	99	103	105	5	5,5	1,5	1,5	0,28	2,1	1,1
	94,8	37	29	2	1,5	28	80	79	104	112	115	6	8	2	1,5	0,37	1,6	0,9
	93,9	24	21	2	1,5	25	82	78	110	115	118	4	5	2	1,5	0,43	1,4	0,8
	95	31	27	2	1,5	28	80	78	108	115	119	4	6	2	1,5	0,43	1,4	0,8
	97,2	41	32	2	1,5	30	79	78	107	115	120	6	9	2	1,5	0,4	1,5	0,8
	98	42	35	8	2,5	30	81	98	111	118	123	7	8	7	2	0,33	1,8	1
	110	35,5	27	3	3	47	82	82	106	126	133	5	12	2,5	2,5	0,88	0,68	0,4
	105	35	30	3	2,5	29	90	82	130	138	140	5	8	2,5	2	0,35	1,7	0,9
	110	35	25	3	2,5	45	85	82	118	138	141	5	13	2,5	2	0,83	0,72	0,4
	106	51	42	3	2,5	36	86	82	125	138	140	6	12	2,5	2	0,35	1,7	0,9
	113	51	42	3	2,5	44	85	82	115	138	141	7	12	2,5	2	0,54	1,1	0,6

Metric single row taper roller bearings
d **75 – 80** mm



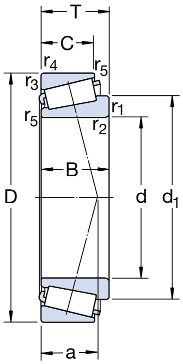
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
d	D	T	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	–
75	105	20	81,5	116	13,2	4 800	6 300	0,52	* **32915 TN9/QVG900**	2BC
	115	25	122	163	18,6	4 300	5 300	0,90	* **32015 X/Q**	4CC
	115	31	134	228	26	4 000	5 300	1,15	**33015/Q**	2CE
	120	31	160	216	25	4 300	5 600	1,30	* **JM 714249/210/Q**	(M 714200)
	125	37	176	265	31,5	3 800	5 000	1,80	**33115/Q**	3DE
	130	27,25	140	176	20,4	3 800	5 000	1,40	**30215 J2/Q**	4DB
	130	33,25	161	212	24,5	3 600	5 000	1,70	**32215 J2/Q**	4DC
	130	41	209	300	34	3 400	4 800	2,25	**33215/Q**	3EE
	145	52	297	450	51	3 400	4 800	3,95	**T3FE 075/QVB481**	3FE
	150	42	232	280	31	3 200	4 300	3,25	* **T7FC 075/QCL7C**	7FC
	160	40	246	290	34	3 200	4 300	3,45	**30315 J2/Q**	2GB
	160	40	240	245	29	3 200	4 300	3,50	* **31315 J2/QCL7C**	7GB
	160	58	336	440	51	3 000	4 300	5,20	**32315 J2**	2GD
	160	58	380	475	55	3 200	4 000	5,55	* **32315 BJ2/QCL7C**	5GD
80	125	29	138	216	24,5	3 600	5 000	1,30	**32016 X/Q**	3CC
	125	36	168	285	32	3 600	5 000	1,65	**33016/Q**	2CE
	130	35	176	275	32,5	3 600	5 300	1,70	**JM 515649/610/Q**	(M515600)
	130	37	179	280	32,5	3 600	4 800	1,90	**33116/Q**	3DE
	130	37	179	280	32,5	3 600	4 800	1,90	**33116 TN9/Q**	3DE
	140	28,25	151	183	21,2	3 400	4 800	1,60	**30216 J2/Q**	3EB
	140	35,25	187	245	28,5	3 400	4 500	2,05	**32216 J2/Q**	3EC
	140	46	251	375	41,5	3 200	4 500	2,90	**33216/Q**	3EE
	160	45	260	315	35,5	3 000	4 000	3,95	* **T7FC 080/QCL7C**	7FC
	170	42,5	270	320	38	3 000	4 300	4,10	**30316 J2**	2GB
	170	42,5	260	265	32	3 000	4 000	4,05	* **31316 J1/QCL7C**	7GB
	170	61,5	380	500	57	3 000	4 300	6,20	**32316 J2**	2GD

* SKF Explorer bearing

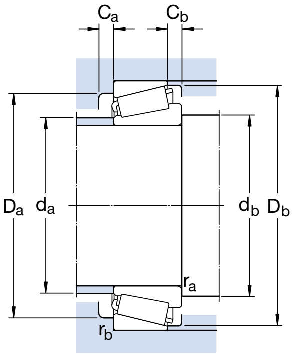


Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
75	89,2	20	16	1	1	19	81	82	98	98	101	4	4	1	1	0,33	1,8	1
	95,1	25	19	1,5	1,5	25	83	82	103	108	110	5	6	1,5	1,5	0,46	1,3	0,7
	95	31	25,5	1,5	1,5	23	84	82	104	108	110	6	5,5	1,5	1,5	0,3	2	1,1
	98,1	29,5	25	3	2,5	28	84	87	104	110	115	5	6	2,5	2	0,44	1,35	0,8
	100	37	29	2	1,5	29	84	84	109	117	120	6	8	2	1,5	0,4	1,5	0,8
	99,2	25	22	2	1,5	27	86	84	115	122	124	4	5	2	1,5	0,43	1,4	0,8
	100	31	27	2	1,5	29	85	84	114	122	125	4	6	2	1,5	0,43	1,4	0,8
	102	41	31	2	1,5	32	84	84	111	122	125	6	10	2	1,5	0,43	1,4	0,8
	111	51	43	5	3	39	88	95	117	131	138	7	9	4	2,5	0,43	1,4	0,8
	118	38	29	3	3	50	88	87	114	136	143	5	13	2,5	2,5	0,88	0,68	0,4
	112	37	31	3	2,5	31	96	87	139	148	149	5	9	2,5	2	0,35	1,7	0,9
	116	37	26	3	2,5	48	91	87	127	148	151	6	14	2,5	2	0,83	0,72	0,4
	113	55	45	3	2,5	38	92	87	133	148	149	7	13	2,5	2	0,35	1,7	0,9
	120	55	45	3	2,5	46	90	87	124	148	151	7	13	2,5	2	0,54	1,1	0,6
80	103	29	22	1,5	1,5	27	90	87	112	117	120	6	7	1,5	1,5	0,43	1,4	0,8
	102	36	29,5	1,5	1,5	26	90	87	112	117	119	6	6,5	1,5	1,5	0,28	2,1	1,1
	105	38	31,5	3	2,5	29	90	91	114	120	124	5	6,5	2,5	2	0,4	1,5	0,8
	105	37	29	2	1,5	30	89	89	114	122	126	6	8	2	1,5	0,43	1,4	0,8
	105	37	29	2	1,5	30	89	89	114	122	126	6	8	2	1,5	0,43	1,4	0,8
	105	26	22	2,5	2	28	92	90	124	130	132	4	6	2	2	0,43	1,4	0,8
	106	33	28	2,5	2	30	91	90	122	130	134	5	7	2	2	0,43	1,4	0,8
	110	46	35	2,5	2	35	89	90	119	130	135	7	11	2	2	0,43	1,4	0,8
	125	41	31	3	3	53	94	92	121	146	152	5	14	2,5	2,5	0,88	0,68	0,4
	120	39	33	3	2,5	33	102	92	148	158	159	5	9,5	2,5	2	0,35	1,7	0,9
	124	39	27	3	2,5	52	97	92	134	158	159	6	15,5	2,5	2	0,83	0,72	0,4
	120	58	48	3	2,5	41	98	92	142	158	159	7	13,5	2,5	2	0,35	1,7	0,9

Metric single row taper roller bearings
d **85 – 95** mm

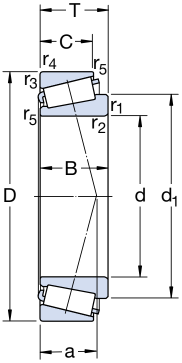


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
d	D	T	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	–
85	130	29	140	224	25,5	3 400	4 800	1,35	**32017 X/Q**	4CC
	130	36	183	310	34,5	3 600	4 800	1,75	**33017/Q**	2CE
	140	41	220	340	38	3 400	4 500	2,45	**33117/Q**	3DE
	150	30,5	176	220	25,5	3 200	4 300	2,05	**30217 J2/Q**	3EB
	150	38,5	212	285	33,5	3 200	4 300	2,60	**32217 J2/Q**	3EC
	150	49	286	430	48	3 000	4 300	3,70	**33217/Q**	3EE
	180	44,5	303	365	40,5	2 800	4 000	4,85	**30317 J2**	2GB
	180	44,5	242	285	33,5	2 600	3 800	4,60	**31317 J2**	7GB
	180	63,5	402	530	60	2 800	4 000	6,85	**32317 J2**	2GD
	180	63,5	391	560	62	2 800	4 000	7,50	**32317 BJ2**	5GD
90	140	32	168	270	31	3 200	4 300	1,75	**32018 X/Q**	3CC
	140	39	216	355	39	3 200	4 500	2,20	**33018/Q**	2CE
	145	35	2001	305	35,5	3 200	4 800	2,10	**JM 718149 A/110/Q**	(M 718100)
	150	42	216	375	40,5	3 000	4 500	3,00	**T5ED 090/QU4**	5ED
	150	45	251	390	43	3 000	4 300	3,10	**33118/Q**	3DE
	150	45	251	390	43	3 000	4 300	3,10	**33118 TN9/Q**	3DE
	160	32,5	194	245	28,5	3 000	4 000	2,55	**30218 J2**	3FB
	160	42,5	251	340	38	3 000	4 000	3,35	**32218 J2/Q**	3FC
	190	46,5	330	400	44	2 600	4 000	5,65	**30318 J2**	2GB
	190	46,5	264	315	36,5	2 400	3 400	5,90	**31318 J2**	7GB
	190	67,5	457	610	67	2 600	4 000	8,40	**32318 J2**	2GD
95	145	32	168	270	30,5	3 200	4 300	1,80	**32019 X/Q**	4CC
	145	39	220	375	40,5	3 200	4 300	2,30	**33019/Q**	2CE
	170	34,5	216	275	31,5	2 800	3 800	3,00	**30219 J2**	3FB
	170	45,5	281	390	43	2 800	3 800	4,05	**32219 J2**	3FC
	170	58	374	560	62	2 600	3 800	5,50	**33219**	3FE
	180	49	275	400	44	2 400	3 400	5,25	**T7FC 095/CL7CVQ051**	7FC
	200	49,5	330	390	42,5	2 600	3 400	6,70	**30319**	2GB
	200	49,5	292	355	39	2 400	3 400	6,95	**31319 J2**	7GB
	200	71,5	501	670	72	2 400	3 400	11,0	**32319 J2**	2GD



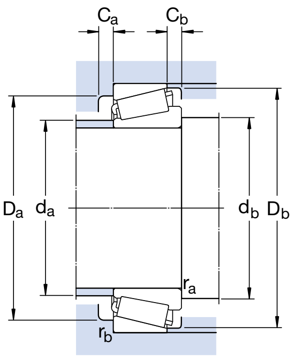
Dimensions							**Abutment and fillet dimensions**										**Calculation factors**		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
85	108	29	22	1,5	1,5	28	94	92	117	122	125	6	7	1,5	1,5	0,44	1,35	0,8
	107	36	29,5	1,5	1,5	26	94	92	118	122	125	6	6,5	1,5	1,5	0,3	2	1,1
	112	41	32	2,5	2	32	95	95	122	130	135	7	9	2	2	0,4	1,5	0,8
	112	28	24	2,5	2	30	97	95	132	140	141	5	6,5	2	2	0,43	1,4	0,8
	113	36	30	2,5	2	33	97	95	130	140	142	5	8,5	2	2	0,43	1,4	0,8
	117	49	37	2,5	2	37	96	95	128	140	144	7	12	2	2	0,43	1,4	0,8
	126	41	34	4	3	35	107	99	156	166	167	6	10,5	3	2,5	0,35	1,7	0,9
	131	41	28	4	3	55	103	99	143	166	169	6	16,5	3	2,5	0,83	0,72	0,4
	126	60	49	4	3	42	103	99	150	166	167	7	14,5	3	2,5	0,35	1,7	0,9
	135	60	49	4	3	52	102	99	138	166	169	7	14,5	3	2,5	0,54	1,1	0,6
90	115	32	24	2	1,5	30	100	98	125	132	134	6	8	1,5	1,5	0,43	1,4	0,8
	113	39	32,5	2	1,5	27	100	98	127	132	135	7	6,5	1,5	1,5	0,27	2,2	1,3
	117	34	27	6	2,5	33	100	108	127	135	139	6	8	5	2	0,44	1,35	0,8
	124	40	34	5	3	40	101	110	124	136	145	6	8	4	2,5	0,54	1,1	0,6
	120	45	35	2,5	2	35	101	101	130	140	144	7	10	2	2	0,4	1,5	0,8
	120	45	35	2,5	2	35	101	101	130	140	144	7	10	2	2	0,4	1,5	0,8
	118	30	26	2,5	2	31	104	101	140	150	150	5	6,5	2	2	0,43	1,4	0,8
	121	40	34	2,5	2	36	102	101	138	150	152	5	8,5	2	2	0,43	1,4	0,8
	132	43	36	4	3	36	113	105	165	176	176	6	10,5	3	2,5	0,35	1,7	0,9
	138	43	30	4	3	57	109	105	151	176	179	5	16,5	3	2,5	0,83	0,72	0,4
	133	64	53	4	3	44	109	105	157	176	177	7	14,5	3	2,5	0,35	1,7	0,9
95	120	32	24	2	1,5	31	105	104	130	138	139	6	8	2	1,5	0,44	1,35	0,8
	118	39	32,5	2	1,5	28	104	104	131	138	139	7	6,5	2	1,5	0,28	2,1	1,1
	126	32	27	3	2,5	33	110	107	149	158	159	5	7,5	2,5	2	0,43	1,4	0,8
	128	43	37	3	2,5	39	109	107	145	158	161	5	8,5	2,5	2	0,43	1,4	0,8
	132	58	44	3	2,5	42	107	107	144	158	163	9	14	2,5	2	0,40	1,5	0,8
	143	45	33	4	4	60	109	110	138	164	172	6	16	3	3	0,88	0,68	0,4
	139	45	38	4	3	39	118	110	172	186	184	6	11,5	3	2,5	0,35	1,7	0,9
	145	45	32	4	3	60	114	110	157	186	187	5	17,5	3	2,5	0,83	0,72	0,4
	141	67	55	4	3	47	115	110	166	186	186	8	16,5	3	2,5	0,35	1,7	0,9

Metric single row taper roller bearings
d **100 – 110** mm



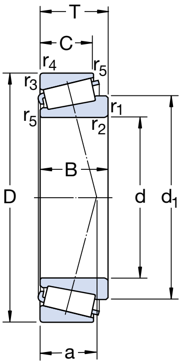
Principal dimensions d	D	T	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
mm			kN		kN	r/min		kg	–	–
100	140	25	119	204	22,4	3 200	4 800	1,15	**32920/Q**	2CC
	145	24	125	190	20,8	3 200	4 500	1,15	**T4CB 100/Q**	4CB
	150	32	172	280	31	3 000	4 000	1,90	**32020 X/Q**	4CC
	150	39	224	390	41,5	3 000	4 000	2,40	**33020/Q**	2CE
	157	42	246	400	42,5	3 000	4 300	2,90	**HM 220149/110/Q**	(HM 220100)
	160	41	246	390	41,5	2 800	4 300	3,00	**JHM 720249/210/Q**	(HM 720200)
	165	47	314	480	53	2 800	4 300	3,90	**T2EE 100**	2EE
	180	37	246	320	36	2 800	3 600	3,65	**30220 J2**	3FB
	180	49	319	440	48	2 600	3 600	4,90	**32220 J2**	3FC
	180	63	429	655	71	2 400	3 600	6,95	**33220**	3FE
	215	51,5	402	490	53	2 400	3 200	8,05	**30320 J2**	2GB
	215	56,5	430	465	51	2 400	3 000	8,60	* **31320 XJ2/CL7CVQ051**	7GB
	215	77,5	572	780	83	2 200	3 000	12,5	**32320 J2**	2GD
105	160	35	201	335	37,5	2 800	3 800	2,40	**32021 X/Q**	4DC
	160	43	246	430	45,5	2 800	3 800	3,05	**33021/Q**	2DE
	190	39	270	355	40	2 600	3 400	4,25	**30221 J2**	3FB
	190	53	358	510	55	2 600	3 400	6,00	**32221 J2**	3FC
	225	81,5	605	815	85	2 000	3 000	14,5	**32321 J2**	2GD
110	150	25	125	224	24	3 000	4 300	1,25	**32922 X/Q**	2CC
	170	38	233	390	42,5	2 600	3 600	3,05	**32022 X/Q**	4DC
	170	47	281	500	53	2 600	3 600	3,85	**33022**	2DE
	180	56	369	630	67	2 600	3 400	5,55	**33122**	3EE
	200	41	308	405	45	2 400	3 200	5,10	**30222 J2**	3FB
	200	56	402	570	61	2 400	3 200	7,10	**32222 J2**	3FC
	240	54,5	473	585	62	2 200	2 800	11,0	**30322 J2**	2GB
	240	63	457	585	62	1 900	2 800	12,0	**31322 XJ2**	7GB
	240	84,5	627	830	86,5	1 900	2 800	17,0	**32322**	2GD

* SKF Explorer bearing

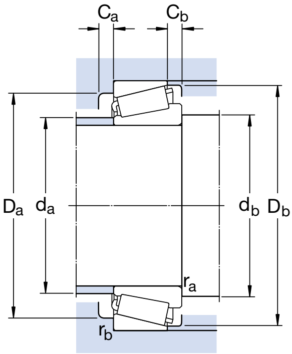


Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
100	119	25	20	1,5	1,5	24	109	107	131	132	135	5	5	1,5	1,5	0,33	1,8	1
	121	22,5	17,5	3	3	30	109	112	133	131	140	4	6,5	2,5	2,5	0,48	1,25	0,7
	125	32	24	2	1,5	32	110	108	134	142	144	6	8	2	1,5	0,46	1,3	0,7
	122	39	32,5	2	1,5	29	109	108	135	142	143	7	6,5	2	1,5	0,3	2	1,1
	128	42	34	8	3,5	32	111	124	140	145	151	7	8	7	3	0,33	1,8	1
	130	40	32	3	2,5	38	110	112	139	148	154	7	9	2,5	2	0,48	1,27	0,7
	130	46	39	3	3	35	111	112	145	151	157	7	8	2,5	2,5	0,31	1,9	1,1
	133	34	29	3	2,5	35	116	112	157	168	168	5	8	2,5	2	0,43	1,4	0,8
	135	46	39	3	2,5	41	115	112	154	168	171	5	10	2,5	2	0,43	1,4	0,8
	139	63	48	3	2,5	43	112	112	151	168	172	10	15	2,5	2	0,4	1,5	0,8
	148	47	39	4	3	40	127	115	184	201	197	6	12,5	3	2,5	0,35	1,7	0,9
	158	51	35	4	3	65	121	115	168	201	202	7	21,5	3	2,5	0,83	0,72	0,4
	151	73	60	4	3	51	123	115	177	201	200	8	17,5	3	2,5	0,35	1,7	0,9
105	132	35	26	2,5	2	34	116	116	143	150	154	6	9	2	2	0,44	1,35	0,8
	131	43	34	2,5	2	31	117	116	145	150	153	7	9	2	2	0,28	2,1	1,1
	141	36	30	3	2,5	37	123	117	165	178	177	6	9	2,5	2	0,43	1,4	0,8
	143	50	43	3	2,5	44	120	117	161	178	180	6	10	2,5	2	0,43	1,4	0,8
	158	77	63	4	3	53	129	120	185	211	209	9	18,5	3	2,5	0,35	1,7	0,9
110	129	25	20	1,5	1,5	26	118	117	140	142	145	5	5	1,5	1,5	0,35	1,7	0,9
	140	38	29	2,5	2	36	123	121	152	160	163	7	9	2	2	0,43	1,4	0,8
	139	47	37	2,5	2	34	123	121	152	160	161	7	10	2	2	0,28	2,1	1,1
	146	56	43	2,5	2	44	121	121	155	170	174	9	13	2	2	0,43	1,4	0,8
	148	38	32	3	2,5	39	129	122	174	188	187	6	9	2,5	2	0,43	1,4	0,8
	151	53	46	3	2,5	46	127	122	170	188	190	6	10	2,5	2	0,43	1,4	0,8
	165	50	42	4	3	43	142	125	206	226	220	8	12,5	3	2,5	0,35	1,7	0,9
	176	57	38	4	3	72	135	125	188	226	224	7	25	3	2,5	0,83	0,72	0,4
	168	80	65	4	3	55	137	125	198	226	222	9	19,5	3	2,5	0,35	1,7	0,9

Metric single row taper roller bearings
d **120 – 160** mm

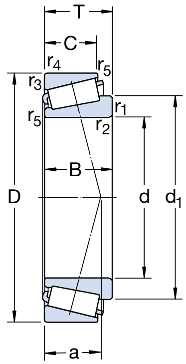


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
d	D	T	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	–
120	165	29	165	305	32	2 600	3 800	1,80	**32924**	2CC
	170	27	157	250	26,5	2 600	3 800	1,70	**T4CB 120**	4CB
	180	38	242	415	44	2 400	3 400	3,25	**32024 X**	4DC
	180	48	292	540	56	2 600	3 400	4,20	**33024**	2DE
	215	43,5	341	465	49	2 200	3 000	6,15	**30224 J2**	4FB
	215	61,5	468	695	72	2 200	3 000	9,15	**32224 J2**	4FD
	260	59,5	561	710	73,5	2 000	2 600	14,0	**30324 J2**	2GB
	260	68	539	695	73,5	1 700	2 400	15,5	**31324 XJ2**	7GB
	260	90,5	792	1 120	110	1 800	2 600	21,5	**32324 J2**	2GD
130	180	32	198	365	38	2 400	3 600	2,40	**32926**	2CC
	200	45	314	540	55	2 200	3 000	4,95	**32026 X**	4EC
	230	43,75	369	490	53	2 000	2 800	7,60	**30226 J2**	4FB
	230	67,75	550	830	85	2 000	2 800	11,5	**32226 J2**	4FD
	280	63,75	627	800	83	1 800	2 400	17,0	**30326 J2**	2GB
	280	72	605	780	81,5	1 600	2 400	18,5	**31326 XJ2**	7GB
140	190	32	205	390	40	2 200	3 400	2,55	**32928**	2CC
	195	29	194	325	33,5	2 200	3 200	2,40	**T4CB 140**	4CB
	210	45	330	585	58,5	2 200	2 800	5,25	**32028 X**	4DC
	250	45,75	418	570	58,5	1 900	2 600	8,65	**30228 J2**	4FB
	250	71,75	644	1 000	100	1 900	2 600	14,5	**32228 J2**	4FD
	300	77	693	900	88	1 500	2 200	24,5	**31328 XJ2**	7GB
150	210	32	233	390	40	2 000	3 000	3,05	**T4DB 150**	4DB
	225	48	369	655	65,5	2 000	2 600	6,35	**32030 X**	4EC
	225	59	457	865	86,5	2 000	2 600	8,15	**33030**	2EE
	270	49	429	560	57	1 800	2 400	11,0	**30230**	4GB
	270	77	737	1 140	112	1 700	2 400	17,5	**32230 J2**	4GD
	320	82	781	1 020	100	1 400	2 000	29,5	**31330 XJ2**	7GB
160	220	32	242	415	41,5	2 000	2 800	3,25	**T4DB 160**	4DB
	240	51	429	780	78	1 800	2 400	7,75	**32032 X**	4EC
	245	61	528	980	95	1 800	2 600	10,5	**T4EE 160/VB406**	4EE
	290	52	528	735	72	1 600	2 200	13,0	**30232 J2**	4GB
	290	84	880	1 400	132	1 600	2 200	25,5	**32232 J2**	4GD
	340	75	913	1 180	114	1 500	2 000	29,0	**30332 J2**	2GB

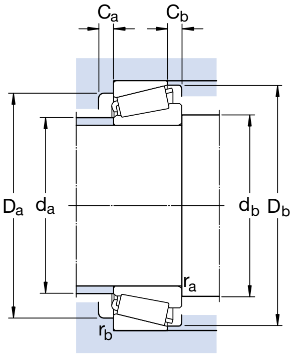


Dimensions							Abutment and fillet dimensions										Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm										–		
120	141	29	23	1,5	1,5	29	130	127	154	157	160	5	6	1,5	1	0,35	1,7	0,9
	142	25	19,5	3	3	34	130	132	157	157	164	4	7,5	2 ,5	2,5	0,48	1,25	0,7
	150	38	29	2,5	2	39	132	131	161	170	173	7	9	2	2	0,46	1,3	0,7
	149	48	38	2,5	2	36	132	131	160	170	171	6	10	2	2	0,3	2	1,1
	161	40	34	3	2,5	43	141	132	187	203	201	6	9,5	2,5	2	0,43	1,4	0,8
	163	58	50	3	2,5	51	137	132	181	203	204	7	11,5	2,5	2	0,43	1,4	0,8
	178	55	46	4	3	47	153	135	221	245	237	7	13,5	3	2,5	0,35	1,7	0,9
	190	62	42	4	3	78	145	135	203	245	244	9	26	3	2,5	0,83	0,72	0,4
	181	86	69	4	3	60	148	135	213	245	239	9	21,5	3	2,5	0,35	1,7	0,9
130	153	32	25	2	1,5	31	141	140	167	172	173	6	7	2	1,5	0,33	1,8	1
	165	45	34	2,5	2	42	144	142	178	190	192	7	11	2	2	0,43	1,4	0,8
	173	40	34	4	3	45	152	146	203	216	217	7	9,5	3	2,5	0,43	1,4	0,8
	176	64	54	4	3	56	146	146	193	216	219	7	13,5	3	2,5	0,43	1,4	0,8
	196	58	49	5	4	51	164	150	239	263	255	8	14,5	4	3	0,35	1,7	0,9
	204	66	44	5	4	84	157	150	218	263	261	8	28	4	3	0,83	0,72	0,4
140	163	32	25	2	1,5	33	150	150	177	182	184	6	7	2	1,5	0,35	1,7	0,9
	165	27	21	3	3	40	151	154	180	181	189	5	8	2,5	2,5	0,5	1,2	0,7
	175	45	34	2,5	2	46	153	152	187	200	202	7	11	2	2	0,46	1,3	0,7
	186	42	36	4	3	47	164	156	219	236	234	7	9,5	3	2,5	0,43	1,4	0,8
	191	68	58	4	3	60	159	156	210	236	238	8	13,5	3	2,5	0,43	1,4	0,8
	219	70	47	5	4	90	169	160	235	283	280	9	30	4	3	0,83	0,72	0,4
150	177	30	23	3	3	41	162	162	194	196	203	5	9	2,5	2,5	0,46	1,3	0,7
	187	48	36	3	2,5	49	164	164	200	213	216	8	12	2,5	2	0,46	1,3	0,7
	188	59	46	3	2,5	48	164	162	200	213	217	8	13	2,5	2	0,37	1,6	0,9
	200	45	38	4	3	50	175	166	234	256	250	9	11	3	2,5	0,43	1,4	0,8
	205	73	60	4	3	64	171	166	226	256	254	8	17	3	2,5	0,43	1,4	0,8
	234	75	50	5	4	96	181	170	251	303	300	9	32	4	3	0,83	0,72	0,4
160	187	30	23	3	3	44	172	174	204	206	213	5	9	2,5	2,5	0,48	1,25	0,7
	200	51	38	3	2,5	52	175	174	213	228	231	8	13	2,5	2	0,46	1,3	0,7
	203	59	50	3	2	57	174	174	229	233	236	9	11	2,5	2	0,44	1,35	0,8
	214	48	40	4	3	54	189	176	252	275	269	8	12	3	2,5	0,43	1,4	0,8
	221	80	67	4	3	70	183	176	242	275	274	10	17	3	2,5	0,43	1,4	0,8
	233	68	58	5	4	61	201	180	290	323	310	9	17	4	3	0,35	1,7	0,9

Metric single row taper roller bearings
d **170 – 260** mm

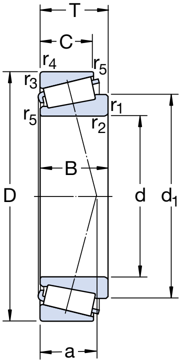


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation	Dimension Series to ISO 355 (ABMA)
d	D	T	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	–
170	230	32	251	440	43	1 900	2 800	3,45	**T4DB 170**	4DB
	230	38	286	585	55	1 900	2 800	4,50	**32934**	3DC
	260	57	512	915	90	1 700	2 200	10,5	**32034 X**	4EC
	310	57	616	865	83	1 500	2 000	19,0	**30234 J2**	4GB
	310	91	1 010	1 630	150	1 500	2 000	28,5	**32234 J2**	4GD
180	240	32	251	450	44	1 800	2 600	3,60	**T4DB 180**	4DB
	250	45	352	735	68	1 700	2 600	6,65	**32936**	4DC
	280	64	644	1 160	110	1 600	2 200	14,5	**32036 X**	3FD
	320	57	583	815	80	1 500	2 000	20,0	**30236 J2**	4GB
	320	91	1 010	1 630	150	1 400	1 900	29,5	**32236 J2**	4GD
190	260	45	358	765	72	1 600	2 400	7,00	**32938**	4DC
	260	46	380	800	75	1 600	2 400	6,70	**JM 738249/210**	(M 738200)
	290	64	660	1 200	112	1 500	2 000	15,0	**32038 X**	4FD
	340	60	721	1 000	95	1 400	1 800	24,0	**30238 J2**	4GB
200	270	37	330	600	57	1 600	2 400	5,45	**T4DB 200**	4DB
	280	51	473	950	88	1 500	2 200	9,50	**32940**	3EC
	310	70	748	1 370	127	1 400	1 900	19,5	**32040 X**	4FD
	360	64	792	1 120	106	1 300	1 700	25,0	**30240 J2**	4GB
	360	104	1 210	2 000	180	1 300	1 700	42,5	**32240 J2**	3GD
220	285	41	396	830	75	1 500	2 200	6,45	**T2DC 220**	2DC
	300	51	484	1 000	91,5	1 400	2 000	10,0	**32944**	3EC
	340	76	897	1 660	150	1 300	1 700	25,5	**32044 X**	4FD
	400	72	990	1 400	129	1 200	1 600	40,0	**30244 J2**	–
	400	114	1 610	2 700	232	1 100	1 500	60,0	**32244 J2**	–
240	320	42	429	815	73,5	1 300	1 900	8,45	**T4EB 240/VE174**	4EB
	320	51	512	1 080	96,5	1 300	1 900	11,0	**32948**	4EC
	320	57	616	1 320	120	1 300	1 900	12,5	**T2EE 240/VB406**	2EE
	360	76	935	1 800	160	1 200	1 600	27,5	**32048 X**	4FD
	440	127	1 790	3 350	275	1 000	1 400	83,5	**32248 J3**	–
260	400	87	1 170	2 200	190	1 100	1 400	40,0	**32052 X**	4FC
	480	137	2 200	3 650	300	900	1 200	105	**32252 J2/HA1**	–
	540	113	2 120	3 050	250	850	1 200	110	**30352 J2**	–

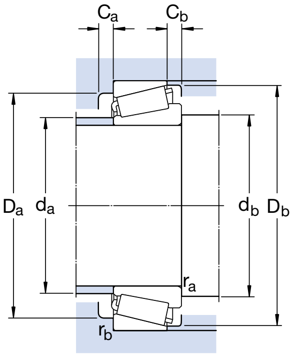


Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
170	197	30	23	3	3	44	182	184	215	216	223	6	9	2,5	2,5	0,46	1,3	0,7
	200	38	30	2,5	2	42	183	182	213	220	222	7	8	2	2	0,37	1,6	0,9
	214	57	43	3	2,5	56	188	184	230	246	249	10	14	2,5	2	0,44	1,35	0,8
	230	52	43	5	4	58	203	190	268	293	288	8	14	4	3	0,43	1,4	0,8
	237	86	71	5	4	75	196	190	259	293	294	10	20	4	3	0,43	1,4	0,8
180	207	30	23	3	3	48	191	194	224	226	233	6	9	2,5	2,5	0,48	1,25	0,7
	216	45	34	2,5	2	53	194	192	225	240	241	8	11	2	2	0,48	1,25	0,7
	229	64	48	3	2,5	59	199	194	247	266	267	10	16	2,5	2	0,43	1,4	0,8
	239	52	43	5	4	61	211	200	278	303	297	9	14	4	3	0,44	1,35	0,8
	247	86	71	5	4	78	204	200	267	303	303	10	20	4	3	0,44	1,35	0,8
190	227	45	34	2,5	2	55	204	202	235	248	251	8	11	2	2	0,48	1,25	0,7
	227	44	36,5	3	2,5	55	205	204	235	256	252	8	9,5	2,5	2	0,48	1,25	o,7
	240	64	48	3	2,5	62	210	204	257	276	279	10	16	2,5	2	0,44	1,35	0,8
	254	55	46	5	4	63	224	210	298	323	318	9	14	4	3	0,43	1,4	0,8
200	232	34	27	3	3	53	214	214	251	255	262	6	10	2,5	2,5	0,48	1,25	0,7
	239	51	39	3	2,5	53	217	214	257	266	271	9	12	2,5	2	0,4	1,5	0,8
	254	70	53	3	2,5	66	222	214	273	296	297	11	17	2,5	2	0,43	1,4	0,8
	268	58	48	5	4	68	237	220	315	343	336	9	16	4	3	0,43	1,4	0,8
	274	98	82	5	4	83	231	220	302	343	340	11	22	4	3	0,4	1,5	0,8
220	249	40	33	4	3	45	233	236	270	270	277	7	8	3	2,5	0,31	1,9	1,1
	259	51	39	3	2,5	58	234	234	275	286	290	9	12	2,5	2	0,43	1,4	0,8
	279	76	57	4	3	72	244	236	300	325	326	12	19	3	2,5	0,43	1,4	0,8
	294	65	54	5	4	74	259	242	348	383	371	10	18	4	3	0,43	1,4	0,8
	306	108	90	5	4	95	253	242	334	383	379	13	24	4	3	0,43	1,4	0,8
240	276	39	30	3	3	60	256	254	299	305	310	7	12	2,5	2,5	0,46	1,3	0,7
	279	51	39	3	2,5	64	255	254	294	306	311	9	12	2,5	2	0,46	1,3	0,7
	277	56	46	3	2	58	254	254	296	308	311	9	11	2,5	2	0,35	1,7	0,9
	299	76	57	4	3	78	262	256	318	345	346	12	19	3	2,5	0,46	1,3	0,7
	346	120	100	5	4	105	290	262	365	420	415	13	27	4	3	0,43	1,4	0,8
260	328	87	65	5	4	84	287	282	352	383	383	13	22	4	3	0,43	1,4	0,8
	366	130	106	6	5	112	303	286	401	458	454	16	31	5	4	0,43	1,4	0,8
	376	102	85	6	6	97	325	286	461	514	493	15	28	5	5	0,35	1,7	0,9

Metric single row taper roller bearings
d **280 – 360** mm

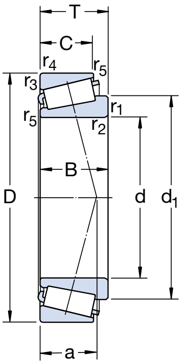


Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Dimension Series to ISO 355
			dynamic	static		Reference speed	Limiting speed			
d	D	T	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	–
280	380	63,5	765	1 660	143	1 100	1 600	20,0	**32956/C02**	4EC
	420	87	1 210	2 360	200	1 000	1 300	40,5	**32056 X**	4FC
300	420	76	1 050	2 240	190	950	1 400	32,0	**32960**	3FD
	460	100	1 540	3 000	250	900	1 200	58,0	**32060 X**	4GD
	540	149	2 750	4 750	365	800	1 100	140	**32260 J2/HA1**	–
320	440	76	1 080	2 360	196	900	1 300	33,5	**32964**	3FD
	480	100	1 540	3 100	255	850	1 100	64,0	**32064 X**	4GD
340	460	76	1 080	2 400	200	850	1 300	35,0	**32968**	4FD
360	480	76	1 120	2 550	204	800	1 200	37,0	**32972**	4FD



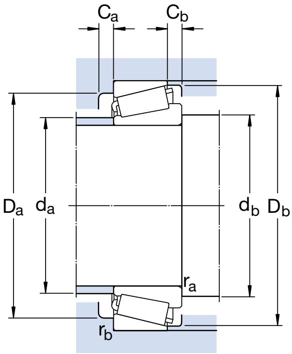
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
Dimensions							**Abutment and fillet dimensions**									**Calculation factors**		
mm							mm									–		
280	329	63,5	48	3	2,5	74	298	295	348	366	368	11	15,5	2,5	2	0,43	1,4	0,8
	348	87	65	5	4	89	305	302	370	400	402	14	22	4	3	0,46	1,3	0,7
300	358	76	57	4	3	79	324	317	383	404	405	12	19	3	2,5	0,4	1,5	0,8
	377	100	74	5	4	97	330	322	404	440	439	15	26	4	3	0,43	1,4	0,8
	413	140	115	6	5	126	343	326	453	518	511	17	34	5	4	0,43	1,4	0,8
320	379	76	57	4	3	84	343	337	402	424	426	13	19	3	2,5	0,43	1,4	0,8
	399	100	74	5	4	103	350	342	424	460	461	15	26	4	3	0,46	1,3	0,7
340	399	76	57	4	3	90	361	357	421	444	446	14	19	3	2,5	0,44	1,35	0,8
360	419	76	57	4	3	96	380	377	439	464	466	14	19	3	2,5	0,46	1,3	0,7

Inch-size single row taper roller bearings
d **14,989 – 22,225** mm
0,5906 – 0,8750 in



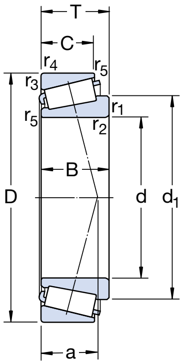
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Series
			dynamic	static		Reference speed	Limiting speed			
d	D	T	C	C_0	P_u					
mm/in			kN		kN	r/min		kg	–	–
14,989	34,988	10,998	13,4	13,2	1,29	16 000	24 000	0,051	**A 4059/A 4138**	A 4000
0,5906	1,3775	0,4326								
15,875	41,275	14,288	25,5	21,2	2,16	15 000	20 000	0,090	* **03062/03162/Q**	03000
0,6250	1,6250	0,5625								
	42,862	14,288	17,6	17,6	1,83	12 000	17 000	0,10	**11590/11520/Q**	11500
	1, 6875	0,5625								
17,462	39,878	13,843	24,5	20,8	2,12	15 000	20 000	0,081	* **LM 11749/710/Q**	LM 11700
0,6875	1,5700	0,5450								
	39,878	13,843	24,5	20,8	2,12	15 000	20 000	0,081	* **LM 11749/710/QVC027**	LM 11700
	1,5700	0,5450								
19,050	45,237	15,494	31,5	27,5	29	13 000	18 000	0,12	* **LM 11949/910/Q**	LM 11900
0,7500	1,7810	0,6100								
	49,225	19,845	39,1	40	4,3	11 000	17 000	0,17	**09067/09195/Q**	09000
	1,9380	0,7100								
	49,225	19,845	39,1	40	4,3	11 000	17 000	0,18	**09074/09195/QVQ494**	09000
	1,9380	0,7100								
21,430	45,237	15.494	27,5	31	3,2	11 000	17 000	0,12	**LM 12748/710**	LM 12700
0,8437	1,7810	0,6100								
	50,005	17,526	42,5	38	4,15	12 000	16 000	0,17	* **M 12649/610/Q**	M 12600
	1,9687	0,6900								
21,986	45,237	15,494	31,5	31	3,2	12 000	17 000	0,12	* **LM 12749/710/Q**	LM 12700
0,8656	1,7810	0,6100								
	45,974	15,494	31,5	31	3,2	12 000	17 000	0,12	* **LM 12749/711/Q**	LM 12700
	1,8100	0,6100								
22,225	52,388	19,368	48	44	4,8	11 000	15 000	0,20	* **1380/1328/Q**	1300
0,8750	2,0625	0,7625								

* SKF Explorer bearing



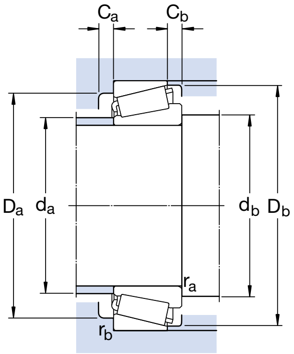
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
14,989	25,3	10,988	8,730	0,8	1,3	8	20	20	28	29	31	2	2	0,8	1,3	0,46	1,3	0,7
0,5906		0,4326	0,3437	0,03	0,05													
15,875	28,1	14,681	11,112	1,3	2	9	22	22	35	33,5	37	2	3	1,3	2	0,31	1,9	1,1
0,6250		0,5780	0,4375	0,05	0,08													
	31,1	14,288	9,525	1,5	1,5	13	23	23	32	36	38	2	4,5	1,5	1,5	0,72	0,84	0,45
		0,5625	0,3750	0,06	0,06													
17,462	28,9	14,605	10,668	1,3	1,3	9	23	23,5	35	33,5	36	2	3	1,3	1,3	0,28	2,1	1,1
0,6875		0,5750	0,4200	0,05	0,05													
	28,9	14,605	10,668	1,3	1,3	9	23	23,5	35	33,5	36	2	3	1,3	1,3	0,28	2,1	1,1
		0,5750	0,4200	0,05	0,05													
19,050	31,4	16,637	12,065	1,3	1,3	10	25	25	38	38,5	41	3	3	1,3	1,3	0,3	2	1,1
0,7500		0,6550	0,4750	0,05	0,05													
	32,3	19,050	14,288	1,3	1,3	10	26	25	41	42,5	44	4	3,5	1,3	1,3	0,27	2,2	1,3
		0,7500	0,5625	0,05	0,05													
	32,3	21,539	14,288	1,5	1,3	10	26	26	41	42,5	44	5	5,5	1,5	1,3	0,27	2,2	1,3
		0,8480	0,5625	0,06	0,05													
21,430	34,3	16,637	12,065	1,3	1,3	10	28	27,5	39	40	42	3	3	1,3	1,3	0,31	1,9	1,1
0,8437		0,6550	0,4750	0,05	0,05													
	34,3	18,288	13,970	1,3	1,3	11	28	27,5	43	43,5	46	3	3,5	1,3	1,3	0,28	2,1	1,1
		0,7200	0,5500	0,05	0,05													
21,986	34,3	16,637	12,065	1,3	1,3	10	28	28	39	40	42	3	3	1,3	1,3	0,31	1,9	1,1
0,8656		0,6550	0,4750	0,05	0,05													
	34,3	16,637	12,065	1,3	1,3	10	28	28	39	40	42	3	3	1,3	1,3	0,31	1,9	1,1
		0,6550	0,4750	0,05	0,05													
22,225	36	20,168	14,288	1,5	1,5	11	29	29,5	45	45	48	4	5	1,5	1,5	0,30	2	1,1
0,8750		0,7490	0,5625	0,06	0,06													

Inch-size single row taper roller bearings
d **25,400 – 30,162** mm
1,000 – 1,1875 in



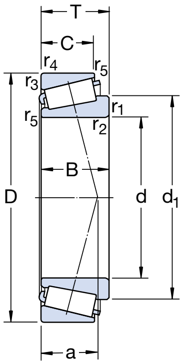
Principal dimensions d	 D	 T	Basic load ratings dynamic C	 static C_0	Fatigue load limit P_u	Speed ratings Reference speed	 Limiting speed	Mass	Designation	Series
mm/in			kN		kN	r/min		kg	–	–
25,400	50,292	14,224	30	30	3,05	11 000	15 000	0,13	* **L 44643/610/Q**	L 44600
1,0000	1,9800	0,5600								
	50,800	15,011	32	30,5	3,15	11 000	15 000	0,13	* **07100 S/07210 X/Q**	07000
	2,0000	0,5910								
	57,150	17,462	40,2	45,5	4,9	9 000	13 000	0,23	**15578/15520**	15500
	2,2500	0,6875								
	57,150	19,431	45,5	45	5	10 000	13 000	0,23	* **M 84548/2/510/2/QVQ506**	M 84500
	2,2500	0,7650								
	62	19,050	48,4	57	6,2	9 500	14 000	0,31	**15101/15245**	15000
	2,4409	0,7500								
26,162	61,912	19,050	56	57	6,2	9 000	12 000	0,29	* **15103 S/15243/Q**	15000
1,0300	2,4375	0,7500								
	62	19,050	56	57	6,2	9 000	12 000	0,29	* **15103 S/15245/Q**	15000
	2,4409	0,7500								
26,988	50,292	14,224	30	30	3,05	11 000	15 000	0,11	* **L 44649/610/Q**	L 44600
1,0625	1,9800	0,5600								
27,500	57,150	19,845	52	51	5,6	10 000	13 000	0,22	* **1982 F/1924 A/QVQ519**	1900
1,0826	2,2500	0,7813								
28,575	57,150	19,845	54	55	6	10 000	13 000	0,22	* **1985/1922/Q**	1900
1,1250	2,2500	0,7813								
	57,150	19,845	47,3	55	6	9 000	13 000	0,22	**1988/1922/Q**	1900
	2,2500	0,7813								
	64,292	21,433	56	61	6,8	8 500	11 000	0,35	* **M 86647/610/QCL7C**	M 86600
	2,5312	0.8438								
	73,025	22,225	99	140	15	7 000	10 000	1,05	**02872/02820/Q**	02800
	2,8750	0,8750								
29,000	50,292	14,224	30	32,5	3,35	11 000	14 000	0,11	* **L 45449/410/Q**	L 45400
1,1417	1 9800	0,5600								
30,162	64,292	21,433	56	61	6,8	8 500	11 000	0,33	* **M 86649/2/610/2/QVQ506**	M 86600
1,1875	2,5312	9,8435								
	68,262	22,225	63	69,5	7,8	8 000	11 000	0,41	* **M 88043/010/2/QCL7C**	M 88000
	2,6875	0,8750								

* SKF Explorer bearing



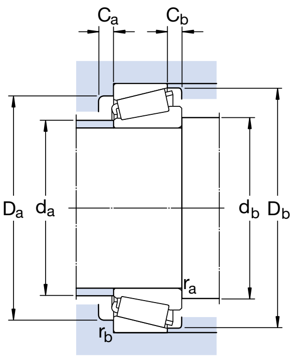
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
25,400	39,1	14,732	10,668	1,3	1,3	11	33	31,5	43,5	43,5	47	2	3,5	1,3	1,3	0,37	1,6	0,9
1,0000		0,5800	0,4200	0,05	0,05													
	37,3	14,260	12,700	1,5	1,5	12	31	32,5	41	43,5	48	2	2	1,5	1,5	0,4	1,5	0,8
		0,5614	0,5000	0,06	0,06													
	42,3	17.462	13,495	1,3	1,5	12	35	31,5	49	50	53	3	3,5	1,3	1,5	0,35	1,7	0,9
		0,6875	0,5313	0,05	0,06													
	42,5	19,431	14,732	1,5	1,5	16	33	32,5	45	50	53	3	4,5	1,5	1,5	0,54	1,1	0,6
		0,7650	0,5800	0,06	0,06													
	45,8	20,638	14,288	0,8	1,3	13	38	30,5	54	55	58	4	4,5	0,8	1,3	0,35	1,7	0,9
		0,8125	0,5625	0,03	0,05													
26,157	45,8	20,638	14,288	0,8	2	13	38	31	54	55	54	4	4,5	0,8	2	0,35	1,7	0,9
1,0298		0,8125	0,5625	0,03	0,08													
	45,8	20,638	14,288	0,8	1,3	13	38	31	54	55	58	4	4,5	0,8	1,3	0,35	1,7	0,9
		0,8125	0,5625	0,03	0,05													
26,988	38,2	14,732	10,668	3,5	1,3	11	33	38	43,5	44	47	2	3,5	3	1,3	0,37	1,6	0,9
1,0625		0,5800	0,4200	0,14	0,05													
27,500	42	20,165	15,875	2,5	0,8	14	35	36,5	49	52	54	3	3,5	2,5	0,8	0,33	1,8	1
1,0875		0,7939	0,6250	0,1	0,03													
28,575	42	19,355	15,875	0,8	1,5	14	35	33,5	49	49,5	54	3	3,5	0,8	1,5	0,33	1,8	1
1,1250		0,7620	0,6250	0,03	0,06													
	42	19,355	15,875	3,5	1,5	14	35	40	49	49,5	54	3	3,5	3	1,5	0,33	1,8	1
		0,7620	0,6250	0,14	0,06													
	48,8	21,433	16,670	1,5	1,5	18	38	36	51	56,5	60	3	4,5	1,5	1,5	0,54	1,1	0,6
		0,8438	0,6563	0,06	0,06													
	54,2	22,225	17,462	0,8	3,3	26	44	33,5	60	61,5	67	3	4,5	0,8	3	0,46	1,3	0,7
		0,8750	0,6875	0,03	0,13													
29,000	40,8	14,732	10,668	3,5	1,3	11	34	40	45	44	48	3	3,5	3	1,3	0,37	1,6	0,9
1,1417		0,5800	0,4200	0,14	0,05													
30,162	48,8	21,433	16,670	1,5	1,5	18	37,5	3,5	51	56,5	60	3	4,5	1,5	1,5	0,54	1,1	0,6
1,1875		0,8438	0,6563	0,06	0,06													
	52,3	22,225	17,462	2,3	1,5	19	41	39	54	60,5	64	3	4,5	2	1,5	0,54	1,1	0,6
		0,8750	0,6875	0,09	0,06													

Inch-size single row taper roller bearings
d **31,750 – 34,988** mm
1,2500 – 1,3775 in



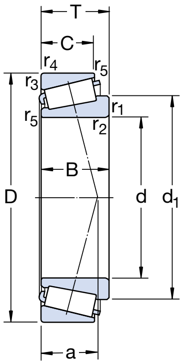
Principal dimensions d	 D	 T	Basic load ratings dynamic C	 static C_0	Fatigue load limit P_u	Speed ratings Reference speed	 Limiting speed	Mass	Designation	Series
mm/in			kN		kN	r/min		kg	–	–
31,750 1,2500	59,131 2,3280	15,875 0,6250	40	41,5	4,4	9 500	12 000	0,18	* **LM 67048/010/Q**	LM 67000
	61,912 2,4375	19,050 0,7500	56	57	6,2	9 000	12 000	0,24	* **15123/15243/Q**	15000
	62 2,4409	19,050 0,7500	56	57	6,2	9 000	12 000	0,24	* **15123/15245/Q**	15000
	73,025 2,8750	29,370 1,1563	70,4	95	10,4	6 700	10 000	0,62	**HM 88542/510/Q**	HM 88500
	73,025 2,8750	29,370 1,1563	81,5	95	10,4	7 500	10 000	0,62	* **HM 88542/2/510/2/QCL7C**	HM 88500
33,388 1,3125	68,262 2,6875	22,225 0,8750	63	69,5	7,8	8 000	11 000	0,38	* **M 88048/2/010/2/QCL7C**	M 88000
	69,012 2,7170	19,845 0,7813	53,9	67	7,35	7 500	11 000	0,35	**14131/14276/Q**	14000
34,925 1,3750	65,088 2,5625	18,034 0,7100	54	57	6,2	8 500	11 000	0,25	* **LM 48548/510/Q**	LM 48500
	65,088 2,5625	18,034 0,7100	54	57	6,2	8 500	11 000	0,25	* **LM 48548 A/510/Q**	LM 48500
	69,012 2,7170	19,845 0,7813	53,9	67	7,35	7 500	11 000	0,34	**14137 A/14276/Q**	14000
	72,233 2,8438	25,400 1,0000	78	90	10	7 500	10 000	0,50	* **HM 88649/2/610/2/QCL7C**	HM 88600
	73,025 2,8750	23,812 0,9375	72,1	88	9,8	7 000	10 000	0,47	**25877/2/25821/2/Q**	25800
	73,025 2,8750	26,988 1,0625	88	93	10,4	8 000	10 000	0,52	* **23690/23620/QCL7C**	23600
	76,200 3,0000	29,370 1,1563	85,8	106	12	6 700	10 000	0,63	**31594/31520/Q**	31500
	76,200 3,0000	29,370 1,1563	90	106	11,8	7 000	9 500	0,66	* **HM 89446/2/410/2/QCL7C**	HM 89400
34,988 1,3775	59,131 2,3280	15,875 0,6250	38	44	4,5	9 000	12 000	0,17	* **L 68149/110/Q**	L 68100
	59.974 2,3612	15,875 0,6250	38	44	4,5	9 000	12 000	0,17	* **L 68149/111/Q**	L 68100

* SKF Explorer bearing



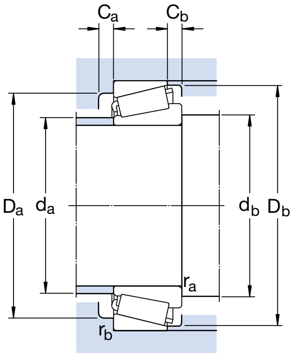
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
31,750 1,2500	44,9	16,764 0,6600	11,811 0,4650	3,6 0,14	1,3 0,05	13	38	42	51	53	55	3	4	3	1,5	0,4	1,5	0,8
	45,8	19,050 0,7500	14,288 0,5625	4 0,16	2 0,08	13	38	44	54	55	58	4	35	3	1,5	0,35	1,7	0,9
	45,8	19,050 0,7500	14,288 0,5625	4 0,16	1,3 0,05	13	38	44	54	55	58	4	35	3	1,3	0,35	1,7	0,9
	56,9	27,783 1,0938	23,020 0,9063	1,3 0,05	3,3 0,13	23	42	38	55	62	69	3	6	1,3	3	0,54	1,1	0,6
	56,9	27,783 1,0938	23,020 0,9063	1,3 0,05	3,3 0,13	23	42	38	55	62	69	3	6	1,3	3	0,54	1,1	0,6
33,338 1,3175	52,3	22,225 0,8750	17,462 0,6875	0,8 0.03	1,5 0,06	19	41	38,5	54	60,5	64	3	4,5	0,8	1,5	0,54	1,1	0,6
	50,7	19,583 0,7710	15,875 0,6250	0,8 0,03	1,3 0,05	15	43	38,5	47	61,5	63	3	3,5	0,8	1,3	0,37	1,6	0,9
34,925 1,3750	50	18,288 0,7200	13,970 0,5500	3,5 0,14	1,3 0,05	14	42	46	57	58,5	61	3	4	3,5	1,3	0,37	1,6	0,9
	50	18,288 0,7200	13,970 0,5500	0,8 0,03	1,3 0,05	14	42	40	57	58,5	61	3	4	3,5	1,3	0,37	1,6	0,9
	50,7	19,583 0,7710	15,875 0,6250	1,5 0,06	1,3 0,05	15	43	42	47	61,5	63	3	3,5	0,8	1,3	0,37	1,6	0,9
	55,9	25,400 1,0000	19,842 0,7812	2,3 0,09	2,3 0,09	20	42	44	57	63	68	5	5,5	2	2	0,54	1,1	0,6
	52,5	24,608 0,9688	19,050 0,7500	1,5 0,06	0,8 0,03	15	44	42	62	66,5	67	5	4,5	1,5	0,8	0,3	2	1,1
	52,3	26,975 1,0625	22,225 0,8750	3,5 0,14	1,5 0,6	19	42	46	59	65	67	3	4,5	3	1,5	0,37	1,6	0,9
	55,6	28,575 1,1250	23,812 0,9375	1,5 0,06	3,3 0,13	20	44	42	62	64,5	71	4	5,5	1,5	3	0,4	1,5	0,8
	59,3	28,575 1,1250	23,020 0,9063	3,5 0,14	3,3 0,13	23	44	46	58	65	72	3	6	3	3	0,54	1,1	0,6
34,988 1,3775	48,4	16,764 0,6600	11,938 0,4700	3,5 0,14	1,3 0,05	13	41	46	52	53,5	56	3	3,5	3	1,3	0,43	1,4	0,8
	48,4	16,764 0,6600	11,938 0,4700	3,5 0,14	1,3 0,05	13	41	46	52	53,5	56	3	3,5	3	1,3	0,43	1,4	0,8

Inch-size single row taper roller bearings
d **35,717 – 40,988** mm
1,4062 – 1,6137 in



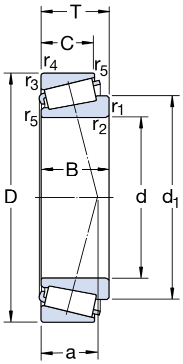
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Series
d	D	T	dynamic C	static C_0	P_u	Reference speed	Limiting speed			
mm/in			kN		kN	r/min		kg	–	–
35,717 1,4062	72,233 2,8438	25,400 1,0000	78	90	10	7 500	10 000	0,50	* **HM 88648/610/Q**	HM 88600
36,487 1,4365	73,025 2,8750	23,812 23,812	83	88	9,8	8 000	10 000	0,45	* **25880/25820/Q**	25800
36,512 1,4375	76,200 3,0000	29,370 1,1563	90	106	11,8	7 000	9 500	0,64	* **HM 89449/2/410/2/QCL7C**	HM 89400
38,100 1,5000	65,088 2,5625	18,034 0,7100	50	57	6,1	8 000	11 000	0,25	* **LM 29748/710/Q**	LM 29700
	65,088 2,5625	18,034 0,7100	50	57	6,1	8 000	11 000	0,25	* **LM 29749/710/QCL7CVA607**	LM 29700
	65,088 2,5625	19,812 0,7800	50	57	6,1	8 000	11 000	0,25	* **LM 29749/711/Q**	LM 29700
	65,088 2,5625	19,812 0,7800	50	57	6,1	8 000	11 000	0,25	* **LM 29749/711/QCL7CVA607**	LM 29700
	72,238 2,8440	20,638 0,8125	56	60	6,55	8 000	10 000	0,39	* **16150/16284/Q**	16000
	72,238 2,8440	23,812 0,9375	56	60	6,55	8 000	10 000	0,39	* **16150/16283/Q**	16000
	76,200 3,0000	23,812 0,9375	86,5	93	10,4	7 500	10 000	0,50	* **2788/2720/QCL7C**	2700
	79,375 3,1250	29,370 1,1563	104	110	12,5	7 000	9 500	0,67	* **3490/3420/QCL7CVQ492**	3400
	82,550 3,2500	29,370 1,1563	100	118	13,4	6 700	8 500	0,78	* **HM 801346/310/Q**	HM 801300
	82,550 3,2500	29,370 1,1563	100	118	13,4	6 700	8 500	0,77	* **HM 801346 X/2/310/QVQ523**	HM 801300
	88,500 3,4843	26,988 1,0625	101	114	13,2	6 300	9 000	0,83	**418/414/Q**	415
39,688 1,5625	73,025 2,8750	25,654 1,0100	76,5	86,5	9,3	7 500	10 000	0,45	* **M 201047/011/Q**	M 201000
40,988 1,6137	67,975 2,6762	17,500 0,6890	50	58,5	6,3	8 000	10 000	0,24	* **LM 300849/811/Q**	LM 300800

* SKF Explorer bearing



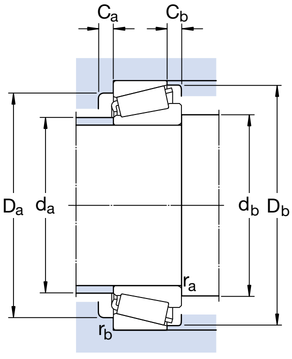
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
35,717 1,4062	55,9	25,400 1,0000	19,842 0,7812	3,5 0,14	2,3 0,09	20	42	47	57	63	68	5	5,5	2	2	0,54	1,1	0,6
36,487 1,4355	52,5	24,608 0,9688	19,050 0,7500	1,5 0,06	2,3 0,09	15	44	43,5	62	66,5	67	5	4,5	1,5	2	0,3	2	1,1
36,512 1,4375	59,3	28,575 1,1250	23,020 0,9063	3,5 0,14	3,3 0,13	23	44	47,5	58	65	72	3	6	3	3	0,54	1,1	0,6
38,100 1,5000	51,8	18,288 0,7200	13,970 0,5500	2,3 0,09	1,3 0,05	15	44	47	58	58	61	2	4	2	1,3	0,33	1,8	1
	51,8	18,288 0,7200	13,970 0,5500	2,3 0,09	1,3 0,05	15	44	47	58	58	61	2	4	2	1,3	0,33	1,8	1
	51,8	18,288 0,7200	15,748 0,6200	2,3 0,09	1,3 0,05	15	44	47	57	58,5	61	2	4	2	1,3	0,33	1,8	1
	51,8	18,288 0,7200	15,748 0,6200	2,3 0,09	1,3 0,05	15	44	47	57	58,5	61	2	4	2	1,3	0,33	1,8	1
	53,8	20,638 0,8125	15,875 0,5625	3,5 0,14	1,3 0,05	19	45	49,5	58	65	66	3	4,5	3	1,3	0,4	1,5	0,8
	53,8	20,638 0,8125	19,050 0,7500	3,5 0,14	2,3 0,09	19	45	49,5	58	63	66	3	4,5	3	2	0,4	1,5	0,8
	54,8	25,654 1,0100	19,050 0,7500	3,5 0,14	3,3 0,13	16	46	49,5	64	65	69	5	4,5	3	3	0,3	2	1,1
	57,3	29,771 1,1721	23,812 0,9375	3,5 0,14	3,3 0,13	20	46	49,5	65	68	73	4	5,5	3	3	0,37	1,6	0,9
	64,1	28,575 1,1250	23,020 0,9063	0,8 0,03	3,3 0,13	24	49	43	64	71	78	4	6	0,8	3	0,54	1,1	0,6
	64,1	28,575 1,1250	23,020 0,9063	2,3 0,09	3,3 0,13	24	49	47	64	71	78	4	6	2	3	0,54	1,1	0,6
	58,8	29,083 1,1450	22,225 0,8750	3,5 0,14	1,5 0,06	17	49	49,5	73	80,5	78	5	4,5	3	1,5	0,26	2,3	1,3
39,688 1,5625	55,7	22,098 0,8700	21,336 0,8400	0,8 0,03	2,3 0,09	19	47	45	62	63,5	69	4	4,5	0,8	2	0,33	1,8	1
40,988 1,6137	54,3	18,000 0,7087	13,500 0,5313	3,6 0,14	1,5 0,06	14	48	48,5	61	60	64	3	4	3,5	1,5	0,35	1,7	0,9

Inch-size single row taper roller bearings
d **41,275 – 42,875** mm
1,6250 – 1,6880 in



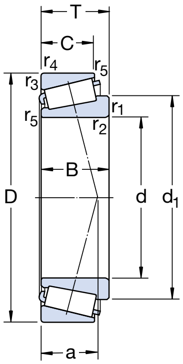
Principal dimensions d	D	T	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation	Series
mm/in			kN		kN	r/min		kg	–	–
41,275 1,6250	73,025 2,875	16,667 0,6562	54	56	6,2	7 500	10 000	0,27	* **18590/18520/Q**	18500
	73,431 2,8910	19,558 0,7700	63	68	7,65	7 500	10 000	0,33	* **LM 501349/310/Q**	LM 501300
	73,431 2,8910	19,558 0,7700	63	68	7,65	7 500	10 000	0,33	* **LM 501349/2/310/2/QCL7C**	LM 501300
	73,431 2,8910	21,430 0,8437	63	68	7,65	7 500	10 000	0,35	* **LM 501349/314/Q**	LM 501300
	76,200 3,0000	18,009 0,7090	52	56	6,1	7 000	9 500	0,34	* **11162/11300/Q**	11000
	76,200 3,0000	18,009 0,7090	52	56	6,1	7 000	9 500	0,34	* **11163/11300/Q**	11000
	76,200 3,0000	22,225 0,8750	68,2	86,5	9,65	6 700	9 500	0,43	**24780/24720/Q**	24700
	82,550 3,2500	26,543 1,0450	85	91,5	10,6	6 700	9 000	0,62	* **M 802048/011/QCL7C**	M 802000
	87, 312 3,4375	30,162 1,1875	102	132	15	6 000	8 500	0,85	**3585/3525/Q**	3500
	88,900 3,5000	30,162 1,1875	95,2	127	14,6	5 600	8 000	0,90	* **HM 803146/110/Q**	HM 803100
	88,900 3,5000	30,162 1,1875	95,2	127	14,6	5 600	8 000	0,90	* **HM 803146/2/110/2/QCL7C**	HM 803100
	101,600 4,0000	34,925 1,3750	151	190	22,8	5 000	7 500	1,45	**526/522/Q**	525
42,875 1,6880	82,931 3,2650	23,812 0,9375	80,9	106	12	6 000	9 000	0,57	**25577/2/25520/2/Q**	25500
	83,058 3,2700	23,876 0,9400	80,9	106	12	6 000	9 000	0,57	**25577/2/25523/2/Q**	25500

* SKF Explorer bearing



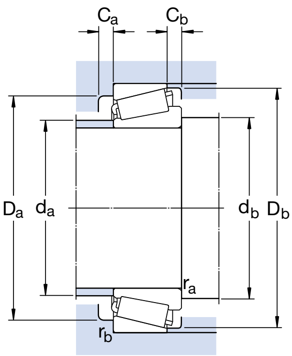
Dimensions							**Abutment and fillet dimensions**									**Calculation factors**		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
41,275	56,1	17,462	12,700	3,5	1,5	14	49	52,5	66	65	68	3	3,5	3	1,5	0,35	1,7	0,9
1,6250		0,6875	0,5000	0,14	0,06													
	56,6	19,812	14,732	3,5	0,8	16	48	52,5	64	68	69	4	4,5	3	0,8	0,4	1,5	0,8
		0,7800	0,5800	0,14	0,03													
	56,6	19,812	14,732	3,5	0,8	16	48	52,5	64	68	69	4	4,5	3	0,8	0,4	1,5	0,8
		0,7800	0,5800	0,14	0,03													
	56,6	19,812	16,604	3,5	0,8	18	48	52,5	63	68	69	3	4,5	3	0,8	0,4	1,5	0,8
		0,7800	0,6537	0,14	0,03													
	58,1	17,384	14,288	1,5	1,5	17	50	49	65	68	71	3	4,5	1,5	1,5	0,48	1,25	0,7
		0,6844	0,5625	0,06	0,06													
	58,1	17,384	14,288	0,8	1,5	17	50	46	65	68	71	3	4,5	0,8	1,5	0,48	1,25	0,7
		0,6844	0,5625	0,03	0,06													
	57,7	23,020	17,462	3,5	0,8	17	48	52,5	65	64	71	3	3,5	3	0,6	0,4	1,5	0,8
		0,9063	0,6875	0,14	0,03													
	62,5	25,654	20,193	3,5	3,3	22	50	52,5	66	71	78	4	6	3	3	0,54	1,1	0,6
		1,0100	0,7950	0,14	0,13													
	68,9	29,370	23,020	3,5	3,3	26	53	52,5	70	78	84	4	7	3	3	0,54	1,1	0,6
		1,1563	0,9063	0,14	0,13													
	63,1	30,886	23,812	1,5	3,3	20	53	49	73	76	80	4	6	1,5	3	0,31	1,9	1,1
		1,2160	0,9375	0,06	0,13													
	68,9	29,370	23,020	3,5	3,3	26	53	52,5	70	78	84	4	7	3	3	0,54	1,1	0,6
		1,1563	0,9063	0,14	0,13													
	72,9	36,068	26,988	3,5	3,3	22	61	52,5	87	90,5	94	6	7,5	3	3	0,28	2,1	1,1
		1,4200	1,0625	0,14	0,13													
42,875	62,1	25,400	19,050	3,5	0,8	17	53	54	71	77	76	5	4,5	3	0,8	0,33	1,8	1
1,6880		1,0000	0,7500	0,14	0,03													
	62,1	25,400	22,225	3,5	2,3	20	53	54	70	74	76	3	4,5	3	2	0,33	1,8	1
		1,0000	0,8750	0,14	0,09													

Inch-size single row taper roller bearings
d **44,450 – 45,618** mm
1,7500 – 1,7960 in



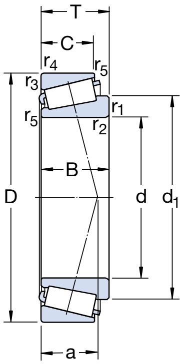
Principal dimensions d	 D	 T	Basic load ratings dynamic C	 static C_0	Fatigue load limit P_u	Speed ratings Reference speed	 Limiting speed	Mass	Designation	Series
mm/in			kN		kN	r/min		kg	–	–
44,450	82,931	23,812	80,9	106	11,8	6 000	9 000	0,57	**25580/25520/Q**	25500
1,7500	3,2650	0,9375								
	82,931	26,988	80,9	106	11,8	6 000	9 000	0,57	**25580/25523/Q**	25500
	3,2650	1,0625								
	83,058	23,876	80,9	106	11,8	6 000	9 000	0,57	**25580/25522/Q**	25500
	3,2700	0,9400								
	88,900	30,162	108	127	14,6	6 000	8 000	1,50	* **HM 803149/110/Q**	HM 803100
	3,5000	1,1875								
	88,900	30,162	108	127	14,6	6 000	8 000	1,50	* **HM 803149/2/110/2/QCL7C**	HM 803100
	3,5000	1,1875								
	92,250	30,958	116	122	14	5 300	7 000	1,00	* **HM 903249/2/210/2/Q**	HM 903200
	3,7500	1,2188								
	92,250	30,958	116	122	14	5 300	7 000	1,00	* **HM 903249/W/210/QCL7C**	HM 903200
	3,7500	1,2188								
	95,250	30,958	88	96,5	11,4	5 000	7 000	0,93	**53178/53377/Q**	53000
	3,7500	1,2188								
	104,775	36,512	170	204	22,4	5 000	6 700	1,50	* **HM 807040/010/QCL7C**	HM 807000
	4,1250	1,4375								
	107,950	38,100	151	190	22,8	4 800	7 000	1,85	**535/532 A**	535
	4,2500	1,5000								
	107,950	38,100	151	190	22,8	4 800	7 000	1,70	**535/532 X**	535
	4,2500	1,5000								
45,237	87,313	30,162	102	132	15	6 000	8 500	0,85	**3586/3525/Q**	3500
1,7810	3,4375	1,1875								
45,242	73,431	19,558	62	75	8,15	7 000	9 500	0,30	* **LM 102949/910/Q**	LM 102900
1.7812	2,8910	0,7700								
	77,788	19,842	62	69,5	7,65	7 000	9 000	0,37	* **LM 603049/011/Q**	LM 603000
	3,0625	0,7812								
45,618	82,931	23,812	80,9	106	11,8	6 300	9 000	0,55	**25590/25520/Q**	25500
1,7960	3,2650	0,9375								
	82,931	26,988	80,9	106	11,8	6 000	9 000	0,55	**25590/25523/Q**	25500
	3,2500	1,0625								
	83,058	23,876	80,9	106	11,8	6 300	9 000	0,55	**25590/25522/Q**	25500
	3,2700	0,9400								

* SKF Explorer bearing



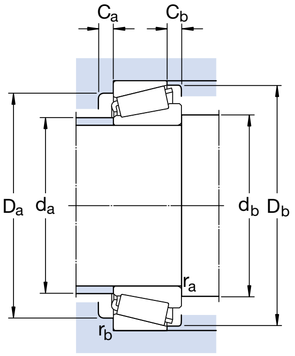
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
44,450 1,7500	62,1	25,400 1,0000	19,050 0,7500	3,5 0,14	0,8 0,03	17	53	55,5	71	76	76	5	4,5	3	0,8	0,33	1,8	1
	62,1	25,400 1,0000	22,225 0,8750	3,5 0,14	2,3 0,09	20	53	55,5	70	73	76	3	4,5	3	2	0,33	1,8	1
	62,1	25,400 1,0000	19,114 0,7525	3,5 0,14	2 0,08	17	53	55,5	71	74	76	5	4,5	3	1,5	0,33	1,8	1
	68,9	29,370 1,563	23,020 0,9063	3,5 0,14	3,3 0,13	26	53	55,5	70	78	84	4	7	3	3	0,54	1,1	0,6
	68,9	29,370 1,563	23,020 0,9063	3,5 0,14	3,3 0,13	26	53	55,5	70	78	84	4	7	3	3	0,54	1,1	0,6
	71,6	28,575 1,1250	22,225 0,8750	3,5 0,14	0,8 0,03	30	53	55,5	71	88	90	4	8,5	3	0,8	0,75	0,8	0,45
	71,6	28,575 1,1250	22,225 0,8750	3,5 0,14	0,8 0,03	30	53	55,5	71	88	90	4	8,5	3	0,8	0,75	0,8	0,45
	69,4	28,300 1,1142	20,638 0,8125	2 0,08	2,3 0,09	30	53	52,5	72	86	89	4	10	2	2	0,75	0,8	0,45
	81	36,512 1,4375	28,575 1,1250	3,5 0,14	3,3 0,13	28	63	55,5	85	93	100	4	7,5	3	3	0,48	1,25	0,7
	76,5	36,957 1,4550	28,575 1,1250	3,5 0,14	3,3 0,13	24	64	55,5	90	95,5	97	5	7,5	3	3	0,3	2	1,1
	76,5	36,957 1,4550	30,162 1,1875	3,5 0,14	3,3 0,13	24	64	55,5	90	95,5	97	5	7,5	3	3	0,3	2	1,1
45,237 1,7810	56	30,886 1,2160	23,812 0,9375	3,5 0,14	3,3 0,13	20	53	57	73	76	80	4	6	3	3	0,31	1,9	1,1
45,242 1,7812	59,4	19,812 0,7800	15,748 0,6200	3,5 0,14	0,8 0,03	15	52	57	66	68	70	3	3,5	3	0,8	0,3	2	1,1
	60,9	19,842 0,7812	15,080 0,5937	3,5 0,14	0,8 0,03	17	52	57	68	72	74	4	4,5	3	0,8	0,43	1,4	0,8
45,618 1,7960	62,1	25,400 1,0000	19,050 0,7500	3,5 0,14	0,8 0,03	17	53	57	71	77	76	5	4,5	3	0,8	0,33	1,8	1
	62,1	25,400 1,0000	22,225 0,8750	3,5 0,14	2,3 0,09	20	53	57	71	74	76	3	4,5	3	2	0,33	1,8	1
	62,1	25,400 1,0000	19,114 0,7525	3,5 0,14	2 0,08	17	53	57	71	74,5	76	5	4,5	3	2	0,33	1,8	1

Inch-size single row taper roller bearings
d **46,038 – 50,800** mm
1,8105 – 2,0000 in



Principal dimensions d	D	T	**Basic load ratings** dynamic C	static C_0	**Fatigue load limit** P_u	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designation**	**Series**
mm/in			kN		kN	r/min		kg	–	–
46,038 1,8105	79,375 3,1250	17,462 0,6875	57	62	6,8	7 000	9 000	0,33	* **18690/18620/Q**	18600
	85 3,3465	20,638 0,8125	81,5	81,5	9,3	6 700	8 500	0,49	* **359 S/354 X/Q**	355
47,625 1,8750	88,900 3,5000	23,812 0,9375	76,5	91,5	10,4	5 600	8 000	0,55	**369 S/2/362 A/2/Q**	365
	95,250 3,7500	30,162 1,1875	108	146	17,3	5 000	7 500	0,95	**HM 804846/2/810/2/Q**	HM 804800
	101,600 4,0000	34,925 1,3750	151	190	22,8	5 000	7 500	1,25	**528 R/522**	525
49,212 1,9375	114,300 4,5000	44,450 1,7500	212	224	25	5 000	6 700	2,20	* **65390/65320/QCL7C**	65300
50,800 2,0000	82,550 3,2500	21,590 0,8500	72,1	100	11	6 000	8500	0,43	**LM 104949/911Q**	LM 104900
	85 3,3465	17,462 0,6875	50,1	65,5	7,2	6 300	8 500	0,37	**18790/18720/Q**	18700
	88,900 3,5000	23,812 0,9375	88	91,5	10,4	6 300	8 000	0,50	* **368 A/362 A/Q**	365
	90 3,5433	25 0,9843	88	91,5	10,4	6 300	8 000	0,58	* **368 A/362 X/Q**	365
	93,264 3,6718	30,162 1,1875	110	146	17	5 300	7 500	0,85	**3780/3720/Q**	3700
	97,630 3,8437	24,608 0,9688	102	129	14,6	5 300	7 000	0,83	* **28678/28622 B/Q**	28600
	104,775 4,1250	36,512 1,4375	170	204	22,4	5 000	6 700	1,50	* **HM 807046/010/QCL7C**	HM 807000
	104,775 4,1250	39,688 1,5625	157	224	25,5	4 800	7 000	1,65	**4580/2/4535/2/Q**	4500
	107,950 4,2500	36,512 1,4375	151	190	22,8	4 800	7 000	1,55	**537/532 X/Q**	535

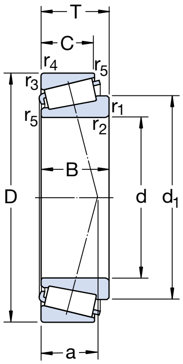
* SKF Explorer bearing



Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
46,038	60,3	17,462	13,495	2,8	1,5	15	53	56,5	69	72	73	3	3,5	2,5	1,5	0,37	1,6	0,9
1,8105		0,6875	0,5313	0,11	0,06													
	62,4	21,692	17,463	2,3	1,5	16	55	55	76	77,5	80	3	3	2	1,5	0,31	1,9	1,1
		0,8540	0,6875	0,09	0,06													
47,625	62,4	22,225	16,513	2,3	1,3	16	55	56,5	76	82,5	80	3	3	2	1,3	0,31	1,9	1,1
1,8750		0,8750	0,6501	0,09	0,05													
	73,6	29,370	23,020	3,5	3,3	26	58	59	76	84	90	5	7	3	3	0,54	1,1	0,6
		1,1563	0,9063	0,14	0,13													
	72,9	36,068	26,988	8	3,3	22	54	71,5	87	90	94	6	7,5	7	3	0,28	2,1	1,1
		1,4200	1,0625	0,31	0,13													
49,212	79,3	44,450	34,925	3,5	3,3	31	60	60,5	89	103	105	5	9,5	3	3	0,43	1,4	0,8
1,9375		1,7500	1,3750	0,14	0,13													
50,800	65,1	22,225	16,510	3,5	1,3	18	57	62	72	76	77	4	4,5	3	1,3	0,3	2	1,1
2,0000		0,8750	0,6500	0,14	0,05													
	66	17,462	13,495	3,5	1,5	16	59	62	75	77,5	79	3	3,5	3	1,5	0,4	1,5	0,8
		0,6875	0,5313	0,14	0,06													
	66,2	22,225	16,513	3,5	1,3	16	58	62	80	82,5	83	4	4	3	1,3	0,31	1,9	1,1
		0,8750	0,6501	0,14	0,05													
	66,2	22,225	20	3,5	2	21	58	62	78	81,5	83	3	5	3	2	0,31	1,9	1,1
		0,8750	0,7874	0,14	0,08													
	71,2	30,302	23,812	3,5	3,3	22	60	62	80	84,5	87	4	6	3	3	0,33	1,8	1
		1,1930	0,9375	0,14	0,13													
	76,7	24,608	19,446	3,5	0,8	21	66	62	84	90,5	91	4	5	3	0,8	0,4	1,5	0,8
		0,9688	0,7656	0,14	0,03													
	81	36,512	28,575	3.5	3,3	29	63	62	85	92,5	100	6	7,5	3	3	0,48	1,25	0,7
		1,4375	1,1250	0,14	0,13													
	79,5	40,157	33,338	3,5	3,3	27	65	62	87	92,5	98	5	6	3	3	0,33	1,8	1
		1,5810	1,3125	0,14	0,13													
	76,5	36,957	28,575	3,5	3,3	24	64	62	90	95,5	97	5	7,5	3	3	0,3	2	1,1
		1,4550	1,1250	0,14	0,13													

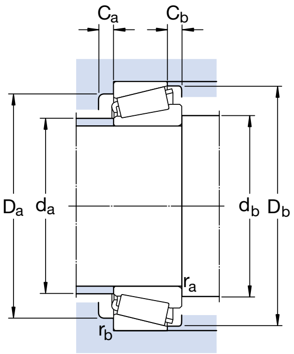
Inch-size single row taper roller bearings

d **53,975 – 60,325** mm
2,1250 – 2,3750 in



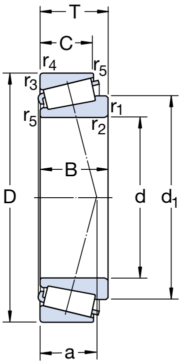
Principal dimensions			Load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Series
			dynamic	static		Reference speed	Limiting speed			
d	D	T	C	C_0	P_u					
mm/in			kN		kN	r/min		kg	–	–
53,975	88,900	23	67	78	9	6 000	8 000	0,43	* **LM 806649/610/Q**	LM 806600
2,1250	3,5000	0,9055								
	95,250	27,783	120	137	16	5 600	7 500	0,80	* **33895/33821/Q**	33800
	3,7500	1,0938								
	95,250	27,783	120	137	16	5 600	7 500	0,80	* **33895/33822/Q**	33800
	3,7500	1,0938								
	107,950	36,512	151	190	22,8	4 800	7 000	1,55	**539/532 A**	535
	4,2500	1,4375								
	107,950	36,512	151	190	22,8	4 800	7 000	1,45	**539/532 X**	535
	4,2500	1,4375								
	123,825	36,512	147	180	21,6	3 800	5 600	2,05	**72212/2/72487/2/Q**	72000
	4,8750	1,4375								
57,150	96,838	20,886	80,9	102	11,6	5 000	7 500	0,59	**387 A/382 A/Q**	385
2,2500	3,8125	0,8223								
	96,838	20,886	80,9	102	11,6	5 000	7 500	0,59	**387/382 A**	385
	3,8125	0,8223								
	96,838	25,400	80,9	102	11,6	5 000	7 500	0,58	**387 A/382 S/Q**	385
	3,8125	1,0000								
	98,425	21	80,9	102	11,6	5 000	7 500	0,58	**387 A/382/Q**	385
	3,8750	0,8268								
	104,775	30,162	121	160	18,6	4 800	7 000	1,05	**462/453 X**	455
	4,1250	1,1875								
	112,712	30,162	142	204	23,6	4 300	6 300	1,45	**39580/39520/Q**	39500
	4,4375	1,1875								
	112,712	30,162	142	204	23,6	4 300	6 300	1,40	**39581/39520/Q**	39500
	4,4375	1,1875								
	119,985	32,750	142	204	23,6	4 300	6 300	1,75	**39580/39528/Q**	39500
	4,7238	1,2894								
	119,985	32,750	142	204	23,6	4 300	6 300	1,75	**39581/39528/Q**	39500
	4,7238	1,2894								
60,325	130,175	36,512	176	180	22,4	3 800	5 000	2,10	* **HM 911245/W/2/210/2/QCL7C**	HM 911200
2.3750	5,1250	1,4375								
	130,175	36,512	176	180	22,4	3 800	5 000	2,10	* **HM 911245/W/210/QV001**	HM 911200
	5,1250	1,4375								

* SKF Explorer bearing



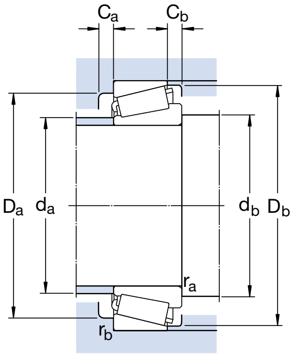
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
53,975 2,1250	71,6	19,050 0,7500	13,492 0,5313	2,3 0,09	2 0,08	21	62	64	78	79,5	84	4	5,5	2	2	0,54	1,1	0,6
	72,3	28,575 1,1250	22,225 0,8750	1,5 0,06	2,3 0,09	20	61	61,5	83	88	90	6	6,5	1,5	0,8	0,33	1,8	1
	72,3	28,575 1,1250	22,225 0,8750	1,5 0,06	0,8 0,03	20	61	61,5	83	88	90	6	6,5	1,5	0,8	0,33	1,8	1
	76,5	36,957 1,4550	28,575 1,1250	3,5 0,14	3,3 0,13	24	64	65,5	90	95,5	97	5	7,5	3	3	0,3	2	1,1
	76,5	36,957 1,4550	30,162 1,1875	3,5 0,14	3,3 0,13	24	64	65,5	90	95,5	97	5	7,5	3	3	0,3	2	1,1
	88,8	32,791 1,2910	25,400 1,0000	3,5 0,14	3,3 0,13	36	68	65,5	93	113	114	5	11	3	3	0,75	0,8	0,45
57,150 2,2500	74,1	21,946 0,8640	15,875 0,6250	3,5 0,14	0,8 0,03	17	65	68,5	87	91,5	91	5	5	3	0,8	0,35	1,7	0,9
	74,1	21,946 0,8640	15,875 0,6250	2,3 0,14	0,8 0,03	17	65	66,5	87	91,5	91	5	5	2	0,8	0,35	1,7	0,9
	74,1	21,946 0,8640	20,274 0,7982	3,5 0,14	2,3 0,09	19	65	68,5	87	87,5	91	5	5	3	2	0,35	1,7	0,9
	74,1	21,946 0,8640	17,826 0,7018	3,5 0,14	0,8 0,03	19	65	68,5	87	93	91	5	5	3	0,8	0,35	1,7	0,9
	78,9	29,317 1,1542	24,605 0,9687	2,3 0,09	3,3 0,13	24	68	67,5	91	93,5	98	4	5,5	2	3	0,33	1,8	1
	88,3	30,162 1,1875	23,812 0,9375	3,5 0,14	3,3 0,13	23	76	68,5	100	102	107	5	6	3	3	0,33	1,8	1
	88,3	30,162 1,1875	23,812 0,9375	8 0,31	3,3 0,13	23	76	81	100	102	107	5	6	7	3	0,33	1,8	1
	88,3	30,162 1,1875	26,949 1,0610	3,5 0,14	0,8 0,03	25	76	68,5	100	114	107	5	6	3	0,8	0,33	1,8	1
	88,3	30,162 1,1875	26,949 1,0610	8 0,31	0,8 0,03	25	76	81	100	114	107	5	6	7	0,8	0,33	1,8	1
60,325 2,3750	97,2	33,338 1,3125	23,812 0,9375	5 0,2	3,3 0,13	40	74	76	102	119	124	4	12,5	4	3	0,83	0,72	0,4
	97,2	33,338 1,3125	23,812 0,9375	5 0,2	3,3 0,13	40	74	76	102	119	124	4	12,5	4	3	0,83	0,72	0,4

Inch-size single row taper roller bearings
d **61,912 – 71,438** mm
2,4375 – 2,8125 in



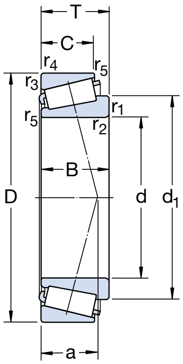
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Series
d	D	T	dynamic C	static C_0	P_u	Reference speed	Limiting speed			
mm/in			kN		kN	r/min		kg	–	–
61,912 2,4375	146,050 5,7500	41,275 1,6250	228	236	29	3 400	4 500	3,20	* **H 913842/810/QCL7C**	H 913800
	146,050 5,7500	41,275 1,6250	228	236	29	3 400	4 500	3,20	* **H 913843/810/QCL7C**	H 913800
63,500 2,5000	112,712 4,4375	30,162 1,8175	123	183	21,2	4 300	6 300	1,25	**3982/3920**	3900
65,088 2,5625	135,755 5,3447	53,975 2,1250	286	400	46,5	3 800	5 600	3,70	**6379/K-6320/Q**	6300
66,675 2,6250	112,712 4,4375	30,162 1,8175	123	183	21,2	4 300	6 000	1,15	**3984/2/3920/2/Q**	3900
	112,712 4,4375	30,162 1,8175	142	204	24	4 300	6 300	1,20	**39590/39520/Q**	39500
	119,985 4,7238	32,750 1,2894	142	204	24	4 300	6 300	1,20	**39590/39528/Q**	39500
	135,755 5,3447	53,975 2,1250	286	400	46,5	3 800	5 600	3,65	**6386/K-6320/Q**	6300
69,850 2,7500	112,712 4,4375	25,400 1,0000	114	156	17,6	4 500	6 000	0,97	* **29675/29620/3/Q**	29600
	120 4,7244	29,795 1,1730	132	186	21,6	4 000	6 000	1,35	**482/472/Q**	475
	120 4,7244	32,545 1,2813	154	228	26,5	4 000	6 000	1,50	**47487/47420**	47400
	120 4,7244	32,545 1,2813	154	228	26,5	4 000	6 000	1,50	**47487/47420 A/Q**	47400
	127 5,0000	36,512 1,4375	176	255	30,5	3 800	5 600	1,90	**566/563/Q**	565
71,438 2,8125	117,475 4,6250	30,162 1,1875	123	190	22	4 000	6 000	1,25	**33281/33462/Q**	33000
	136,525 5,3750	41,275 1,6250	224	290	34	3 600	5 300	2,65	**H 414249/210/Q**	H 414200

* SKF Explorer bearing



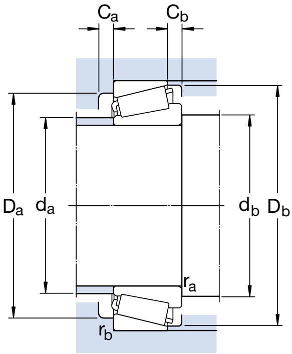
Dimensions							Abutment and fillet dimensions										Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm										–		
61,912	109	39,688	25,400	3,5	3,3	44	83	73,5	116	135	138	6	15,5	3	3	0,79	0,76	0,4
2,4375		1,5625	1,0000	0,14	3,3													
	109	39,688	25,400	7	3,3	44	83	83	116	135	138	6	15,5	6	3	0,79	0,76	0,4
		1,5625	1,0000	0,28	3,3													
63,500	87,8	30,048	23,812	3,5	3,3	25	75	75	96	101	105	4	6	3	3	0,4	1,5	0,8
2,5000		1,1830	0,9375	0,14	0,13													
65,088	97,4	56,007	44,450	3,5	3,3	34	78	76,5	110	124	125	7	9,5	3	3	0,33	1,8	1
2,5625		2,2050	1,7500	0,14	0,13													
66,675	87,8	30,048	23,812	3,5	3,3	25	75	78,5	96	101	105	4	6	3	3	0,4	1,5	0,8
2,6250		1,1830	0,9375	0,14	0,13													
	88,3	30,162	23,812	3,5	3,3	23	76	78,5	100	101	107	5	6	3	3	0,33	1,8	1
		1,1830	0,9375	0,14	0,13													
	88,3	30,162	26,949	3,5	0,8	25	76	78,5	100	112	107	5	6	3	0,8	0,33	1,8	1
		1,1830	1,0610	0,14	0,03													
	97,4	56,007	44,450	4,3	3,3	34	78	80,5	110	124	125	7	9,5	4	3	0,33	1,88	1
		2,2050	1,7500	0,17	0,13													
69,850	94,3	25,400	19,050	1,5	3,3	26	82	77,5	100	101	108	4	6	1,5	3	0,48	1,25	0,7
2,7500		1,0000	0,7500	0,06	0,13													
	92,5	29,007	24,237	3,5	2	26	80	82	103	111	112	4	5,5	3	2	0,37	1,6	0,9
		1,1420	0,9542	0,14	0,08													
	94,3	32,545	26,195	3,5	3,3	25	81	82	105	109	113	6	6	3	3	0,35	1,7	0,9
		1,2813	1,0313	0,14	0,13													
	94,3	32,545	26,195	3,5	0,5	25	81	82	105	117	113	6	6	3	3	0,35	1,7	0,9
		1,2813	1,0313	0,14	0,02													
	97,6	36,170	28,575	3,5	3,3	28	83	82	109	114	119	5	7,5	3	3	0,37	1,6	0,9
		1,4240	1,1250	0,14	0,13													
71,438	94,1	30,162	23,812	3,5	3,3	26	81	83	101	105	111	5	6	3	3	0,44	1,35	0,8
2,8125		1,1875	0,9375	0,14	0,13													
	101	41,275	31,750	3,5	3,3	30	83	83	118	123,5	129	7	9,5	3	3	0,35	1,7	0,9
		1,6250	1,2500	0,14	0,13													

Inch-size single row taper roller bearings
d **73,025 – 92,075** mm
2,8750 – 3,6250 in



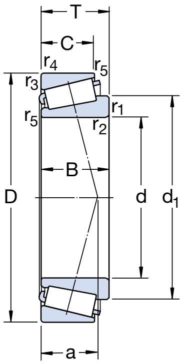
Principal dimensions d	D	T	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designation	Series
mm/in			kN		kN	r/min		kg	–	–
73,025 2,8750	112,712 4,4375	25,400 1,0000	114	156	17,6	4 500	6 000	0,89	⋆ **29685/2/29620/3/Q**	29600
	117,475 4,6250	30,162 1,1875	123	190	22	4 000	6 000	1,20	**33287/33462/Q**	33000
	127 5,0000	36,512 1,4375	176	255	30,5	3 800	5 600	1,80	**567/563**	565
76,200 3,0000	109,538 4,3125	19,050 0,7500	67	102	11	4 500	6 000	0,60	⋆ **L 814749/710/QCL7C**	L 814700
	127,000 5,0000	30,162 1,1875	138	204	24	3 800	5 300	1,90	**42687/42620**	42600
	133,350 5,2500	33,338 1.3125	165	260	30	3 400	5 000	1,90	**47678/47620/Q**	47600
	139,992 5,5115	36,512 1,4375	187	280	32,5	3 400	5 000	2,45	**575/572/Q**	575
	161,925 6,3750	49,212 1,9375	260	335	38	2 800	4 000	4,40	**9285/9220/CL7C**	9200
77,788 3,0625	117,475 4, 6250	25,400 1,0000	116	163	18,3	4 300	5 600	0,90	⋆ **LM 814849/2/810/2/Q**	LM 814800
82,550 3,2500	139,992 5,5115	36,512 1,4375	187	280	32,5	3 400	5 000	2,20	**580/572/Q**	575
	146,050 5,7500	41,275 1,6250	220	320	35,5	3 200	4 800	2,80	**663/653/Q**	655
85,725 3,3750	146,050 5,7500	41,275 1,6250	220	320	35,5	3 200	4 800	2,80	**665/653/Q**	655
88,900 3,5000	152,400 6,0000	39,688 1,5625	194	305	34,5	3 000	4 500	2,80	**593/592 A/Q**	595
92,075 3,6250	152,400 6,0000	39,688 1,5625	194	305	34,5	3 000	4 500	2,70	**598/592 A/Q**	595

⋆ SKF Explorer bearing



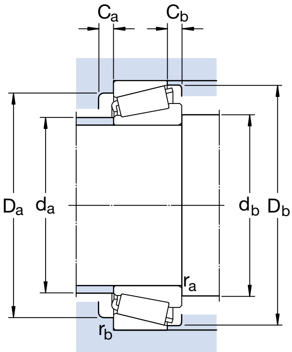
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm									–		
73,025	94,3	25,400	19,050	3,5	3,3	26	82	85	100	100	108	4	6	3	3	0,48	1,25	0,7
2,8750		1,0000	0,7500	0,14	0,13													
	94,1	30,162	23,812	3,5	3,3	26	81	85	101	105	111	5	6	3	3	0,44	1,35	0,8
		1,1875	0,9375	0,14	0,13													
	97,6	36,170	28,575	4,8	3,3	28	83	89	109	114	119	5	7,5	4	3	0,37	1,6	0,9
		1,4240	1,1250	0,19	0,13													
76,200	94,8	19,050	15.083	1,5	1,5	24	85	85	98	100,5	105	3	3,5	1,5	1,5	0,5	1,2	0,7
3,0000		0,7500	0,5938	0,06	0,06													
	101	31	22,225	3,5	3,3	27	88	89,5	112	114	120	5	7,5	3	3	0,43	1,4	0,8
		1,2205	0,8750	0,14	0,13													
	108	33,338	26,195	6,4	3,3	29	93	96	117	120,5	126	5	7	6	3	0,4	1,5	0,8
		1,3125	1,0313	0,25	0,13													
	110	36,098	28,575	3,5	3,3	31	94	89,5	120	127	131	5	7,5	3	3	0,4	1,5	0,8
		1,4212	1,1250	0,14	0,13													
	122	46,068	31,750	3,5	3,3	47	93	90	128	148,5	153	7	17	3	3	0,72	0,84	0,45
		1,8125	1,2500	0,14	0,13													
77,788	99	25,400	19,050	3,5	3,3	28	87	89,5	104	106	113	4	6	3	3	0,52	1,15	0,6
3,0625		1,0000	0,7500	0,14	0,13													
82,550	110	36,098	28,575	3,5	3,3	31	94	94,5	120	127	131	5	7,5	3	3	0,4	1,5	0,8
3,25000		1,4212	1,1250	0,14	0,13													
	114	41,275	31,750	3,5	3,3	32	96	94,5	125	133	138	6	9	3	3	0,4	1,5	0,8
		1,6250	1,2500	0,14	0,13													
85,725	113	41,275	31,750	3,5	3,3	33	96	97	125	133	138	6	9	3	3	0,4	1,5	0,8
3,3750		1,6250	1,2500	0,14	0,13													
88,900	122	36,322	30,162	3,5	3,3	37	101	102,5	128	141	141	4	9,5	3	3	0,44	1,35	0,8
3,5000		1,4300	1,1875	0,14	0,13													
92,075	122	36,322	30,162	6,4	3,3	37	101	112	128	141	141	4	9,5	6	3	0,44	1,35	0,8
3,6250		1,4300	1,1875	0,25	0,13													

Inch-size single row taper roller bearings
d **95,250 – 149,225** mm
3,7500 – 5,8750 in



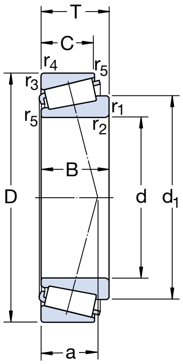
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation	Series
d	D	T	dynamic C	static C_0	P_u	Refer-ence speed	Limiting speed			
mm/in			kN		kN	r/min		kg	–	–
95,250 3,7500	146,050 5,7500	33,338 1.3125	168	280	31,5	3 200	4 500	1,90	**47896/47820/Q**	47800
	152,400 6,0000	39,688 1,5625	194	305	34,5	3 000	4 500	2,55	**594/592 A/Q**	595
	152,400 6,0000	39,688 1,5625	194	305	34,5	3 000	4 500	2,55	**594 A/592 A/Q**	595
	168,275 6,6250	41,275 1,6250	233	365	39	2 800	4 000	3,80	**683/672**	675
96,838 3,8125	188,913 7,4375	53,297 2,0893	325	375	41,5	2 600	3 400	5,70	* **90381/90744/HA1CL7C**	90000
101,600 4,0000	168,275 6,6250	41,275 1,6250	233	365	39	2 800	4 000	3,45	**687/672**	675
107,950 4,2500	158,750 6,2500	23,020 0,9063	101	163	18,3	2 800	4 300	1,40	**37425/2/37625/2/Q**	37000
114,300 4,5000	177,800 7,0000	41,275 1,6250	251	415	42,5	2 600	3 800	3,60	**64450/64700**	64000
	180,975 7,1250	34,925 1,3750	183	280	30	2 600	3 800	2,95	**68450/68712**	68000
127,000 5,0000	182, 562 7,1875	39,688 1,5625	229	440	44	2 400	3 600	3,30	**48290/48220/Q**	48200
	196,850 7,7500	46,038 1,8135	319	585	60	2 200	3 400	5,20	**67388/67322**	67300
133,350 5,2500	177,008 6,9688	25,400 1,0000	134	280	28	2 400	3 600	1.80	**L 327249/210**	L 327200
	196,850 7,7500	46,038 1,8135	319	585	60	2 200	3 400	4,80	**67391/67322**	67300
139,700 5,5000	236,538 9,3125	57,150 2,2500	512	850	86,5	1 900	2 800	10,0	**HM 231132/110**	HM 231100
149,225 5,8750	236,538 9,3125	57,150 2,2500	512	850	86,5	1 900	2 800	10,0	**HM 231148/110**	HM 231100

* SKF Explorer bearing



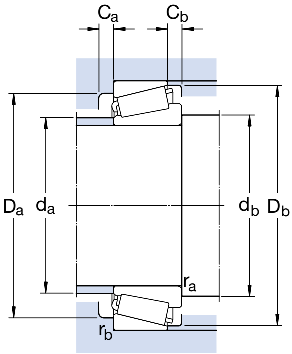
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
95,250	120	34,925	26,195	3,5	3,3	32	105	107	128	138,5	141	6	7	3	3	0,44	1,35	0,8
3,7500		1,3750	1,0313	0,14	0,13													
	121	36,322	30,162	3,5	3,3	37	104	107	128	139	141	4	9,5	3	3	0,44	1,35	0,8
		1,4300	1,1875	0,14	0,13													
	121	36,322	30,162	5	3,3	37	104	112	128	139	141	4	9,5	4	3	0,44	1,35	0,8
		1,4300	1,1875	0,2	0,13													
	133	41,275	30,162	3,5	3,3	38	114	107	143	154,5	157	6	11	3	3	0,48	1,25	0,7
		1,6250	1,1875	0,14	0,13													
96,838	145	46,038	31,750	3,5	3,3	62	114	109	148	177	179	6	19	3	3	0,88	0,68	0,4
3,8125		1,8125	1,2500	0,14	0,13													
101,600	133	41,275	30,162	3,5	3,3	38	114	113	143	157	157	6	11	3	3	0,48	1,25	0,7
4,0000		1,6250	1,1875	0,14	0,13													
107,950	132	21,438	15,875	3,5	3,3	37	120	121	140	145	149	4	7	3	3	0,6	1	0,6
4,2500		0,8440	0,6250	0,14	0,13													
114,300	146	41,275	30,162	3,5	3,3	42	126	127	155	166	171	6	11	3	3	0,52	1,15	0,6
4,5000		1,6250	1,1875	0,14	0,13													
	144	31,750	25,400	3,5	3,3	40	129	127	158	170	170	4	9,5	3	3	0,5	1,2	0,7
		1,25000	1,0000	0,14	0,13													
127,000	155	38,100	33,338	3,5	3,3	34	140	140	165	168,5	174	6	6	3	3	0,3	2	1,1
5,0000		1,5000	1,3125	0,14	0,13													
	164	46,038	38,100	3,5	3,3	39	146	140	177	185	189	7	7,5	3	3	0,35	1,7	0,9
		1,8125	1,5000	0,14	0,13													
133,350	155	26,195	20,638	1,5	1,5	29	145	141	165	188	170	5	4,5	1,5	1,5	0,33	1,8	1
5,2500		1,0313	0,8125	0,06	0,06													
	164	46,038	38,100	8	3,3	39	146	161	177	185	189	7	7,5	7	3	0,35	1,7	0,9
		1,8125	1,5000	0,31	0,13													
139,700	187	56,642	44,450	3,5	3,3	45	166	153	210	225	223	9	12,5	3	3	0,31	1,9	1,1
5,5000		2,2300	1,7500	0,14	0,13													
149,225	187	56,642	44,450	6,4	3,3	45	166	171	210	225	223	9	12,5	6	3	0,31	1,9	1,1
5,8750		2,2300	1,7500	0,25	0,13													

Inch-size single row taper roller bearings
d **152,400 – 203,987** mm
6,0000 – 8,0310 in



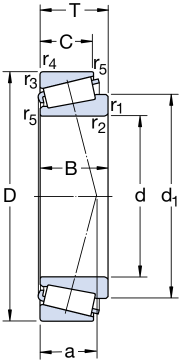
Principal dimensions d	 D	 T	Basic load ratings dynamic C	 static C_0	Fatigue load limit P_u	Speed ratings Reference speed	 Limiting speed	Mass	Designation	Series
mm/in			kN		kN	r/min		kg	–	–
152,400 6,0000	222,250 8,7500	46,830 1,8437	375	630	62	2 200	3 000	5,90	* **M 231649/610/VQ051**	M 231600
158,750 6,2500	205,583 8,0938	23,812 0.9375	138	280	27	2 000	3 000	1,95	**L 432348/310**	L 432300
	205,583 8,0938	23,812 0.9375	138	280	27	2 000	3 000	1,95	**L 432349/310**	L 432300
177,800 7,0000	227,012 8,9375	30,162 1,1875	187	425	40	1 800	2 800	3,00	**36990/36920**	36900
178,595 7,0313	265,112 10,4375	51,595 2,0313	495	880	86,5	1 700	2 400	9,60	**M 336948/912**	M 336900
179,934 7,0840	265,112 10,4375	51,595 2,0313	495	880	86,5	1 700	2 400	9,40	**M 336949/912**	M 336900
187,325 7,3750	282,575 11,1250	50,800 2,0000	402	695	67	1 600	2 200	9,80	**87737/87111**	87000
190,475 7,4990	279,400 11,0000	52,388 2,0625	523	980	95	1 600	2 200	9,50	**M 239449/410**	M 239400
190,500 7,5000	282,575 11,1250	50,800 2,0000	402	695	67	1 600	2 200	9,60	**87750/87111**	87000
191,237 7,5290	279,400 11,0000	52,388 2,0625	523	980	95	1 600	2 200	9,20	**M 239448 A/410**	M 239400
196,850 7,7500	241,300 9,5000	23,812 0,9375	154	315	29	1 700	2 600	2,00	**LL 639249/210**	LL 639200
	241,300 9,5000	23,812 0,9375	154	315	29	1 700	2 600	2,00	**LL 639249/2/210/4**	LL 639200
	257,175 10,1250	39,688 1,5625	275	655	58,5	1 600	2 400	5,30	**LM 739749/710/VE174**	LM 739700
200,025 7,8750	276,225 10,8750	42,862 1,6875	450	780	72	1 700	2 200	7,70	* **LM 241147/110/QVQ051**	LM 241100
203,987 8,0310	276,225 10,8750	42,862 1,6875	450	780	72	1 700	2 200	7,25	* **LM 241148/110/QVQ051**	LM 241100

* SKF Explorer bearing



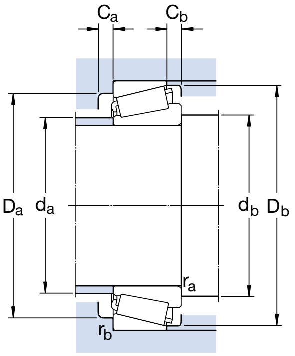
Dimensions							Abutment and fillet dimensions										Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
152,400 6,0000	186	46,830 1,8437	34,925 1,3750	3,5 0,14	1,5 0,06	40	169	165	200	214	210	7	11,5	3	1,5	0,33	1,8	1
158,750 6,2500	182	23,812 0,9375	18,258 0,7188	4,8 0,19	1,5 0,06	33	172	175	194	197	197	5	5,5	4	1,5	0,35	1,7	0,9
	182	23,812 0,9375	18,258 0,7188	1,5 0,06	1,5 0,06	33	172	167	194	197	197	5	5,5	1,5	1,5	0,35	1,7	0,9
177,800 7,0000	203	30,162 1,1875	23,020 0,9063	1,5 0,06	1,5 0,06	43	190	186	212	219	220	5	7	1,5	1,5	0,44	1,35	0,8
178,595 7,0313	217	57,150 2,2500	38,895 1,5313	3,3 0,13	3,3 0,13	47	196	191	240	253	251	9	12,5	3	3	0,33	1,8	1
179,934 7,0840	217	57,150 2,2500	38,895 1,5313	3,3 0,13	3,3 0,13	47	196	193	240	253	251	9	12,5	3	3	0,33	1,8	1
187,325 7,3750	233	47,625 1,8750	36,512 1,4375	3,5 0,14	3,3 0,13	55	213	201	253	271	267	6	14	3	3	0,43	1,4	0,8
190,475 7, 4990	232	57,150 2,2500	41,275 1,6250	3,3 0,13	3,3 0,13	49	211	203	254	265	266	9	11	3	3	0,35	1,7	0,9
190,500 7,5000	233	47,625 1,8750	36,512 1,4375	3,5 0,14	3,3 0,13	55	213	205	253	268	267	6	14	3	3	0,43	1,4	0,8
191,237 7,5290	232	58,738 2,3125	41,275 1,6250	3,3 0,13	3,3 0,13	49	211	204	254	265	266	9	11	3	3	0,35	1,7	0,9
196,850 7,7500	217	23,017 0,9062	17,462 0,6875	1,5 0,06	1,5 0,06	41	207	204	232	233	235	5	6	1,5	1,5	0,43	1,4	0,8
	217	23,017 0,9062	17,462 0,6875	1,5 0,06	1,5 0,06	41	207	204	232	233	235	5	6	1,5	1,5	0,43	1,4	0,8
	229	39,688 1,5625	30,162 1,1875	3,5 0,14	3,3 0,13	50	236	210	236	245	247	8	9,5	3	3	0,44	1,35	0,8
200,025 7,8750	237	46,038 1,8125	34,133 1,3438	3,5 0,14	3,3 0,13	45	220	213	257	261	265	6	8,5	3	3	0,31	1,9	1,1
203,987 8,0310	237	46,038 1,8125	34,133 1,3438	3,5 0,14	3,3 0,13	45	220	217	257	261	265	6	8,5	3	3	0,31	1,9	1,1

Inch-size single row taper roller bearings
d **206,375 – 343,154** mm
8,1250 – 13,5100 in



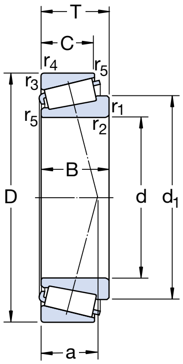
Principal dimensions d	 D	 T	Basic load ratings dynamic C	 static C_0	Fatigue load limit P_u	Speed ratings Reference speed	 Limiting speed	Mass	Designation	Series
mm/in			kN		kN	r/min		kg	–	–
206,375 8,1250	282,575 11,1250	46,038 1,8125	380	830	76,5	1 500	2 200	8,60	**67985/67920/HA3VQ117**	67900
215,900 8,5000	285,750 11,2500	48,038 1,8125	380	850	76,5	1 500	2 200	7,90	**LM 742749/710/VE174**	LM 742700
216,408 8,5200	285,750 11,2500	48,038 1,8125	380	850	76,5	1 500	2 200	7,85	**LM 742747/710**	LM 742700
216,713 8,5320	285,750 11,2500	48,038 1,8125	380	850	76,5	1 500	2 200	7,85	**LM 742747 A/710**	LM 742700
230,188 9,0625	317,500 12,5000	47,625 1,8750	523	980	90	1 300	2 000	10,5	**LM 245846/810**	LM 245800
231,775 9,1250	300,038 11,8125	33,338 1,3125	216	425	39	1 400	2 000	5,30	**544091/2B/544118 A/2B**	544000
	317,500 12,5000	47,625 1,8750	523	980	90	1 300	2 000	10,5	**LM 245848/810**	LM 245800
255,600 10,0630	342,900 13,5000	57,150 2,2500	594	1 220	110	1 200	1 800	14,0	**M 349547/510**	M 349500
257,175 10,1259	342,900 13,5000	57,150 2,2500	594	1 220	110	1 200	1 800	14,0	**M 349549/510/VE174**	M 349500
	358,775 14,1250	71,438 2,8125	842	1 760	156	1 200	1 700	20,5	**M 249747/710**	M 249700
263,525 10,3750	325,438 12,8125	28,575 1,1250	220	550	48	1 300	1 800	53,0	**38880/38820**	38800
292,100 11,5000	374,650 14,7500	47,625 1,8750	501	1 140	98	1 100	1 600	12,0	**L 555249/210**	L 555200
	374,650 14,7500	47,625 1,8750	501	1 140	98	1 100	1 600	12,0	**L 555249/210/VE174**	L 555200
304,800 12,0000	393,700 15,5000	50,800 2,0000	528	1 220	104	1 000	1 500	14,5	**L 357049/010/VE174**	L 357000
343,154 13,5100	450,850 17,7500	66,675 2,6250	935	2 200	180	900	1 300	28,0	**LM 361649 A/610**	LM 361600

SKF

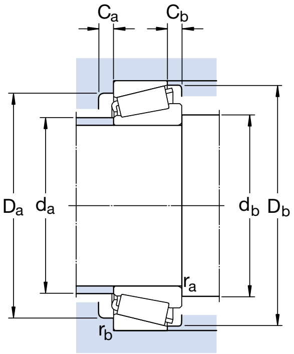


Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
206,375 8,1250	247	46,038 1,8125	36,512 1,4375	3,5 0,14	3,3 0,13	62	222	220	254	268	272	8	9,5	3	3	0,5	1,2	0,7
215,900 8,5000	253	46,038 1,8125	34,924 1,3750	3,5 0,14	3,3 0,13	60	230	229	261	271	277	7	11	3	3	0,48	1,25	0,7
216,408 8,5200	253	49,212 1,9375	34,924 1,3750	3,5 0,14	3,3 0,13	60	230	230	261	271	277	7	11	3	3	0,48	1,25	0,7
216,713 8,5320	253	49,212 1,9375	34,924 1,3750	3,5 0,14	3,3 0,13	60	230	230	261	271	277	7	11	3	3	0,48	1,25	0,7
230,188 9,0625	268	52,388 2,0625	36,512 1,4375	3,3 0,13	3,3 0,13	49	249	243	296	303	304	8	11	3	3	0,31	1,9	1,1
231,775 9,1250	260	31,750 1,2500	23,812 0,9375	3,3 0,13	3,3 0,13	49	248	245	278	285	284	5	9,5	3	3	0,4	1,5	0,8
	268	52,388 2,0625	36,512 1,4375	3,3 0,13	3,3 0,13	49	249	245	296	303	304	8	11	3	3	0,31	1,9	1,1
255,600 10,0630	297	63,500 2,5000	44,450 1,7500	1,5 0,06	3,3 0,13	60	274	267	318	328	331	9	12,5	1,5	3	0,35	1,7	0,9
257,175 10,1250	297	57,150 2,2500	44,450 1,7500	6,4 0,25	3,3 0,13	60	274	289	318	328	331	9	12,5	6	3	0,35	1,7	0,9
	297	57,150 2,2500	44,450 1,7500	6,4 0,25	3,3 0,13	60	273	289	318	343	331	9	12,5	6	3	0,35	1,7	0,9
263,525 10,3750	294	28,575 1,1250	25,400 1,0000	1,5 0,06	1,5 0,06	49	282	275	307	315	313	4	3	1,5	1,5	0,37	1,6	0,9
292,100 11,5000	331	47,625 1,8750	34,925 1,3750	3,5 0,14	3,3 0,13	65	311	308	350	359	361	8	12,5	3	3	0,4	1,5	0,8
	331	47,625 1,8750	34,925 1,3750	3,5 0,14	3,3 0,13	65	311	308	350	359	361	8	12,5	3	3	0,4	1,5	0,8
304,800 12,0000	348	50,800 2,0000	38,100 1,5000	6,4 0,25	3,3 0,13	64	328	337	368	378	379	7	12,5	6	3	0,35	1,7	0,9
343,154 13,5100	394	66,675 2,6250	52,388 2,0625	8,5 0,33	3,5 0,14	75	365	385	417	433	434	12	14	8	3	0,35	1,7	0,9

Inch-size single row taper roller bearings
d **346,075 – 749,300** mm
13,6250 – 29,5000 in



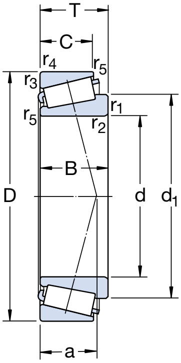
Principal dimensions			**Basic load ratings**		**Fatigue load limit**	**Speed ratings**		**Mass**	**Designation**	**Series**
d	D	T	dynamic C	static C_0	P_u	Reference speed	Limiting speed			
mm/in			kN		kN	r/min		kg	–	–
346,075 13,6250	488,950 19,2500	95,250 3,7500	1 420	3 150	255	850	1 200	55,0	**HM 262749/710**	HM 262700
381,000 15,0000	479,425 18,8750	49,250 1,9375	594	1 500	120	800	1 200	20,0	**L 865547/512**	L 865500
384,175 15,1250	546,100 21,5000	104,775 4,1250	1 870	4 150	320	750	1 100	77,0	**HM 266449/410**	HM 266400
403,225 15,8750	460,375 18,1250	28,575 1,1250	246	765	58,5	800	1 200	6,70	**LL 566848/810/HA1**	LL 566800
406,400 16,0000	549,275 21,6250	85,725 3,3750	1 380	3 050	236	700	1 000	53,5	**LM 567949/910/HA1**	LM 567900
457,200 18,0000	603,250 23,7500	85,725 3,3750	1 450	3 400	265	630	950	61,5	**LM 770949/910**	LM 770900
488,950 19,2500	634,873 24,9950	84,183 3,3143	1 450	3 650	265	600	850	63,5	**LM 772748/710/HA1**	LM 772700
498,475 19,6250	634,873 24,9950	80,962 3,1875	1 470	3 650	270	600	850	59,5	**EE 243196/250/HA2**	243000
558,800 22,0000	736,600 29,0000	88,108 3,4688	1 830	4 150	305	500	750	92,5	**EE 843220/290**	843000
	736,600 29,0000	104,775 4,1250	2 330	5 700	405	500	750	115	**LM 377449/410**	LM 377400
609,600 24,0000	787,400 31,0000	93,662 3,6875	2 160	5 300	380	450	670	110	**EE 649240/310**	649000
	787,400 31,0000	93,662 3,6875	2 160	5 300	380	450	670	110	**EE 649240 AX/310**	649000
749,300 29,5000	990,600 39,0000	159,500 6,2795	4 570	12 000	750	340	500	330	**LM 283649/610/HA1**	LM 283600



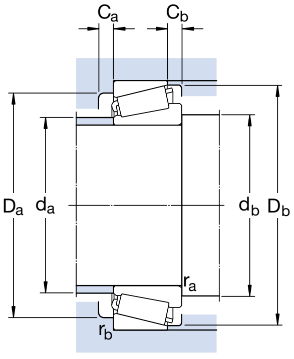
Dimensions							Abutment and fillet dimensions									Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm									–		
346,075 13,6250	413	95,250 3,7500	74,612 2,9375	6,4 0,25	3,3 0,13	88	379	378	442	472	467	12	21	6	3	0,33	1,8	1
381,000 15,0000	431	47,625 1,8750	34,925 1,3750	6,4 0,25	3,3 0,13	92	406	413	448	462	463	9	14	6	3	0,5	1,2	0,7
384,175 15,1250	458	104,775 4,1250	82,550 3,2500	6,4 0,25	6,4 0,25	96	418	416	492	514	520	15	22	6	6	0,33	1,8	1
403,225 15,8750	430	28,575 1,1250	20,638 0,8125	3,5 0,14	3,3 0,13	70	417	420	445	443	448	6	7,5	3	3	0,4	1,5	0,8
406,400 16,0000	471	84,138 3,3125	61,962 2,4375	6,4 0,25	3,3 0,13	100	434	438	502	532	526	13	23,5	6	3	0,4	1,5	0,8
457,200 18,0000	525	84,138 3,3125	60,325 2,3750	6,4 0,25	3,3 0,13	115	486	489	553	586	580	13	25	6	3	0,46	1,3	0,7
488,950 19,2500	560	84,138 3,3125	61,912 2,4375	6,4 0,25	3,3 o,13	124	519	520	584	618	613	13	22	6	3	0,48	1,25	0,7
498,475 19,6250	556	80,962 3,1875	63,500 2,5000	6,4 0,25	3,3 0,13	98	522	530	590	618	610	14	17	6	3	0,35	1,7	0,9
558,800 22,0000	637	88,108 3,4686	63,500 2,5000	6,4 0,25	6,4 0,25	111	600	590	689	704	707	13	24,5	6	6	0,35	1,7	0,9
	640	104,775 4,1250	80,962 3,1875	6,4 0,25	6,4 0,25	130	595	590	680	704	707	17	23,5	6	6	0,35	1,7	0,9
609,600 24,0000	687	93,662 3,6875	69,850 2,7500	6,4 0,25	6,4 0,25	125	643	642	732	755	755	17	23,5	6	6	0,37	1,6	0,9
	687	93,662 3,6875	69,850 2,7500	6,4 0,25	6,4 0,25	125	643	642	732	755	755	17	23,5	6	6	0,37	1,6	0,9
749,300 29,5000	858	160,338 6,3125	123 4,8425	6,4 0,25	6,4 0,25	165	793	781	910	958	953	22	36,6	6	6	0,33	1,8	1

Inch-size single row taper roller bearings

d **760,000 – 838,200** mm
29,9183 – 33,0000 in

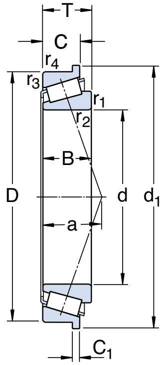


Principal dimensions			**Basic load ratings**		**Fatigue load limit**	**Speed ratings**		**Mass**	**Designation**	**Series**
			dynamic	static		Reference speed	Limiting speed			
d	D	T	C	C_0	P_u					
mm/in			kN		kN	r/min		kg	–	–
760,000 29,9183	889,000 35,0000	69,850 2,7500	1 230	3 800	255	380	560	67,5	**LL 483448/418**	LL 483400
	889,000 35,0000	88,900 3,5000	1 870	5 850	380	360	530	94,0	**L 1833448/410**	L 183400
762,000 30,0000	889,000 35,0000	69,850 2,7500	1 230	3 800	255	380	560	66,5	**LL 483449/418**	LL 483400
	889,000 35,0000	88,900 3,5000	1 870	5 850	380	360	530	94,0	**L 1833449/410**	L 183400
838,200 33,0000	1 041,400 41,0000	93,662 3,6875	1 900	4 800	320	320	460	160	**EE 763330/410**	763000



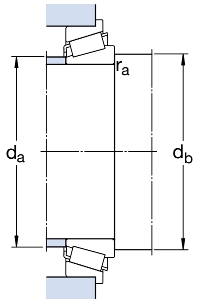
Dimensions							Abutment and fillet dimensions										Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm/in							mm										–		
760,000	819	69,850	50,800	3,3	3,3	132	785	777	844	872	858	13	19	3	3	0,37	1,6	0,9
29,9183		2,7500	2,0000	0,13	0,13													
	822	88,900	72,000	3,3	3,3	123	785	777	854	872	872	16	16,5	3	3	0,3	2	1,1
		3,5000	2,8346	0,13	0,13													
762,000	819	69,850	50,800	3,3	3,3	132	785	779	844	872	858	13	19	3	3	0,37	1,6	0,9
30,0000		2,7500	2,0000	0,13	0,13													
	822	88,900	72,000	3,3	3,3	123	785	779	854	872	872	16	16,5	3	3	0,3	2	1,1
		3,5000	2,8346	0,13	0,13													
838,200	925	88,900	66,675	6,4	6,4	177	894	870	975	1 010	1 001	10	26,5	6	6	0,44	1,35	0,8
33,0000		3,5000	2,6250	0,25	0,25													

Metric single row taper roller bearings with flanged outer ring
d **35 – 65** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	T	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
35	80	22,75	83	73,5	8,3	7 500	9 000	0,52	* **30307 RJ2/Q**
40	68	19	60	71	7,65	7 500	9 500	0,27	* **32008 XR/QVA621**
	80	19,75	71	68	7,65	7 000	8 500	0,42	* **30208 RJ2/Q**
45	85	32	108	143	16,3	5 300	7 500	0,85	**33209 R/Q**
	100	38,25	156	176	20	5 000	6 700	1,50	* **32309 BRJ2/QCL7C**
55	120	45,5	216	260	30	4 300	5 600	2,50	* **32311 BRJ2/QCL7C**
65	110	34	142	208	24	4 300	5 600	1,30	**33113 R/Q**
	140	36	194	228	27,5	3 600	4 800	2,40	**30313 RJ2**

* SKF Explorer bearing



Dimensions									Abutment and fillet dimensions			Calculation factors		
d	d_1 ~	D_1	B	C	C_1	$r_{1,2}$ min	$r_{3,4}$ min	a	d_a max	d_b min	r_a max	e	Y	Y_0
mm									mm			–		
35	54,5	85	21	18	4,5	2	1,5	16	46	44	1,5	0,31	1,9	1,1
40	54,2	72	19	14,5	3,5	1	1	15	46	46	1	0,37	1,6	0,9
	57,5	85	18	16	4	1,5	1,5	16	49	47	1	0,37	1,6	0,9
45	65,2	90	32	25	5	1,5	1,5	22	52	52	1	0,4	1,5	0,8
	74,8	106	36	30	7	2	1,5	30	55	54	1,5	0,54	1,1	0,6
55	90,5	127	43	35	8	2,5	2	36	67	65	2	0,54	1,1	0,6
65	87,9	116	34	26,5	5,5	1,5	1,5	26	74	72	1	0,4	1,5	0,8
	98,3	147	33	28	6	3	2,5	28	84	77	2	0,35	1,7	0,9


SKF

Paired single row taper roller bearings

Matched bearing pairs

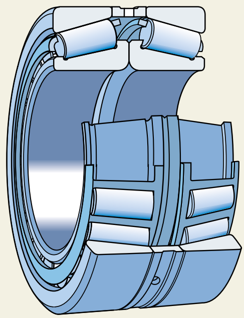
For bearing arrangements where the load carrying capacity of a single taper roller bearing is inadequate, or where the shaft has to be axially located in both directions with a given positive or negative axial play, the bearings listed in the section “Single row taper roller bearings”, starting on **page 599**, can be supplied as matched pairs (➔ **fig** 1) arranged

- face-to-face,
- back-to-back or
- in tandem.

Matched bearing sets provide an economic solution to many bearing arrangement problems and offer many advantages, including

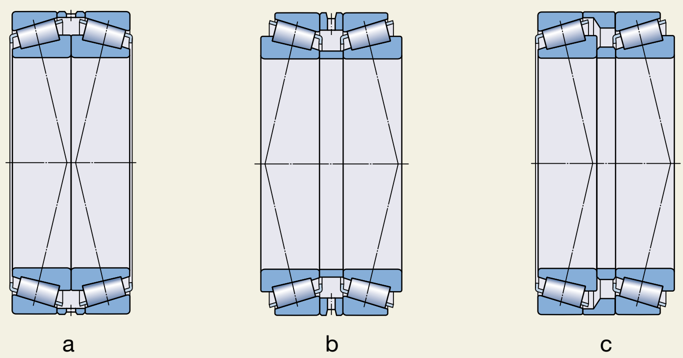
- simple mounting, since calibration of intermediate rings is not required, so that mounting errors are avoided;
- exact axial location of the shaft; the axial play is determined during manufacture;
- high radial and axial load carrying capacity;
- simple maintenance; the lubricant can be introduced via the annular groove and lubrication holes in the intermediate ring.

Fig 1



SKF can supply matched bearing sets in the arrangements described in the following. The bearing pairs shown in the product tables, starting on **page 676**, are only part of the comprehensive SKF programme. Other bearing sets can be supplied to order.

Fig 2



Face-to-face arrangement
In bearing pairs where the bearings are matched face-to-face, an intermediate ring is positioned between the two outer rings (➔ **fig** 2a) so that production is relatively simple. In face-to-face arrangements, the load lines converge towards the bearing axis. Axial loads acting in both directions can be accommodated by one bearing in each direction.

Back-to-back arrangement
In pairs where the bearings are arranged back-to-back (➔ **fig** 2b) an intermediate ring is positioned both between the two inner rings and between the two outer rings. This is a more expensive procedure than required for the face-to-face sets. In back-to-back arrangements, the load lines diverge towards the bearing axis, thus providing relatively stiff bearing arrangements, which can also take up tilting moments. Axial loads acting in both directions can be accommodated by one bearing in each direction.

Tandem arrangement
Bearing pairs where the bearings are arranged in tandem are seldom used and also require an intermediate ring between both inner rings and both outer rings (➔ **fig** 2c). Because the load lines of the two bearings are in parallel, radial and axial loads will be equally distributed over the two bearings. The bearing pair can only accommodate axial loads acting in one direction and should be adjusted against a third bearing which can accommodate the axial loads acting in the opposite direction.

Bearing data – general

Dimensions
The dimensions of the individual bearings with series designations of a set are in accordance with ISO 355:1977.

Tolerances
The matched bearing sets are made to Normal tolerances as for the single bearings. The values for the Normal tolerances conform to ISO 492:2002 and are listed in **table** 6 on **page 128**. The tolerance for the total width of the set, although not standardized, can be found in **table** 1. In the table Δ_{TsD} designates the deviation of a single total abutment width of a bearing pair from the nominal.

Axial internal clearance
The bearing sets of standard metric bearings are produced with the axial internal clearance given in **table** 2 as standard. The values in the table apply to bearing pairs before they are mounted under measuring loads of

- 0,1 kN for bearings with outside diameter $D \leq 90$ mm,
- 0,3 kN for bearings with outside diameter $90 < D \leq 240$ mm and
- 0,5 kN for bearings with outside diameter $D > 240$ mm.

Matched bearing sets having a clearance other than the standard value are identified by the designation suffix C followed by a two or three-figure number which gives the mean axial internal clearance in µm. The range of the special clearance is, however, the same as for the standard clearance, i.e. for the bearing set 32232 J2/DFC230, which has a mean axial internal clearance of 230 µm, the clearance will lie in the range 200 to 260 µm.

Misalignment

Any misalignment of the outer rings relative to the inner rings of matched bearing pairs can only be accommodated between the rollers and raceways by force. The increased stress in the bearing caused by misalignment should be avoided. If misalignment cannot be avoided, SKF recommends using the less stiff face-to-face arrangement.

Cages

The single row taper roller bearings that are matched in bearing sets, are fitted with a pressed steel window-type cage (→ **fig** 3).

Fig 3

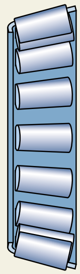


Table 1

Total width tolerances of matched single row metric taper roller bearings

Bore diameter d over	incl.	Total width tolerance Δ_{TsD} of matched bearings of series 329 high	low	320 X high	low	330 high	low	331, 302, 322, 332 high	low	303,323 high	low	313(X) high	low
mm		µm											
–	30	–	–	+550	+100	–	–	+550	+100	+600	+150	+500	+50
30	40	–	–	+550	+100	–	–	+600	+150	+600	+150	+550	+50
40	50	–	–	+600	+150	–	–	+600	+200	+600	+200	+550	+50
50	65	–	–	+600	+150	–	–	+600	+200	+650	+200	+550	+100
65	80	–	–	+600	+200	–	–	+650	+200	+700	+200	+600	+100
80	100	+750	–150	+650	–250	+800	–50	+700	–200	+700	–100	+600	–300
100	120	+750	–150	+700	–200	+800	–100	+700	–200	+750	–150	+600	–300
120	140	+1 100	–200	+1 000	–300	+1 100	–200	+1 000	–300	+1 100	–200	+950	–350
140	160	+1 150	–150	+1 050	–250	+1 100	–200	+1 050	–250	+1 150	–150	+950	–350
160	180	+1 150	–150	+1 100	–200	–	–	+1 100	–200	+1 150	–150	–	–
180	190	+1 150	–150	+1 100	–200	–	–	+1 100	–200	+1 200	–100	–	–
190	200	+1 150	–150	+1 100	–200	–	–	+1 100	–200	+1 200	–100	–	–
200	225	+1 200	–100	+1 150	–150	–	–	+1 150	–150	+1 250	–50	–	
225	250	+1 200	–100	+1 200	–100	–	–	+1 200	–100	+1 300	0	–	–
250	280	+1 300	0	+1 250	–50	–	–	+1 250	–50	–	–	–	–
280	300	+1 400	+100	+1 300	0	–	–	+1 300	0	–	–	–	–
300	315	+1 400	+100	+1 350	+50	–	–	+1 350	+50	–	–	–	–
315	340	+1 500	–200	+1 450	–250	–	–	+1 450	+200	–	–	–	–

Minimum load

In order to provide satisfactory operation, paired taper roller 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 to be subjected to high accelerations or rapid changes in the direction of load. Under such conditions the inertia forces of the rollers and cages, 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 radial load to be applied to matched pairs of SKF standard bearings can be estimated from

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

and for matched pairs of SKF Explorer bearings from

$$F_{rm} = 0,017\ C$$

where

F_{rm} = minimum radial load for a bearing pair, kN

C = basic dynamic load rating of a bearing pair, kN (➔ **product tables**)

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 pair, together with external forces, generally exceeds the requisite minimum load. If this is not the case, the bearing pair must be subjected to an additional radial load.

Equivalent dynamic bearing load

For dynamically loaded bearing pairs arranged face-to-face or back-to-back

$$P = F_r + Y_1 F_a \qquad \text{when } F_a/F_r \leq e$$
$$P = 0,67\ F_r + Y_2 F_a \qquad \text{when } F_a/F_r > e$$

and for bearing pairs arranged in tandem

$$P = F_r \qquad \text{when } F_a/F_r \leq e$$
$$P = 0,4\ F_r + Y_2 F_a \qquad \text{when } F_a/F_r > e$$

F_r and F_a are the forces acting on the bearing pair. Values for the calculation factors e, Y_1 and Y_2 are given in the product tables.

When determining the axial force for bearing pairs arranged in tandem reference should be made to the section "Determining axial force for bearings mounted singly or paired in tandem" on **page 606**.

Equivalent static bearing load

For statically loaded bearing pairs arranged face-to-face or back-to-back

$$P_0 = F_r + Y_0 F_a$$

and for bearing pairs arranged in tandem

$$P_0 = 0,5\ F_r + Y_0 F_a$$

When $P_0 < F_r$, $P_0 = F_r$ should be used. F_r and F_a are the forces acting on the bearing pair. Values of the calculation factor Y_0 are given in the product tables.

When determining the axial force for bearing pairs arranged in tandem reference should be made to the section "Determining axial force for bearings mounted singly or paired in tandem" on **page 606**.

Supplementary designations

The designation suffixes used to identify certain features of SKF paired single row taper roller bearings are explained in the following.

CL7C High-performance design for pinion bearing arrangements
C... Special clearance. The two or three-figure number immediately following the C gives the mean axial internal clearance in µm.
DB Matched bearing pair arranged back-to-back. A figure combination immediately following the DB identifies the design of the intermediate rings
DF Matched bearing pair arranged face-to-face. A figure combination immediately following the DF identifies the design of the intermediate ring
DT Matched bearing pair arranged in tandem. A figure combination immediately following the DF identifies the design of the intermediate rings
HA1 Inner and outer ring made of case-hardening steel
HA3 Inner ring made of case-hardening steel
J Pressed steel window-type cage. A figure following the J indicates a different cage design
Q Optimized contact geometry and surface finish
T T, followed by a figure, identifies the total width of bearing pairs arranged back-to-back or in tandem.
X Boundary dimensions altered to conform to ISO

Fits for bearing pairs

The values of axial internal clearance given in **table** 2 are so dimensioned that if the bearings are mounted on shafts machined to

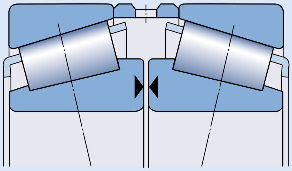
- m5 for shaft diameters up to and including 140 mm,
- n6 for shaft diameters over 140 mm and up to and including 200 mm, or
- p6 for shaft diameters above 200 mm

an appropriate operational clearance will be obtained. These shaft seating tolerances are recommended where loads are moderate to heavy and rotating loads apply for the inner ring. If tighter fits are selected, it is necessary to check that the bearings do not become pinched or clamped.

For stationary outer ring load, the recommended housing bore tolerance is J6 or H7.

Table 2

Axial internal clearance of matched single row metric taper roller bearings



Bore diameter		Axial internal clearance of matched bearings of series											
		329		320 X		330		331, 302, 322, 332		303, 323		313(X)	
over	incl.	min	max	min	max	min	max	min	max	min	max	min	max
mm		µm											
–	30	–	–	80	120	–	–	100	140	130	170	60	100
30	40	–	–	100	140	–	–	120	160	140	180	70	110
40	50	–	–	120	160	180	220	140	180	160	200	80	120
50	65	–	–	140	180	200	240	160	200	180	220	100	140
65	80	–	–	160	200	250	290	180	220	200	260	110	170
80	100	270	310	190	230	350	390	210	270	240	300	110	170
100	120	270	330	220	280	340	400	220	280	280	340	130	190
120	140	310	370	240	300	340	400	240	300	330	390	160	220
140	160	370	430	270	330	340	400	270	330	370	430	180	240
160	180	370	430	310	370	–	–	310	370	390	450	–	–
180	190	370	430	340	400	–	–	340	400	440	500	–	–
190	200	390	450	340	400	–	–	340	400	440	500	–	–
200	225	440	500	390	450	–	–	390	450	490	550	–	–
225	250	440	500	440	500	–	–	440	500	540	600	–	–
250	280	540	600	490	550	–	–	490	550	–	–	–	–
280	300	640	700	540	600	–	–	540	600	–	–	–	–
300	340	640	700	590	650	–	–	590	650	–	–	–	–

Determining the load acting on bearing pairs

If matched pairs of taper roller bearings arranged face-to-face or back-to-back are mounted together with a third bearing, the bearing arrangement is statically indeterminate. In these cases the size of the radial load F_r acting on the bearing pair must first be determined.

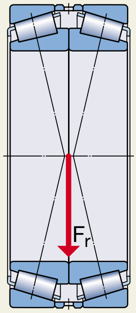
Bearing pairs arranged face-to-face
For bearing pairs where the two bearings are arranged face-to-face (➔ **fig** 4) it can be assumed that the radial load will act at the geometric centre of the bearing set as the distance between the pressure centres of the two bearings is short compared with the distance between the geometric centres of the set and the other bearing. In this case it can be assumed that the bearing arrangement is statically determined.

Bearing pairs arranged back-to-back
The distance between the pressure centres of two bearings arranged back-to-back in a matched set is large compared with the distance L between the geometric centres of the set and the other bearing (➔ **fig** 5). It is therefore necessary to determine the magnitude of the load acting on the bearing pair and also the distance a_1 at which the load acts. The magnitude of the radial load can be obtained from the equation

$$F_r = \frac{L_1}{L - a_1} K_r$$

where
F_r = radial load acting on a bearing pair, kN
K_r = radial force acting on the shaft, kN
L = distance between the geometric centres of the two bearing positions, mm
L_1 = distance between the centre of bearing position I and the point of action of the force K_r, mm
a = distance between the bearing pressure centres, mm
a_1 = distance between the geometric centre of the bearing set and the point of action of the radial load F_r, mm

Fig 4



The distance a_1 can be determined using **diagram** 1. The distance of the pressure centres a and the calculation factor Y_2 are given in the product table.

Fig 5

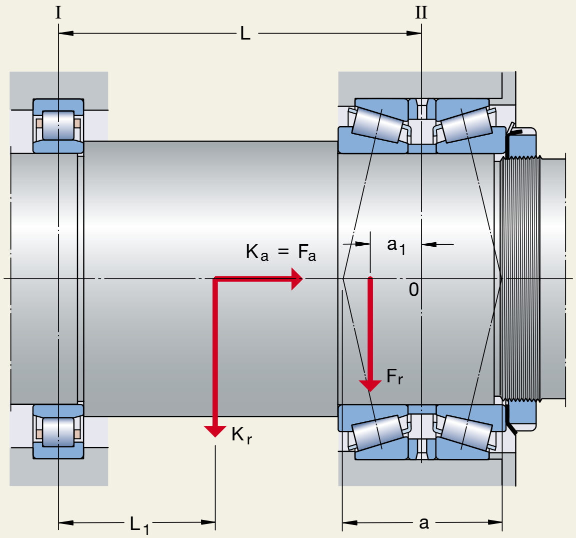
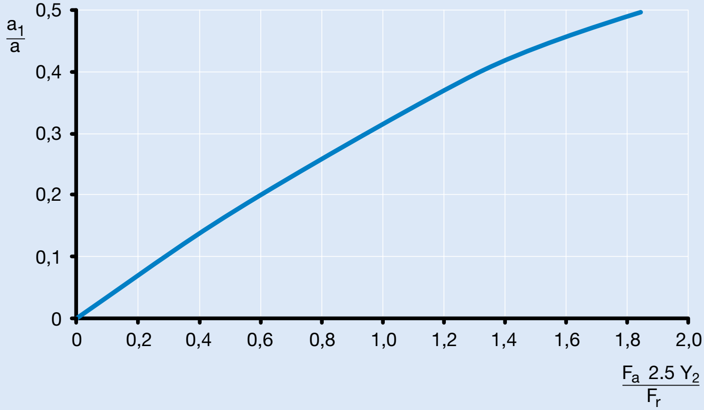
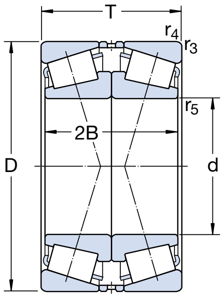


Diagram 1

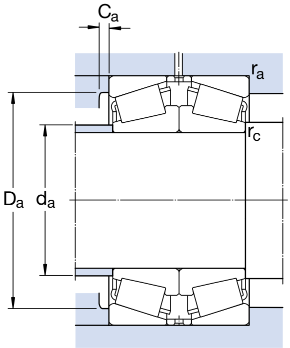


Single row taper roller bearings paired face-to-face
d **25 – 80** mm



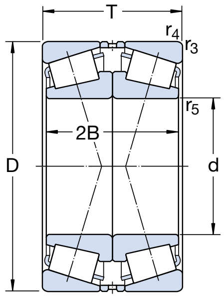
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	T	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
25	62	36,5	64,4	80	8,65	6 000	9 000	0,55	**31305 J2/QDF**
30	72	41,5	93	100	11,4	5 600	7 500	0,85	* **31306 J2/QDF**
35	80	45,5	120	134	15,6	5 000	6 700	1,10	* **31307 J2/QDF**
40	90	50,5	146	163	19	4 500	6 000	1,50	* **31308 J2/QCL7CDF**
45	100	54,5	180	204	24,5	4 000	5 300	2,00	* **31309 J2/QCL7CDF**
50	90	43,5	150	183	20,8	4 800	6 000	1,10	* **30210 J2/QDF**
	110	58,5	208	240	28,5	3 600	4 800	2,60	* **31310 J2/QCL7CDF**
55	90	54	180	270	30,5	4 500	5 600	1,35	* **33011/QDF03C170**
	120	63	240	275	33,5	3 400	4 500	3,30	* **31311 J2/QDF**
60	95	35	163	245	27	4 300	5 300	1,90	* **32012 X/QCL7CDFC250**
	110	48	250	320	37,5	4 000	5 000	2,40	* **32212 J2/QDFC290**
	130	67	246	335	40,5	2 800	4 000	4,10	**31312 J2/QDF**
65	120	49,5	228	270	32,5	3 600	4 500	1,20	* **30213 J2/QDF**
	140	72	325	380	47,5	2 800	3 800	5,05	* **31313 J2/QCL7CDF**
70	110	38	200	305	34,5	3 800	4 500	1,80	* **32014 X/QDF**
	110	51	220	400	45,5	3 400	4 800	2,40	**33014/DF**
	150	76	365	440	54	2 600	3 600	6,15	* **31314 J2/QCL7CDF**
75	115	62	233	455	52	3 200	4 300	2,40	**33015/QDF**
	125	74	303	530	63	3 000	4 000	3,80	**33115/QDFC150**
	130	54,5	238	355	41,5	3 000	4 000	2,85	**30215 J2/QDF**
	130	66,5	275	425	49	3 000	4 000	3,40	**32215 J2/QDF**
	160	80	405	490	58,5	2 400	3 200	7,25	**31315 J2/QDF**
80	125	58	233	430	49	3 000	4 000	2,65	**32016 X/QDFC165**
	140	70,5	319	490	57	2 800	3 800	4,25	**32216 J2/QDF**
	170	85	440	530	64	2 400	3 000	8,75	**31316 J1/QCL7CDF**

* SKF Explorer bearing

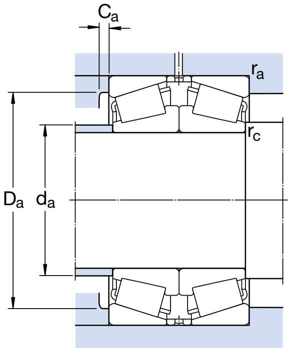


Dimensions				Abutment and fillet dimensions						Calculation factors			
d	2B	$r_{3,4}$ min	r_5 min	d_a max	D_a min	D_a max	C_a min	r_a max	r_c max	e	Y_1	Y_2	Y_0
mm				mm						–			
25	34	1,5	0,6	34	47	55	3	1,5	0,6	0,83	0,81	1,2	0,8
30	38	1,5	0,6	40	55	65	3	1,5	0,6	0,83	0,81	1,2	0,8
35	42	1,5	0,6	45	62	71	3	1,5	0,6	0,83	0,81	1,2	0,8
40	46	1,5	0,6	51	71	81	3	1,5	0,6	0,83	0,81	1,2	0,8
45	50	1,5	0,6	57	79	91	4	1,5	0,6	0,83	0,81	1,2	0,8
50	40	1,5	0,6	58	79	83	3	1,5	0,6	0,43	1,6	2,3	1,6
	54	2	0,6	62	87	100	4	2	0,6	0,83	0,81	1,2	0,8
55	54	1,5	0,6	63	81	83	5	1,5	0,6	0,31	2,2	3,3	2,2
	58	2	0,6	68	94	112	4	2	0,6	0,83	0,81	1,2	0,8
60	46	1,5	0,6	67	85	88	4	1,5	0,6	0,43	1,6	2,3	1,6
	56	1,5	0,6	69	95	103	4	1,5	0,6	0,4	1,7	2,5	1,6
	62	2,5	1	74	103	118	5	2	1	0,83	0,81	1,2	0,8
65	46	1,5	0,6	78	106	113	4	1,5	0,6	0,4	1,7	2,5	1,6
	66	2,5	1	80	111	128	5	2	1	0,83	0,81	1,2	0,8
70	50	1,5	0,6	78	98	103	5	1,5	0,6	0,43	1,6	2,3	1,6
	62	1,5	0,6	78	99	103	5	1,5	0,6	0,28			
	70	2,5	1	85	118	138	5	2	1	0,83	0,81	1,2	0,8
75	62	1,5	0,6	84	104	108	6	1,5	0,6	0,3	2,3	3,4	2,2
	74	1,5	0,6	84	109	117	6	1,5	0,6	0,4	1,7	2,5	1,6
	50	1,5	0,6	86	115	122	4	1,5	0,6	0,43	1,6	2,3	1,6
	62	1,5	0,6	85	114	122	4	1,5	0,6	0,43	1,6	2,3	1,6
	74	2,5	1	91	127	148	6	2	1	0,83	0,81	1,2	0,8
80	58	1,5	0,6	90	112	117	6	1,5	0,6	0,43	1,6	2,3	1,6
	66	2	0,6	91	122	130	5	2	0,6	0,43	1,6	2,3	1,6
	78	2,5	1	97	134	158	6	2	1	0,83	0,81	1,2	0,8

Single row taper roller bearings paired face-to-face
d **85 – 120** mm

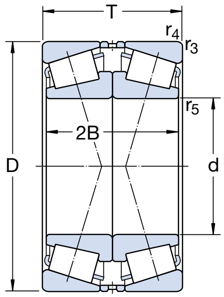


Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass	Designation
d	D	T	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
85	130	58	238	450	51	2 800	3 800	2,80	**32017 X/QDF**
	130	72	308	620	69,5	2 800	3 800	3,55	**33017/QDFC240**
	150	61	303	440	51	2 600	3 600	4,30	**30217 J2/QDF**
	150	77	369	570	65,5	2 600	3 600	5,45	**32217 J2/QDF**
	150	98	495	850	96,5	2 400	3 400	7,35	**33217/QDF**
	180	89	413	570	67	2 000	3 000	10,0	**31317 J2/DF**
90	140	64	292	540	62	2 600	3 600	3,65	**32018 X/QDF**
	140	78	369	710	78	2 600	3 600	4,50	**33018/QDFC150**
	160	65	336	490	57	2 400	3 400	5,15	**30218 J2/DF**
	160	85	429	680	76,5	2 400	3 400	6,90	**32218 J2/QDF**
	190	93	457	630	73,5	1 900	2 800	11,5	**31318 J2/DF**
95	145	78	380	735	81,5	2 600	3 400	5,00	**33019/QDF**
	170	91	484	780	86,5	2 200	3 200	8,45	**32219 J2/DF**
	200	99	501	710	78	1 800	2 600	13,0	**31319 J2/DF**
100	150	64	292	560	62	2 400	3 200	3,95	**32020 X/QDF**
	180	74	418	640	72	2 200	3 000	7,60	**30220 J2/DF**
	180	98	539	880	96,5	2 200	3 000	10,0	**32220 J2/DF**
	215	103	693	980	106	1 900	2 600	16,5	**30320 J2/DFC400**
	215	113	644	930	102	1 700	2 400	18,0	**31320 XJ2/DF**
105	160	70	347	670	73,5	2 200	3 200	5,00	**32021 X/QDF**
110	170	76	402	780	85	2 200	3 000	6,30	**32022 X/QDF**
	180	112	627	1 250	134	2 000	2 800	11,5	**33122/DF**
	200	82	523	800	90	2 000	2 600	10,5	**30222 J2/DF**
	200	112	682	1 140	122	1 900	2 600	14,5	**32222 J2/DF**
	240	126	781	1 160	125	1 500	2 200	26,0	**31322 XJ2/DF**
120	180	76	418	830	88	2 000	2 800	6,75	**32024 X/DF**
	180	96	495	1 080	112	2 000	2 800	8,65	**33024/DFC250**
	215	87	583	915	98	1 800	2 400	13,0	**30224 J2/DF**
	215	123	792	1 400	146	1 800	2 400	18,5	**32224 J2/DF**
	260	119	968	1 400	146	1 600	2 200	29,5	**30324 J2/DFC600**
	260	136	935	1 400	146	1 400	2 000	33,5	**31324 XJ2/DF**

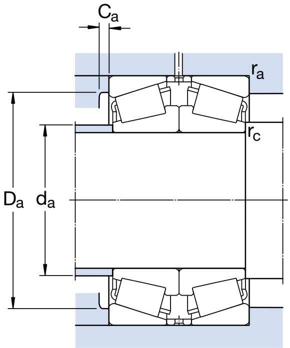


Dimensions				Abutment and fillet dimensions						Calculation factors			
d	2B	$r_{3,4}$ min	r_5 min	d_a max	D_a min	D_a max	C_a min	r_a max	r_c max	e	Y_1	Y_2	Y_0
mm				mm						–			
85	58	1,5	0,6	94	117	122	6	1,5	0,6	0,44	1,5	2,3	1,6
	72	1,5	0,6	94	118	122	6	1,5	0,6	0,3	2,3	3,4	2,2
	56	2	0,6	97	132	140	5	2	0,6	0,43	1,6	2,3	1,6
	72	2	0,6	97	130	140	5	2	0,6	0,43	1,6	2,3	1,6
	98	2	0,6	96	128	140	7	2	0,6	0,43	1,6	2,3	1,6
	82	3	1	103	143	166	6	2,5	1	0,83	0,81	1,2	0,8
90	64	1,5	0,6	100	125	132	6	1,5	0,6	0,43	1,6	2,3	1,6
	78	1,5	0,6	100	127	132	7	1,5	0,6	0,27	2,5	3,7	2,5
	60	2	0,6	102	140	150	5	2	0,6	0,43	1,6	2,3	1,6
	80	2	0,6	102	138	150	5	2	0,6	0,43	1,6	2,3	1,6
	86	3	1	109	151	176	5	2,5	1	0,83	0,81	1,2	0,8
95	78	1,5	0,6	104	131	138	7	1,5	0,6	0,28	2,4	3,6	2,5
	86	2,5	1	109	145	158	5	2	1	0,43	1,6	2,3	1,6
	90	3	1	114	157	186	5	2,5	1	0,83	0,81	1,2	0,8
100	64	1,5	0,6	110	134	142	6	1,5	0,6	0,46	1,5	2,2	1,4
	68	2,5	1	116	157	168	5	2	1	0,43	1,6	2,3	1,6
	92	2,5	1	115	154	168	5	2	1	0,43	1,6	2,3	1,6
	94	3	1	127	184	201	6	2,5	1	0,35	1,9	2,9	1,8
	102	3	1	121	168	201	7	2,5	1	0,83	0,81	1,2	0,8
105	70	2	0,6	116	143	150	6	2	0,6	0,44	1,5	2,3	1,6
110	76	2	0,6	123	152	160	7	2	0,6	0,43	1,6	2,3	1,6
	112	2	0,6	121	155	170	9	2	0,6	0,43	1,6	2,3	1,6
	76	2,5	1	129	174	188	6	2	1	0,43	1,6	2,3	1,6
	106	2,5	1	127	170	188	6	2	1	0,43	1,6	2,3	1,6
	114	3	1	135	188	226	7	2,5	1	0,83	0,81	1,2	0,8
120	76	2	0,6	132	161	170	7	2	0,6	0,46	1,5	2,2	1,4
	96	2	0,6	132	160	170	6	2	0,6	0,3	2,3	3,4	2,2
	80	2,5	1	141	187	203	6	2	1	0,43	1,6	2,3	1,6
	116	2,5	1	137	181	203	7	2	1	0,43	1,6	2,3	1,6
	110	3	1	153	221	245	7	2,5	1	0,35	1,9	2,9	1,8
	124	3	1	145	203	245	9	2,5	1	0,83	0,81	1,2	0,8

Single row taper roller bearings paired face-to-face
d **130 – 220** mm

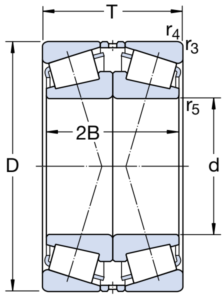


Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	T	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
130	180	64	341	735	76,5	2 000	3 000	4,95	**32926/DF**
	200	90	539	1 080	110	1 800	2 400	10,0	**32026 X/DF**
	230	87,5	627	980	106	1 700	2 200	14,5	**30226 J2/DF**
	230	135,5	952	1 660	170	1 600	2 200	23,0	**32226 J2/DF**
	280	144	1 050	1 560	163	1 300	1 800	40,0	**31326 XJ2/DF**
140	210	90	561	1 160	116	1 700	2 400	11,0	**32028 X/DF**
	250	91,5	721	1 140	116	1 500	2 000	18,0	**30228 J2/DFC100**
	250	143,5	1 100	2 000	200	1 500	2 000	29,5	**32228 J2/DF**
	300	154	1 190	1 800	176	1 200	1 700	52,5	**31328 XJ2/DF**
150	225	96	644	1 320	132	1 600	2 200	13,5	**32030 X/DF**
	270	98	737	1 120	114	1 400	2 000	22,5	**30230/DFC350**
	270	154	1 250	2 280	224	1 400	1 900	37,0	**32230 J2/DF**
	320	164	1 340	2 040	200	1 100	1 600	58,5	**31330 XJ2/DF**
160	240	102	737	1 560	156	1 500	2 000	16,0	**32032 X/DF**
	290	104	913	1 460	143	1 300	1 800	27,5	**30232 J2/DF**
	290	168	1 510	2 800	265	1 300	1 800	48,0	**32232 J2/DF**
170	230	76	484	1 160	110	1 500	2 200	9,20	**32934/DFC225**
	260	114	880	1 830	180	1 400	1 900	22,0	**32034 X/DF**
	310	182	1 720	3 250	300	1 200	1 600	59,0	**32234 J2/DF**
180	250	90	605	1 460	137	1 400	2 000	14,0	**32936/DF**
	280	128	1 100	2 320	220	1 300	1 700	29,5	**32036 X/DF**
	320	114	1 010	1 630	160	1 200	1 600	42,0	**30236 J2/DFC300**
	320	182	1 720	3 250	300	1 100	1 600	61,0	**32236 J2/DF**
190	260	90	616	1 530	143	1 300	1 900	14,5	**32938/DF**
	290	128	1 120	2 400	224	1 200	1 600	30,5	**32038 X/DF**
	340	120	1 230	2 000	190	1 100	1 500	50,0	**30238 J2/DFC700**
200	310	140	1 280	2 750	255	1 100	1 500	39,0	**32040 X/DF**
	360	128	1 340	2 240	212	1 000	1 400	52,0	**30240 J2/DFC570**
	360	208	2 090	4 000	360	1 000	1 400	88,0	**32240 J2/DF**
220	300	102	842	2 000	183	1 100	1 600	21,0	**32944/DFC300**
	340	152	1 540	3 350	300	1 000	1 400	51,0	**32044 X/DF**

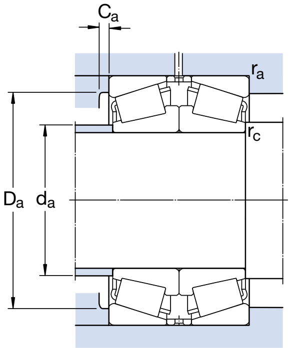


Dimensions				**Abutment and fillet dimensions**						**Calculation factors**			
d	2B	$r_{3,4}$ min	r_5 min	d_a max	D_a min	D_a max	C_a min	r_a max	r_c max	e	Y_1	Y_2	Y_0
mm				mm						–			
130	64	1,5	0,6	141	167	172	6	1,5	0,6	0,33	2	3	2
	90	2	0,6	144	178	190	7	2	0,6	0,43	1,6	2,3	1,6
	80	3	1	152	203	216	7	2,5	1	0,43	1,6	2,3	1,6
	128	3	1	146	193	216	7	2,5	1	0,43	1,6	2,3	1,6
	132	4	1,5	157	218	263	8	3	1,5	0,83	0,81	1,2	0,8
140	90	2	0,6	153	187	200	7	2	0,6	0,46	1,5	2,2	1,4
	84	3	1	164	219	236	7	2,5	1	0,43	1,6	2,3	1,6
	136	3	1	159	210	236	8	2,5	1	0,43	1,6	2,3	1,6
	140	4	1,5	169	235	283	9	3	1,5	0,83	0,81	1,2	0,8
150	96	2,5	1	164	200	213	8	2	1	0,46	1,5	2,2	1,4
	90	3	1	175	234	256	9	2,5	1	0,43	1,6	2,3	1,6
	146	3	1	171	226	256	8	2,5	1	0,43	1,6	2,3	1,6
	150	4	1,5	181	251	303	9	3	1,5	0,83	0,81	1,2	0,8
160	102	2,5	1	175	213	228	8	2	1	0,46	1,5	2,2	1,4
	96	3	1	189	252	275	8	2,5	1	0,43	1,6	2,3	1,6
	160	3	1	183	242	275	10	2,5	1	0,43	1,6	2,3	1,6
170	76	2	0,6	183	213	220	7	2	0,6	0,37	1,7	2,8	1,8
	114	2,5	1	188	230	246	10	2	1	0,44	1,5	2,3	1,6
	172	4	1,5	196	259	293	10	3	1,5	0,43	1,6	2,3	1,6
180	90	2	0,6	194	225	240	8	2	0,6	0,48	1,4	2,1	1,4
	128	2,5	1	199	247	266	10	2	1	0,43	1,6	2,3	1,6
	104	4	1,5	211	278	303	9	3	1,5	0,44	1,5	2,3	1,6
	172	4	1,5	204	267	303	10	3	1,5	0,44	1,5	2,3	1,6
190	90	2	0,6	204	235	248	8	2	0,6	0,48	1,4	2,1	1,4
	128	2,5	1	210	257	276	10	2	1	0,44	1,5	2,3	1,6
	110	4	1,5	224	298	323	9	3	1,5	0,43	1,6	2,3	1,6
200	140	2,5	1	222	273	296	11	2	1	0,43	1,6	2,3	1,6
	116	4	1,5	237	315	343	9	3	1,5	0,43	1,6	2,3	1,6
	196	4	1,5	231	302	343	11	3	1,5	0,4	1,7	2,5	1,6
220	102	2,5	1	234	275	286	9	2	1	0,43	1,6	2,3	1,6
	152	3	1	244	300	325	12	2,5	1	0,43	1,6	2,3	1,6

Single row taper roller bearings paired face-to-face
d **240 – 320** mm

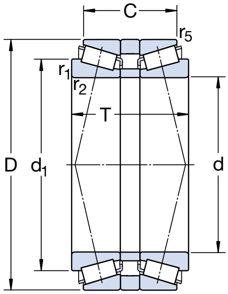


Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	T	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
240	360	152	1 570	3 550	315	950	1 300	54,5	**32048 X/DF**
260	400	174	1 980	4 400	380	850	1 200	79,5	**32052 X/DF**
280	420	174	2 050	4 750	400	800	1 100	84,5	**32056 X/DF**
300	420	152	1 790	4 500	375	800	1 100	65,5	**32960/DF**
320	480	200	2 640	6 200	510	700	950	125	**32064 X/DF**



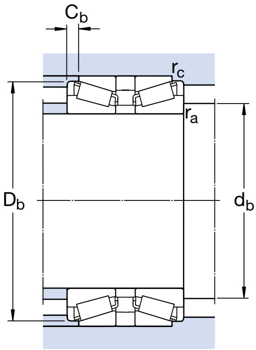
Dimensions				Abutment and fillet dimensions						Calculation factors			
d	2B	$r_{3,4}$ min	r_5 min	d_a max	D_a min	D_a max	C_a min	r_a max	r_c max	e	Y_1	Y_2	Y_0
mm				mm						–			
240	152	3	1	262	318	345	12	2,5	1	0,46	1,5	2,2	1,4
260	174	4	1,5	287	352	383	13	3	1,5	0,43	1,6	2,3	1,6
280	174	4	1,5	305	370	400	14	3	1,5	0,46	1,5	2,2	1,4
300	152	3	1	324	383	404	12	2,5	1	0,4	1,7	2,5	1,6
320	200	4	1,5	350	424	460	15	3	4	0,46	1,5	2,2	1,4

Single row taper roller bearings paired back-to-back
d **40 – 170** mm



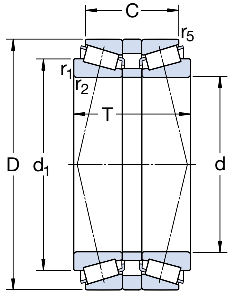
Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	T	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
40	90	72	170	190	21,6	5 300	6 300	1,90	* **30308T72 J2/QDBC220**
75	130	70	238	355	41,5	3 000	4 000	3,25	**30215T70 J2/DBC270**
	130	80	275	425	49	3 000	4 000	6,80	**32215T80 J2/QDB**
80	140	78	319	490	57	2 800	3 800	4,45	**32216T78 J2/QDBC110**
85	130	66	238	450	51	2 800	3 800	2,7	**32017T66 X/QDB/C280**
	130	70	308	620	69,5	2 800	3 800	3,5	**33017T70/Q**
	150	71	303	440	51	2 600	3 600	4,10	**30217T71 J2/Q**
90	190	103	457	630	73,5	1 900	2 800	12,5	**31318T103 J2/DB31**
100	180	108	539	880	96,5	2 200	3 000	10,5	**32220T108 J2/DB**
	180	140	418	640	72	2 200	3 000	12,5	**32220T140 J2/DB11**
110	170	84	402	780	85	2 200	3 000	6,50	**32022T84 X/QDBC200**
120	180	84	418	830	88	2 000	2 800	7,00	**32024T84 X/QDBC200**
	215	146	792	1 400	146	1 800	2 400	21,0	**32224T146 J2/DB31C210**
	260	146	935	1 400	146	1 400	2 000	35,0	**31324T146 XJ2/DB**
130	230	97,5	627	980	106	1 700	2 200	15,0	**30226T97.5 J2/DB**
	280	142	1 080	1 600	166	1 400	2 000	36,5	**30326T142 J2/DB11C150**
140	210	130	561	1 160	116	1 700	2 400	12,7	**32028T130 X/QDB**
	250	106	721	1 140	116	1 500	2 000	19,5	**30228T106 J2/DB**
	250	158	1 100	2 000	200	1 500	2 000	31,0	**32228T158 J2/DB**
150	270	168	1 250	2 250	224	1 400	1 900	38,0	**32230T168 J2/DB**
	270	248	1 250	2 280	224	1 600	2 200	39,5	**32230T248 J2/DB31**
	320	179	1 340	2 040	200	1 100	1 600	58,5	**31330T179 XJ2/DB**
160	290	179	1 510	2 800	265	1 300	1 800	52,5	**32232T179 J2/DB32C230**
170	260	162	880	1 830	180	1 400	1 900	30,5	**32034T162 X/DB31**

* SKF Explorer bearing

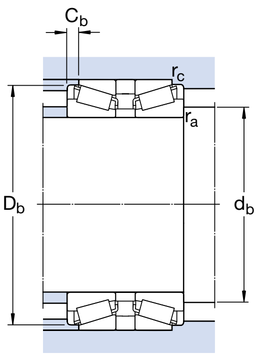


Dimensions						Abutment and fillet dimensions					Calculation factors			
d	d_1 ~	C	$r_{1,2}$ min	r_5 min	a	d_b min	D_b min	C_b min	r_a max	r_c max	e	Y_1	Y_2	Y_0
mm						mm					–			
40	62,5	61,5	2	0,6	50	49	82	5	2	0,6	0,35	1,9	2,9	1,8
75	99,2	59,5	2	0,6	69	84	124	5	2	0,6	0,43	1,6	2,3	1,6
	100	67,5	2	0,6	72	84	125	6	2	0,6	0,43	1,6	2,3	1,6
80	106	63,5	2,5	0,6	68	90	134	7	2	0,6	0,43	1,6	2,3	1,6
85	108	52	1,5	0,6	64	92	125	7	1,5	0,6	0,44	1,5	2,3	1,4
	108	56	1,5	0,6	68	92	125	7	1,5	0,6	0,44	1,5	2,3	1,4
	112	58.5	2,5	0,6	71	95	141	6,5	2	0,6	0,43	1,6	2,3	1,6
90	138	70	4	1	124	105	179	16,5	3	1	0,83	0,81	1,2	0,8
100	135	88	3	1	92	112	171	10	2,5	1	0,43	1,6	2,3	1,6
	135	120	3	1	124	112	171	10	2,5	1	0,43	1,6	2,3	1,6
110	140	66	2,5	0,6	80	121	163	9	2	0,6	0,43	1,6	2,3	1,6
120	150	66	2,5	0,6	86	131	173	9	2	0,6	0,46	1,5	2,2	1,4
	163	123	3	1	125	132	204	11,5	2,5	1	0,43	1,6	2,3	1,6
	190	134	4	1	166	135	244	26	3	1	0,83	0,81	1,2	0,9
130	173	78	4	1	99	146	217	9,5	3	1	0,43	1,6	2,3	1,6
	196	112,5	5	1,5	117	150	255	14,5	4	1,5	0,35	1,9	2,9	1,8
140	175	108	2,5	0,6	132	152	202	11	2	0,6	0,46	1,5	2,2	1,4
	186	86,5	4	1	108	156	234	9,5	3	1	0,43	1,6	2,3	1,6
	191	130,5	4	1	134	156	238	13,5	3	1	0,43	1,6	2,3	1,6
150	205	134	4	1	142	166	254	17	3	1	0,43	1,6	2,3	1,6
	205	214	4	1	222	166	254	17	3	1	0,43	1,6	2,3	1,6
	234	115	5	1,5	207	170	300	32	4	1,5	0,83	0,81	1,2	0,8
160	221	145	4	1	150	176	274	17	3	1	0,43	1,6	2,3	1,6
170	214	134	3	1	160	184	249	14	2,5	1	0,44	1,5	2,3	1,6

Single row taper roller bearings paired back-to-back
d **180 – 260** mm

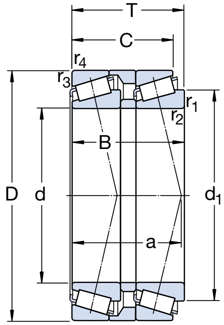


Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	T	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
180	250	135	605	1 460	137	1 400	2 000	14,5	**32936T135/DBC260**
	280	150	1 100	2 320	220	1 300	1 700	29,5	**32036T150 X/DB**
	280	150	1 100	2 320	220	1 300	1 700	29,5	**32036T150 XDB11C150**
	320	196	1 720	3 250	300	1 100	1 600	61,5	**32236T196 J2/DB32**
190	260	102	616	1 530	143	1 300	1 900	15,0	**32938T102/DB31**
	260	122	616	1 530	143	1 300	1 900	15,5	**32938T122/DBCG**
	290	146	1 120	2 400	224	1 200	1 600	31,5	**32038T146 X/DB42C220**
	290	146	1 120	2 400	224	1 200	1 600	31,5	**32038T146 X/DBC220**
	290	183	1 120	2 400	224	1 200	1 600	32,5	**32038T183 X/DB31C330**
200	310	154,5	1 280	2 750	255	1 100	1 500	39,5	**32040T154.5 X/DB11C170**
220	340	165	1 540	3 550	300	1 000	1 400	52,0	**32044T165 X/DB11C170**
	340	165	1 540	3 550	300	1 000	1 400	52,0	**32044T165 X/DB42C220**
	340	165	1 540	3 550	300	1 000	1 400	52,0	**32044T165 X/DBC340**
	340	168	1 540	3 550	300	1 000	1 400	52,0	**32044T168 X/DB**
240	360	172	1 570	3 550	315	950	1 300	56,0	**32048T172 X/DB**
	440	284	3 300	6 550	550	800	1 100	180	**32248T284 J3/DB**
260	400	189	1 980	4 400	380	850	1 200	80,5	**32052T189 X/DBC280**
	400	194	1 980	4 400	380	850	1 200	80,5	**32052T194 X/DB**



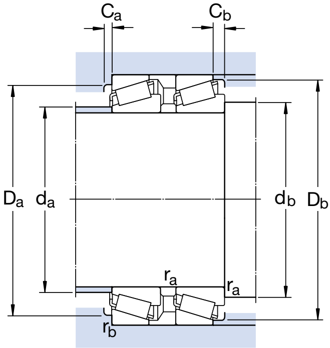
Dimensions						Abutment and fillet dimensions					Calculation factors			
d	d_1 ~	C	$r_{1,2}$ min	r_5 min	a	d_b min	D_b min	C_b min	r_a max	r_c max	e	Y_1	Y_2	Y_0
mm						mm					–			
180	216	83	2,5	0,6	122	192	241	11	2	0,6	0,48	1,4	2,1	1,4
	229	118	3	0,6	140	194	267	16	2,5	0,6	0,43	1,6	2,3	1,6
	229	118	3	1	140	194	267	16	2,5	1	0,43	1,6	2,3	1,6
	239	156	5	1,5	169	200	297	14	4	1,5	0,44	1,5	2,3	1,4
190	227	80	2,5	0,6	122	202	251	11	2	0,6	0,48	1,4	2,1	1,4
	227	100	2,5	0,6	142	202	251	11	2	0,6	0,48	1,4	2,1	1,4
	240	114	3	1	142	204	279	16	2,5	1	0,44	1,5	2,3	1,4
	240	114	3	1	142	204	279	16	2,5	1	0,44	1,5	2,3	1,4
	240	151	3	1	179	204	279	16	2,5	1	0,44	1,5	2,3	1,4
200	254	120,5	3	1	147	214	297	17	2,5	1	0,43	1,6	2,3	1,6
220	279	127	4	1	157	236	326	19	3	1	0,43	1,6	2,3	1,6
	279	127	4	1	157	236	326	19	3	1	0,43	1,6	2,3	1,6
	279	157	4	1	157	236	326	19	3	1	0,43	1,6	2,3	1,6
	279	130	4	1	160	236	326	19	3	1	0,43	1,6	2,3	1,6
240	299	134	4	1	175	256	346	19	3	1	0,46	1,5	2,2	1,4
	346	230	5	1,5	240	262	415	27	4	1,5	0,43	1,6	2,3	1,6
260	328	145	5	1,5	183	282	383	22	4	1,5	0,43	1,6	2,3	1,6
	328	150	5	1,5	188	282	383	22	4	1,5	0,43	1,6	2,3	1,6

Single row taper roller bearings paired in tandem
d **55 – 80** mm



Principal dimensions			Basic load ratings		Fatigue load limit	Speed ratings		Mass	Designation
			dynamic	static		Reference speed	Limiting speed		
d	D	T	C	C_0	P_u				
mm			kN		kN	r/min		kg	–
55	115	73	250	325	39	3 400	4 500	3,50	**★ T7FC 055T73/QCL7CDTC10**
60	125	80	305	405	49	3 000	4 000	4,05	**★ T7FC 060T80/QCL7CDTC10**
70	140	83	355	480	55	2 800	3 600	11,0	**★ T7FC 070T83/QCL7CDTC10**
80	160	98	450	630	71	2 400	3 200	16,5	**★ T7FC 080T98/QCL7CDTC20**

★ SKF Explorer bearing



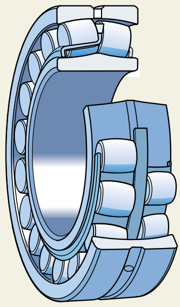
Dimensions							Abutment and fillet dimensions										Calculation factors		
d	d_1 ~	B	C	$r_{1,2}$ min	$r_{3,4}$ min	a ~	d_a max	d_b min	D_a min	D_a max	D_b min	C_a min	C_b min	r_a max	r_b max	e	Y	Y_0
mm							mm										–		
55	90	70	62,5	3	3	78	66	67	86	101	109	4	10,5	2,5	2,5	0,88	0,68	0,4
60	97	76,5	69	3	3	84	72	72	94	111	119	4	11	2,5	2,5	0,83	0,72	0,4
70	110	79,5	71	3	3	47	82	82	106	126	133	5	12	2,5	2,5	0,88	0,68	0,4
80	125	94	84	3	3	106	94	92	121	146	152	5	14	2,5	2,5	0,88	0,68	0,4

Spherical roller bearings

Spherical roller bearings have two rows of rollers with a common sphered raceway in the outer ring and two inner ring raceways inclined at an angle to the bearing axis (➔ **fig** 1). This gives them an attractive combination of design features making them irreplaceable in many demanding applications. They are self-aligning and consequently insensitive to misalignment of the shaft relative to the housing and to shaft deflection or bending.

SKF spherical roller bearings are leading in design and can, in addition to high radial loads, accommodate high axial loads acting in both directions.

Fig 1



Standard bearings

The standard range of SKF spherical roller bearings comprises

- open bearings,
- sealed bearings and
- bearings for vibratory applications.

In addition to the standard range, SKF offers a wide range of special spherical roller bearings adapted for specific applications.

Open bearings
SKF spherical roller bearings are produced in several designs, depending on bearing series and size. The differences are

- the arrangement of the floating guide ring as well as
- the design of the inner ring and the cages,

as described in the following and shown in **fig** 2.

C(J), CC	Two window-type steel cages, flangeless inner ring and guide ring centred on the inner ring (**a**).
EC(J), ECC(J)	Two window-type steel cages, flangeless inner ring, guide ring centred on the inner ring and reinforced roller complement (**a**).
CA, CAC	One-piece machined brass cage of the double-pronged type, retaining flanges on the inner ring and guide ring centred on the inner ring (**b**).
CAF	As CA, but with a steel cage
ECA, ECAC	One-piece machined brass cage of the double-pronged type, retaining flanges on the inner ring, guide ring centred on the inner ring and reinforced roller complement (**b**).
ECAF	As ECA, but with a steel cage
E	When bearing bore diameter $d \leq 65$ mm: Two window-type steel cages, flangeless inner ring and guide ring centred on the inner ring (**c**). When bearing bore diameter $d > 65$ mm: Two window-type steel cages, flangeless inner ring and guide ring centred on the cages (**d**).
CAFA	One-piece machined steel cage of the double-pronged type centred on the outer ring raceway, retaining flanges on the inner ring and guide ring centred on the inner ring (**e**).
CAMA	As CAFA, but with a brass cage

With some exceptions all SKF spherical roller bearings are produced with a cylindrical bore as well as with a tapered bore. The tapered bore of bearings in the

- 240, 241, 248 and 249 series have a taper of 1:30, designation suffix K30, and the
- other series have a taper of 1:12, designation suffix K.

Annular groove and lubrication holes

To facilitate efficient bearing lubrication, SKF spherical roller bearings are provided with

- an annular groove and three lubrication holes in the outer ring (➔ **fig 3 a**), designation suffix W33, or
- three lubrication holes in the outer ring (➔ **fig 3 b**), designation suffix W20.

E-design spherical roller bearings have the annular groove and three lubrication holes feature as standard so that the designation suffix W33 is omitted from the bearing designation.

Fig 2

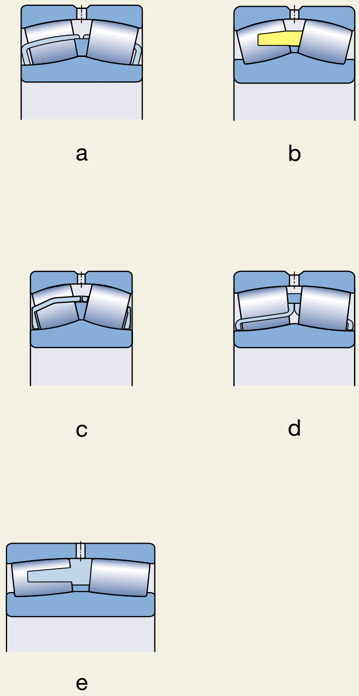
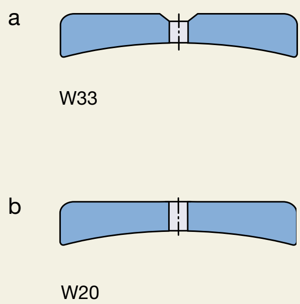


Fig 3



Sealed bearings

A selection of SKF spherical roller bearings is also produced in a sealed version with contact seals on both sides (➔ **fig** 4). The seals are reinforced with sheet steel and made of an oil and wear-resistant

- acrylonitrile butadiene rubber (NBR), designation suffix 2CS,
- hydrogenated acrylonitrile butadiene rubber (HNBR), designation suffix 2CS5, or
- fluoro rubber (FPM), designation suffix 2CS2.

Warning

Seals made of fluoro rubber exposed to extreme temperatures above 300 °C give off hazardous fumes. Therefore the safety recommendations mentioned in the section “Seal materials”, starting on **page 142**, must be considered.

The seals are inserted in recesses in the outer ring. For smaller bearing sizes, the seals are pressed into the recesses (**a**) while the seals for the larger sizes are held in position by means of retaining rings (**b**). The seals have two sealing lips contacting the lead-in at the sides of the inner ring raceway, to provide efficient sealing.

Sealed bearings are lubricated as standard with an extreme pressure bearing grease according to **table** 1. They should not be heated to temperatures above 80 °C during mounting, and should not be washed.

Table 1

SKF standard grease filling for sealed spherical roller bearings

Technical specification	Grease for sealed bearings of type 2CS, 2CS2/VT143 and 2CS5/VT143
Type	Extreme pressure grease
Thickener	Lithium
Base oil type	Mineral
NLGI consistency class	2
Operating temperature, °C	–20 to +110
Base oil viscosity, mm^2/s	
at 40 °C	200
at 100 °C	16
Filling degree, % of free space in bearing	25 to 35

Fig 4

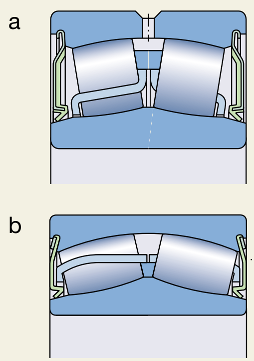


Fig 5

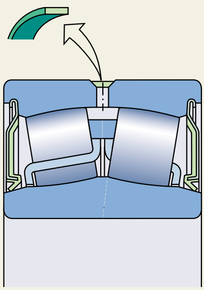
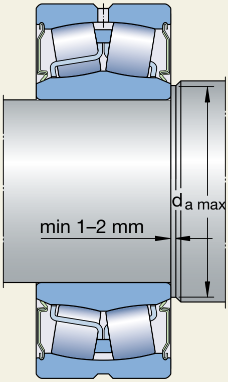
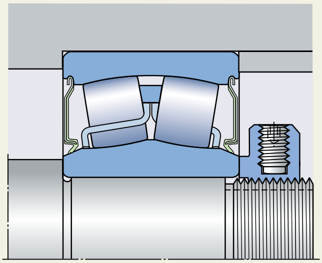


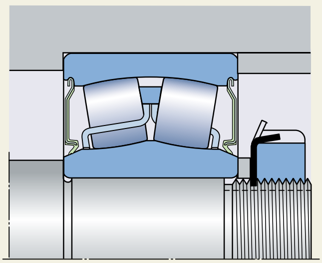
Fig 6



a



b



c

Sealed bearings do not need to be relubricated when the operating temperature does not exceed 70 °C and the rotational speed is below 50 % of the limiting speed listed in the product table. When temperature and speeds are high, relubrication with a similar lithium base grease is recommended (➔ **table** 1). In this case the polymer band, which covers the lubrication holes in the outer ring must be removed before mounting (➔ **fig** 5). Note that only a small amount of grease is needed to relubricate sealed bearings. The grease should be pressed in slowly through the lubrication holes in the outer ring while the bearing is rotating. Excessive pressure should be avoided so as not to damage the seals.

The internal design of a sealed bearing corresponds to that of an open bearing. The external dimensions are also the same except for bearings based on the 222 series. These bearings are slightly wider and carry the series designation BS2-22.

Sealed bearings are available with a cylindrical bore as standard. However most bearings in the BS2-22 series are available with a tapered bore as well. Every sealed bearing can be supplied with a tapered bore to special order.

To prevent interference with the seal, the diameter of the shaft abutment should not exceed $d_{a\ max}$ at least for the 1 to 2 mm closest to the bearing (➔ **fig** 6 **a**).

If the bearings are secured axially on the shaft by a lock nut SKF recommends using a KMFE lock nut (➔ **fig** 6 **b**) or to position an intermediate ring between the bearing and the nut (➔ **fig** 6 **c**).

Bearings for vibratory applications
Vibratory applications, such as vibrating screens or exciters, induce accelerations of rollers and cages in the bearings. This puts extra demands on the bearing design. SKF spherical roller bearings for vibratory applications can withstand considerably higher accelerations than corresponding standard bearings. The permissible acceleration depends on the lubricant and the type of acceleration – rotating or linear acceleration.

- Rotating acceleration
  The bearing is subjected to a rotating outer ring load and a rotating acceleration field. This generates cyclic loads on the cages from the unloaded rollers. Typical examples are vibrating screens and planetary gears. Road rollers are subject to a mix of rotating and linear accelerations (➔ **fig 7a**).
  Individual values for the permissible rotating accelerations are provided in the product table and are valid for oil lubricated bearings. The values are expressed in m/s^2, where 28 g stands for 28 × 9,81 = 275 m/s^2 for example.

- Linear acceleration
  The bearing is subjected to impact loads and thus linear accelerations. This causes hammering in the cage pockets by the unloaded rollers. A typical linear acceleration is generated when rail wheels are rolling over rail joints (➔ **fig 7b**). An analogous application using bearings for vibrating applications is a road roller where the roller is vibrating against a relatively hard surface.
  Individual values for the permissible linear accelerations are provided in the product table and are valid for oil lubricated bearings. The values are expressed in m/s^2, where 90 g stands for 90 × 9,81 = 883 m/s^2 for example.

Fig 7

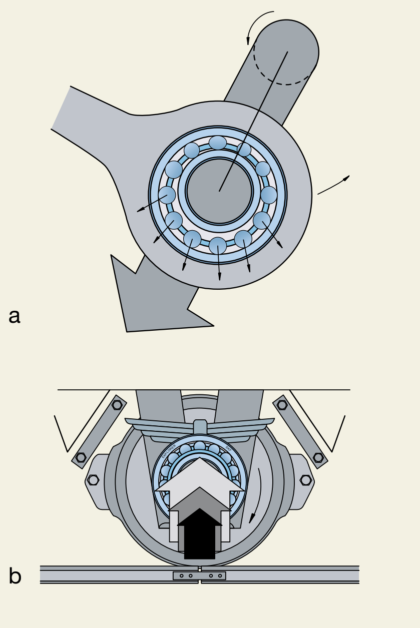
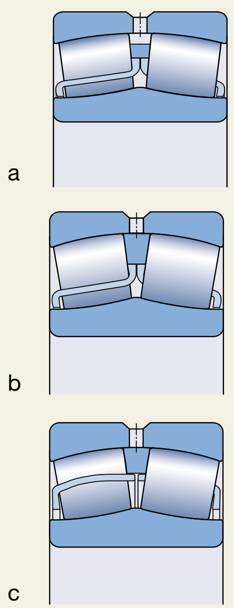


Fig 8



SKF

Bearing design

SKF spherical roller bearings for vibratory applications have the same dimensions and performance values as bearings in the 223 series but have a C4 radial internal clearance as standard. They are available with either a cylindrical or tapered bore. To facilitate efficient lubrication all bearings are provided with an annular groove and three lubrication holes in the outer ring.

SKF spherical roller bearings for vibratory applications are, depending on their size, available in one of the designs described below and shown in **fig** 8.

E/VA405 design
Two surface hardened steel window-type cages, flangeless inner ring and guide ring centred above the cages (**a**).

EJA/VA405 and CCJA/W33VA405 designs
Two surface hardened steel window-type cages of EJA design (**b**) or CCJA design (**c**), flangeless inner ring and guide ring centred on the outer ring raceway.

EJA/VA406 and CCJA/W33VA406 designs
These bearings, which have a PTFE coated cylindrical bore, have the same features as a VA405 design bearing. They are available for shaft diameters from 85 up to 200 mm. These bearings are intended for the use at the non-locating bearing position in vibratory applications to prevent fretting corrosion between the shaft and the bore of the bearing. Shafts do not require special heat treatments or coatings.

System solutions for vibrating screens

In addition to single bearings for vibrating screens, SKF has developed fault detection and bearing systems that can extend performance, reduce maintenance and monitor machine condition in vibratory equipment. More information on this “SKF Copperhead system solution for vibrating screens” can be found on **page 1100**.

SKF Explorer class bearings

High performance SKF spherical roller bearings in the Explorer performance class are shown with an asterisk in the product tables. The SKF Explorer bearings retain the designation of the earlier standard bearings, e.g. 22220 E. However, each bearing and its box are marked with the name “EXPLORER”.

Special bearings

SKF produces a wide range of special spherical roller bearings to meet specific customer needs. These are, for example, bearings for

- printing machines, paper mills or coaters in high precision execution
- for very arduous operating conditions as for example in continuous casting machines
- high temperature applications
- mounting with loose fit on roll necks
- railway vehicles

For detailed information on these spherical roller bearings please contact SKF.

Fig 9

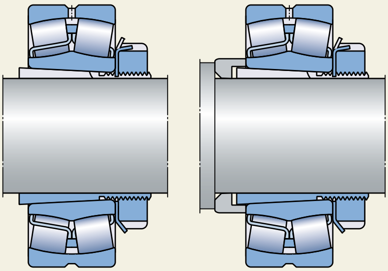


Fig 10

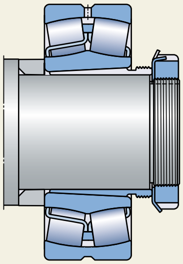
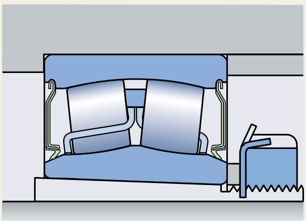


Fig 11



Bearings on sleeves

Spherical roller bearings with a tapered bore can be mounted on smooth or stepped shafts using

- an adapter sleeve (➔ **fig** 9), product table starting on **page 744**,
- a withdrawal sleeve (➔ **fig** 10), product table starting on **page 758**.

The sleeves facilitate bearing mounting and dismounting and often simplify bearing arrangement design.

When sealed bearings are to be mounted on an adapter sleeve it is necessary to protect the sealing lips from being damaged. This can be done by

- using an E-design adapter sleeve (➔ section “Adapter sleeves”, starting on **page 971**) or
- inserting an intermediate ring between the bearing and the locking washer (➔ **fig** 11).

Appropriate bearing housings

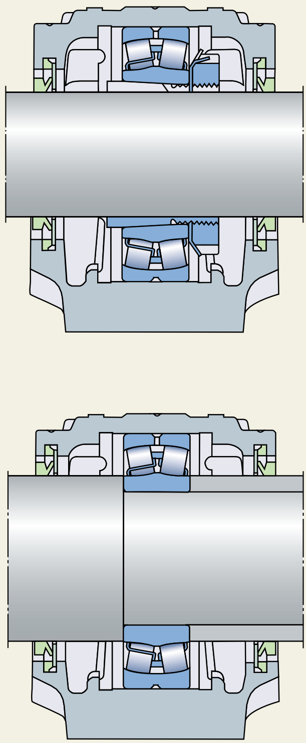
The combination of a spherical roller bearing and an appropriate bearing housing constitutes an economic, interchangeable and reliable bearing arrangement that meets the demands for easy maintenance. SKF produces appropriate housings in a variety of designs and sizes to suit a wide range of applications. The designs include

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

Detailed information on plummer block housings in the SNL 2, 3, 5 and 6 series (➔ **fig 12**) can be found in the section “Bearing housings”, starting on **page 1027**.

A brief description of all SKF housings is also provided in the chapter “Bearing housings” where only main design features are presented. Publications for detailed information are listed.

Fig 12



Bearing data – general

Dimensions

The boundary dimensions for spherical roller bearings are in accordance with ISO 15:1998. The dimensions of the adapter and withdrawal sleeves correspond to ISO 2982-1:1995.

Tolerances

SKF spherical roller bearings are manufactured as standard to Normal tolerances.

SKF Explorer spherical roller bearings up to 315 mm bore diameter with a cylindrical or a tapered bore are produced to higher precision than the ISO Normal tolerances. For example

- the width tolerance is considerable tighter than the ISO Normal tolerance (➔ **table** 2),
- the running accuracy is to tolerance class P5 as standard.

For larger bearing arrangements where running accuracy is a key operational parameter, SKF spherical roller bearings with P5 running accuracy are also available. These bearings are identified by the suffix C08. Their availability should be checked.

The tolerance for the bore and the outside diameter of SKF Explorer spherical roller bearings for vibratory applications have been reduced from Normal to P6 and P5 respectively.

The values of the tolerances are in accordance with ISO 492:2002 and can be found in **tables** 3 to 5, starting on **page 125**.

Table 2

Width tolerances for bearings with bore up to 315 mm

Bore diameter d		**Width tolerances** according to SKF Standard Δ_{Bs}		ISO Standard Δ_{Bs}	
over	incl.	high	low	high	low
mm		µm			
18	**50**	0	–60	0	–120
50	**80**	0	–60	0	–150
80	**120**	0	–80	0	–200
120	**180**	0	–80	0	–250
180	**250**	0	–80	0	–300
250	**315**	0	–100	0	–350

Internal clearance

SKF spherical roller bearings are produced as standard with Normal radial internal clearance and most are also available with a greater C3 clearance. Many bearings can also be supplied with a smaller C2 clearance or the much greater C4 or C5 clearances.

SKF spherical roller bearings for vibratory applications are produced as standard with C4 clearance.

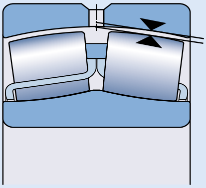
The radial internal clearance limits are listed for bearings with

- cylindrical bore in **table** 3 and with
- tapered bore in **table** 4.

The clearance limits are in accordance with ISO 5753:1991 and are valid for bearings before mounting under zero measuring load.

Table 3

Radial internal clearance of spherical roller bearings with cylindrical bore

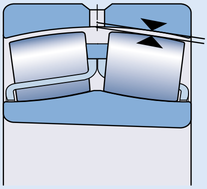


Bore diameter d over	incl.	Radial internal clearance C2 min	max	Normal min	max	C3 min	max	C4 min	max	C5 min	max
mm		µm									
18	**24**	10	20	20	35	35	45	45	60	60	75
24	**30**	15	25	25	40	40	55	55	75	75	95
30	**40**	15	30	30	45	45	60	60	80	80	100
40	**50**	20	35	35	55	55	75	75	100	100	125
50	**65**	20	40	40	65	65	90	90	120	120	150
65	**80**	30	50	50	80	80	110	110	145	145	185
80	**100**	35	60	60	100	100	135	135	180	180	225
100	**120**	40	75	75	120	120	160	160	210	210	260
120	**140**	50	95	95	145	145	190	190	240	240	300
140	**160**	60	110	110	170	170	220	220	280	280	350
160	**180**	65	120	120	180	180	240	240	310	310	390
180	**200**	70	130	130	200	200	260	260	340	340	430
200	**225**	80	140	140	220	220	290	290	380	380	470
225	**250**	90	150	150	240	240	320	320	420	420	520
250	**280**	100	170	170	260	260	350	350	460	460	570
280	**315**	110	190	190	280	280	370	370	500	500	630
315	**355**	120	200	200	310	310	410	410	550	550	690
355	**400**	130	220	220	340	340	450	450	600	600	750
400	**450**	140	240	240	370	370	500	500	660	660	820
450	**500**	140	260	260	410	410	550	550	720	720	900
500	**560**	150	280	280	440	440	600	600	780	780	1 000
560	**630**	170	310	310	480	480	650	650	850	850	1 100
630	**710**	190	350	350	530	530	700	700	920	920	1 190
710	**800**	210	390	390	580	580	770	770	1 010	1 010	1 300
800	**900**	230	430	430	650	650	860	860	1 120	1 120	1 440
900	**1 000**	260	480	480	710	710	930	930	1 220	1 220	1 570
1 000	**1 120**	290	530	530	780	780	1 020	1 020	1 330	1 330	1 720
1 120	**1 250**	320	580	580	860	860	1 120	1 120	1 460	1 460	1 870
1 250	**1 400**	350	640	640	950	950	1 240	1 240	1 620	1 620	2 060
1 400	**1 600**	400	720	720	1 060	1 060	1 380	1 380	1 800	1 800	2 300
1 600	**1 800**	450	810	810	1 180	1 180	1 550	1 550	2 000	2 000	2 550

Please refer to **page 137** for definition of radial internal clearance

Table 4

Radial internal clearance of spherical roller bearings with tapered bore



Bore diameter d		Radial internal clearance C2		Normal		C3		C4		C5	
over	incl.	min	max	min	max	min	max	min	max	min	max
mm		µm									
24	**30**	20	30	30	40	40	55	55	75	–	–
30	**40**	25	35	35	50	50	65	65	85	85	105
40	**50**	30	45	45	60	60	80	80	100	100	130
50	**65**	40	55	55	75	75	95	95	120	120	160
65	**80**	50	70	70	95	95	120	120	150	150	200
80	**100**	55	80	80	110	110	140	140	180	180	230
100	**120**	65	100	100	135	135	170	170	220	220	280
120	**140**	80	120	120	160	160	200	200	260	260	330
140	**160**	90	130	130	180	180	230	230	300	300	380
160	**180**	100	140	140	200	200	260	260	340	340	430
180	**200**	110	160	160	220	220	290	290	370	370	470
200	**225**	120	180	180	250	250	320	320	410	410	520
225	**250**	140	200	200	270	270	350	350	450	450	570
250	**280**	150	220	220	300	300	390	390	490	490	620
280	**315**	170	240	240	330	330	430	430	540	540	680
315	**355**	190	270	270	360	360	470	470	590	590	740
355	**400**	210	300	300	400	400	520	520	650	650	820
400	**450**	230	330	330	440	440	570	570	720	720	910
450	**500**	260	370	370	490	490	630	630	790	790	1 000
500	**560**	290	410	410	540	540	680	680	870	870	1 100
560	**630**	320	460	460	600	600	760	760	980	980	1 230
630	**710**	350	510	510	670	670	850	850	1 090	1 090	1 360
710	**800**	390	570	570	750	750	960	960	1 220	1 220	1 500
800	**900**	440	640	640	840	840	1 070	1 070	1 370	1 370	1 690
900	**1 000**	490	710	710	930	930	1 190	1 190	1 520	1 520	1 860
1 000	**1 120**	530	770	770	1 030	1 030	1 300	1 300	1 670	1 670	2 050
1 120	**1 250**	570	830	830	1 120	1 120	1 420	1 420	1 830	1 830	2 250
1 250	**1 400**	620	910	910	1 230	1 230	1 560	1 560	2 000	2 000	2 450
1 400	**1 600**	680	1 000	1 000	1 350	1 350	1 720	1 720	2 200	2 200	2 700
1 600	**1 800**	750	1 110	1 110	1 500	1 500	1 920	1 920	2 400	2 400	2 950

Please refer to **page 137** for definition of radial internal clearance

Misalignment

The design of spherical roller bearings is such that they are inherently self-aligning, i.e. angular misalignment between the outer and inner rings can be accommodated without any effect on bearing performance. Under normal loads and operating conditions (C/P > 10), and when misalignment is constant in position with respect to the outer ring, the guideline values for permissible misalignment given in **table 5** apply. Whether these values can be fully exploited or not depends on the design of the bearing arrangement, the type of seals used etc.

When the position of the misalignment is not constant with respect to the bearing outer ring, e.g. in

- vibrating screens with rotating imbalance and therefore rotating deflection of the shaft (➔ **fig 13**), or
- deflection-compensating rolls of paper machines where the stationary shaft is bent,

additional sliding is caused in the bearing under the operating conditions. Therefore, with reference to bearing friction and associated heat generation, it is recommended that misalignment of the inner ring with respect to the outer ring should not exceed a few tenths of a degree.

Sealed bearings can accommodate angular misalignments of the shaft with respect to the housing of up to approximately 0,5°. Provided the guideline value is not exceeded, there will be no detrimental effect on the efficiency of the seals.

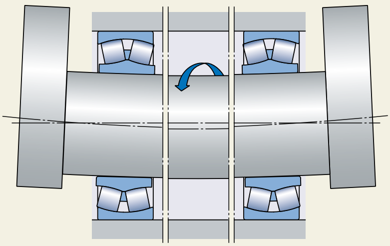
Table 5

Permissible angular misalignment

Bearing series Sizes[1]	**Permissible angular misalignment**
–	degrees
Series 213	2
Series 222	
Sizes < 52	2
Sizes ≥ 52	1,5
Series 223	3
Series 230	
Sizes < 56	2
Sizes ≥ 56	2,5
Series 231	
Sizes < 60	2
Sizes ≥ 60	3
Series 232	
Sizes < 52	2,5
Sizes ≥ 52	3,5
Series 238	1,5
Series 239	1,5
Series 240	2
Series 241	
Sizes < 64	2,5
Sizes ≥ 64	3,5
Series 248	1,5
Series 249	2,5

[1] Last two figures of bearings designations

Fig 13



Influence of operating temperature on bearing material

All SKF spherical roller 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 short periods at even higher temperatures is permitted.

Axial load carrying capacity

Because of their special internal design, SKF spherical roller bearings are able to accommodate heavy axial loads and even purely axial loads.

Axial load carrying capacity of bearings mounted on an adapter sleeve

If spherical roller bearings with adapter sleeves are mounted on smooth shafts with no fixed abutment, the magnitude of the axial load that can be supported is determined by the friction between the shaft and sleeve. Provided the bearings are correctly mounted, the permissible axial load can be calculated from

$$F_{ap} = 0{,}003\ B\ d$$

where
F_{ap} = maximum permissible axial load, kN
B = bearing width, mm
d = bearing bore diameter, mm

Minimum load

In order to provide satisfactory operation, spherical roller 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(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 rollers and raceways.

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

$$P_{0m} = 0{,}01\ C_0$$

where
P_{0m} = minimum equivalent static load, kN
C_0 = basic static load rating, kN (➔ product tables)

In some applications it is not possible to reach or exceed the requisite minimum load. However, if the bearing is oil lubricated lower minimum loads are permissible. These loads can be calculated when $n/n_r \leq 0{,}3$ from

$$P_{0m} = 0{,}003\ C_0$$

and when $0{,}3 < n/n_r \leq 2$ from

$$P_{0m} = 0{,}003\ C_0 \left(1 + 2\sqrt{\frac{n}{n_r} - 0{,}3}\right)$$

where
P_{0m} = minimum equivalent static bearing load, kN
C_0 = basic static load rating, kN (➔ product tables)
n = rotational speed, r/min
n_r = reference speed, r/min (➔ product tables)

When starting up at low temperatures or when the lubricant is highly viscous, even greater minimum loads than $P_{0m} = 0{,}01\ C_0$ 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 bearing must be subjected to an additional radial load.

NoWear spherical roller bearings have proven to give reliable operation at very low loads. They can withstand longer periods of insufficient lubrication, sudden variations in load and rapid speed changes (➔ **page 939**).

Equivalent dynamic bearing load

For dynamically loaded spherical roller bearings

$P = F_r + Y_1 F_a$ when $F_a/F_r \leq e$
$P = 0,67\ F_r + Y_2 F_a$ when $F_a/F_r > e$

The values of the calculation factors e, Y_1 and Y_2 will be found in the product tables.

Equivalent static bearing load

For statically loaded spherical roller bearings

$P_0 = F_r + Y_0 F_a$

The value of the calculation factor Y_0 will be found in the product tables.

Supplementary designations

The designation suffixes used to identify certain features of SKF spherical roller bearings are explained in the following. The suffixes used to identify bearing (and cage) design, e.g. CC or E, are not included here as they are explained in the section "Standard bearings" on **page 692**.

C2	Radial internal clearance smaller than Normal
C3	Radial internal clearance greater than Normal
C4	Radial internal clearance greater than C3
C5	Radial internal clearance greater than C4
C08	Heightened running accuracy to ISO tolerance class 5
C083	C08 + C3
C084	C08 + C4
2CS	Sheet steel reinforced contact seal of acrylonitrile butadiene rubber (NBR) on both sides of the bearing. Annular groove and three lubrication holes in the outer ring covered with a polymer band. Lubricated with an extreme pressure bearing grease according to **table 1** on **page 694**
2CS2	Sheet steel reinforced contact seal of fluoro rubber (FPM) on both sides of the bearing. Annular groove and three lubrication holes in the outer ring; covered with a polymer band. Lubricated with a polyurea high temperature grease
2CS5	Sheet steel reinforced contact seal of hydrogenated acrylonitrile butadiene rubber (HNBR) on both sides of the bearing. Otherwise as 2CS2
HA3	Inner ring of case-hardening steel
K	Tapered bore, taper 1:12
K30	Tapered bore, taper 1:30
P5	Dimensional and running accuracy to ISO tolerance class 5
P6	Dimensional and running accuracy to ISO tolerance class 6
P62	P6 + C2
VA405	Bearings for vibratory applications with surface hardened cages
VA406	VA405 and PTFE-coated bore
VE552(E)	Outer ring with three equally spaced threaded holes in one side face to accommodate hoisting tackle; the E indicates that appropriate eye bolts are supplied with the bearings
VE553(E)	As VE552 but with threaded holes in both side faces
VG114	Surface hardened pressed steel cage
VQ424	Running accuracy better than C08
VT143	Grease fill with an extreme pressure grease according to **table 1** on **page 694**
W	Without annular groove and lubrication holes in outer ring
W20	Three lubrication holes in the outer ring
W26	Six lubrication holes in the inner ring
W33	Annular groove and three lubrication holes in the outer ring
W64	Solid Oil filling
W77	Plugged W33 lubrication holes
W513	W26 + W33
235220	Inner ring of case-hardened steel with helical groove in bore

Mounting bearings with tapered bore

Bearings with a tapered bore are always mounted with an interference fit. The reduction in radial internal clearance, or the axial displacement of the inner ring on its tapered seating is used as a measure of the degree of interference.

Suitable methods for mounting spherical roller bearings with tapered bore are:

- measuring the clearance reduction,
- measuring the lock nut tightening angle,
- measuring the axial drive-up,
- measuring the inner ring expansion.

Small bearings with a bore diameter up to 100 mm can be properly mounted by measuring the lock nut tightening angle. For larger bearings the SKF Drive-up Method is recommended. This method is more accurate and takes less time than the procedure based on clearance reduction or the lock nut tightening angle. Measuring the inner ring expansion, i.e. applying the SKF SensorMount® Method, allows large size bearings to be mounted simply, quickly and accurately, since a sensor is integrated into the bearing inner ring.

Measuring clearance reduction

The method using feeler gauges for measuring the radial internal clearance before and after mounting bearings is applicable for medium and large-sized bearings. The clearance should always be measured between the outer ring and an unloaded roller (➔ **fig** 14). Before measuring, rotate the inner or outer ring a few times. Care must be taken to see that both bearing rings and the roller complement are centrically arranged with respect to each other. For the first measurement, a blade should be selected which is slightly thinner than the minimum value for the clearance. The procedure should be repeated using slightly thicker blades each time until a certain resistance is felt when moving between

- outer ring and uppermost roller (**a**) – before mounting
- outer ring and lowest roller (**b**) – after mounting.

Guideline values for the permissible minimum clearance after mounting are given in **table** 6.

Fig 14

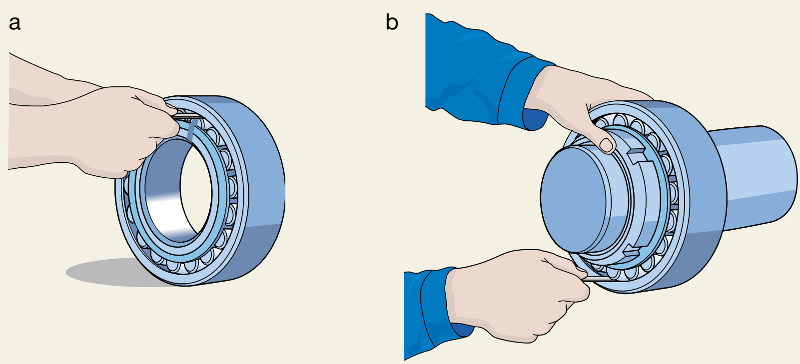
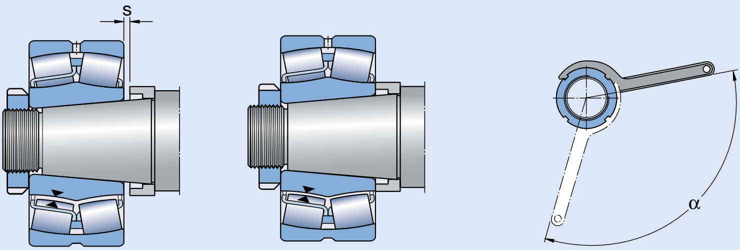


Table 6

Guideline values for reduction of radial internal clearance, axial drive-up and lock nut tightening angle



Bore diameter d over	incl.	Reduction of radial internal clearance min	max	Axial drive-up[1)] s Taper 1:12 min	max	Taper 1:30 min	max	Permissible residual[2)] radial clearance after mounting bearings with initial clearance Normal	C3	C4	Lock nut tightening angle α
mm		mm		mm				mm			degrees
24	**30**	0,015	0,020	0,3	0,35	–	–	0,015	0,020	0,035	110
30	**40**	0,020	0,025	0,35	0,4	–	–	0,015	0,025	0,040	120
40	**50**	0,025	0,030	0,4	0,45	–	–	0,020	0,030	0,050	130
50	**65**	0,030	0,040	0,45	0,6	3	4	0,025	0,035	0,055	110
65	**80**	0,040	0,050	0,6	0,7	3,2	4,2	0,025	0,040	0,070	130
80	**100**	0,045	0,060	0,7	0,9	1,7	2,2	0,035	0,050	0,080	150
100	**120**	0,050	0,070	0,75	1,1	1,9	2,7	0,050	0,065	0,100	–
120	**140**	0,065	0,090	1,1	1,4	2,7	3,5	0,055	0,080	0,110	–
140	**160**	0,075	0,100	1,2	1,6	3	4	0,055	0,090	0,130	–
160	**180**	0,080	0,110	1,3	1,7	3,2	4,2	0,060	0,100	0,150	–
180	**200**	0,090	0,130	1,4	2	3,5	5	0,070	0,100	0,160	–
200	**225**	0,100	0,140	1,6	2,2	4	5,5	0,080	0,120	0,180	–
225	**250**	0,110	0,150	1,7	2,4	4,2	6	0,090	0,130	0,200	–
250	**280**	0,120	0,170	1,9	2,7	4,7	6,7	0,100	0,140	0,220	–
280	**315**	0,130	0,190	2	3	5	7,5	0,110	0,150	0,240	–
315	**355**	0,150	0,210	2,4	3,3	6	8,2	0,120	0,170	0,260	–
355	**400**	0,170	0,230	2,6	3,6	6,5	9	0,130	0,190	0,290	–
400	**450**	0,200	0,260	3,1	4	7,7	10	0,130	0,200	0,310	–
450	**500**	0,210	0,280	3,3	4,4	8,2	11	0,160	0,230	0,350	–
500	**560**	0,240	0,320	3,7	5	9,2	12,5	0,170	0,250	0,360	–
560	**630**	0,260	0,350	4	5,4	10	13,5	0,200	0,290	0,410	–
630	**710**	0,300	0,400	4,6	6,2	11,5	15,5	0,210	0,310	0,450	–
710	**800**	0,340	0,450	5,3	7	13,3	17,5	0,230	0,350	0,510	–
800	**900**	0,370	0,500	5,7	7,8	14,3	19,5	0,270	0,390	0,570	–
900	**1 000**	0,410	0,550	6,3	8,5	15,8	21	0,300	0,430	0,640	–
1 000	**1 120**	0,450	0,600	6,8	9	17	23	0,320	0,480	0,700	–
1 120	**1 250**	0,490	0,650	7,4	9,8	18,5	25	0,340	0,540	0,770	–
1 250	**1 400**	0,550	0,720	8,3	10,8	21	27	0,360	0,590	0,840	–
1 400	**1 600**	0,600	0,800	9,1	11,9	22,7	29,8	0,400	0,650	0,920	–
1 600	**1 800**	0,670	0,900	10,2	13,4	25,4	33,6	0,440	0,720	1,020	–

1) Valid only for solid steel shafts and general application. Not valid for the SKF Drive-up Method
2) The residual clearance must be checked in cases where the initial radial internal clearance is in the lower half of the tolerance range, and where large temperature differentials between the bearing rings can arise in operation. The residual clearance must not be less than the minimum values quoted above

Measuring the lock nut tightening angle
Mounting small to medium-size bearings on tapered seatings is easy when the tightening angle α of the locking nut (➔ **fig** 15) and the method that is described in the following is used. Guideline values for the tightening angle α are given in **table** 6.

Before starting the final tightening procedure, the bearing should always be pushed up on the tapered seating until the bore of the bearing is in contact with the seating on the shaft or sleeve around its whole circumference. By turning the nut through the given angle the bearing will then be pressed up the tapered seating. The residual clearance of the bearing should be checked, if possible.

Then unscrew the nut, place the locking washer in position and tighten the nut firmly again. Lock the nut by bending one of the locking washer tabs into the nut slot or by attaching the locking clip to the nut.

Measuring the axial drive-up
Mounting bearings with a tapered bore can be done by measuring the axial drive-up s of the inner ring on its seating. Guideline values for the required axial drive-up s for general applications are given in **table** 6.

The most suitable method in this case is the SKF Drive-up Method. This mounting method provides a very reliable and easy way to determine the starting position for a bearing from which the axial displacement is to be measured. For that, the following mounting tools (➔ **fig** 16) must be used:

- an SKF hydraulic nut of the HMV .. E design (**a**),
- a hydraulic pump (**b**) with
- a pressure gauge (**c**), appropriate to the mounting conditions, and
- a dial gauge (**d**).

Fig 15

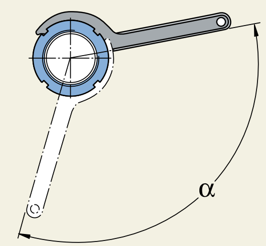


Fig 16

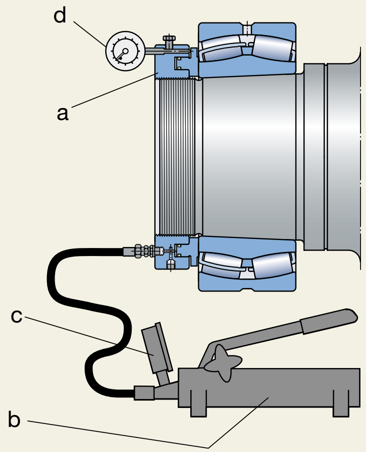


Fig 17

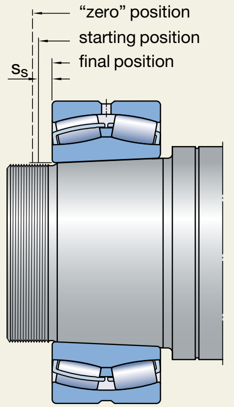
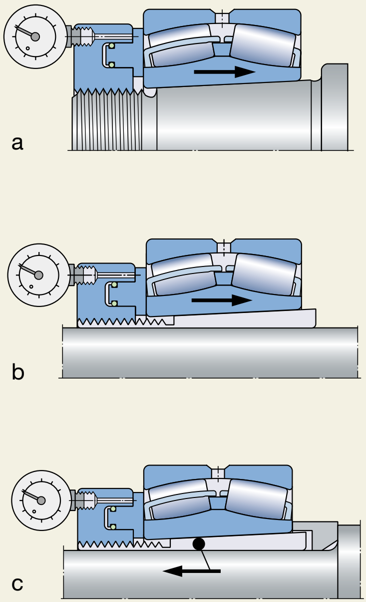


Fig 18



Using the drive-up method the bearing is pushed up its seating to a defined starting position (➔ **fig** 17) using a given oil pressure (corresponding to a given drive-up force) in the hydraulic nut. In this way, part of the desired reduction in radial internal clearance is achieved. The oil pressure is monitored by the pressure gauge. The bearing is then driven up from the defined starting position through a given distance to its final position. The axial displacement s_s is accurately determined using the dial gauge mounted on the hydraulic nut.

SKF has determined values of the requisite oil pressure and the axial displacement for the individual bearings. These values apply to bearing arrangements (➔ **fig** 18) with

- one sliding interface (**a**) and (**b**) or
- two sliding interfaces (**c**).

Measuring the inner ring expansion
Measuring inner ring expansion allows large-size spherical roller bearings with a tapered bore to be mounted simply, quickly and accurately without measuring the radial internal clearance before and after mounting. The SKF Sensor Mount Method uses a sensor, integrated into the bearing inner ring, and a dedicated hand-held indicator (➔ **fig 19**).

The bearing is driven up the tapered seating using common SKF mounting tools. The information from the sensor is processed by the indicator. Inner ring expansion is displayed as the relationship between the clearance reduction (mm) and the bearing bore diameter (m).

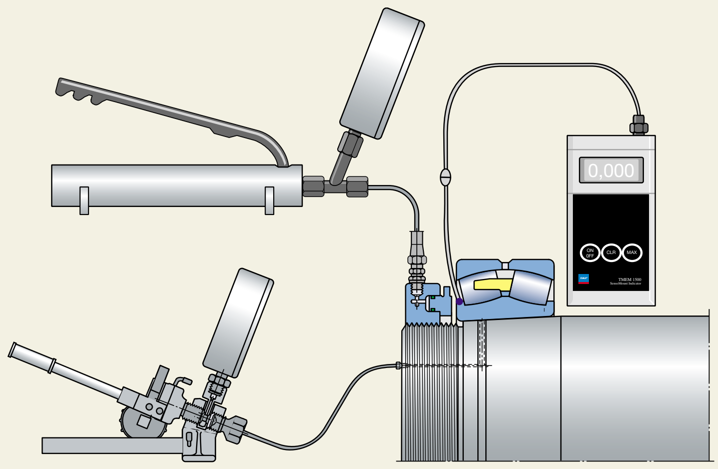
Aspects like bearing size, smoothness, shaft material or design – solid or hollow – do not need to be considered.

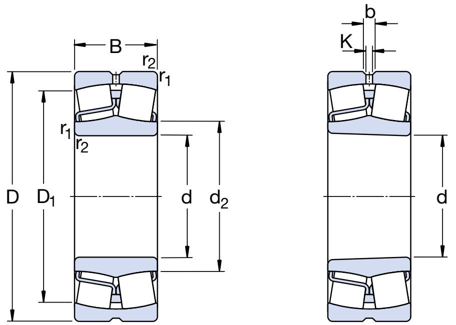
For detailed information about the SKF SensorMount Method please contact the SKF application engineering service.

Additional mounting information
Additional information on mounting spherical roller bearings in general or with the aid of the SKF Drive-up Method can be found

- in the handbook "SKF Drive-up Method" on CD-ROM,
- in the "SKF Interactive Engineering Catalogue" on CD-ROM or online at www.skf.com or
- online at www.skf.com/mount.

Fig 19

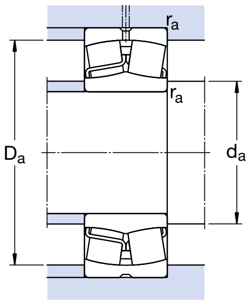


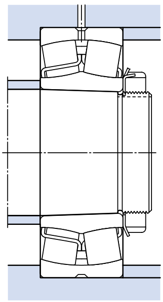


Cylindrical bore   Tapered bore

Principal dimensions d	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass	Designations Bearing with cylindrical bore	tapered bore
mm			kN		kN	r/min		kg	–	
20	52	18	49	44	4,75	13 000	17 000	0,28	* **22205/20 E**	**–**
25	52	18	49	44	4,75	13 000	17 000	0,26	* **22205 E**	* **22205 EK**
	62	17	41,4	41,5	4,55	8 500	12 000	0,28	**21305 CC**	**–**
30	62	20	64	60	6,4	11 000	14 000	0,29	* **22206 E**	* **22206 EK**
	72	19	55,2	61	6,8	7 500	10 000	0,41	**21306 CC**	**21306 CCK**
35	72	23	86,5	85	9,3	9 000	12 000	0,45	* **22207 E**	* **22207 EK**
	80	21	65,6	72	8,15	6 700	9 500	0,55	**21307 CC**	**21307 CCK**
40	80	23	96,5	90	9,8	8 000	11 000	0,53	* **22208 E**	* **22208 EK**
	90	23	104	108	11,8	7 000	9 500	0,75	* **21308 E**	* **21308 EK**
	90	33	150	140	15	6 000	8 000	1,05	* **22308 E**	* **22308 EK**
45	85	23	102	98	10,8	7 500	10 000	0,58	* **22209 E**	* **22209 EK**
	100	25	125	127	13,7	5 300	7 000	0,99	* **21309 E**	* **21309 EK**
	100	36	183	183	19,6	5 300	7 000	1,40	* **22309 E**	* **22309 EK**
50	90	23	104	108	11,8	7 000	9 500	0,63	* **22210 E**	* **22210 EK**
	110	27	156	166	18,6	5 600	7 500	1,35	* **21310 E**	* **21310 EK**
	110	40	220	224	24	4 800	6 300	1,90	* **22310 E**	* **22310 EK**
55	100	25	125	137	13,7	6 300	8 000	0,84	* **22211 E**	* **22211 EK**
	120	29	156	166	18,6	5 600	7 500	1,70	* **21311 E**	* **21311 EK**
	120	43	270	280	30	4 300	5 600	2,45	* **22311 E**	* **22311 EK**
60	110	28	156	166	18,6	5 600	7 500	1,15	* **22212 E**	* **22212 EK**
	130	31	212	240	26,5	4 800	6 300	2,10	* **21312 E**	* **21312 EK**
	130	46	310	335	36,5	4 000	5 300	3,10	* **22312 E**	* **22312 EK**
65	120	31	193	216	24	4 300	7 000	1,55	* **22213 E**	* **22213 EK**
	140	33	236	270	29	4 300	6 000	2,55	* **21313 E**	* **21313 EK**
	140	48	340	360	38	3 800	5 000	3,75	* **22313 E**	* **22313 EK**
70	125	31	208	228	25,5	5 000	6 700	1,55	* **22214 E**	* **22214 EK**
	150	35	285	325	34,5	3 400	4 500	3,10	* **21314 E**	* **21314 EK**
	150	51	400	430	45	3 400	4 500	4,55	* **22314 E**	* **22314 EK**

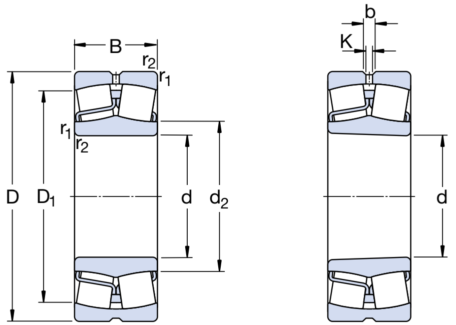
* SKF Explorer bearing





Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
20	31,2	44,2	3,7	2	1	25,6	46,4	1	0,35	1,9	2,9	1,8
25	31,2	44,2	3,7	2	1	30,6	46,4	1	0,35	1,9	2,9	1,8
	35,7	50,7	–	–	1,1	32	55	1	0,30	2,3	3,4	2,2
30	37,7	53	3,7	2	1	35,6	56,4	1	0,31	2,2	3,3	2,2
	43,3	58,8	–	–	1,1	37	65	1	0,27	2,5	3,7	2,5
35	44,5	61,8	3,7	2	1,1	42	65	1	0,31	2,2	3,3	2,2
	47,2	65,6	–	–	1,5	44	71	1,5	0,28	2,4	3,6	2,5
40	49,6	69,4	5,5	3	1,1	47	73	1	0,28	2,4	3,6	2,5
	59,9	79	–	–	1,5	49	81	1,5	0,24	2,8	4,2	2,8
	49,9	74,3	5,5	3	1,5	49	81	1,5	0,37	1,8	2,7	1,8
45	54,9	74,4	5,5	3	1,1	52	78	1	0,26	2,6	3,9	2,5
	65,3	87,9	5,5	3	1,5	54	91	1,5	0,24	2,8	4,2	2,8
	57,6	83,1	5,5	3	1,5	54	91	1,5	0,37	1,8	2,7	1,8
50	59,9	79	5,5	3	1,1	57	83	1	0,24	2,8	4,2	2,8
	72,6	96	5,5	3	2	61	99	2	0,24	2,8	4,2	2,8
	63,9	91,9	5,5	3	2	61	99	2	0,37	1,8	2,7	1,8
55	65,3	87,9	5,5	3	1,5	64	91	1,5	0,24	2,8	4,2	2,8
	72,6	96	5,5	3	2	66	109	2	0,24	2,8	4,2	2,8
	70,1	102	5,5	3	2	66	109	2	0,35	1,9	2,9	1,8
60	72,6	96,3	5,5	3	1,5	69	101	1,5	0,24	2,8	4,2	2,8
	87,8	115	5,5	3	2,1	72	118	2	0,22	3	4,6	2,8
	77,9	110	5,5	4,5	2,1	72	118	2	0,35	1,9	2,9	1,8
65	80	106	5,5	3	1,5	74	111	1,5	0,24	2,8	4,2	2,8
	94,7	124	5,5	3	2,1	77	128	2	0,22	3	4,6	2,8
	81,6	118	8,3	4,5	2,1	77	128	2	0,35	1,9	2,9	1,8
70	83	111	5,5	3	1,5	79	116	1,5	0,22	3	4,6	2,8
	101	133	5,5	3	2,1	82	138	2	0,22	3	4,6	2,8
	90,3	128	8,3	4,5	2,1	82	138	2	0,33	2	3	2

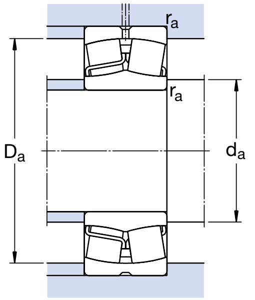
Spherical roller bearings
d **75 – 110** mm

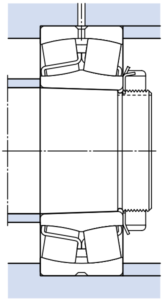


Cylindrical bore Tapered bore

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	–	
75	115	40	173	232	28,5	3 800	5 300	1,55	* **24015 CC/W33**	–
	130	31	212	240	26,5	4 800	6 300	1,70	* **22215 E**	* **22215 EK**
	160	37	285	325	34,5	4 000	5 600	3,75	* **21315 E**	* **21315 EK**
	160	55	440	475	48	3 200	4 300	5,55	* **22315 E**	* **22315 EK**
80	140	33	236	270	29	4 300	6 000	2,10	* **22216 E**	* **22216 EK**
	170	39	325	375	39	3 800	5 300	4,45	* **21316 E**	* **21316 EK**
	170	58	490	540	54	3 000	4 000	6,60	* **22316 E**	* **22316 EK**
85	150	36	285	325	34,5	4 000	5 600	2,65	* **22217 E**	* **22217 EK**
	180	41	325	375	39	3 800	5 300	5,20	* **21317 E**	* **21317 EK**
	180	60	550	620	61	2 800	3 800	7,65	* **22317 E**	* **22317 EK**
90	160	40	325	375	39	3 800	5 300	3,40	* **22218 E**	* **22218 EK**
	160	52,4	355	440	48	2 800	3 800	4,65	* **23218 CC/W33**	* **23218 CCK/W33**
	190	43	380	450	46,5	3 600	4 800	6,10	* **21318 E**	* **21318 EK**
	190	64	610	695	67	2 600	3 600	9,05	* **22318 E**	* **22318 EK**
95	170	43	380	450	46,5	3 600	4 800	4,15	* **22219 E**	* **22219 EK**
	200	45	425	490	49	3 400	4 500	7,05	* **21319 E**	* **21319 EK**
	200	67	670	765	73,5	2 600	3 400	10,5	* **22319 E**	* **22319 EK**
100	150	50	285	415	45,5	2 800	4 000	3,15	* **24020 CC/W33**	–
	165	52	365	490	53	3 000	4 000	4,55	* **23120 CC/W33**	* **23120 CCK/W33**
	165	65	455	640	68	2 200	3 200	5,65	* **24120 CC/W33**	–
	180	46	425	490	49	3 400	4 500	4,90	* **22220 E**	* **22220 EK**
	180	60,3	475	600	63	2 400	3 400	6,85	* **23220 CC/W33**	* **23220 CCK/W33**
	215	47	425	490	49	3 400	4 500	8,60	* **21320 E**	* **21320 EK**
	215	73	815	950	88	2 400	3 000	13,5	* **22320 E**	* **22320 EK**
110	170	45	310	440	46,5	3 400	4 300	3,80	* **23022 CC/W33**	* **23022 CCK/W33**
	170	60	415	620	67	2 200	3 600	5,00	* **24022 CC/W33**	* **24022 CCK30/W33**
	180	56	430	585	61	2 800	3 600	5,75	* **23122 CC/W33**	* **23122 CCK/W33**
	180	69	520	750	78	2 200	3 000	7,10	* **24122 CC/W33**	* **24122 CCK30/W33**
	200	53	560	640	63	3 000	4 000	7,00	* **22222 E**	* **22222 EK**
	200	69,8	600	765	76,5	2 200	3 000	9,85	* **23222 CC/W33**	* **23222 CCK/W33**
	240	80	950	1 120	100	2 000	2 800	18,4	* **22322 E**	* **22322 EK**

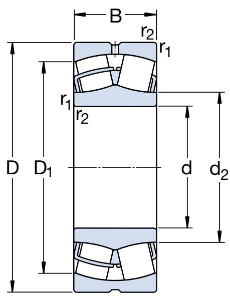
* SKF Explorer bearing



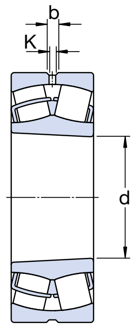


Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
75	84,1	100	5,5	3	1,1	81	109	1	0,28	2,4	3,6	2,5
	87,8	115	5,5	3	1,5	84	121	1,5	0,22	3	4,6	2,8
	101	133	5,5	3	2,1	87	148	2	0,22	3	4,6	2,8
	92,8	135	8,3	4,5	2,1	87	148	2	0,35	1,9	2,9	1,8
80	94,7	127	5,5	3	2	91	129	2	0,22	3	4,6	2,8
	106	141	5,5	3	2,1	92	158	2	0,24	2,8	4,2	2,8
	98,3	143	8,3	4,5	2,1	92	158	2	0,35	1,9	2,9	1,8
85	101	133	5,5	3	2	96	139	2	0,22	3	4,6	2,8
	106	141	5,5	3	3	99	166	2,5	0,24	2,8	4,2	2,8
	108	154	8,3	4,5	3	99	166	2,5	0,33	2	3	2
90	106	141	5,5	3	2	101	149	2	0,24	2,8	4,2	2,8
	106	137	5,5	3	2	101	149	2	0,31	2,2	3,3	2,2
	112	150	8,3	4,5	3	104	176	2,5	0,24	2,8	4,2	2,8
	113	161	11,1	6	3	104	176	2,5	0,33	2	3	2
95	112	150	8,3	4,5	2,1	107	158	2	0,24	2,8	4,2	2,8
	118	159	8,3	4,5	3	109	186	2,5	0,24	2,8	4,2	2,8
	118	168	11,1	6	3	109	186	2,5	0,33	2	3	2
100	111	132	5,5	3	1,5	107	143	1,5	0,28	2,4	3,6	2,5
	115	144	5,5	3	2	111	154	2	0,30	2,3	3,4	2,2
	113	141	5,5	3	2	111	154	2	0,37	1,8	2,7	1,8
	118	159	8,3	4,5	2,1	112	168	2	0,24	2,8	4,2	2,8
	117	153	8,3	4,5	2,1	112	168	2	0,33	2	3	2
	118	159	8,3	4,5	3	114	201	2,5	0,24	2,8	4,2	2,8
	130	184	11,1	6	3	114	201	2,5	0,33	2	3	2
110	125	151	5,5	3	2	120	160	2	0,23	2,9	4,4	2,8
	122	149	5,5	3	2	120	160	2	0,33	2	3	2
	126	157	8,3	4,5	2	121	169	2	0,30	2,3	3,4	2,2
	123	153	5,5	3	2	121	169	2	0,37	1,8	2,7	1,8
	130	178	8,3	4,5	2,1	122	188	2	0,25	2,7	4	2,5
	130	169	8,3	4,5	2,1	122	188	2	0,33	2	3	2
	143	204	13,9	7,5	3	124	226	2,5	0,33	2	3	2

Spherical roller bearings
d **120 – 150** mm



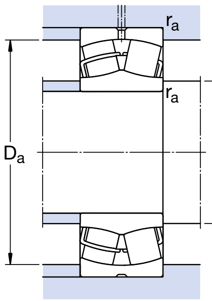
Cylindrical bore

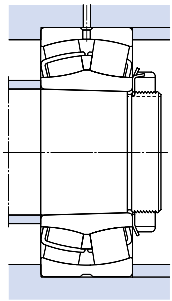


Tapered bore

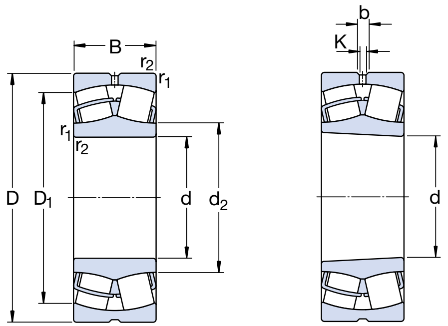
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designations** Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
120	180	46	355	510	53	3 200	4 000	4,20	* **23024 CC/W33**	* **23024 CCK/W33**
	180	60	430	670	68	2 000	3 400	5,45	* **24024 CC/W33**	* **24024 CCK30/W33**
	200	62	510	695	71	2 400	3 400	8,00	* **23124 CC/W33**	* **23124 CCK/W33**
	200	80	655	950	95	1 900	2 600	10,3	* **24124 CC/W33**	* **24124 CCK30/W33**
	215	58	630	765	73,5	2 800	3 800	8,70	* **22224 E**	* **22224 EK**
	215	76	695	930	93	2 000	2 800	12,0	* **23224 CC/W33**	* **23224 CCK/W33**
	260	86	965	1 120	100	2 000	2 600	23,0	* **22324 CC/W33**	* **22324 CCK/W33**
130	200	52	430	610	62	2 800	3 600	6,00	* **23026 CC/W33**	* **23026 CCK/W33**
	200	69	540	815	81,5	1 900	3 000	8,05	* **24026 CC/W33**	* **24026 CCK30/W33**
	210	64	560	780	78	2 400	3 200	8,80	* **23126 CC/W33**	* **23126 CCK/W33**
	210	80	680	1 000	100	1 800	2 400	11,0	* **24126 CC/W33**	* **24126 CCK30/W33**
	230	64	735	930	88	2 600	3 600	11,0	* **22226 E**	* **22226 EK**
	230	80	780	1 060	104	1 900	2 600	14,5	* **23226 CC/W33**	* **23226 CCK/W33**
	280	93	1 120	1 320	114	1 700	2 400	29,0	* **22326 CC/W33**	* **22326 CCK/W33**
140	210	53	465	680	68	2 600	3 400	6,55	* **23028 CC/W33**	* **23028 CCK/W33**
	210	69	570	900	88	1 800	2 800	8,55	* **24028 CC/W33**	* **24028 CCK30/W33**
	225	68	630	900	88	2 200	2 800	10,5	* **23128 CC/W33**	* **23128 CCK/W33**
	225	85	673	1 160	112	1 500	2 400	13,5	* **24128 CC/W33**	* **24128 CCK30/W33**
	250	68	710	900	86,5	2 400	3 200	14,0	* **22228 CC/W33**	* **22228 CCK/W33**
	250	88	915	1 250	120	1 600	2 400	19,0	* **23228 CC/W33**	* **23228 CCK/W33**
	300	102	1 290	1 560	132	1 700	2 200	36,5	* **22328 CC/W33**	* **22328 CCK/W33**
150	225	56	510	750	73,5	2 400	3 200	7,95	* **23030 CC/W33**	* **23030 CCK/W33**
	225	75	655	1 040	100	1 700	2 600	10,5	* **24030 CC/W33**	* **24030 CCK30/W33**
	250	80	830	1 200	114	2 000	2 600	16,0	* **23130 CC/W33**	* **23130 CCK/W33**
	250	100	1 020	1 530	146	1 400	2 200	20,0	* **24130 CC/W33**	* **24130 CCK30/W33**
	270	73	850	1 080	102	2 200	3 000	18,0	* **22230 CC/W33**	* **22230 CCK/W33**
	270	96	1 080	1 460	137	1 500	2 200	24,5	* **23230 CC/W33**	* **23230 CCK/W33**
	320	108	1 460	1 760	146	1 600	2 000	43,5	* **22330 CC/W33**	* **22330 CCK/W33**

* SKF Explorer bearing





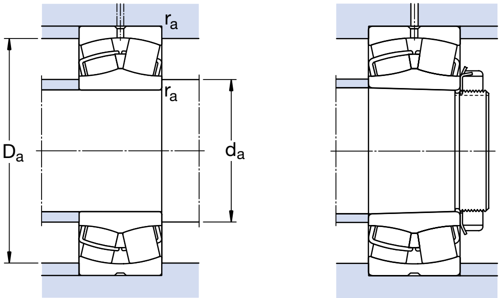
Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
120	135	163	5,5	3	2	130	170	2	0,22	3	4,6	2,8
	132	159	5,5	3	2	130	170	2	0,30	2,3	3,4	2,2
	139	174	8,3	4,5	2	131	189	2	0,28	2,4	3,6	2,5
	135	168	5,5	3	2	131	189	2	0,37	1,8	2,7	1,8
	141	189	11,1	6	2,1	132	203	2	0,26	2,6	3,9	2,5
	141	182	8,3	4,5	2,1	132	203	2	0,35	1,9	2,9	1,8
	152	216	13,9	7,5	3	134	246	2,5	0,35	1,9	2,9	1,8
130	148	180	8,3	4,5	2	140	190	2	0,23	2,9	4,4	2,8
	145	175	5,5	3	2	140	190	2	0,31	2,2	3,3	2,2
	148	184	8,3	4,5	2	141	199	2	0,28	2,4	3,6	2,5
	146	180	5,5	3	2	141	199	2	0,35	1,9	2,9	1,8
	152	201	11,1	6	3	144	216	2,5	0,27	2,5	3,7	2,5
	151	196	8,3	4,5	3	144	216	2,5	0,33	2	3	2
	164	233	16,7	9	4	148	262	3	0,35	1,9	2,9	1,8
140	158	190	8,3	4,5	2	150	200	2	0,22	3	4,6	2,8
	155	185	5,5	3	2	150	200	2	0,30	2,3	3,4	2,2
	159	197	8,3	4,5	2,1	152	213	2	0,28	2,4	3,6	2,5
	156	193	8,3	4,5	2,1	152	213	2	0,35	1,9	2,9	1,8
	166	216	11,1	6	3	154	236	2,5	0,26	2,6	3,9	2,5
	165	212	11,1	6	3	154	236	2,5	0,33	2	3	2
	175	247	16,7	9	4	157	283	3	0,35	1,9	2,9	1,8
150	169	203	8,3	4,5	2,1	161	214	2	0,22	3	4,6	2,8
	165	197	5,5	3	2,1	161	214	2	0,30	2,3	3,4	2,2
	172	216	11,1	6	2,1	162	238	2	0,30	2,3	3,4	2,2
	169	211	8,3	4,5	2,1	162	238	2	0,37	1,8	2,7	1,8
	178	234	13,9	7,5	3	164	256	2,5	0,26	2,6	3,9	2,5
	175	228	11,1	6	3	164	256	2,5	0,35	1,9	2,9	1,8
	188	266	16,7	9	4	167	303	3	0,35	1,9	2,9	1,8



Cylindrical bore Tapered bore

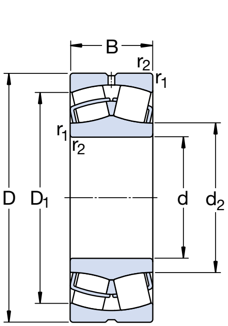
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass	Designations Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
160	240	60	585	880	83	2 400	3 000	9,70	* **23032 CC/W33**	* **23032 CCK/W33**
	240	80	750	1 200	114	1 700	2 400	13,0	* **24032 CC/W33**	* **24032 CCK30/W33**
	270	86	980	1 370	129	1 700	2 400	20,5	* **23132 CC/W33**	* **23132 CCK/W33**
	270	109	1 180	1 760	163	1 400	1 900	25,0	* **24132 CC/W33**	* **24132 CCK30/W33**
	290	80	1 000	1 290	118	2 000	2 800	22,5	* **22232 CC/W33**	* **22232 CCK/W33**
	290	104	1 220	1 660	153	1 500	2 200	31,0	* **23232 CC/W33**	* **23232 CCK/W33**
	340	114	1 600	1 960	160	1 500	1 900	52,0	* **22332 CC/W33**	* **22332 CCK/W33**
170	260	67	710	1 060	100	2 200	2 800	13,0	* **23034 CC/W33**	* **23034 CCK/W33**
	260	90	930	1 460	137	1 400	2 400	17,5	* **24034 CC/W33**	* **24034 CCK30/W33**
	280	88	1 040	1 500	137	1 800	2 400	22,0	* **23134 CC/W33**	* **23134 CCK/W33**
	280	109	1 220	1 860	170	1 300	1 900	27,5	* **24134 CC/W33**	* **24134 CCK30/W33**
	310	86	1 120	1 460	132	1 900	2 600	28,5	* **22234 CC/W33**	* **22234 CCK/W33**
	310	110	1 400	1 930	173	1 400	2 000	37,5	* **23234 CC/W33**	* **23234 CCK/W33**
	360	120	1 760	2 160	176	1 400	1 800	61,0	* **22334 CC/W33**	* **22334 CCK/W33**
180	250	52	431	830	76,5	2 400	2 800	7,90	**23936 CC/W33**	**23936 CCK/W33**
	280	74	830	1 250	114	2 000	2 600	17,0	* **23036 CC/W33**	* **23036 CCK/W33**
	280	100	1 080	1 730	156	1 500	2 200	23,0	* **24036 CC/W33**	* **24036 CCK30/W33**
	300	96	1 200	1 760	160	1 500	2 200	28,0	* **23136 CC/W33**	* **23136 CCK/W33**
	300	118	1 400	2 160	196	1 300	1 700	34,5	* **24136 CC/W33**	* **24136 CCK30/W33**
	320	86	1 180	1 560	140	1 800	2 600	29,5	* **22236 CC/W33**	* **22236 CCK/W33**
	320	112	1 500	2 120	186	1 300	1 900	39,5	* **23236 CC/W33**	* **23236 CCK/W33**
	380	126	2 000	2 450	193	1 300	1 700	71,5	* **22336 CC/W33**	* **22336 CCK/W33**
190	260	52	414	800	76,5	2 200	2 600	8,30	**23938 CC/W33**	**23938 CCK/W33**
	290	75	865	1 340	122	1 900	2 400	18,0	* **23038 CC/W33**	* **23038 CCK/W33**
	290	100	1 120	1 800	163	1 400	2 000	24,5	* **24038 CC/W33**	* **24038 CCK30/W33**
	320	104	1 370	2 080	183	1 500	2 000	35,0	* **23138 CC/W33**	* **23138 CCK/W33**
	320	128	1 600	2 500	212	1 200	1 600	43,0	* **24138 CC/W33**	* **24138 CCK30/W33**
	340	92	1 270	1 700	150	1 700	2 400	36,5	* **22238 CC/W33**	* **22238 CCK/W33**
	340	120	1 660	2 400	208	1 300	1 800	48,0	* **23238 CC/W33**	* **23238 CCK/W33**
	400	132	2 120	2 650	208	1 200	1 800	82,5	* **22338 CC/W33**	* **22338 CCK/W33**

* SKF Explorer bearing

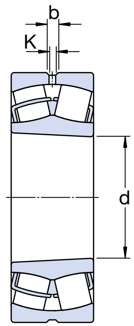


Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
160	180	217	11,1	6	2,1	171	229	2	0,22	3	4,6	2,8
	176	211	8,3	4,5	2,1	171	229	2	0,30	2,3	3,4	2,2
	184	234	13,9	7,5	2,1	172	258	2	0,30	2,3	3,4	2,2
	181	228	8,3	4,5	2,1	172	258	2	0,40	1,7	2,5	1,6
	191	250	13,9	7,5	3	174	276	2,5	0,26	2,6	3,9	2,5
	188	244	13,9	7,5	3	174	276	2,5	0,35	1,9	2,9	1,8
	200	282	16,7	9	4	177	323	3	0,35	1,9	2,9	1,8
170	191	232	11,1	6	2,1	181	249	2	0,23	2,9	4,4	2,8
	188	226	8,3	4,5	2,1	181	249	2	0,33	2	3	2
	195	244	13,9	7,5	2,1	182	268	2	0,30	2,3	3,4	2,2
	190	237	8,3	4,5	2,1	182	268	2	0,37	1,8	2,7	1,8
	203	267	16,7	9	4	187	293	3	0,27	2,5	3,7	2,5
	200	261	13,9	7,5	4	187	293	3	0,35	1,9	2,9	1,8
	213	300	16,7	9	4	187	343	3	0,33	2	3	2
180	199	231	5,5	3	2	190	240	2	0,18	3,8	5,6	3,6
	204	249	13,9	7,5	2,1	191	269	2	0,24	2,8	4,2	2,8
	201	243	8,3	4,5	2,1	191	269	2	0,33	2	3	2
	207	259	13,9	7,5	3	194	286	2,5	0,30	2,3	3,4	2,2
	203	253	11,1	6	3	194	286	2,5	0,37	1,8	2,7	1,8
	213	278	16,7	9	4	197	303	3	0,26	2,6	3,9	2,5
	211	271	13,9	7,5	4	197	303	3	0,35	1,9	2,9	1,8
	224	317	22,3	12	4	197	363	3	0,35	1,9	2,9	1,8
190	209	240	5,5	3	2	200	250	2	0,16	4,2	6,3	4
	216	261	13,9	7,5	2,1	201	279	2	0,23	2,9	4,4	2,8
	210	253	8,3	4,5	2,1	201	279	2	0,31	2,2	3,3	2,2
	220	276	13,9	7,5	3	204	306	2,5	0,31	2,2	3,3	2,2
	215	268	11,1	6	3	204	306	2,5	0,40	1,7	2,5	1,6
	225	294	16,7	9	4	207	323	3	0,26	2,6	3,9	2,5
	222	287	16,7	9	4	207	323	3	0,35	1,9	2,9	1,8
	236	333	22,3	12	5	210	380	4	0,35	1,9	2,9	1,8

Spherical roller bearings
d **200 – 260** mm



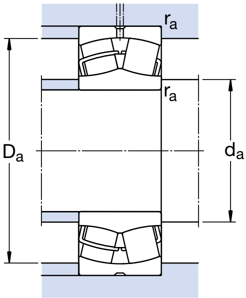
Cylindrical bore

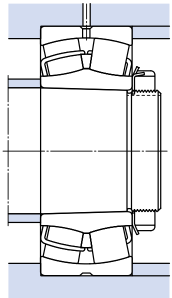


Tapered bore

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	280	60	546	1 040	93	2 000	2 400	11,5	**23940 CC/W33**	**23940 CCK/W33**
	310	82	1 000	1 530	137	1 800	2 200	23,3	* **23040 CC/W33**	* **23040 CCK/W33**
	310	109	1 290	2 120	186	1 300	1 900	31,0	* **24040 CC/W33**	* **24040 CCK30/W33**
	340	112	1 600	2 360	204	1 500	1 900	43,0	* **23140 CC/W33**	* **23140 CCK/W33**
	340	140	1 800	2 800	232	1 100	1 500	53,5	* **24140 CC/W33**	* **24140 CCK30/W33**
	360	98	1 460	1 930	166	1 600	2 200	43,5	* **22240 CC/W33**	* **22240 CCK/W33**
	360	128	1 860	2 700	228	1 200	1 700	58,0	* **23240 CC/W33**	* **23240 CCK/W33**
	420	138	2 320	2 900	224	1 200	1 500	95,0	* **22340 CC/W33**	* **22340 CCK/W33**
220	300	60	546	1 080	93	1 900	2 200	12,5	**23944 CC/W33**	**23944 CCK/W33**
	340	90	1 220	1 860	163	1 600	2 000	30,5	* **23044 CC/W33**	* **23044 CCK/W33**
	340	118	1 560	2 600	212	1 200	1 700	40,0	* **24044 CC/W33**	* **24044 CCK30/W33**
	370	120	1 800	2 750	232	1 300	1 700	53,5	* **23144 CC/W33**	* **23144 CCK/W33**
	370	150	2 120	3 350	285	1 000	1 400	67,0	* **24144 CC/W33**	* **24144 CCK30/W33**
	400	108	1 760	2 360	196	1 700	2 000	60,5	* **22244 CC/W33**	* **22244 CCK/W33**
	400	144	2 360	3 450	285	1 100	1 500	81,5	* **23244 CC/W33**	* **23244 CCK/W33**
	460	145	2 700	3 450	260	1 000	1 400	120	* **22344 CC/W33**	* **22344 CCK/W33**
240	320	60	564	1 160	98	1 700	2 000	13,5	**23948 CC/W33**	**23948 CCK/W33**
	360	92	1 290	2 080	176	1 500	1 900	33,5	* **23048 CC/W33**	* **23048 CCK/W33**
	360	118	1 600	2 700	228	1 100	1 600	43,0	* **24048 CC/W33**	* **24048 CCK30/W33**
	400	128	2 080	3 200	255	1 200	1 600	66,5	* **23148 CC/W33**	* **23148 CCK/W33**
	400	160	2 400	3 900	320	900	1 300	83,0	* **24148 CC/W33**	* **24148 CCK30/W33**
	440	120	2 000	3 000	245	1 300	1 800	83,0	* **22248 CC/W33**	* **22248 CCK/W33**
	440	160	2 900	4 300	345	950	1 300	110	* **23248 CC/W33**	* **23248 CCK/W33**
	500	155	3 100	4 000	290	950	1 300	155	* **22348 CC/W33**	* **22348 CCK/W33**
260	360	75	880	1 800	156	1 500	1 900	23,5	**23952 CC/W33**	**23952 CCK/W33**
	400	104	1 600	2 550	212	1 300	1 700	48,5	* **23052 CC/W33**	* **23052 CCK/W33**
	400	140	2 040	3 450	285	1 000	1 400	65,5	* **24052 CC/W33**	* **24052 CCK30/W33**
	440	144	2 550	3 900	290	1 100	1 400	90,5	* **23152 CC/W33**	* **23152 CCK/W33**
	440	180	3 000	4 800	380	850	1 200	110	* **24152 CC/W33**	* **24152 CCK30/W33**
	480	130	2 650	3 550	285	1 200	1 600	110	* **22252 CC/W33**	* **22252 CCK/W33**
	480	174	3 250	4 750	360	850	1 200	140	* **23252 CC/W33**	* **23252 CCK/W33**
	540	165	3 550	4 550	325	850	1 100	190	* **22352 CC/W33**	* **22352 CCK/W33**

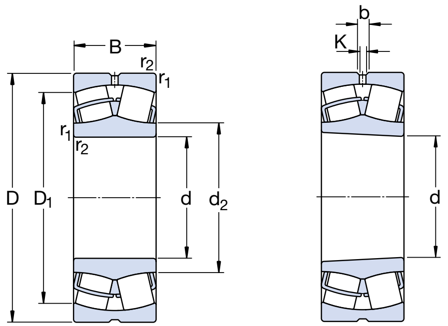
* SKF Explorer bearing





Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
200	222	258	8,3	4,5	2,1	211	269	2	0,19	3,6	5,3	3,6
	228	278	13,9	7,5	2,1	211	299	2	0,24	2,8	4,2	2,8
	223	268	11,1	6	2,1	211	299	2	0,33	2	3	2
	231	293	16,7	9	3	214	326	2,5	0,31	2,2	3,3	2,2
	226	284	11,1	6	3	214	326	2,5	0,40	1,7	2,5	1,6
	238	313	16,7	9	4	217	343	3	0,26	2,6	3,9	2,5
	235	304	16,7	9	4	217	343	3	0,35	1,9	2,9	1,8
	249	351	22,3	12	5	220	400	4	0,33	2	3	2
220	241	278	8,3	4,5	2,1	231	289	2	0,16	4,2	6,3	4
	250	306	13,9	7,5	3	233	327	2,5	0,24	2,8	4,2	2,8
	244	295	11,1	6	3	233	327	2,5	0,33	2	3	2
	255	320	16,7	9	4	237	353	3	0,30	2,3	3,4	2,2
	248	310	11,1	6	4	237	353	3	0,40	1,7	2,5	1,6
	263	346	16,7	9	4	237	383	3	0,27	2,5	3,7	2,5
	259	338	16,7	9	4	237	383	3	0,35	1,9	2,9	1,8
	279	389	22,3	12	5	240	440	4	0,31	2,2	3,3	2,2
240	261	298	8,3	4,5	2,1	251	309	2	0,15	4,5	6,7	4,5
	271	326	13,9	7,5	3	253	347	2,5	0,23	2,9	4,4	2,8
	265	316	11,1	6	3	253	347	2,5	0,30	2,3	3,4	2,2
	277	348	16,7	9	4	257	383	3	0,30	2,3	3,4	2,2
	271	336	11,1	6	4	257	383	3	0,40	1,7	2,5	1,6
	290	683	22,3	12	4	257	423	3	0,27	2,5	3,7	2,5
	287	374	22,3	12	4	257	423	3	0,35	1,9	2,9	1,8
	304	422	22,3	12	5	260	480	4	0,31	2,2	3,3	2,2
260	287	331	8,3	4,5	2,1	271	348	2	0,18	3,8	5,6	3,6
	295	360	16,7	9	4	275	385	3	0,23	2,9	4,4	2,8
	289	347	11,1	6	4	275	385	3	0,33	2	3	2
	301	380	16,7	9	4	277	423	3	0,31	2,2	3,3	2,2
	294	368	13,9	7,5	4	277	423	3	0,40	1,7	2,5	1,6
	311	421	22,3	12	5	280	460	4	0,27	2,5	3,7	2,5
	312	408	22,3	12	5	280	460	4	0,35	1,9	2,9	1,8
	329	457	22,3	12	6	286	514	5	0,31	2,2	3,3	2,2

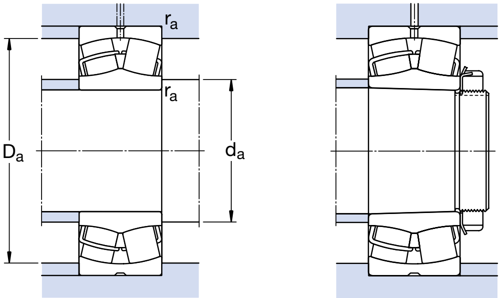
Spherical roller bearings
d **280 – 340** mm



Cylindrical bore   Tapered bore

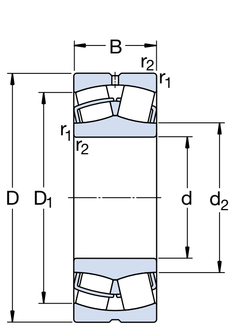
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designations** Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
280	380	75	845	1 760	143	1 400	1 700	25,0	**23956 CC/W33**	**23956 CCK/W33**
	420	106	1 730	2 850	224	1 300	1 600	52,5	* **23056 CC/W33**	* **23056 CCK/W33**
	420	140	2 160	3 800	285	950	1 400	69,5	* **24056 CC/W33**	* **24056 CCK30/W33**
	460	146	2 650	4 250	335	1 000	1 300	97,0	* **23156 CC/W33**	* **23156 CCK/W33**
	460	180	3 100	5 100	415	800	1 100	120	* **24156 CC/W33**	* **24156 CCK30/W33**
	500	130	2 700	3 750	300	1 100	1 500	115	* **22256 CC/W33**	* **22256 CCK/W33**
	500	176	3 250	4 900	365	800	1 100	150	* **23256 CC/W33**	* **23256 CCK/W33**
	580	175	4 000	5 200	365	800	1 100	235	* **22356 CC/W33**	* **22356 CCK/W33**
300	380	60	656	1 600	137	900	1 800	16,5	**23860 CAMA**	**23860 CAKMA**
	420	90	1 200	2 500	200	1 300	1 600	39,5	**23960 CC/W33**	**23960 CCK/W33**
	460	118	2 120	3 450	265	1 200	1 500	71,5	* **23060 CC/W33**	* **23060 CCK/W33**
	460	160	2 700	4 750	355	850	1 200	97,0	* **24060 CC/W33**	* **24060 CCK30/W33**
	500	160	3 200	5 100	380	950	1 200	125	* **23160 CC/W33**	* **23160 CCK/W33**
	500	200	3 750	6 300	465	700	1 000	160	* **24160 CC/W33**	* **24160 CCK30/W33**
	540	140	3 150	4 250	325	1 000	1 400	145	* **22260 CC/W33**	* **22260 CCK/W33**
	540	192	3 900	5 850	425	750	1 000	190	* **23260 CC/W33**	* **23260 CCK/W33**
320	440	90	1 430	2 700	212	1 400	1 500	42,0	* **23964 CC/W33**	* **23964 CCK/W33**
	480	121	2 240	3 800	285	1 100	1 400	78,0	* **23064 CC/W33**	* **23064 CCK/W33**
	480	160	2 850	5 100	400	800	1 200	100	* **24064 CC/W33**	* **24064 CCK30/W33**
	540	176	3 750	6 000	440	850	1 100	165	* **23164 CC/W33**	* **23164 CCK/W33**
	540	218	4 250	7 100	510	670	900	210	* **24164 CC/W33**	* **24164 CCK30/W33**
	580	150	3 600	4 900	375	950	1 300	175	* **22264 CC/W33**	* **22264 CCK/W33**
	580	208	4 400	6 700	480	700	950	240	* **23264 CC/W33**	* **23264 CCK/W33**
340	460	90	1 460	2 800	216	1 300	1 400	45,5	* **23968 CC/W33**	* **23968 CCK/W33**
	520	133	2 700	4 550	335	1 000	1 300	105	* **23068 CC/W33**	* **23068 CCK/W33**
	520	180	3 450	6 200	475	750	1 100	140	* **24068 CC/W33**	* **24068 CCK30/W33**
	580	190	4 250	6 800	480	800	1 000	210	* **23168 CC/W33**	* **23168 CCK/W33**
	580	243	5 300	8 650	640	600	850	280	* **24168 ECCJ/W33**	* **24168 ECCK30J/W33**
	620	224	5 100	7 800	550	560	800	295	* **23268 CA/W33**	* **23268 CAK/W33**

* SKF Explorer bearing

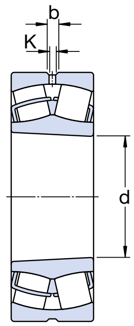


Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
280	308	352	11,1	6	2,1	291	369	2	0,16	4,2	6,3	4
	315	380	16,7	9	4	295	405	3	0,23	2,9	4,4	2,8
	309	368	11,1	6	4	295	405	3	0,31	2,2	3,3	2,2
	321	400	16,7	9	5	300	440	4	0,30	2,3	3,4	2,2
	315	390	13,9	7,5	5	300	440	4	0,40	1,7	2,5	1,6
	333	441	22,3	12	5	300	480	4	0,26	2,6	3,9	2,5
	332	429	22,3	12	5	300	480	4	0,35	1,9	2,9	1,8
	354	492	22,3	12	6	306	554	5	0,30	2,3	3,4	2,2
300	329	358	–	–	2,1	311	369	2	0,13	5,2	7,7	5
	333	385	11,1	6	3	313	407	2,5	0,19	3,6	5,3	3,6
	340	413	16,7	9	4	315	445	3	0,23	2,9	4,4	2,8
	331	400	13,9	7,5	4	315	445	3	0,33	2	3	2
	345	434	16,7	9	5	320	480	4	0,30	2,3	3,4	2,2
	339	422	13,9	7,5	5	320	480	4	0,40	1,7	2,5	1,6
	354	477	22,3	12	5	320	520	4	0,26	2,6	3,9	2,5
	356	461	22,3	12	5	320	520	4	0,35	1,9	2,9	1,8
320	354	405	11,1	6	3	333	427	2,5	0,17	4	5,9	4
	360	433	16,7	9	4	335	465	3	0,23	2,9	4,4	2,8
	354	423	13,9	7,5	4	335	465	3	0,31	2,2	3,3	2,2
	370	465	22,3	12	5	340	520	4	0,31	2,2	3,3	2,2
	364	455	16,7	9	5	340	520	4	0,40	1,7	2,5	1,6
	379	513	22,3	12	5	340	560	4	0,26	2,6	3,9	2,5
	382	494	22,3	12	5	340	560	4	0,35	1,9	2,9	1,8
340	374	426	11,1	6	3	353	447	2,5	0,17	4	5,9	4
	385	467	22,3	12	5	358	502	4	0,24	2,8	4,2	2,8
	377	453	16,7	9	5	358	502	4	0,33	2	3	2
	394	498	22,3	12	5	360	560	4	0,31	2,2	3,3	2,2
	383	491	16,7	9	5	360	560	4	0,40	1,7	2,5	1,6
	426	528	22,3	12	6	366	594	5	0,35	1,9	2,9	1,8

Spherical roller bearings
d **360 – 420** mm



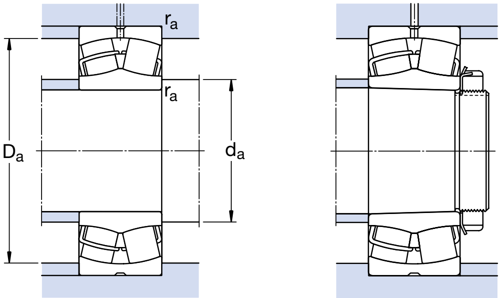
Cylindrical bore



Tapered bore

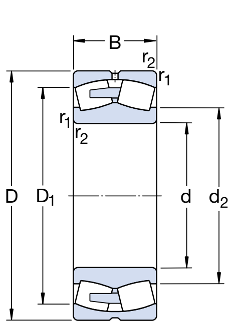
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designations** Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
360	480	90	1 400	2 750	220	1 200	1 300	43,0	*** 23972 CC/W33**	*** 23972 CCK/W33**
	540	134	2 750	4 800	345	950	1 200	110	*** 23072 CC/W33**	*** 23072 CCK/W33**
	540	180	3 550	6 550	490	700	1 000	145	*** 24072 CC/W33**	*** 24072 CCK30/W33**
	600	192	4 300	6 950	490	750	1 000	220	*** 23172 CC/W33**	*** 23172 CCK/W33**
	600	243	5 600	9 300	670	560	800	270	*** 24172 ECCJ/W33**	*** 24172 ECCK30J/W33**
	650	170	4 300	6 200	440	630	850	255	*** 22272 CA/W33**	*** 22272 CAK/W33**
	650	232	5 400	8 300	570	530	750	335	*** 23272 CA/W33**	*** 23272 CAK/W33**
380	520	106	1 960	3 800	285	1 100	1 200	69,0	*** 23976 CC/W33**	*** 23976 CCK/W33**
	560	135	2 900	5 000	360	900	1 200	115	*** 23076 CC/W33**	*** 23076 CCK/W33**
	560	180	3 600	6 800	480	670	950	150	*** 24076 CC/W33**	*** 24076 CCK30/W33**
	620	194	4 400	7 100	500	560	1 000	230	*** 23176 CA/W33**	*** 23176 CAK/W33**
	620	243	5 700	9 800	710	480	850	300	*** 24176 ECA/W33**	*** 24176 ECAK30/W33**
	680	240	5 850	9 150	620	500	750	375	*** 23276 CA/W33**	*** 23276 CAK/W33**
400	540	106	2 000	3 900	290	1 100	1 200	71,0	*** 23980 CC/W33**	*** 23980 CCK/W33**
	600	148	3 250	5 700	400	850	1 100	150	*** 23080 CC/W33**	*** 23080 CCK/W33**
	600	200	4 300	8 150	560	630	900	205	*** 24080 ECCJ/W33**	*** 24080 ECCK30J/W33**
	650	200	4 650	7 650	530	530	950	265	*** 23180 CA/W33**	*** 23180 CAK/W33**
	650	250	6 200	10 600	735	430	800	340	*** 24180 ECA/W33**	*** 24180 ECAK30/W33**
	720	256	6 550	10 400	680	480	670	450	*** 23280 CA/W33**	*** 23280 CAK/W33**
	820	243	7 500	10 400	670	430	750	650	*** 22380 CA/W33**	*** 22380 CAK/W33**
420	560	106	2 040	4 150	300	1 000	1 100	74,5	*** 23984 CC/W33**	*** 23984 CCK/W33**
	620	150	3 400	6 000	415	600	1 100	155	*** 23084 CA/W33**	*** 23084 CAK/W33**
	620	200	4 400	8 300	585	530	480	210	*** 24084 ECA/W33**	*** 24084 ECAK30/W33**
	700	224	5 600	9 300	620	480	900	350	*** 23184 CJ/W33**	*** 23184 CKJ/W33**
	700	280	7 350	12 600	850	400	750	445	*** 24184 ECA/W33**	*** 24184 ECAK30/W33**
	760	272	7 350	11 600	765	450	630	535	*** 23284 CA/W33**	*** 23284 CAK/W33**

* SKF Explorer bearing

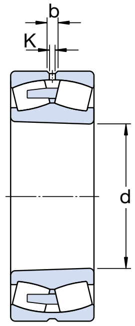


Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
360	394	447	11,1	6	3	373	467	2,5	0,15	4,5	6,7	4,5
	404	482	22,3	12	5	378	522	4	0,23	2,9	4,4	2,8
	398	474	16,7	9	5	378	522	4	0,31	2,2	3,3	2,2
	418	524	22,3	12	5	380	580	4	0,30	2,3	3,4	2,2
	406	506	16,7	9	5	380	580	4	0,37	1,8	2,7	1,8
	453	566	22,3	12	6	386	624	5	0,26	2,6	3,9	2,5
	447	552	22,3	12	6	386	624	5	0,35	1,9	2,9	1,8
380	420	481	13,9	7,5	4	395	505	3	0,17	4	5,9	4
	425	508	22,3	12	5	398	542	4	0,22	3	4,6	2,8
	420	496	16,7	9	5	398	542	4	0,30	2,3	3,4	2,2
	452	541	22,3	12	5	400	600	4	0,30	2,3	3,4	2,2
	446	529	16,7	9	5	400	600	4	0,37	1,8	2,7	1,8
	471	581	22,3	12	6	406	654	5	0,35	1,9	2,9	1,8
400	439	500	13,9	7,5	4	415	525	3	0,17	4	5,9	4
	450	541	22,3	12	5	418	582	4	0,23	2,9	4,4	2,8
	443	526	22,3	12	5	418	582	4	0,30	2,3	3,4	2,2
	474	566	22,3	12	6	426	624	5	0,28	2,4	3,6	2,5
	468	554	22,3	12	6	426	624	5	0,37	1,8	2,7	1,8
	499	615	22,3	12	6	426	694	5	0,35	1,9	2,9	1,8
	534	697	22,3	12	7,5	432	788	6	0,30	2,3	3,4	2,2
420	459	519	16,7	9	4	435	545	3	0,16	4,2	6,3	4
	485	562	22,3	12	5	438	602	4	0,22	3	4,6	2,8
	476	547	22,3	12	5	438	602	4	0,30	2,3	3,4	2,2
	483	607	22,3	12	6	446	674	5	0,30	2,3	3,4	2,2
	496	590	22,3	12	6	446	674	5	0,37	1,8	2,7	1,8
	525	649	22,3	12	7,5	452	726	6	0,35	1,9	2,9	1,8

Spherical roller bearings
d **440 – 500** mm



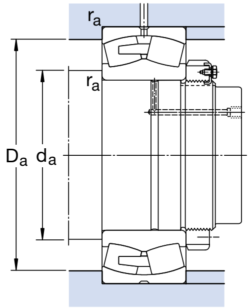
Cylindrical bore

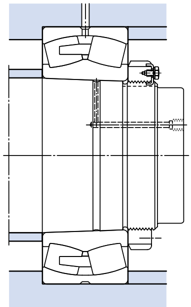


Tapered bore

Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Refer- ence 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	–	
440	600	118	2 450	4 900	345	950	1 000	99,5	* **23988 CC/W33**	* **23988 CCK/W33**
	650	157	3 650	6 550	450	560	1 000	180	* **23088 CA/W33**	* **23088 CAK/W33**
	650	212	4 800	9 150	630	500	850	245	* **24088 ECA/W33**	* **24088 ECAK30/W33**
	720	226	6 000	10 000	670	450	850	360	* **23188 CA/W33**	* **23188 CAK/W33**
	720	280	7 500	13 200	900	400	700	460	* **24188 ECA/W33**	* **24188 ECAK30/W33**
	790	280	7 800	12 500	800	430	600	590	* **23288 CA/W33**	* **23288 CAK/W33**
460	580	118	1 790	4 900	345	560	1 100	75,5	**24892 CAMA/W20**	**24892 CAK30MA/W20**
	620	118	2 500	5 000	355	600	1 000	105	* **23992 CA/W33**	* **23992 CAK/W33**
	680	163	3 900	6 950	465	560	950	205	* **23092 CA/W33**	* **23092 CAK/W33**
	680	218	5 200	10 000	670	480	800	275	* **24092 ECA/W33**	* **24092 ECAK30/W33**
	760	240	6 400	10 800	680	430	800	440	* **23192 CA/W33**	* **23192 CAK/W33**
	760	300	8 300	14 600	1 000	360	670	560	* **24192 ECA/W33**	* **24192 ECAK30/W33**
	830	296	8 500	13 700	880	400	560	695	* **23292 CA/W33**	* **23292 CAK/W33**
480	600	90	1 440	3 750	280	530	1 100	61,0	**23896 CAMA/W20**	**23896 CAKMA/W20**
	650	128	2 900	5 700	405	560	1 000	125	* **23996 CA/W33**	* **23996 CAK/W33**
	700	165	3 900	6 800	450	530	950	215	* **23096 CA/W33**	* **23096 CAK/W33**
	700	218	5 300	10 400	695	450	750	285	* **24096 ECA/W33**	* **24096 ECAK30/W33**
	790	248	6 950	12 000	780	400	750	485	* **23196 CA/W33**	* **23196 CAK/W33**
	790	308	9 000	15 600	1 040	340	630	605	* **24196 ECA/W33**	* **24196 ECAK30/W33**
	870	310	9 300	15 000	950	380	530	800	* **23296 CA/W33**	* **23296 CAK/W33**
500	620	90	1 480	4 000	290	530	1 000	62,0	**238/500 CAMA/W20**	**238/500 CAKMA/W20**
	670	128	2 900	6 000	415	530	950	130	* **239/500 CA/W33**	* **239/500 CAK/W33**
	720	167	4 150	7 800	510	500	900	225	* **230/500 CA/W33**	* **230/500 CAK/W33**
	720	218	5 500	11 000	735	430	700	295	* **240/500 ECA/W33**	* **240/500 ECAK30/W33**
	830	264	7 650	12 900	830	380	700	580	* **231/500 CA/W33**	* **231/500 CAK/W33**
	830	325	9 800	17 000	1 120	320	600	745	* **241/500 ECA/W33**	* **241/500 ECAK30/W33**
	920	336	10 600	17 300	1 060	360	500	985	* **232/500 CA/W33**	* **232/500 CAK/W33**

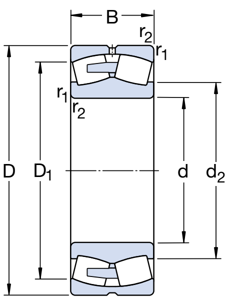
* SKF Explorer bearing



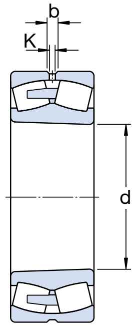


Dimensions						**Abutment and fillet dimensions**			**Calculation factors**			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
440	484	552	16,7	9	4	455	585	3	0,17	4	5,9	4
	509	589	22,3	12	6	463	627	5	0,22	3	4,6	2,8
	498	572	22,3	12	6	463	627	5	0,30	2,3	3,4	2,2
	528	632	22,3	12	6	466	694	5	0,30	2,3	3,4	2,2
	516	610	22,3	12	6	466	694	5	0,37	1,8	2,7	1,8
	547	676	22,3	12	7,5	472	758	6	0,35	1,9	2,9	1,8
460	505	541	–	6	3	473	567	2,5	0,17	4	5,9	3,7
	512	573	16,7	9	4	475	605	3	0,16	4,2	6,3	4
	531	616	22,3	12	6	483	657	5	0,22	3	4,6	2,8
	523	601	22,3	12	6	483	657	5	0,28	2,4	3,6	2,5
	553	665	22,3	12	7,5	492	728	6	0,30	2,3	3,4	2,2
	544	649	22,3	12	7,5	492	728	6	0,37	1,8	2,7	1,8
	572	706	22,3	12	7,5	492	798	6	0,35	1,9	2,9	1,8
480	521	566	–	7,5	3	493	587	2,5	0,13	5,2	7,7	5
	532	601	16,7	9	5	498	632	4	0,18	3,8	5,6	3,6
	547	632	22,3	12	6	503	677	5	0,21	3,2	4,8	3,2
	541	619	22,3	12	6	503	677	5	0,28	2,4	3,6	2,5
	577	692	22,3	12	7,5	512	758	6	0,30	2,3	3,4	2,2
	564	678	22,3	12	7,5	512	758	6	0,37	1,8	2,7	1,8
	600	741	22,3	12	7,5	512	838	6	0,35	1,9	2,9	1,8
500	543	587	–	7,5	3	513	607	2,5	0,12	5,6	8,4	5,6
	557	621	22,3	12	5	518	652	4	0,17	4	5,9	4
	571	656	22,3	12	6	523	697	5	0,21	3,2	4,8	3,2
	565	643	22,3	12	6	523	697	5	0,26	2,6	3,9	2,5
	603	726	22,3	12	7,5	532	798	6	0,30	2,3	3,4	2,2
	589	713	22,3	12	7,5	532	798	6	0,37	1,8	2,7	1,8
	631	779	22,3	12	7,5	532	888	6	0,35	1,9	2,9	1,8

Spherical roller bearings
d **530 – 630** mm



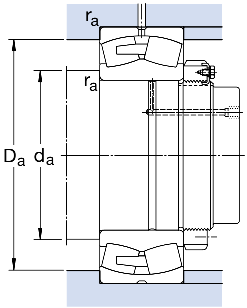
Cylindrical bore

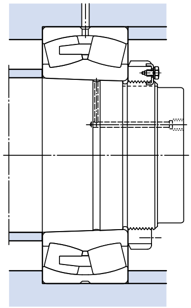


Tapered bore

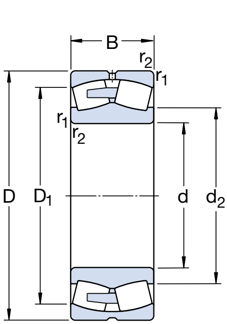
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass**	**Designations** Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
530	650	118	1 840	5 300	380	480	950	86,0	**248/530 CAMA/W20**	**248/530 CAK30MA/W20**
	710	136	3 200	6 700	480	500	900	155	* **239/530 CA/W33**	* **239/530 CAK/W33**
	780	185	5 100	9 300	630	450	800	310	* **230/530 CA/W33**	* **230/530 CAK/W33**
	780	250	6 700	13 200	830	400	670	410	* **240/530 ECA/W33**	* **240/530 ECAK30/W33**
	870	272	8 150	14 000	915	360	670	645	* **231/530 CA/W33**	* **231/530 CAK/W33**
	870	335	10 600	19 000	1 220	300	560	830	* **241/530 ECA/W33**	* **241/530 ECAK30/W33**
	980	355	11 100	20 400	1 220	300	480	1 200	**232/530 CA/W33**	**232/530 CAK/W33**
560	750	140	3 450	7 200	510	450	850	175	* **239/560 CA/W33**	* **239/560 CAK/W33**
	820	195	5 600	10 200	680	430	750	355	* **230/560 CA/W33**	* **230/560 CAK/W33**
	820	258	7 350	14 600	960	380	630	465	* **240/560 ECA/W33**	* **240/560 ECAK30/W33**
	920	280	9 150	16 000	980	340	630	740	* **231/560 CA/W33**	* **231/560 CAK/W33**
	920	355	12 000	21 600	1 340	280	500	985	* **241/560 ECJ/W33**	* **241/560 ECK30J/W33**
	1 030	365	11 500	22 000	1 400	280	430	1 350	**232/560 CA/W33**	**232/560 CAK/W33**
600	800	150	3 900	8 300	585	430	700	220	* **239/600 CA/W33**	* **239/600 CAK/W33**
	870	200	6 000	11 400	750	400	700	405	* **230/600 CA/W33**	* **230/600 CAK/W33**
	870	272	8 150	17 000	1 100	340	560	520	* **240/600 ECA/W33**	* **240/600 ECAK30/W33**
	980	300	10 200	18 000	1 100	320	560	895	* **231/600 CA/W33**	* **231/600 CAK/W33**
	980	375	11 500	23 600	1 460	240	480	1 200	**241/600 ECA/W33**	**241/600 ECAK30/W33**
	1 090	388	13 100	25 500	1 560	260	400	1 600	**232/600 CA/W33**	**232/600 CAK/W33**
630	780	112	2 190	6 100	415	400	750	120	**238/630 CAMA/W20**	**238/630 CAKMA/W20**
	850	165	4 650	9 800	640	400	700	280	* **239/630 CA/W33**	* **239/630 CAK/W33**
	920	212	6 700	12 500	800	380	670	485	* **230/630 CA/W33**	* **230/630 CAK/W33**
	920	290	8 800	18 000	1 140	320	530	645	* **240/630 ECJ/W33**	* **240/630 ECK30J/W33**
	1 030	315	10 500	20 800	1 220	260	530	1 050	**231/630 CA/W33**	**231/630 CAK/W33**
	1 030	400	12 700	27 000	1 630	220	450	1 400	**241/630 ECA/W33**	**241/630 ECAK30/W33**

* SKF Explorer bearing

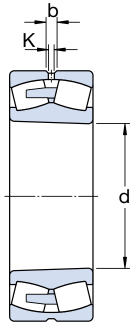




Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
530	573	612	–	7,5	3	543	637	2,5	0,15	4,5	6,7	4,5
	589	659	22,3	12	5	548	692	4	0,17	4	5,9	4
	611	708	22,3	12	6	553	757	5	0,22	3	4,6	2,8
	600	687	22,3	12	6	553	757	5	0,28	2,4	3,6	2,5
	636	763	22,3	12	7,5	562	838	6	0,30	2,3	3,4	2,2
	623	748	22,3	12	7,5	562	838	6	0,37	1,8	2,7	1,8
	668	836	22,3	12	9,5	570	940	8	0,35	1,9	2,9	1,8
560	625	695	22,3	12	5	578	732	4	0,16	4,2	6,3	4
	644	745	22,3	12	6	583	797	5	0,22	3	4,6	2,8
	635	728	22,3	12	6	583	797	5	0,28	2,4	3,6	2,5
	673	808	22,3	12	7,5	592	888	6	0,30	2,3	3,4	2,2
	634	796	22,3	12	7,5	592	888	6	0,37	1,8	2,7	1,8
	704	877	22,3	12	9,5	600	990	8	0,35	1,9	2,9	1,8
600	668	742	22,3	12	5	618	782	4	0,17	4	5,9	4
	683	786	22,3	12	6	623	847	5	0,22	3	4,6	2,8
	675	774	22,3	12	6	623	847	5	0,30	2,3	3,4	2,2
	720	862	22,3	12	7,5	632	948	6	0,30	2,3	3,4	2,2
	702	845	22,3	12	7,5	632	948	6	0,35	1,9	2,9	1,8
	752	928	22,3	12	9,5	640	1 050	8	0,37	1,8	2,7	1,8
630	681	738	–	9	4	645	765	3	0,12	5,6	8,4	5,6
	705	786	22,3	12	6	653	827	5	0,17	4	5,9	4
	725	837	22,3	12	7,5	658	892	6	0,21	3,2	4,8	3,2
	697	823	22,3	12	7,5	658	892	6	0,28	2,4	3,6	2,5
	757	908	22,3	12	7,5	662	998	6	0,30	2,3	3,4	2,2
	738	885	22,3	12	7,5	662	998	6	0,37	1,8	2,7	1,8



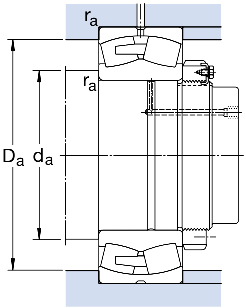
Cylindrical bore

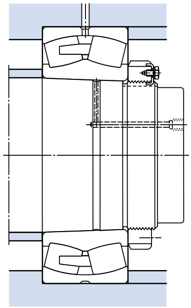


Tapered bore

Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Refer-ence 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	–	
670	820	112	2 250	6 400	440	360	700	130	**238/670 CAMA/W20**	**238/670/ CAKMA/W20**
	820	150	3 110	9 500	655	360	700	172	**248/670 CAMA/W20**	**–**
	900	170	5 000	10 800	695	360	670	315	*** 239/670 CA/W33**	*** 239/670 CAK/W33**
	980	230	7 650	14 600	915	340	600	600	*** 230/670 CA/W33**	*** 230/670 CAK/W33**
	980	308	10 000	20 400	1 320	300	500	790	*** 240/670 ECA/W33**	*** 240/670 ECAK30/W33**
	1 090	336	10 900	22 400	1 370	240	500	1 250	**231/670 CA/W33**	**231/670 CAK/W33**
	1 090	412	13 800	29 000	1 760	200	400	1 600	**241/670 ECA/W33**	**241/670 ECAK30/W33**
	1 220	438	15 400	30 500	1 700	220	360	2 270	**232/670 CA/W33**	**232/670 CAK/W33**
710	870	118	2 580	7 500	500	340	670	153	**238/710 CAMA/W20**	**–**
	950	180	5 600	12 000	765	340	600	365	*** 239/710 CA/W33**	*** 239/710 CAK/W33**
	950	243	6 800	15 600	930	300	500	495	*** 249/710 CA/W33**	*** 249/710 CAK30/W33**
	1 030	236	8 300	16 300	1 000	320	560	670	*** 230/710 CA/W33**	*** 230/710 CAK/W33**
	1 030	315	9 370	22 800	1 370	260	450	895	**240/710 ECA/W33**	**240/710 ECAK30/W33**
	1 150	345	12 200	26 000	1 530	240	450	1 450	**231/710 CA/W33**	**231/710 CAK/W33**
	1 150	438	15 200	32 500	1 900	190	380	1 900	**241/710 ECA/W33**	**241/710 ECAK30/W33**
	1 280	450	17 600	34 500	2 000	200	320	1 450	**232/710 CA/W33**	**232/710 CAK/W33**
750	920	128	2 930	8 500	550	320	600	135	**238/750 CAMA/W20**	**238/750 CAKMA/W20**
	1 000	185	6 000	13 200	815	320	560	420	*** 239/750 CA/W33**	*** 239/750 CAK/W33**
	1 000	250	7 650	18 000	1 100	280	480	560	*** 249/750 CA/W33**	*** 249/750 CAK30/W33**
	1 090	250	9 650	18 600	1 100	300	530	795	*** 230/750 CA/W33**	*** 230/750 CAK/W33**
	1 090	335	10 100	25 000	1 460	240	430	1 065	**240/750 ECA/W33**	**240/750 ECAK30/W33**
	1 220	365	13 600	29 000	1 660	220	430	1 700	**231/750 CA/W33**	**231/750 CAK/W33**
	1 220	475	17 300	37 500	2 160	180	360	2 100	**241/750 ECA/W33**	**241/750 ECAK30/W33**
	1 360	475	18 700	36 500	2 120	190	300	3 050	**232/750 CAF/W33**	**232/750 CAKF/W33**
800	980	180	4 140	12 900	830	300	560	300	**248/800 CAMA/W20**	**248/800 CAK30MA/W20**
	1 060	195	6 400	14 300	880	300	530	470	*** 239/800 CA/W33**	*** 239/800 CAK/W33**
	1 060	258	8 000	19 300	1 060	260	430	640	*** 249/800 CA/W33**	*** 249/800 CAK30/W33**
	1 150	258	10 000	20 000	1 160	280	480	895	*** 230/800 CA/W33**	*** 230/800 CAK/W33**
	1 150	345	11 100	28 500	1 730	220	400	1 200	**240/800 ECA/W33**	**240/800 ECAK30/W33**
	1 280	375	14 800	31 500	1 800	200	400	1 920	**231/800 CA/W33**	**231/800 CAK/W33**
	1 280	475	18 400	40 500	2 320	170	320	2 300	**241/800 ECA/W33**	**241/800 ECAK30/W33**

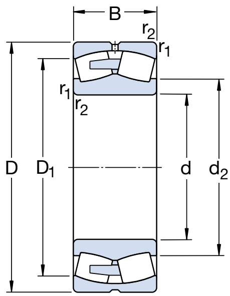
* SKF Explorer bearing



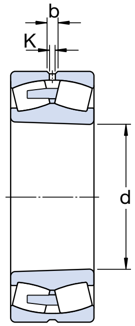


Dimensions						**Abutment and fillet dimensions**			**Calculation factors**			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
670	720	778	–	9	4	685	805	3	0,11	6,1	9,1	6,3
	718	786	–	9	4	685	805	3	0,16	4,2	6,3	4
	749	834	22,3	12	6	693	877	5	0,17	4	5,9	4
	770	890	22,3	12	7,5	698	952	6	0,21	3,2	4,8	3,2
	756	866	22,3	12	7,5	698	952	6	0,28	2,4	3,6	2,5
	802	958	22,3	12	7,5	702	1 058	6	0,30	2,3	3,4	2,2
	782	942	22,3	12	7,5	702	1 058	6	0,37	1,8	2,7	1,8
	830	1 027	22,3	12	12	718	1 172	10	0,35	1,9	2,9	1,8
710	762	834	–	12	4	725	855	3	0,11	6,1	9,1	6,3
	788	881	22,3	12	6	733	927	5	0,17	4	5,9	4
	792	868	22,3	12	6	733	927	5	0,22	3	4,6	2,8
	814	939	22,3	12	7,5	738	1 002	6	0,21	3,2	4,8	3,2
	807	917	22,3	12	7,5	738	1 002	6	0,27	2,5	3,7	2,5
	850	1 017	22,3	12	9,5	750	1 110	8	0,28	2,4	3,6	2,5
	838	982	22,3	12	9,5	750	1 110	8	0,37	1,8	2,7	1,8
	851	1 017	22,3	12	12	758	1 232	10	0,35	1,9	2,9	1,8
750	807	873	–	12	5	768	902	4	0,11	6,1	9,1	6,3
	832	929	22,3	12	6	773	977	5	0,16	4,2	6,3	4
	830	916	22,3	12	6	773	977	5	0,22	3	4,6	3,2
	860	996	22,3	12	7,5	778	1 062	6	0,21	3,2	4,8	3,2
	853	969	22,3	12	7,5	778	1 062	6	0,28	2,4	3,6	2,5
	900	1 080	22,3	12	9,5	790	1 180	8	0,28	2,4	3,6	2,5
	875	1 050	22,3	12	9,5	790	1 180	8	0,37	1,8	2,7	1,8
	938	1 163	22,3	12	15	808	1 302	12	0,35	1,9	2,9	1,8
800	865	921	–	12	5	818	962	4	0,15	4,5	6,7	4,5
	885	984	22,3	12	6	823	1 037	5	0,16	4,2	6,3	4
	883	973	22,3	12	6	823	1 037	5	0,21	3,2	4,8	3,2
	915	1 051	22,3	12	7,5	828	1 122	6	0,20	3,4	5	3,2
	908	1 027	22,3	12	7,5	828	1 122	6	0,27	2,5	3,7	2,5
	950	1 141	22,3	12	9,5	840	1 240	8	0,28	2,4	3,6	2,5
	930	1 111	22,3	12	9,5	840	1 240	8	0,35	1,9	2,9	1,8

Spherical roller bearings
d **850 – 1 120** mm

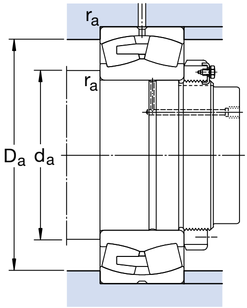


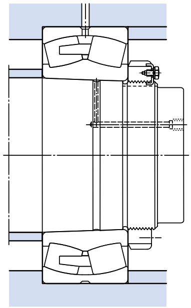
Cylindrical bore



Tapered bore

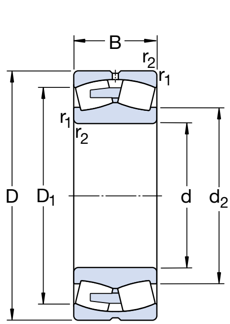
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Refer-ence speed	Limiting speed	**Mass**	**Designations** Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
850	1 030	136	3 340	10 000	640	260	530	240	**238/850 CAMA/W20**	**238/850 CAKMA/W20**
	1 120	200	5 980	15 600	930	260	480	560	**239/850 CA/W33**	**239/850 CAK/W33**
	1 120	272	8 170	22 800	1 370	220	400	740	**249/850 CA/W33**	**249/850 CAK30/W33**
	1 220	272	9 370	21 600	1 270	240	450	1 050	**230/850 CA/W33**	**230/850 CAK/W33**
	1 220	365	12 700	31 500	1 900	200	360	1 410	**240/850 ECA/W33**	**240/850 ECAK30/W33**
	1 360	400	16 100	34 500	2 000	180	360	2 200	**231/850 CA/W33**	**231/850 CAK/W33**
	1 360	500	20 200	45 000	2 550	150	300	2 710	**241/850 ECAF/W33**	**241/850 ECAK30F/W33**
900	1 090	190	4 660	15 300	950	240	480	370	**248/900 CAMA/W20**	**248/900 CAK30MA/W20**
	1 180	206	6 440	17 000	1 020	240	450	605	**239/900 CA/W33**	**239/900 CAK/W33**
	1 280	280	10 100	23 200	1 340	220	400	1 200	**230/900 CA/W33**	**230/900 CAK/W33**
	1 280	375	13 600	34 500	2 040	190	340	1 570	**240/900 ECA/W33**	**240/900 ECAK30/W33**
	1 420	515	21 400	49 000	2 700	140	280	3 350	**241/900 ECAF/W33**	**241/900 ECAK30F/W33**
950	1 250	224	7 250	19 600	1 120	220	430	755	**239/950 CA/W33**	**239/950 CAK/W33**
	1 250	300	9 200	26 000	1 500	180	340	1 015	**249/950 CA/W33**	**249/950 CAK30/W33**
	1 360	300	12 000	28 500	1 600	200	380	1 450	**230/950 CA/W33**	**230/950 CAK/W33**
	1 360	412	14 800	39 000	2 320	170	300	1 990	**240/950 CAF/W33**	**240/950 CAK30F/W33**
	1 500	545	23 900	55 000	3 000	130	260	3 535	**241/950 ECAF/W33**	**241/950 ECAK30F/W33**
1 000	1 220	165	4 660	14 300	865	220	400	410	**238/1000 CAMA/W20**	**238/1000 CAKMA/W20**
	1 320	315	10 400	29 000	1 500	170	320	1 200	**249/1000 CA/W33**	**249/1000 CAK30/W33**
	1 420	308	12 700	30 500	1 700	180	360	1 600	**230/1000 CAF/W33**	**230/1000 CAKF/W33**
	1 420	412	15 400	40 500	2 240	160	280	2 140	**240/1000 CAF/W33**	**240/1000 CAK30F/W33**
	1 580	462	21 400	48 000	2 550	140	280	3 500	**231/1000 CAF/W33**	**231/1000 CAKF/W33**
	1 580	580	26 700	62 000	3 350	120	240	4 300	**241/1000 ECAF/W33**	**241/1000 ECAK30F/W33**
1 060	1 280	165	4 770	15 000	800	200	380	435	**238/1060 CAMA/W20**	**238/1060 CAKMA/W20**
	1 280	218	6 100	20 000	1 200	200	380	570	**248/1060 CAMA/W20**	**248/1060 CAK30MA/W20**
	1 400	250	9 550	26 000	1 460	180	360	1 100	**239/1060 CAF/W33**	**239/1060 CAKF/W33**
	1 400	335	11 500	32 500	1 860	160	280	1 400	**249/1060 CAF/W33**	**249/1060 CAK30F/W33**
	1 500	325	13 800	34 000	1 830	170	320	2 250	**230/1060 CAF/W33**	**230/1060 CAKF/W33**
	1 500	438	17 300	45 500	2 500	150	260	2 515	**240/1060 CAF/W33**	**240/1060 CAK30F/W33**
1 120	1 360	243	7 250	24 000	1 400	180	340	735	**248/1120 CAFA/W20**	**248/1120 CAK30FA/W20**
	1 460	335	11 700	34 500	1 830	140	260	1 500	**249/1120 CAF/W33**	**249/1120 CAK30F/W33**
	1 580	462	18 700	50 000	2 850	130	240	2 925	**240/1120 CAF/W33**	**240/1120 CAK30F/W33**



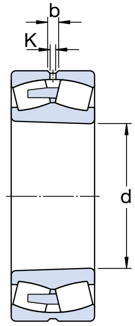


Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
850	910	981	–	12	5	868	1 012	4	0,11	6,1	9,1	6,3
	940	1 043	22,3	12	6	873	1 097	5	0,16	4,2	6,3	4
	948	1 028	22,3	12	6	873	1 097	5	0,22	3	4,6	2,8
	969	1 114	22,3	12	7,5	878	1 192	6	0,20	3,4	5	3,2
	954	1 087	22,3	12	7,5	878	1 192	6	0,27	2,5	3,7	2,5
	1 010	1 203	22,3	12	12	898	1 312	10	0,28	2,4	3,6	2,5
	988	1 182	22,3	12	12	898	1 312	10	0,35	1,9	2,9	1,8
900	969	1 029	–	12	5	918	1 072	4	0,14	4,8	7,2	4,5
	989	1 100	22,3	12	6	923	1 157	5	0,15	4,5	6,7	4,5
	1 023	1 177	22,3	12	7,5	928	1 252	6	0,20	3,4	5	3,2
	1 012	1 147	22,3	12	7,5	928	1 252	6	0,26	2,6	3,9	2,5
	1 043	1 235	22,3	12	12	948	1 372	10	0,35	1,9	2,9	1,8
950	1 049	1 161	22,3	12	7,5	978	1 222	6	0,15	4,5	6,7	4,5
	1 051	1 150	22,3	12	7,5	978	1 222	6	0,21	3,2	4,8	3,2
	1 083	1 242	22,3	12	7,5	978	1 332	6	0,20	3,4	5	3,2
	1 074	1 212	22,3	12	7,5	978	1 332	6	0,27	2,5	3,7	2,5
	1 102	1 305	22,3	12	12	998	1 452	10	0,35	1,9	2,9	1,8
1 000	1 077	1 161	–	12	6	1 023	1 197	5	0,12	5,6	8,4	5,6
	1 106	1 209	22,3	12	7,5	1 028	1 292	6	0,21	3,2	4,8	3,2
	1 139	1 305	22,3	12	7,5	1 028	1 392	6	0,19	3,6	5,3	3,6
	1 133	1 275	22,3	12	7,5	1 028	1 392	6	0,26	2,6	3,9	2,5
	1 182	1 399	22,3	12	12	1 048	1 532	10	0,28	2,4	3,6	2,5
	1 159	1 373	22,3	12	12	1 048	1 532	10	0,35	1,9	2,9	1,8
1 060	1 135	1 219	–	12	6	1 083	1 257	5	0,11	6,1	9,1	6,3
	1 159	1 210	–	12	6	1 083	1 257	5	0,14	4,8	7,2	4,5
	1 171	1 303	22,3	12	7,5	1 088	1 392	6	0,16	4,2	6,3	4
	1 165	1 282	22,3	12	7,5	1 088	1 392	6	0,21	3,2	4,8	3,2
	1 202	1 373	22,3	12	9,5	1 094	1 466	8	0,19	3,6	5,3	3,6
	1 196	1 347	22,3	12	9,5	1 094	1 466	8	0,26	2,6	3,9	2,5
1 120	1 207	1 282	–	12	6	1 143	1 337	5	0,15	4,5	6,7	4,5
	1 230	1 349	22,3	12	7,5	1 148	1 432	6	0,20	3,4	5	3,2
	1 266	1 422	22,3	12	9,5	1 154	1 546	8	0,26	2,6	3,9	2,5

Spherical roller bearings
d **1 180 – 1 800** mm

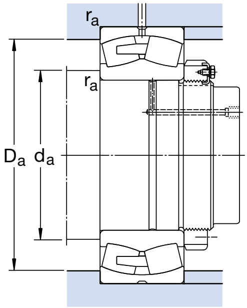


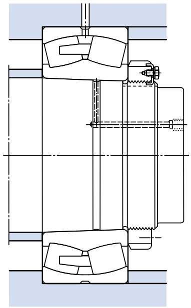
Cylindrical bore



Tapered bore

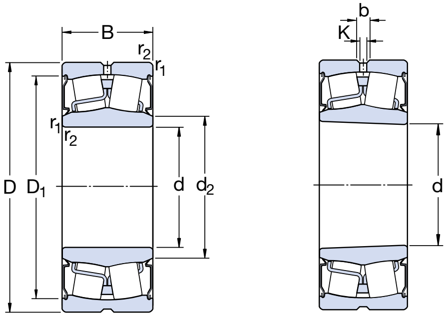
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Refer-ence speed	Limiting speed	**Mass**	**Designations** Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
1 180	1 420	180	5 870	18 600	1 080	170	320	575	**238/1180 CAFA/W20**	**238/1180 CAKFA/W20**
	1 420	243	7 710	27 000	1 560	170	320	770	**248/1180 CAFA/W20**	**248/1180 CAK30FA/W20**
	1 540	272	11 100	31 000	1 660	150	300	1 400	**239/1180 CAF/W33**	**239/1180 CAKF/W33**
	1 540	355	13 600	40 500	2 160	130	240	1 800	**249/1180 CAF/W33**	**249/1180 CAK30F/W33**
1 250	1 750	375	17 900	45 000	2 400	130	240	2 840	**230/1250 CAF/W33**	**230/1250 CAKF/W33**
1 320	1 600	280	9 780	33 500	1 860	140	260	1 160	**248/1320 CAFA/W20**	**248/1320 CAK30FA/W20**
	1 720	400	16 100	49 000	2 550	110	200	2 500	**249/1320 CAF/W33**	**249/1320 CAK30F/W33**
1 500	1 820	315	12 700	45 000	2 400	160	200	1 710	**248/1500 CAFA/W20**	**248/1500 CAK30FA/W20**
1 800	2 180	375	17 600	63 000	3 050	110	130	2 900	**248/1800 CAFA/W20**	**248/1800 CAK30FA/W20**





Dimensions						Abutment and fillet dimensions			Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm			–			
1 180	1 261	1 355	–	12	6	1 203	1 397	5	0,11	6,1	9,1	6,3
	1 280	1 343	–	12	6	1 203	1 397	5	0,14	4,8	7,2	4,5
	1 298	1 435	22,3	12	7,5	1 208	1 512	6	0,16	4,2	6,3	4
	1 293	1 417	22,3	12	7,5	1 208	1 512	6	0,20	3,4	5	3,2
1 250	1 411	1 607	22,3	12	9,5	1 284	1 716	8	0,19	3,6	5,3	3,6
1 320	1 422	1 511	–	12	6	1 343	1 577	5	0,15	4,5	6,7	4,5
	1 445	1 584	22,3	12	7,5	1 348	1 692	6	0,21	3,2	4,8	3,2
1 500	1 612	1 719	–	12	7,5	1 528	1 792	6	0,15	4,5	6,7	4,5
1 800	1 932	2 060	–	12	9,5	1 834	2 146	8	0,15	4,5	6,7	4,5

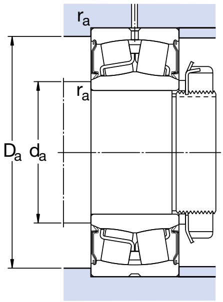
Sealed spherical roller bearings
d **30 – 110** mm



Cylindrical bore Tapered bore

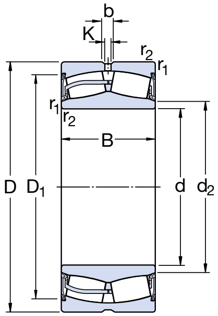
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Limiting speed	Mass	Designations Bearing with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u				
mm			kN		kN	r/min	kg	–	
30	62	25	64	60	6,4	2 800	0,34	* **BS2-2206-2CS**	–
35	72	28	86,5	85	9,3	2 400	0,52	* **BS2-2207-2CS**	–
40	80	28	96,5	90	9,8	2 200	0,57	* **BS2-2208-2CS**	* **BS2-2208-2CSK**
45	85	28	102	98	10,8	2 000	0,66	* **BS2-2209-2CS**	* **BS2-2209-2CSK**
50	90	28	104	108	11,8	1 900	0,70	* **BS2-2210-2CS**	* **BS2-2210-2CSK**
55	100	31	125	127	13,7	1 700	1,00	* **BS2-2211-2CS**	* **BS2-2211-2CSK**
60	110	34	156	166	18,6	1 600	1,30	* **BS2-2212-2CS**	* **BS2-2212-2CSK**
65	100	35	132	173	20,4	1 000	0,95	* **24013-2CS5/VT143**	–
	120	38	193	216	24	1 500	1,60	* **BS2 2213 C-2CS**	* **BS2 2213 C-2CSK**
70	125	38	208	228	25,5	1 400	1,80	* **BS2 2214-2CS**	* **BS2 2214-2CSK**
75	115	40	173	232	28,5	950	1,55	* **24015-2CS2/VT143**	–
	130	38	212	240	26,5	1 300	2,10	* **BS2-2215-2CS**	* **BS2-2215-2CSK**
80	140	40	236	270	29	1 200	2,40	* **BS2-2216-2CS**	* **BS2-2216-2CSK**
85	150	44	285	325	34,5	1 100	3,00	* **BS2-2217-2CS**	* **BS2-2217-2CSK**
90	160	48	325	375	39	1 000	3,70	* **BS2-2218-2CS**	* **BS2-2218-2CSK**
100	150	50	285	415	45,5	800	3,15	* **24020-2CS2/VT143**	–
	165	52	365	490	53	850	4,55	* **23120-2CS2/VT143**	–
	180	55	425	490	49	900	5,50	* **BS2-2220-2CS**	–
	180	60,3	475	600	63	700	6,85	* **23220-2CS**	–
110	170	45	310	440	46,5	900	3,80	* **23022-2CS**	–
	180	56	430	585	61	800	5,75	* **23122-2CS2/VT143**	–
	180	69	520	750	78	630	7,10	* **24122-2CS2/VT143**	–
	200	63	560	640	63	800	7,60	* **BS2-2222-2CS5/VT143**	–

* SKF Explorer bearing



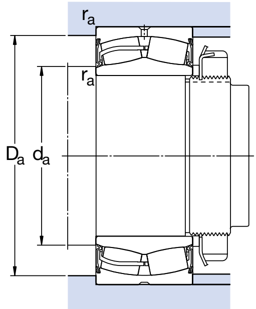
Dimensions						Abutment and fillet dimensions				Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	d_a max	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm				–			
30	36	55,7	3,7	2	1	35,6	36	56,4	1	0,31	2,2	3,3	2
35	43	63,7	3,7	2	1,1	42	43	65	1	0,31	2,2	3,3	2,2
40	47	73	5,5	3	1,1	47	47	73	1	0,28	2,4	3,6	2,5
45	53	77,1	5,5	3	1,1	52	53	78	1	0,26	2,6	3,9	2,5
50	58,1	82,1	5,5	3	1,1	57	58	83	1	0,24	2,8	4,2	2,8
55	64	91,9	5,5	3	1,5	64	64	91	1,5	0,24	2,8	4,2	2,8
60	69,3	100	5,5	3	1,5	69	69	101	1,5	0,24	2,8	4,2	2,8
65	71,9	92,8	5,5	3	1,1	71	71,5	94	1	0,27	2,5	3,7	2,5
	74	111	5,5	3	1,5	74	74	111	1,5	0,24	2,8	4,2	2,8
70	80,1	115	5,5	3	1,5	79	80	116	1,5	0,22	3	4,6	2,8
75	81,8	105	5,5	3	1,1	81	81,5	109	1	0,28	2,4	3,6	2,5
	84,5	119	5,5	3	1,5	84	84	121	1,5	0,22	3	4,6	2,8
80	92	128	5,5	3	2	91	92	129	2	0,22	3	4,6	2,8
85	98,2	138	5,5	3	2	96	98	139	2	0,22	3	4,6	2,8
90	103	148	5,5	3	2	101	103	149	2	0,24	2,8	4,2	2,8
100	108	139	5,5	3	1,5	107	108	143	1,5	0,28	2,4	3,6	2,5
	113	152	5,5	3	2	111	113	154	2	0,27	2,5	3,7	2,5
	114	168	8,3	4,5	2,1	112	114	168	2	0,24	2,8	4,2	2,8
	114	160	8,3	4,5	2,1	112	114	168	2	0,30	2,3	3,4	2,2
110	122	157	8,3	4,5	2	120	122	160	2	0,23	2,9	4,4	2,8
	123	166	8,3	4,5	2	121	123	169	2	0,27	2,5	3,7	2,5
	121	163	5,5	3	2	121	121	169	2	0,35	1,9	2,9	1,8
	126	182	8,3	4,5	2,1	122	125	188	2	0,25	2,7	4	2,5

Sealed spherical roller bearings
d **120 – 220** mm



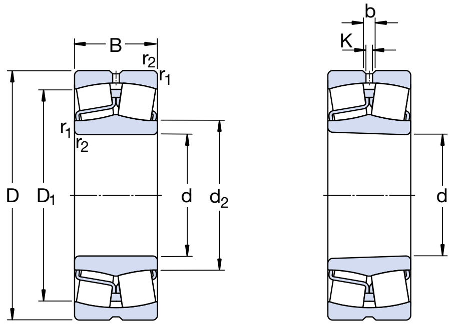
Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Limiting speed**	**Mass**	**Designation**
d	D	B	C	C_0	P_u			
mm			kN		kN	r/min	kg	–
120	180	46	355	510	52	850	4,20	* **23024-2CS2/VT143**
	180	60	430	670	68	670	5,45	* **24024-2CS2/VT143**
	200	80	655	950	95	560	10,5	* **24124-2CS2/VT143**
	215	69	630	765	73,5	750	9,75	* **BS2-2224-2CS**
130	200	52	430	610	62	800	6,00	* **23026-2CS2/VT143**
	200	69	540	815	81,5	600	8,05	* **24026-2CS2/VT143**
	210	80	680	1 000	100	530	11,0	* **24126-2CS2/VT143**
140	210	69	570	900	68	560	8,55	* **24028-2CS2/VT143**
	225	85	673	1 160	112	450	13,5	* **24128-2CS2/VT143**
150	225	75	655	1 040	100	530	10,5	* **24030-2CS2/VT143**
	250	100	1 020	1 530	146	400	20,0	* **24130-2CS2/VT143**
160	240	80	750	1 200	114	450	13,0	* **24032-2CS2/VT143**
	270	86	980	1 370	129	530	20,5	* **23132-2CS2/VT143**
170	260	90	930	1 460	137	400	17,5	* **24034-2CS2/VT143**
	280	109	1 220	1 860	170	360	27,5	* **24134-2CS2/VT143**
180	280	100	1 080	1 730	156	380	23,0	* **24036-2CS2/VT143**
190	320	128	1 600	2 500	212	340	43,0	* **24138-2CS2/VT143**
200	340	140	1 800	2 800	232	320	53,5	* **24140-2CS**
	360	128	1 860	2 700	228	430	58,0	* **23240-2CS2/VT143**
220	300	60	546	1 080	93	600	12,5	**23944-2CS**

* SKF Explorer bearing



Dimensions						Abutment and fillet dimensions				Calculation factors			
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	d_a max	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm						mm				–			
120	133	168	5,5	3	2	130	132	170	2	0,20	3,4	5	3,2
	130	166	5,5	3	2	130	130	170	2	0,28	2,4	3,6	2,5
	132	179	5,5	3	2	131	132	189	2	0,37	1,8	2,7	1,8
	136	193	11,1	6	2,1	132	135	203	2	0,26	2,6	3,9	2,5
130	145	186	8,3	4,5	2	140	144	190	2	0,21	3,2	4,8	3,2
	141	183	5,5	3	2	140	141	190	2	0,30	2,3	3,4	2,2
	142	190	5,5	3	2	141	142	199	2	0,33	2	3	2
140	152	194	5,5	3	2	150	152	200	2	0,28	2,4	3,6	2,5
	153	203	8,3	4,5	2,1	152	153	213	2	0,35	1,9	2,9	1,8
150	162	206	5,5	3	2,1	161	162	214	2	0,28	2,4	3,6	2,5
	163	221	8,3	4,5	2,1	162	163	238	2	0,37	1,8	2,7	1,8
160	173	218	8,3	4,5	2,1	171	173	229	2	0,28	2,4	3,6	2,5
	180	243	13,9	7,5	2,1	172	179	258	2	0,28	2,4	3,6	2,5
170	184	235	8,3	4,5	2,1	181	184	249	2	0,30	2,3	3,4	2,2
	185	249	8,3	4,5	2,1	182	184	268	2	0,37	1,8	2,7	1,8
180	195	251	8,3	4,5	2,1	191	194	269	2	0,31	2,2	3,3	2,2
190	210	284	11,1	6	3	204	209	306	2,5	0,40	1,7	2,5	1,6
200	220	300	11,1	6	3	214	218	326	2,5	0,40	1,7	2,5	1,6
	227	318	16,7	9	4	217	225	343	3	0,35	1,9	2,9	1,8
220	239	284	8,3	4,5	2,1	231	237	289	2	0,15	4,5	6,7	4,5

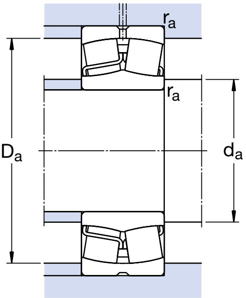
Spherical roller bearings for vibratory applications
d **40 – 140** mm



Cylindrical bore Tapered bore

Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass	Designations Bearings with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
40	90	33	150	140	15	6 000	8 000	1,10	* **22308 E/VA405**	–
45	100	36	183	183	19,6	5 300	7 000	1,40	* **22309 E/VA405**	–
50	110	40	220	224	24	4 800	6 300	1,90	* **22310 E/VA405**	–
55	120	43	270	280	30	4 300	5 600	2,45	* **22311 E/VA405**	* **22311 EK/VA405**
60	130	46	310	335	36,5	4 000	5 300	3,10	* **22312 E/VA405**	* **22312 EK/VA405**
65	140	48	340	360	38	3 800	5 000	3,75	* **22313 E/VA405**	* **22313 EK/VA405**
70	150	51	400	430	45	3 400	4 500	4,55	* **22314 E/VA405**	* **22314 EK/VA405**
75	160	55	440	475	48	3 200	4 300	5,55	* **22315 EJA/VA405**	* **22315 EKJA/VA405**
80	170	58	490	540	54	3 000	4 000	6,60	* **22316 EJA/VA405**	* **22316 EKJA/VA405**
85	180	60	550	620	61	2 800	3 800	7,65	* **22317 EJA/VA405**	* **22317 EKJA/VA405**
	180	60	550	620	61	2 800	3 800	7,65	* **22317 EJA/VA406**	–
90	190	64	610	695	67	2 600	3 600	9,05	* **22318 EJA/VA405**	* **22318 EKJA/VA405**
95	200	67	670	765	73,5	2 600	3 400	10,5	* **22319 EJA/VA405**	* **22319 EKJA/VA405**
100	215	73	815	950	88	2 400	3 400	13,5	* **22320 EJA/VA405**	* **22320 EKJA/VA405**
	215	73	815	950	88	2 400	3 400	13,5	* **22320 EJA/VA406**	–
110	240	80	950	1 120	100	2 000	2 800	18,4	* **22322 EJA/VA405**	* **22322 EKJA/VA405**
	240	80	950	1 120	100	2 000	2 800	18,4	* **22322 EJA/VA406**	–
120	260	86	965	1 120	100	2 000	2 600	23,0	* **22324 CCJA/W33VA405**	* **22324 CCKJA/W33VA405**
	260	86	965	1 120	100	2 000	2 600	23,0	* **22324 CCJA/W33VA406**	–
130	280	93	1 120	1 320	114	1 700	2 400	29,0	* **22326 CCJA/W33VA405**	* **22326 CCKJA/W33VA405**
	280	93	1 120	1 320	114	1 700	2 400	29,0	* **22326 CCJA/W33VA406**	–
140	300	102	1 290	1 560	132	1 700	2 200	36,5	* **22328 CCJA/W33VA405**	* **22328 CCKJA/W33VA405**
	300	102	1 290	1 560	132	1 700	2 200	36,5	* **22328 CCJA/W33VA406**	

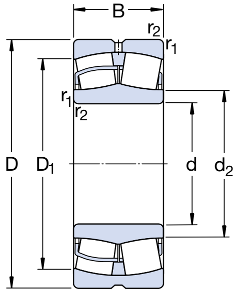
* SKF Explorer bearing



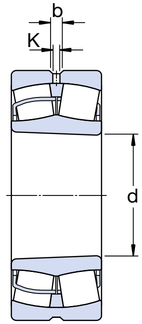
Dimensions						Abutment and fillet dimensions			Calculation factors				Permissible accelerations[1) for oil lubrication	
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0	rotational	linear
mm						mm			–				m/s^2	
40	49,9	74,3	5,5	3	1,5	49	81	1,5	0,37	1,8	2,7	1,8	115 g	31 g
45	57,6	83,1	5,5	3	1,5	54	91	1,5	0,37	1,8	2,7	1,8	97 g	29 g
50	63,9	91,9	5,5	3	2	61	99	2	0,37	1,8	2,7	1,8	85 g	28 g
55	70,1	102	5,5	3	2	66	109	2	0,35	1,9	2,9	1,8	78 g	26 g
60	77,9	110	5,5	3	2,1	72	118	2	0,35	1,9	2,9	1,8	70 g	25 g
65	81,6	118	8,3	4,5	2,1	77	128	2	0,35	1,9	2,9	1,8	69 g	24 g
70	90,3	128	8,3	4,5	2,1	82	138	2	0,33	2	3	2	61 g	23 g
75	92,8	135	8,3	4,5	2,1	87	148	2	0,35	1,9	2,9	1,8	88 g	23 g
80	98,3	143	8,3	4,5	2,1	92	158	2	0,35	1,9	2,9	1,8	80 g	22 g
85	108	154	8,3	4,5	3	99	166	2,5	0,33	2	3	2	74 g	21 g
	108	154	8,3	4,5	3	99	166	2,5	0,33	2	3	2	74 g	21 g
90	113	161	11,1	6	3	104	176	2,5	0,33	2	3	2	68 g	21 g
95	118	168	11,1	6	3	109	186	2,5	0,33	2	3	2	64 g	20 g
100	130	184	11,1	6	3	114	201	2,5	0,33	2	3	2	56 g	20 g
	130	184	11,1	6	3	114	201	2,5	0,33	2	3	2	56 g	20 g
110	143	204	13,9	7,5	3	124	226	2,5	0,33	2	3	2	53 g	19 g
	143	204	13,9	7,5	3	124	226	2,5	0,33	2	3	2	53 g	19 g
120	152	216	13,9	7,5	3	134	246	2,5	0,35	1,9	2,9	1,8	96 g	21 g
	152	216	13,9	7,5	3	134	246	2,5	0,35	1,9	2,9	1,8	96 g	21 g
130	164	233	16,7	9	4	147	263	3	0,35	1,9	2,9	1,8	87 g	20 g
	164	233	16,7	9	4	147	263	3	0,35	1,9	2,9	1,8	87 g	20 g
140	175	247	16,7	9	4	157	283	3	0,35	1,9	2,9	1,8	78 g	20 g
	175	247	16,7	9	4	157	283	3	0,35	1,9	2,9	1,8	78 g	20 g

[1) For details regarding permissible accelerations ➔ **page 696**

Spherical roller bearings for vibratory applications
d **150 – 240** mm



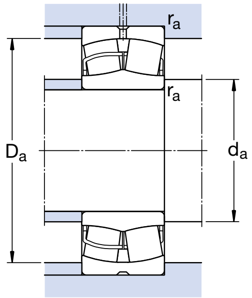
Cylindrical bore



Tapered bore

Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass	Designations Bearings with cylindrical bore	tapered bore
d	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
150	320	108	1 460	1 760	146	1 600	2 000	43,5	* **22330 CCJA/W33VA405**	* **22330 CCKJA/W33VA405**
	320	108	1 460	1 760	146	1 600	2 000	43,5	* **22330 CCJA/W33VA406**	–
160	340	114	1 600	1 960	160	1 500	1 900	52,0	* **22332 CCJA/W33VA405**	* **22332 CCKJA/W33VA405**
	340	114	1 600	1 960	160	1 500	1 900	52,0	* **22332 CCJA/W33VA406**	–
170	360	120	1 760	2 160	176	1 400	1 800	61,0	* **22334 CCJA/W33VA405**	* **22334 CCKJA/W33VA405**
	360	120	1 760	2 160	176	1 400	1 800	61,0	* **22334 CCJA/W33VA406**	–
180	380	126	2 000	2 450	193	1 300	1 700	71,5	* **22336 CCJA/W33VA405**	* **22336 CCKJA/W33VA405**
	380	126	2 000	2 450	193	1 300	1 700	71,5	* **22336 CCJA/W33VA406**	–
190	400	132	2 120	2 650	208	1 200	1 600	82,5	* **22338 CCJA/W33VA405**	* **22338 CCKJA/W33VA405**
	400	132	2 120	2 650	208	1 200	1 600	82,5	* **22338 CCJA/W33VA406**	–
200	420	138	2 320	2 900	224	1 200	1 500	95,0	* **22340 CCJA/W33VA405**	* **22340 CCKJA/W33VA405**
	420	138	2 320	2 900	224	1 200	1 500	95,0	* **22340 CCJA/W33VA406**	–
220	460	145	2 700	3 450	260	1 000	1 400	120	* **22344 CCJA/W33VA405**	* **22344 CCKJA/W33VA405**
240	500	155	3 100	4 000	290	950	1 300	155	* **22348 CCJA/W33VA405**	* **22348 CCKJA/W33VA405**

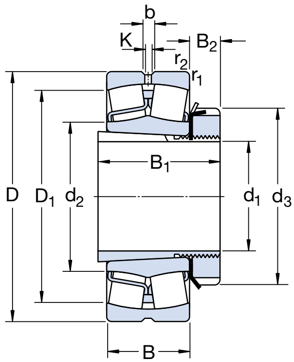
* SKF Explorer bearing



Dimensions						Abutment and fillet dimensions			Calculation factors				Permissible accelerations[1) for oil lubrication	
d	d_2 ~	D_1 ~	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0	rotational	linear
mm						mm			–				m/s^2	
150	188	266	16,7	9	4	167	303	3	0,35	1,9	2,9	1,8	72 g	19 g
	188	266	16,7	9	4	167	303	3	0,35	1,9	2,9	1,8	72 g	19 g
160	200	282	16,7	9	4	177	323	3	0,35	1,9	2,9	1,8	69 g	18 g
	200	282	16,7	9	4	177	323	3	0,35	1,9	2,9	1,8	69 g	18 g
170	213	300	16,7	9	4	187	343	3	0,33	2	3	2	65 g	18 g
	213	300	16,7	9	4	187	343	3	0,33	2	3	2	65 g	18 g
180	224	317	22,3	12	4	197	363	3	0,35	1,9	2,9	1,8	59 g	17 g
	224	317	22,3	12	4	197	363	3	0,35	1,9	2,9	1,8	59 g	17 g
190	236	333	22,3	12	5	210	380	4	0,35	1,9	2,9	1,8	57 g	17 g
	236	333	22,3	12	5	210	380	4	0,35	1,9	2,9	1,8	57 g	17 g
200	249	351	22,3	12	5	220	400	4	0,33	2	3	2	55 g	17 g
	249	351	22,3	12	5	220	400	4	0,33	2	3	2	55 g	17 g
220	279	389	22,3	12	5	240	440	4	0,31	2,2	3,3	2,2	49 g	16 g
240	304	422	22,3	12	5	260	480	4	0,31	2,2	3,3	2,2	45 g	15 g

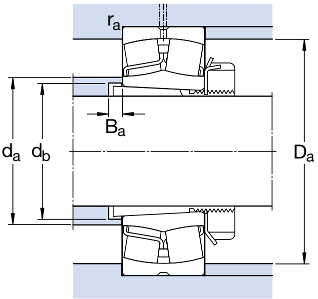
1) For details regarding permissible accelerations → **page 696**

Spherical roller bearings on adapter sleeve
d1 **20 – 65** mm



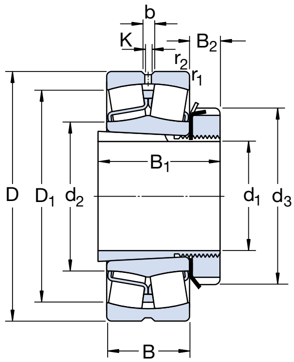
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
20	52	18	49	44	4,75	13 000	17 000	0,25	* **22205 EK**	**H 305**
25	62	20	64	60	6,4	11 000	14 000	0,39	* **22206 EK**	**H 306**
	72	19	55,2	61	6,8	7 500	10 000	0,51	**21306 CCK**	**H 306**
30	72	23	86,5	85	9,3	9 000	12 000	0,59	* **22207 EK**	**H 307**
	80	21	65,6	72	8,15	6 700	9 500	0,69	**21307 CCK**	**H 307**
35	80	23	96,5	90	9,8	8 000	11 000	0,68	* **22208 EK**	**H 308**
	90	23	104	108	11,8	7 000	9 500	0,92	* **21308 EK**	**H 308**
	90	33	150	140	15	6 000	8 000	1,25	* **22308 EK**	**H 2308**
40	85	23	102	96	10,8	7 500	10 000	0,81	* **22209 EK**	**H 309**
	100	25	125	127	13,7	6 300	8 500	1,20	* **21309 EK**	**H 309**
	100	36	183	183	19,6	4 800	7 000	1,70	* **22309 EK**	**H 2309**
45	90	23	104	108	11,8	7 000	9 500	0,90	* **22210 EK**	**H 310**
	110	27	156	166	18,6	4 800	6 300	1,60	* **21310 EK**	**H 310**
	110	40	220	224	24	4 300	6 300	2,25	* **22310 EK**	**H 2310**
50	100	25	125	127	13,7	6 300	8 500	1,10	* **22211 EK**	**H 311**
	120	29	156	166	18,6	5 600	7 500	1,95	* **21311 EK**	**H 311**
	120	43	270	280	30	4 000	5 600	2,85	* **22311 EK**	**H 2311**
55	110	28	156	166	18,6	5 600	7 500	1,45	* **22212 EK**	**H 312**
	130	31	212	240	26,5	4 000	5 300	2,35	* **21312 EK**	**H 312**
	130	46	310	335	36,5	3 600	5 3000	3,50	* **22312 EK**	**H 2312**
60	120	31	193	216	24	5 300	7 000	1,85	* **22213 EK**	**H 313**
	125	31	208	228	25,5	5 000	6 700	2,15	* **22214 EK**	**H 314**
	140	33	236	270	29	4 300	6 000	2,90	* **21313 EK**	**H 313**
	140	48	340	360	38	3 400	5 000	4,20	* **22313 EK**	**H 2313**
	150	35	285	325	34,5	4 000	5 600	3,70	* **21314 EK**	**H 314**
	150	51	400	430	45	3 400	4 500	5,35	* **22314 EK**	**H 2314**
65	130	31	212	240	26,5	4 800	6 300	2,45	* **22215 EK**	**H 315**
	160	37	285	325	34,5	4 000	5 600	4,50	* **21315 EK**	**H 315**
	160	55	440	475	48	3 200	4 300	6,50	* **22315 EK**	**H 2315**

* SKF Explorer bearing



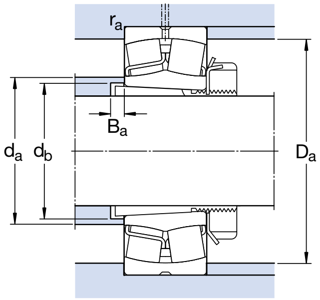
Dimensions									Abutment and fillet dimensions					Calculation factors			
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	b	K	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm									mm					–			
20	31,2	38	43,5	29	8	3,7	2	1	31	28	46,4	5	1	0,35	1,9	2,9	1,8
25	37,7	45	53	31	8	3,7	2	1	37	33	56	5	1	0,31	2,2	3,3	2,2
	43,3	45	58,8	31	8	–	–	1,1	43	33	65	6	1	0,27	2,5	3,7	2,5
30	44,5	52	61,8	35	9	3,7	2	1,1	44	39	65	5	1	0,31	2,2	3,3	2,2
	47,2	52	65,6	35	9	–	–	1,5	47	39	71	6	1,5	0,28	2,4	3,6	2,5
35	49,6	58	69,4	36	10	3,7	2	1,1	49	44	73	5	1	0,28	2,4	3,6	2,5
	59,9	58	79	36	10	–	–	1,5	59	44	81	5	1,5	0,24	2,8	4,2	2,8
	49,9	58	74,3	46	10	5,5	3	1,5	49	45	81	5	1,5	0,37	1,8	2,7	1,8
40	54,9	65	74,4	39	11	5,5	3	1,1	54	50	78	7	1	0,26	2,6	3,9	2,5
	65,3	65	87,9	39	11	5,5	3	1,5	65	50	91	5	1,5	0,24	2,8	4,2	2,8
	57,6	65	83,1	50	11	5,5	3	1,5	57	50	91	5	1,5	0,37	1,8	2,7	1,8
45	59,9	70	79	42	12	5,5	3	1,1	59	55	83	9	1	0,24	2,8	4,2	2,8
	72,6	70	96,5	42	12	5,5	3	2	72	55	99	5	2	0,24	2,8	4,2	2,8
	63,9	70	91,9	55	12	5,5	3	2	63	56	99	5	2	0,37	1,8	2,7	1,8
50	65,3	75	87,9	45	12	5,5	3	1,5	65	60	91	10	1,5	0,24	2,8	4,2	2,8
	72,6	75	96	45	12	5,5	3	2	71	60	109	6	2	0,24	2,8	4,2	2,8
	70,1	75	102	59	12	5,5	3	2	70	61	109	6	2	0,35	1,9	2,9	1,8
55	72,6	80	96,3	47	13	5,5	3	1,5	72	65	101	9	1,5	0,24	2,8	4,2	2,8
	87,8	80	115	47	13	5,5	3	2,1	87	65	118	6	2	0,22	3	4,6	2,8
	77,9	80	110	62	13	5,5	4,5	2,1	77	66	118	6	2	0,35	1,9	2,9	1,8
60	80	85	106	50	14	5,5	3	1,5	80	70	111	8	1,5	0,24	2,8	4,2	2,8
	83	92	111	52	14	5,5	3	1,5	83	75	116	9	1,5	0,22	3	4,6	2,8
	94,7	85	124	50	14	5,5	3	2,1	94	70	128	6	2	0,22	3	4,6	2,8
	81,6	85	118	65	14	8,3	4,5	2,1	81	72	128	5	2	0,35	1,9	2,9	1,8
	101	92	133	52	14	5,5	3	2,1	101	75	138	6	2	0,22	3	4,6	2,8
	90,3	92	128	68	14	8,3	4,5	2,1	90	76	138	6	2	0,33	2	3	2
65	87,8	98	115	55	15	5,5	3	1,5	87	80	121	12	1,5	0,22	3	4,6	2,8
	101	98	133	55	15	5,5	3	2,1	101	80	148	6	2	0,22	3	4,6	2,8
	92,8	98	135	73	15	8,3	4,5	2,1	92	82	148	5	2	0,35	1,9	2,9	1,8

Spherical roller bearings on adapter sleeve
d_1 **70 – 115** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
70	140	33	236	270	29	4 300	6 000	3,00	*** 22216 EK**	**H 316**
	170	39	325	375	39	3 800	5 300	5,30	*** 21316 EK**	**H 316**
	170	58	490	540	54	3 000	4 000	7,65	*** 22316 EK**	**H 2316**
75	150	36	285	325	34,5	4 000	5 600	3,70	*** 22217 EK**	**H 317**
	180	41	325	375	39	3 800	5 300	6,20	*** 21317 EK**	**H 317**
	180	60	550	620	61	2 800	3 800	8,85	*** 22317 EK**	**H 2317**
80	160	40	325	375	39	3 800	5 300	4,55	*** 22218 EK**	**H 318**
	160	52,4	355	440	48	2 800	3 800	6,00	*** 23218 CCK/W33**	**H 2318**
	190	43	380	450	46,5	3 600	4 800	7,25	*** 21318 EK**	**H 318**
	190	64	610	695	67	2 600	3 600	10,5	*** 22318 EK**	**H 2318**
85	170	43	380	450	46,5	3 600	4 800	5,45	*** 22219 EK**	**H 319**
	200	45	425	490	49	3 400	4 500	8,25	*** 21319 EK**	**H 319**
	200	67	670	765	73,5	2 600	3 400	12,0	*** 22319 EK**	**H 2319**
90	165	52	365	490	53	3 000	4 000	6,15	*** 23120 CCK/W33**	**H 3120**
	180	46	425	490	49	3 400	4 500	6,40	*** 22220 EK**	**H 320**
	180	60,3	475	600	63	2 400	3 400	8,75	*** 23220 CCK/W33**	**H 2320**
	215	47	425	490	49	3 400	4 500	10,5	*** 21320 EK**	**H 320**
	215	73	815	950	88	2 400	3 000	14,0	*** 22320 EK**	**H 2320**
100	170	45	310	440	46,5	3 400	4 300	5,75	*** 23022 CCK/W33**	**H 322**
	180	56	430	585	61	2 800	3 600	7,70	*** 23122 CCK/W33**	**H 3122**
	200	53	560	640	63	3 000	4 000	8,90	*** 22222 EK**	**H 322**
	200	69,8	600	765	76,5	2 200	3 200	12,5	*** 23222 CCK/W33**	**H 2322**
	240	80	950	1 120	100	2 000	2 800	21,0	*** 22322 EK**	**H 2322**
110	180	46	355	510	53	3 200	4 000	5,95	*** 23024 CCK/W33**	**H 3024**
	200	62	510	695	71	2 400	3 400	10,0	*** 23124 CCK/W33**	**H 3124**
	215	58	630	765	73,5	2 800	3 800	11,0	*** 22224 EK**	**H 3124**
	215	76	695	930	93	2 000	2 800	14,7	*** 23224 CCK/W33**	**H 2324**
	260	86	965	1 120	100	2 000	2 600	25,5	*** 22324 CCK/W33**	**H 2324**
115	200	52	430	610	62	2 800	3 600	8,60	*** 23026 CCK/W33**	**H 3026**
	210	64	560	780	78	2 400	3 200	12,0	*** 23126 CCK/W33**	**H 3126**
	230	64	735	930	88	2 600	3 600	14,0	*** 22226 EK**	**H 3126**
	230	80	780	1 060	104	1 900	2 600	18,5	*** 23226 CCK/W33**	**H 2326**
	280	93	1 120	1 320	114	1 700	2 400	33,0	*** 22326 CCK/W33**	**H 2326**

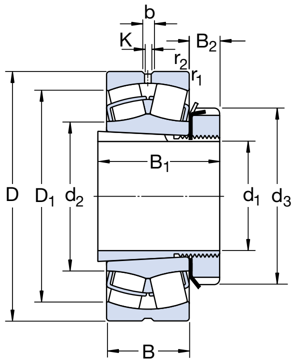
* SKF Explorer bearing



Dimensions									Abutment and fillet dimensions					Calculation factors			
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	b	K	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm									mm					–			
70	94,7	105	127	59	17	5,5	3	2	94	85	129	12	2	0,22	3	4,6	2,8
	106	105	141	59	17	5,5	3	2,1	106	85	158	6	2	0,24	2,8	4,2	2,8
	98,3	105	143	78	17	8,3	4,5	2,1	98	88	158	6	2	0,35	1,9	2,9	1,8
75	101	110	133	63	18	5,5	3	2	101	91	139	12	2	0,22	3	4,6	2,8
	106	110	141	63	18	5,5	3	3	106	91	166	7	2,5	0,24	2,8	4,2	2,8
	108	110	154	82	18	8,3	4,5	3	108	94	166	7	2,5	0,33	2	3	2
80	106	120	141	65	18	5,5	3	2	106	96	149	10	2	0,24	2,8	4,2	2,8
	106	120	137	86	18	5,5	3	2	106	100	149	18	2	0,31	2,2	3,3	2,2
	112	120	150	65	18	8,3	4,5	3	112	96	176	7	2,5	0,24	2,8	4,2	2,8
	113	120	161	86	18	11,1	6	3	113	100	176	7	2,5	0,33	2	3	2
85	112	125	150	68	19	8,3	4,5	2,1	112	102	158	9	2	0,24	2,8	4,2	2,8
	118	125	159	68	19	8,3	4,5	3	118	102	186	7	2,5	0,24	2,8	4,2	2,8
	118	125	168	90	19	11,1	6	3	118	105	186	7	2,5	0,33	2	3	2
90	115	130	144	76	20	5,5	3	2	115	106	154	6	2	0,30	2,3	3,4	2,2
	118	130	159	71	20	8,3	4,5	2,1	118	108	168	8	2	0,24	2,8	4,2	2,8
	117	130	153	97	20	8,3	4,5	2,1	117	110	168	19	2	0,33	2	3	2
	118	130	159	71	20	8,3	4,5	3	118	108	201	7	2,5	0,24	2,8	4,2	2,8
	130	130	184	97	20	11,1	6	3	130	110	201	7	2,5	0,33	2	3	2
100	125	145	151	77	21	5,5	3	2	125	118	160	14	2	0,23	2,9	4,4	2,8
	126	145	157	81	21	8,3	4,5	2	126	117	169	7	2	0,30	2,3	3,4	2,2
	130	145	178	77	21	8,3	4,5	2,1	130	118	188	6	2	0,25	2,7	4	2,5
	130	145	169	105	21	8,3	4,5	2,1	130	121	188	17	2	0,33	2	3	2
	143	145	204	105	21	13,9	7,5	3	143	121	226	7	2,5	0,33	2	3	2
110	135	145	163	72	22	5,5	3	2	135	127	170	7	2	0,22	3	4,6	2,8
	139	155	174	88	22	8,3	4,5	2	139	128	189	7	2	0,28	2,4	3,6	2,5
	141	155	189	88	22	11,1	6	2,1	141	128	203	11	2	0,26	2,6	3,9	2,5
	141	155	182	112	22	8,3	4,5	2,1	141	131	203	17	2	0,35	1,9	2,9	1,8
	152	155	216	112	22	13,9	7,5	3	152	131	246	7	2,5	0,35	1,9	2,9	1,8
115	148	155	180	80	23	8,3	4,5	2	148	137	190	8	2	0,23	2,9	4,4	2,8
	148	165	184	92	23	8,3	4,5	2	148	138	199	8	2	0,28	2,4	3,6	2,5
	152	165	201	92	23	11,1	6	3	152	138	216	8	2,5	0,27	2,5	3,7	2,5
	151	165	196	121	23	8,3	4,5	3	151	142	216	21	2,5	0,33	2	3	2
	164	165	233	121	23	16,7	9	4	164	142	262	8	3	0,35	1,9	2,9	1,8

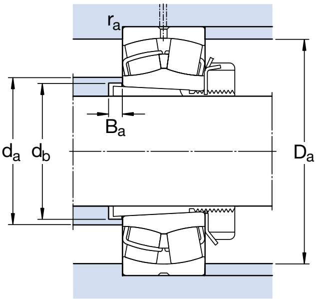
Spherical roller bearings on adapter sleeve

d_1 **125 – 170** mm



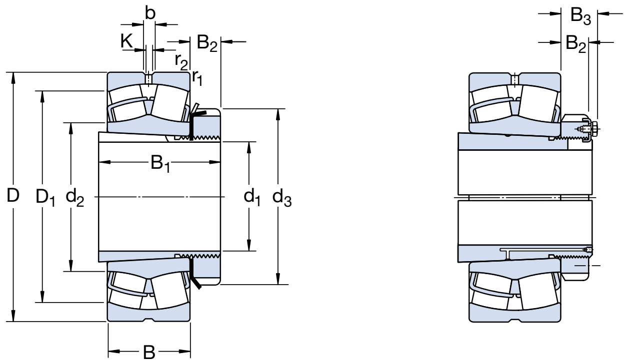
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
125	210	53	465	680	68	2 600	3 400	9,40	* **23028 CCK/W33**	**H 3028**
	225	68	630	900	88	2 200	2 800	14,3	* **23128 CCK/W33**	**H 3128**
	250	68	710	900	86,5	2 400	3 200	17,8	* **22228 CCK/W33**	**H 3128**
	250	88	915	1 250	120	1 600	2 400	24,0	* **23228 CCK/W33**	**H 2328**
	300	102	1 290	1 560	132	1 700	2 200	41,0	* **22328 CCK/W33**	**H 2328**
135	225	56	510	750	73,5	2 400	3 200	11,0	* **23030 CCK/W33**	**H 3030**
	250	80	830	1 200	114	2 000	2 600	20,8	* **23130 CCK/W33**	**H 3130**
	270	73	850	1 080	102	2 200	3 000	22,8	* **22230 CCK/W33**	**H 3130**
	270	96	1 080	1 460	137	1 500	2 200	30,0	* **23230 CCK/W33**	**H 2330**
	320	108	1 460	1 760	146	1 600	2 000	47,4	* **22330 CCK/W33**	**H 2330**
140	240	60	585	880	83	2 400	3 000	14,5	* **23032 CCK/W33**	**H 3032**
	270	86	980	1 370	129	1 700	2 400	27,3	* **23132 CCK/W33**	**H 3132**
	290	80	1 000	1 290	118	2 000	2 800	29,3	* **22232 CCK/W33**	**H 3132**
	290	104	1 220	1 660	153	1 500	2 200	38,8	* **23232 CCK/W33**	**H 2332**
	340	114	1 600	1 960	160	1 500	1 900	60,0	* **22332 CCK/W33**	**H 2332**
150	260	67	710	1 060	100	2 200	2 800	18,3	* **23034 CCK/W33**	**H 3034**
	280	88	1 040	1 500	137	1 800	2 400	29,5	* **23134 CCK/W33**	**H 3134**
	310	86	1 120	1 460	132	1 900	2 600	36,0	* **22234 CCK/W33**	**H 3134**
	310	110	1 400	1 930	173	1 400	2 000	46,4	* **23234 CCK/W33**	**H 2334**
	360	120	1 760	2 160	176	1 400	1 800	60,5	* **22334 CCK/W33**	**H 2334**
160	250	52	431	830	76,5	2 400	2 800	7,90	**23936 CCK/W33**	**H 3936**
	280	74	830	1 250	114	2 000	2 600	23,2	* **23036 CCK/W33**	**H 3036**
	300	96	1 200	1 760	160	1 500	2 200	37,0	* **23136 CCK/W33**	**H 3136**
	320	86	1 180	1 560	140	1 800	2 600	38,2	* **22236 CCK/W33**	**H 3136**
	320	112	1 290	2 120	186	1 300	1 900	49,5	* **23236 CCK/W33**	**H 2336**
	380	126	2 000	2 450	193	1 300	1 700	80,0	* **22336 CCK/W33**	**H 2336**
170	260	52	414	800	76,5	2 200	2 600	14,5	**23938 CCK/W33**	**H 3938**
	290	75	865	1 340	122	1 900	2 400	24,8	* **23038 CCK/W33**	**H 3038**
	320	104	1 370	2 080	183	1 500	2 000	44,5	* **23138 CCK/W33**	**H 3138**
	340	92	1 270	1 700	150	1 700	2 400	46,0	* **22238 CCK/W33**	**H 3138**
	340	120	1 660	2 400	208	1 300	1 800	59,0	* **23238 CCK/W33**	**H 2338**
	400	132	2 120	2 650	208	1 200	1 600	93,0	* **22338 CCK/W33**	**H 2338**

* SKF Explorer bearing



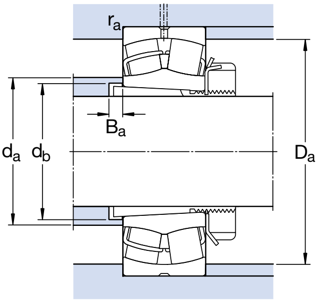
Dimensions									Abutment and fillet dimensions					Calculation factors			
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	b	K	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm									mm					–			
125	158	165	190	82	24	8,3	4,5	2	158	147	200	8	2	0,22	3	4,6	2,8
	159	180	197	97	24	8,3	4,5	2,1	159	149	213	8	2	0,28	2,4	3,6	2,5
	166	180	216	97	24	11,1	6	3	166	149	236	8	2,5	0,26	2,6	3,9	2,5
	165	180	212	131	24	11,1	6	3	165	152	236	22	2,5	0,33	2	3	2
	175	180	247	131	24	16,7	9	4	175	152	283	8	3	0,35	1,9	2,9	1,8
135	169	180	203	87	26	8,3	4,5	2,1	169	158	214	8	2	0,22	3	4,6	2,8
	172	195	216	111	26	11,1	6	2,1	172	160	238	8	2	0,30	2,3	3,4	2,2
	178	195	234	111	26	13,9	7,5	3	178	160	256	15	2,5	0,26	2,6	3,9	2,5
	175	195	228	139	26	11,1	6	3	175	163	256	20	2,5	0,35	1,9	2,9	1,8
	188	195	266	139	26	16,7	9	4	188	163	303	8	3	0,35	1,9	2,9	1,8
140	180	190	217	93	27,5	11,1	6	2,1	180	168	229	8	2	0,22	3	4,6	2,8
	184	210	234	119	28	13,9	7,5	2,1	184	170	258	8	2	0,30	2,3	3,4	2,2
	191	210	250	119	28	13,9	7,5	3	191	170	276	14	2,5	0,26	2,6	3,9	2,5
	188	210	244	147	28	13,9	7,5	3	188	174	276	18	2,5	0,35	1,9	2,9	1,8
	200	210	282	147	28	16,7	9	4	200	174	323	8	3	0,35	1,9	2,9	1,8
150	191	200	232	101	28,5	11,1	6	2,1	191	179	249	8	2	0,23	2,9	4,4	2,8
	195	220	244	122	29	13,9	7,5	2,1	195	180	268	8	2	0,30	2,3	3,4	2,2
	203	220	267	122	29	16,7	9	4	203	180	293	10	3	0,27	2,5	3,7	2,5
	200	220	261	154	29	13,9	7,5	4	200	185	293	18	3	0,35	1,9	2,9	1,8
	213	220	300	154	29	16,7	9	4	213	185	343	8	3	0,33	2	3	2
160	199	210	231	87	29,5	5,5	3	2	199	188	240	8	2	0,22	3	4,6	2,8
	204	210	249	109	29,5	13,9	7,5	2,1	204	189	269	8	2	0,24	2,8	4,2	2,8
	207	230	259	131	30	13,9	7,5	3	207	191	286	8	2,5	0,30	2,3	3,4	2,2
	213	230	278	131	30	16,7	9	4	213	191	303	18	3	0,26	2,6	3,9	2,5
	211	230	271	161	30	13,9	7,5	4	211	195	303	22	3	0,35	1,9	2,9	1,8
	224	230	317	161	30	22,3	12	4	224	195	363	8	3	0,35	1,9	2,9	1,8
170	209	220	240	89	30,5	5,5	3	2	209	198	250	9	2	0,23	2,9	4,4	2,8
	216	220	261	112	30,5	13,9	7,5	2,1	216	199	279	9	2	0,23	2,9	4,4	2,8
	220	240	276	141	31	13,9	7,5	3	220	202	306	9	2,5	0,31	2,2	3,3	2,2
	225	240	294	141	31	16,7	9	4	225	202	323	21	3	0,26	2,6	3,9	2,5
	222	240	287	169	31	16,7	9	4	222	206	323	21	3	0,35	1,9	2,9	1,8
	236	240	333	169	31	22,3	12	5	236	206	380	9	4	0,35	1,9	2,9	1,8

Spherical roller bearings on adapter sleeve
d_1 **180 – 280** mm



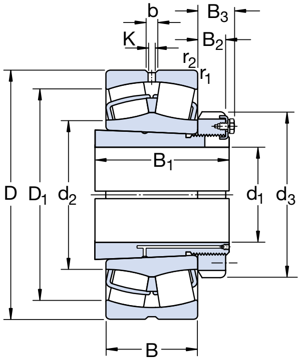
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
180	280	60	546	1 040	93	2 000	2 400	19,0	**23940 CCK/W33**	**H 3940**
	310	82	1 000	1 530	137	1 800	2 200	31,7	* **23040 CCK/W33**	**H 3040**
	340	112	1 600	2 360	204	1 500	1 900	55,5	* **23140 CCK/W33**	**H 3140**
	360	98	1 460	1 930	166	1 600	2 200	66,0	* **22240 CCK/W33**	**H 3140**
	360	128	1 860	2 700	228	1 200	1 700	70,0	* **23240 CCK/W33**	**H 2340**
	420	138	2 320	2 900	224	1 200	1 500	107	* **22340 CCK/W33**	**H 2340**
200	300	60	546	1 080	93	1 900	2 200	22,5	**23944 CCK/W33**	**OH 3944 H**
	340	90	1 220	1 860	163	1 600	2 000	39,4	* **23044 CCK/W33**	**OH 3044 H**
	370	120	1 800	2 750	232	1 300	1 700	67,5	* **23144 CCK/W33**	**OH 3144 H**
	400	108	1 760	2 360	196	1 500	2 000	74,0	* **22244 CCK/W33**	**OH 3144 H**
	400	144	2 360	3 450	285	1 100	1 500	96,5	* **23244 CCK/W33**	**OH 2344 H**
	460	145	2 700	3 450	260	1 000	1 400	135	* **22344 CCK/W33**	**OH 2344 H**
220	320	60	564	1 160	98	1 700	2 000	24,5	**23948 CCK/W33**	**OH 3948 H**
	360	92	1 290	2 080	176	1 500	1 900	44,5	* **23048 CCK/W33**	**OH 3048 H**
	400	128	2 080	3 200	255	1 200	1 600	80,5	* **23148 CCK/W33**	**OH 3148 H**
	440	120	2 000	3 000	245	1 300	1 800	99,0	* **22248 CCK/W33**	**OH 3148 H**
	440	160	2 900	4 300	345	950	1 300	125	* **23248 CCK/W33**	**OH 2348 H**
	500	155	3 100	4 000	290	950	1 300	170	* **22348 CCK/W33**	**OH 2348 H**
240	360	75	880	1 800	156	1 500	1 900	35,0	**23952 CCK/W33**	**OH 3952 H**
	400	104	1 600	2 550	212	1 300	1 700	60,5	* **23052 CCK/W33**	**OH 3052 H**
	440	144	2 550	3 900	290	850	1 100	109	* **23152 CCK/W33**	**OH 3152 H**
	480	130	2 650	3 550	285	900	1 200	130	* **22252 CCK/W33**	**OH 3152 H**
	480	174	3 250	4 750	360	850	1 200	160	* **23252 CCK/W33**	**OH 2352 H**
	540	165	3 550	4 550	325	850	1 100	215	* **22352 CCK/W33**	**OH 2352 H**
260	380	75	845	1 760	143	1 400	1 700	40,0	**23956 CCK/W33**	**OH 3956 H**
	420	106	1 730	2 850	224	1 300	1 600	67,0	* **23056 CCK/W33**	**OH 3056 H**
	460	146	2 650	4 250	335	1 000	1 300	115	* **23156 CCK/W33**	**OH 3156 H**
	500	130	2 700	3 750	300	1 100	1 500	135	* **22256 CCK/W33**	**OH 3156 H**
	500	176	3 250	4 900	365	800	1 100	165	* **23256 CCK/W33**	**OH 2356 H**
	580	175	4 000	5 200	365	800	1 100	250	* **22356 CCK/W33**	**OH 2356 H**
280	420	90	1 200	2 500	200	1 300	1 600	58,5	* **23960 CCK/W33**	**OH 3960 H**
	460	118	2 120	3 450	265	1 200	1 500	90,0	* **23060 CCK/W33**	**OH 3060 H**
	500	160	3 200	5 100	380	950	1 200	150	* **23160 CCK/W33**	**OH 3160 H**
	540	140	3 150	4 250	325	1 000	1 400	170	* **22260 CCK/W33**	**OH 3160 H**
	540	192	3 900	5 850	425	750	1 000	210	* **23260 CCK/W33**	**OH 3260 H**

* SKF Explorer bearing



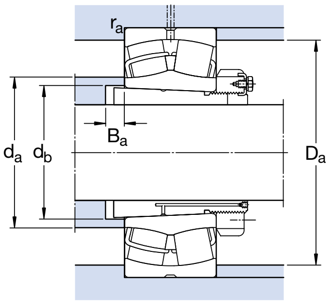
Dimensions										Abutment and fillet dimensions					Calculation factors			
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	B_3	b	K	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm										mm					–			
180	222	240	258	98	31,5	–	8,3	4,5	2,1	222	208	269	9	2	0,18	3,8	5,6	3,6
	228	240	278	120	31,5	–	13,9	7,5	2,1	228	210	299	9	2	0,24	2,8	4,2	2,8
	231	250	293	150	32	–	16,7	9	3	231	212	326	9	2,5	0,31	2,2	3,3	2,2
	238	250	313	150	32	–	16,7	9	4	238	212	343	24	3	0,26	2,6	3,9	2,5
	235	250	304	176	32	–	16,7	9	4	235	216	343	19	3	0,35	1,9	2,9	1,8
	249	250	351	176	32	–	22,3	12	5	249	216	400	9	4	0,33	2	3	2
200	241	260	276	96	30	41	8,3	4,5	2,1	241	229	289	12	2	0,16	4,2	6,3	4
	250	260	306	126	30	41	13,9	7,5	3	250	231	327	9	2,5	0,24	2,8	4,2	2,8
	255	280	320	161	35	–	16,7	9	4	255	233	353	9	3	0,30	2,3	3,4	2,2
	263	280	346	161	35	–	16,7	9	4	263	233	383	21	3	0,27	2,5	3,7	2,5
	259	280	338	186	35	–	16,7	9	4	259	236	383	10	3	0,35	1,9	2,9	1,8
	279	280	389	186	35	–	22,3	12	5	279	236	440	9	4	0,31	2,2	3,3	2,2
220	261	290	298	101	34	46	8,3	4,5	2,1	261	249	309	12	2	0,19	3,6	5,3	3,6
	271	290	326	133	34	46	13,9	7,5	3	271	251	347	11	2,5	0,23	2,9	4,4	2,8
	277	300	348	172	37	–	16,7	9	4	277	254	383	11	3	0,30	2,3	3,4	2,2
	290	300	683	172	37	–	22,3	12	4	290	254	423	19	3	0,27	2,5	3,7	2,5
	287	300	374	199	37	–	22,3	12	4	287	257	423	6	3	0,35	1,9	2,9	1,8
	304	300	422	199	37	–	22,3	12	5	304	257	480	11	4	0,31	2,2	3,3	2,2
240	287	310	331	116	34	46	8,3	4,5	2,1	287	270	348	12	2	0,16	4,2	6,3	4
	295	310	360	145	34	46	16,7	9	4	295	272	385	11	3	0,23	2,9	4,4	2,8
	301	330	380	190	39	–	16,7	9	4	301	276	423	11	3	0,31	2,2	3,3	2,2
	311	330	420	190	39	–	22,3	12	5	311	276	460	25	4	0,27	2,5	3,7	2,5
	312	330	408	211	39	–	22,3	12	5	312	278	460	2	4	0,35	1,9	2,9	1,8
	329	330	457	211	39	–	22,3	12	6	329	278	514	11	5	0,31	2,2	3,3	2,2
260	308	330	352	121	38	50	11,1	6	2,1	308	290	369	12	2	0,15	4,5	6,7	4,5
	315	330	380	152	38	50	16,7	9	4	315	292	405	12	3	0,23	2,9	4,4	2,8
	321	350	400	195	41	–	16,7	9	5	321	296	440	12	4	0,30	2,3	3,4	2,2
	333	350	441	195	41	–	22,3	12	5	333	296	480	28	4	0,26	2,6	3,9	2,5
	332	350	429	224	41	–	22,3	12	5	332	299	480	11	4	0,35	1,9	2,9	1,8
	354	350	492	224	41	–	22,3	12	6	354	299	554	12	5	0,30	2,3	3,4	2,2
280	333	360	385	140	42	54	11,1	6	3	333	312	407	13	2,5	0,19	3,6	5,3	3,6
	340	360	413	168	42	54	16,7	9	4	340	313	445	12	3	0,23	2,9	4,4	2,8
	345	380	434	208	40	53	16,7	9	5	345	318	480	12	4	0,30	2,3	3,4	2,2
	354	380	478	208	40	53	22,3	12	5	354	318	520	32	4	0,26	2,6	3,9	2,5
	356	380	461	240	40	53	22,3	12	5	356	321	520	12	4	0,35	1,9	2,9	1,8

Spherical roller bearings on adapter sleeve
d_1 **300 – 410** mm



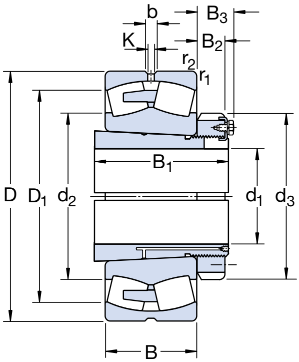
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
300	440	90	1 430	2 700	212	1 400	1 500	61,0	* **23964 CCK/W33**	**OH 3964 H**
	480	121	2 240	3 800	285	1 100	1 400	97,0	* **23064 CCK/W33**	**OH 3064 H**
	540	176	3 750	6 000	440	850	1 100	185	* **23164 CCK/W33**	**OH 3164 H**
	580	150	3 600	4 900	375	950	1 300	200	* **22264 CCK/W33**	**OH 3164 H**
	580	208	4 400	6 700	480	700	950	260	* **23264 CCK/W33**	**OH 3264 H**
320	460	90	1 460	2 800	216	1 300	1 400	67,5	* **23968 CCK/W33**	**OH 3968 H**
	520	133	2 700	4 550	335	1 000	1 300	130	* **23068 CCK/W33**	**OH 3068 H**
	580	190	4 250	6 800	480	800	1 000	250	* **23168 CCK/W33**	**OH 3168 H**
	620	224	5 100	7 800	550	560	800	335	* **23268 CAK/W33**	**OH 3268 H**
340	480	90	1 400	2 750	220	1 200	1 300	68,5	* **23972 CCK/W33**	**OH 3972 H**
	540	134	2 750	4 800	345	950	1 200	135	* **23072 CCK/W33**	**OH 3072 H**
	600	192	4 300	6 950	490	750	1 000	260	* **23172 CCK/W33**	**OH 3172 H**
	650	170	4 300	6 200	440	630	850	375	* **22272 CAK/W33**	**OH 3172 H**
	650	232	5 400	8 300	570	530	850	375	* **23272 CAK/W33**	**OH 3272 H**
360	520	106	1 960	3 800	285	1 100	1 200	96,0	* **23976 CCK/W33**	**OH 3976 H**
	560	135	2 900	5 000	360	900	1 200	145	* **23076 CCK/W33**	**OH 3076 H**
	620	194	4 400	7 100	500	560	1 000	275	* **23176 CAK/W33**	**OH 3176 H**
	680	240	5 850	9 150	620	500	750	420	* **23276 CAK/W33**	**OH 3276 H**
380	540	106	2 000	3 900	290	1 100	1 200	100	* **23980 CCK/W33**	**OH 3980 H**
	600	148	3 250	5 700	400	850	1 100	180	* **23080 CCK/W33**	**OH 3080 H**
	650	200	4 650	7 650	530	530	950	325	* **23180 CAK/W33**	**OH 3180 H**
	720	256	6 550	10 400	680	480	670	505	* **23280 CAK/W33**	**OH 3280 H**
	820	243	7 500	10 400	670	430	750	735	* **22380 CAK/W33**	**OH 3280 H**
400	560	106	2 040	4 150	300	1 000	1 100	105	* **23984 CCK/W33**	**OH 3984 H**
	620	150	3 400	6 000	415	600	1 100	190	* **23084 CAK/W33**	**OH 3084 H**
	700	224	5 600	9 300	620	480	900	410	* **23184 CKJ/W33**	**OH 3184 H**
	760	272	7 350	11 600	765	450	630	590	* **23284 CAK/W33**	**OH 3284 H**
410	600	118	2 450	4 900	345	950	1 000	150	* **23988 CCK/W33**	**OH 3988 H**
	650	157	3 650	6 550	450	560	1 000	235	* **23088 CAK/W33**	**OH 3088 H**
	720	226	6 000	10 000	670	450	850	430	* **23188 CAK/W33**	**OH 3188 H**
	790	280	7 800	12 500	800	430	600	670	* **23288 CAK/W33**	**OH 3288 H**

* SKF Explorer bearing



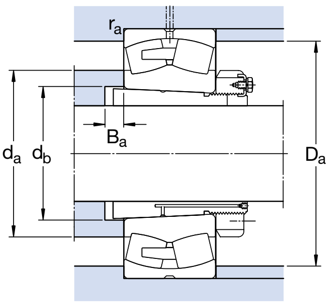
Dimensions										Abutment and fillet dimensions					Calculation factors			
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	B_3	b	K	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm										mm					–			
300	354	380	405	140	42	55	11,1	6	3	354	332	427	13	2,5	0,17	4	5,9	4
	360	380	433	171	42	55	16,7	9	4	360	334	465	13	3	0,23	2,9	4,4	2,8
	370	400	465	226	42	56	22,3	12	5	370	338	520	13	4	0,31	2,2	3,3	2,2
	379	400	513	226	42	56	22,3	12	5	379	338	560	39	4	0,26	2,6	3,9	2,5
	382	400	494	258	42	56	22,3	12	5	382	343	560	13	4	0,35	1,9	2,9	1,8
320	374	400	426	144	45	58	11,1	6	3	374	352	447	14	2,5	0,17	4	5,9	4
	385	400	467	187	45	58	22,3	12	5	385	355	502	14	4	0,24	2,8	4,2	2,8
	394	440	498	254	55	72	22,3	12	5	394	360	560	14	4	0,31	2,2	3,3	2,2
	426	440	528	288	55	72	22,3	12	6	426	364	594	14	5	0,35	1,9	2,9	1,8
340	394	420	447	144	45	58	11,1	6	3	394	372	467	14	2,5	0,15	4,5	6,7	4,5
	404	420	482	188	45	58	22,3	12	5	404	375	522	14	4	0,23	2,9	4,4	2,8
	418	460	524	259	58	75	22,3	12	5	418	380	580	14	4	0,30	2,3	3,4	2,2
	453	460	566	259	58	75	22,3	12	6	453	380	624	36	5	0,26	2,6	3,9	2,5
	447	460	552	299	58	75	22,3	12	6	447	385	624	14	5	0,35	1,9	2,9	1,8
360	420	450	481	164	48	62	13,9	7,5	4	420	393	505	15	3	0,17	4	5,9	4
	425	450	508	193	48	62	22,3	12	5	425	396	542	15	4	0,22	3	4,6	2,8
	452	490	541	264	60	77	22,3	12	5	452	401	600	15	4	0,30	2,3	3,4	2,2
	471	490	581	310	60	77	22,3	12	6	471	405	654	15	5	0,35	1,9	2,9	1,8
380	439	470	500	168	52	66	13,9	7,5	4	439	413	525	15	3	0,17	4	5,9	4
	450	470	541	210	52	66	22,3	12	5	450	417	582	15	4	0,23	2,9	4,4	2,8
	474	520	566	272	62	82	22,3	12	6	474	421	624	15	5	0,28	2,4	3,6	2,5
	499	520	615	328	62	82	22,3	12	6	499	427	694	15	5	0,35	1,9	2,9	1,8
	534	520	697	328	62	82	22,3	12	7,5	534	427	788	28	6	0,30	2,3	3,4	2,2
400	459	490	519	168	52	66	16,7	9	4	466	433	545	15	3	0,16	4,2	6,3	4
	485	490	562	212	52	66	22,3	12	5	485	437	602	16	4	0,22	3	4,6	2,8
	483	540	607	304	70	90	22,3	12	6	483	443	674	16	5	0,30	2,3	3,4	2,2
	525	540	649	352	70	90	22,3	12	7,5	525	449	726	16	6	0,35	1,9	2,9	1,8
410	484	520	552	189	60	77	16,7	9	4	484	454	585	17	3	0,17	4	5,9	4
	509	520	589	228	60	77	22,3	12	6	509	458	627	17	5	0,22	3	4,6	2,8
	528	560	632	307	70	90	22,3	12	6	528	463	694	17	5	0,30	2,3	3,4	2,2
	547	560	676	361	70	90	22,3	12	7,5	547	469	758	17	6	0,35	1,9	2,9	1,8

Spherical roller bearings on adapter sleeve
d_1 **430 – 630** mm



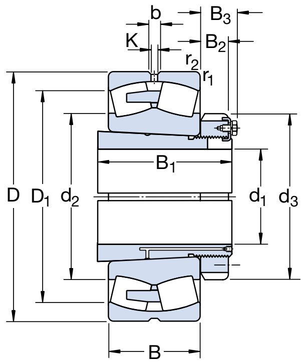
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Adapter sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
430	620	118	2 500	5 000	355	600	1 000	160	* **23992 CAK/W33**	**OH 3992 H**
	680	163	3 900	6 950	465	560	950	265	* **23092 CAK/W33**	**OH 3092 H**
	760	240	6 400	10 800	680	430	800	530	* **23192 CAK/W33**	**OH 3192 H**
	830	296	8 500	13 700	880	400	560	790	* **23292 CAK/W33**	**OH 3292 H**
450	650	128	2 900	5 700	405	560	1 000	185	* **23996 CAK/W33**	**OH 3996 H**
	700	165	3 900	6 800	450	530	950	275	* **23096 CAK/W33**	**OH 3096 H**
	790	248	6 950	12 000	780	400	750	590	* **23196 CAK/W33**	**OH 3196 H**
	870	310	9 300	15 000	950	380	530	935	* **23296 CAK/W33**	**OH 3296 H**
470	670	128	2 900	6 000	415	530	950	195	* **239/500 CAK/W33**	**OH 39/500 H**
	720	167	4 150	7 800	510	500	900	290	* **230/500 CAK/W33**	**OH 30/500 H**
	830	264	7 650	12 900	830	380	700	690	* **231/500 CAK/W33**	**OH 31/500 H**
	920	336	10 600	17 300	1 060	360	500	1 100	* **232/500 CAK/W33**	**OH 32/500 H**
500	710	136	3 200	6 700	480	500	900	255	* **239/530 CAK/W33**	**OH 39/530 H**
	780	185	5 100	9 300	630	450	800	395	* **230/530 CAK/W33**	**OH 30/530 H**
	870	272	8 150	14 000	915	360	670	765	* **231/530 CAK/W33**	**OH 31/530 H**
	980	355	11 100	20 400	1 220	300	480	1 490	**232/530 CAK/W33**	**OH 32/530 H**
530	750	140	3 450	7 200	510	450	850	260	* **239/560 CAK/W33**	**OH 39/560 H**
	820	195	5 600	10 200	680	430	750	445	* **230/560 CAK/W33**	**OH 30/560 H**
	920	280	9 150	16 000	980	340	630	880	* **231/560 CAK/W33**	**OH 31/560 H**
	1 030	365	11 500	22 000	1 400	280	430	1 490	**232/560 CAK/W33**	**OH 32/560 H**
560	800	150	3 900	8 300	585	430	750	330	* **239/600 CAK/W33**	**OH 39/600 H**
	870	200	6 000	11 400	750	400	700	525	* **230/600 CAK/W33**	**OH 30/600 H**
	980	300	10 200	18 000	1 100	320	560	1 070	* **231/600 CAK/W33**	**OH 31/600 H**
	1 090	388	13 100	25 500	1 560	260	400	1 780	**232/600 CAK/W33**	**OH 32/600 H**
600	850	165	4 650	9 800	640	400	700	385	* **239/630 CAK/W33**	**OH 39/630 H**
	920	212	6 700	12 500	800	380	670	595	* **230/630 CAK/W33**	**OH 30/630 H**
	1 030	315	10 500	20 800	1 220	260	530	1 240	**231/630 CAK/W33**	**OH 31/630 H**
630	900	170	5 000	10 800	695	360	670	455	* **239/670 CAK/W33**	**OH 39/670 H**
	980	230	7 650	14 600	915	340	600	755	* **230/670 CAK/W33**	**OH 30/670 H**
	1 090	336	10 900	22 400	1 370	240	500	1 510	**231/670 CAK/W33**	**OH 31/670 H**
	1 220	438	15 400	30 500	1 700	220	360	2 535	**232/670 CAK/W33**	**OH 32/670 H**

* SKF Explorer bearing

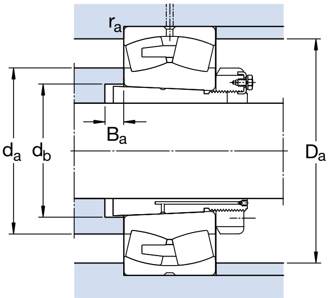


Dimensions										Abutment and fillet dimensions					Calculation factors			
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	B_3	b	K	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm										mm					–			
430	512	540	573	189	60	77	16,7	9	4	512	474	605	17	3	0,16	4,2	6,3	4
	531	540	616	234	60	77	22,3	12	6	531	478	657	17	5	0,22	3	4,6	2,8
	553	580	665	326	75	95	22,3	12	7,5	553	484	728	17	6	0,30	2,3	3,4	2,2
	572	580	706	382	75	95	22,3	12	7,5	572	490	798	17	6	0,35	1,9	2,9	1,8
450	532	560	601	200	60	77	16,7	9	5	532	496	632	18	4	0,18	3,8	5,6	3,6
	547	560	632	237	60	77	22,3	12	6	547	499	677	18	5	0,21	3,2	4,8	3,2
	577	620	692	335	75	95	22,3	12	7,5	577	505	758	18	6	0,30	2,3	3,4	2,2
	600	620	741	397	75	95	22,3	12	7,5	600	512	838	18	6	0,35	1,9	2,9	1,8
470	557	580	621	208	68	85	22,3	12	5	557	516	652	18	4	0,17	4	5,9	4
	571	580	656	247	68	85	22,3	12	6	571	519	697	18	5	0,21	3,2	4,8	3,2
	603	630	726	356	80	100	22,3	12	7,5	603	527	798	18	6	0,30	2,3	3,4	2,2
	631	630	779	428	80	100	22,3	12	7,5	631	534	888	18	6	0,35	1,9	2,9	1,8
500	589	630	659	216	68	90	22,3	12	5	589	547	692	20	4	0,17	4	5,9	4
	611	630	708	265	68	90	22,3	12	6	611	551	757	20	5	0,22	3	4,6	2,8
	636	670	763	364	80	105	22,3	12	7,5	636	558	838	20	6	0,30	2,3	3,4	2,2
	668	670	836	447	80	105	22,3	12	9,5	668	566	940	20	8	0,35	1,9	2,9	1,8
530	625	650	695	227	75	97	22,3	12	5	625	577	732	20	4	0,16	4,2	6,3	4
	644	650	745	282	75	97	22,3	12	6	644	582	797	20	5	0,22	3	4,6	2,8
	673	710	808	377	85	110	22,3	12	7,5	673	589	888	20	6	0,30	2,3	3,4	2,2
	704	710	877	462	85	110	22,3	12	9,5	704	600	990	20	8	0,35	1,9	2,9	1,8
560	668	700	742	239	75	97	22,3	12	5	668	619	782	22	4	0,17	4	5,9	4
	683	700	786	289	75	97	22,3	12	6	683	623	847	22	5	0,22	3	4,6	2,8
	720	750	862	399	85	110	22,3	12	7,5	720	632	948	22	6	0,30	2,3	3,4	2,2
	752	750	928	487	85	110	22,3	12	9,5	752	639	1 050	22	8	0,37	1,8	2,7	1,8
600	705	730	786	254	75	97	22,3	12	6	705	650	827	22	5	0,17	4	5,9	4
	725	730	837	301	75	97	22,3	12	7,5	725	654	892	22	6	0,21	3,2	4,8	3,2
	757	800	908	424	95	120	22,3	12	7,5	757	663	998	22	6	0,30	2,3	3,4	2,2
630	749	780	834	264	80	102	22,3	12	6	749	691	877	22	5	0,17	4	5,9	4
	770	780	890	324	80	102	22,3	12	7,5	770	696	952	22	6	0,21	3,2	4,8	3,2
	802	850	958	456	106	131	22,3	12	7,5	802	705	1 058	22	6	0,30	2,3	3,4	2,2
	830	850	1 027	558	106	131	22,3	12	12	830	720	1 172	22	10	0,35	1,9	2,9	1,8

Spherical roller bearings on adapter sleeve
d$_1$ **670 – 1 000** mm



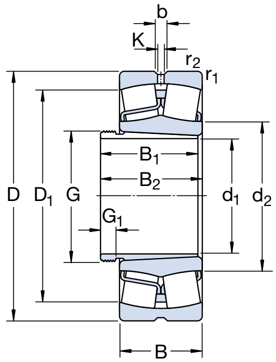
Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Adapter sleeve
d$_1$	D	B	C	C$_0$	P$_u$					
mm			kN		kN	r/min		kg	–	
670	950	180	5 600	12 000	765	340	600	525	* **239/710 CAK/W33**	**OH 39/710 H**
	1 030	236	8 300	16 300	1 000	320	560	860	* **230/710 CAK/W33**	**OH 30/710 H**
	1 150	345	12 200	26 000	1 530	240	450	1 750	**231/710 CAK/W33**	**OH 31/710 H**
	1 280	450	17 600	34 500	2 000	200	320	3 350	**232/710 CAK/W33**	**OH 32/710 H**
710	1 000	185	6 000	13 200	815	320	560	605	* **239/750 CAK/W33**	**OH 39/750 H**
	1 090	250	9 650	18 600	1 100	300	530	990	* **230/750 CAK/W33**	**OH 30/750 H**
	1 220	365	13 600	29 000	1 660	220	430	2 045	**231/750 CAK/W33**	**OH 31/750 H**
	1 360	475	18 700	36 500	2 120	190	320	3 400	**232/750 CAKF/W33**	**OH 32/750 H**
750	1 060	195	6 400	14 300	880	300	530	730	* **239/800 CAK/W33**	**OH 39/800 H**
	1 150	258	10 000	20 000	1 160	280	480	1 200	* **230/800 CAK/W33**	**OH 30/800 H**
	1 280	375	14 800	31 500	1 800	200	400	2 430	**231/800 CAK/W33**	**OH 31/800 H**
800	1 120	200	5 980	15 600	930	260	480	950	**239/850 CAK/W33**	**OH 39/850 H**
	1 220	272	9 370	21 600	1 270	240	450	1 390	**230/850 CAK/W33**	**OH 30/850 H**
	1 360	400	16 100	34 500	2 000	180	360	2 800	**231/850 CAK/W33**	**OH 31/850 H**
850	1 180	206	6 440	17 000	1 020	240	450	930	**239/900 CAK/W33**	**OH 39/900 H**
	1 280	280	10 100	23 200	1 340	220	400	1 580	**230/900 CAK/W33**	**OH 30/900 H**
900	1 250	224	7 250	19 600	1 120	220	430	1 120	**239/950 CAK/W33**	**OH 39/950 H**
	1 360	300	12 000	28 500	1 600	200	380	1 870	**230/950 CAK/W33**	**OH 30/950 H**
950	1 420	308	12 700	30 500	1 700	180	360	2 070	**230/1000 CAKF/W33**	**OH 30/1000 H**
	1 580	462	21 400	48 000	2 550	140	280	4 340	**231/1000 CAKF/W33**	**OH 31/1000 H**
1 000	1 400	250	9 550	26 000	1 460	180	360	1 590	**239/1060 CAKF/W33**	**OH 39/1060 H**
	1 500	325	13 800	34 000	1 830	170	320	2 800	**230/1060 CAKF/W33**	**OH 30/1060 H**



Dimensions										Abutment and fillet dimensions					Calculation factors			
d_1	d_2 ~	d_3	D_1 ~	B_1	B_2	B_3	b	K	$r_{1,2}$ min	d_a max	d_b min	D_a max	B_a min	r_a max	e	Y_1	Y_2	Y_0
mm										mm					–			
670	788	830	881	286	90	112	22,3	12	6	788	732	927	26	5	0,17	4	5,9	4
	814	830	939	342	90	112	22,3	12	7,5	814	736	1 002	26	6	0,21	3,2	4,8	3,2
	850	900	1 017	467	106	135	22,3	12	9,5	850	745	1 110	26	8	0,28	2,4	3,6	2,5
	851	900	1 017	572	106	135	22,3	12	12	851	753	1 232	26	10	0,35	1,9	2,9	1,8
710	832	870	929	291	90	112	22,3	12	6	832	772	977	26	5	0,16	4,2	6,3	4
	860	870	996	356	90	112	22,3	12	7,5	860	778	1 062	26	6	0,21	3,2	4,8	3,2
	900	950	1 080	493	112	141	22,3	12	9,5	900	787	1 180	26	8	0,28	2,4	3,6	2,5
	938	950	1 163	603	112	141	22,3	12	15	938	800	1 302	26	12	0,35	1,9	2,9	1,8
750	885	920	984	303	90	112	22,3	12	6	885	825	1 037	28	5	0,16	4,2	6,3	4
	915	920	1 051	366	90	112	22,3	12	7,5	915	829	1 122	28	6	0,20	3,4	5	3,2
	950	1 000	1 141	505	112	141	22,3	12	9,5	950	838	1 240	28	8	0,28	2,4	3,6	2,5
800	940	980	1 043	308	90	115	22,3	12	6	940	876	1 097	28	5	0,16	4,2	6,3	4
	969	980	1 114	380	90	115	22,3	12	7,5	969	880	1 192	28	6	0,20	3,4	5	3,2
	1 010	1 060	1 203	536	118	147	22,3	12	12	1 010	890	1 312	28	10	0,28	2,4	3,6	2,5
850	989	1 030	1 100	326	100	125	22,3	12	6	989	924	1 157	30	5	0,15	4,5	6,7	4,5
	1 023	1 030	1 177	400	100	125	22,3	12	7,5	1 023	931	1 252	30	6	0,20	3,4	5	3,2
900	1 049	1 080	1 161	344	100	125	22,3	12	7,5	1 049	976	1 222	30	6	0,15	4,5	6,7	4,5
	1 083	1 080	1 242	420	100	125	22,3	12	7,5	1 083	983	1 332	30	6	0,20	3,4	5	3,2
950	1 139	1 140	1 305	430	100	125	22,3	12	7,5	1 139	1 034	1 392	33	6	0,19	3,6	5,3	3,6
	1 182	1 240	1 399	609	125	154	22,3	12	12	1 182	1 047	1 532	33	10	0,28	2,4	3,6	2,5
1 000	1 171	1 200	1 303	372	100	125	22,3	12	7,5	1 171	1 090	1 392	33	6	0,16	4,2	6,3	4
	1 202	1 200	1 373	447	100	125	22,3	12	9,5	1 202	1 096	1 466	33	8	0,19	3,6	5,3	3,6

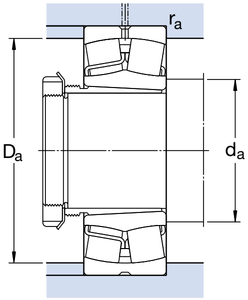
Spherical roller bearings on withdrawal sleeve

d_1 **35 – 80** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Refer-ence speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
35	80	23	96,5	90	9,8	8 000	11 000	0,60	*** 22208 EK**	**AH 308**
	90	23	104	108	11,8	7 000	9 500	0,84	*** 21308 EK**	**AH 308**
	90	33	150	140	15	6 000	8 000	1,20	*** 22308 EK**	**AH 2308**
40	85	23	102	98	10,8	7 500	10 000	0,70	*** 22209 EK**	**AH 309**
	100	25	125	127	13,7	6 300	8 500	1,10	*** 21309 EK**	**AH 309**
	100	36	183	183	19,6	5 300	7 000	1,55	*** 22309 EK**	**AH 2309**
45	90	23	104	108	11,8	7 000	9 500	0,79	*** 22210 EK**	**AHX 310**
	110	27	156	166	18,6	5 600	7 500	1,45	*** 21310 EK**	**AHX 310**
	110	40	220	224	24	4 800	6 300	2,10	*** 22310 EK**	**AHX 2310**
50	100	25	125	137	13,7	6 300	8 500	0,95	*** 22211 EK**	**AHX 311**
	120	29	156	166	18,6	5 600	7 500	1,80	*** 21311 EK**	**AHX 311**
	120	43	270	280	30	4 300	5 600	2,70	*** 22311 EK**	**AHX 2311**
55	110	28	156	166	18,6	5 600	7 500	1,30	*** 22212 EK**	**AHX 312**
	130	31	212	240	26,5	4 800	6 300	2,20	*** 21312 EK**	**AHX 312**
	130	46	310	335	36,5	4 000	5 300	3,30	*** 22312 EK**	**AHX 2312**
60	120	31	193	216	24	5 300	7 000	1,70	*** 22213 EK**	**AH 313 G**
	140	33	236	270	29	4 300	6 000	2,75	*** 21313 EK**	**AH 313 G**
	140	48	340	360	38	3 800	5 000	4,10	*** 22313 EK**	**AH 2313 G**
65	125	31	208	228	25,5	5 000	6 700	1,80	*** 22214 EK**	**AH 314 G**
	150	35	285	325	34,5	3 400	4 500	3,35	*** 21314 EK**	**AH 314 G**
	150	51	400	430	45	3 400	4 500	4,90	*** 22314 EK**	**AHX 2314 G**
70	130	31	212	240	26,5	4 800	6 300	1,95	*** 22215 EK**	**AH 315 G**
	160	37	285	325	34,5	4 000	5 600	4,15	*** 21315 EK**	**AH 315 G**
	160	55	440	475	48	3 200	4 300	6,00	*** 22315 EK**	**AHX 2315 G**
75	140	33	236	270	29	4 300	6 000	2,40	*** 22216 EK**	**AH 316**
	170	39	325	375	39	3 800	5 300	4,75	*** 21316 EK**	**AH 316**
	170	58	490	540	54	3 000	4 000	7,00	*** 22316 EK**	**AHX 2316**
80	150	36	285	325	34,5	4 000	5 600	3,05	*** 22217 EK**	**AHX 317**
	180	41	325	375	39	3 800	5 300	4,55	*** 21317 EK**	**AHX 317**
	180	60	550	620	61	2 800	3 800	8,15	*** 22317 EK**	**AHX 2317**

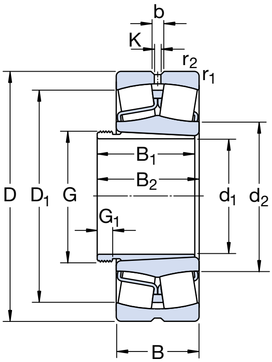
* SKF Explorer bearing



Dimensions										Abutment and fillet dimensions			Calculation factors			
d_1	d_2 ~	D_1 ~	B_1	B_2[1)] ~	G	G_1	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm										mm			–			
35	49,6	69,4	29	32	M 45×1,5	6	5,5	3	1,1	47	73	1	0,28	2,4	3,6	2,5
	59,9	79	29	32	M 45×1,5	6	–	–	1,5	49	81	1,5	0,24	2,8	4,2	2,8
	49,9	74,3	40	43	M 45×1,5	7	5,5	3	1,5	49	81	1,5	0,37	1,8	2,7	1,8
40	54,9	74,4	31	34	M 50×1,5	6	5,5	3	1,1	52	78	1	0,26	2,6	3,9	2,5
	65,3	87,9	31	34	M 50×1,5	6	5,5	3	1,5	54	91	1,5	0,24	2,8	4,2	2,8
	57,6	83,1	44	47	M 50×1,5	7	5,5	3	1,5	54	91	1,5	0,37	1,8	2,7	1,8
45	59,9	79	35	38	M 55×2	7	5,5	3	1,1	57	83	1	0,24	2,8	4,2	2,8
	72,6	96,5	35	38	M 55×2	7	5,5	3	2	61	99	2	0,24	2,8	4,2	2,8
	63,9	91,9	50	53	M 55×2	9	5,5	3	2	61	99	2	0,37	1,8	2,7	1,8
50	65,3	87,9	37	40	M 60×2	7	5,5	3	1,5	64	91	1,5	0,24	2,8	4,2	2,8
	72,6	96	37	40	M 60×2	7	5,5	3	2	66	109	2	0,24	2,8	4,2	2,8
	70,1	102	54	57	M 60×2	10	5,5	3	2	66	109	2	0,35	1,9	2,9	1,8
55	72,6	96,3	40	43	M 65×2	8	5,5	3	1,5	69	101	1,5	0,24	2,8	4,2	2,8
	87,8	115	40	43	M 65×2	8	5,5	3	2,1	72	118	2	0,22	3	4,6	2,8
	77,9	110	58	61	M 65×2	11	5,5	4,5	2,1	72	118	2	0,35	1,9	2,9	1,8
60	80	106	42	45	M 70×2	8	5,5	3	1,5	74	111	1,5	0,24	2,8	4,2	2,8
	94,7	124	42	45	M 70×2	8	5,5	3	2,1	77	128	2	0,22	3	4,6	2,8
	81,6	118	61	64	M 70×2	12	8,3	4,5	2,1	77	128	2	0,35	1,9	2,9	1,8
65	83	111	43	47	M 75×2	8	5,5	3	1,5	79	116	1,5	0,22	3	4,6	2,8
	101	133	43	47	M 75×2	8	5,5	3	2,1	82	138	2	0,22	3	4,6	2,8
	90,3	128	64	68	M 75×2	12	8,3	4,5	2,1	82	138	2	0,33	2	3	2
70	87,8	115	45	49	M 80×2	8	5,5	3	1,5	84	121	1,5	0,22	3	4,6	2,8
	101	133	45	49	M 80×2	8	5,5	3	2,1	87	148	2	0,22	3	4,6	2,8
	92,8	135	68	72	M 80×2	12	8,3	4,5	2,1	87	148	2	0,35	1,9	2,9	1,8
75	94,7	127	48	52	M 90×2	8	5,5	3	2	91	129	2	0,22	3	4,6	2,8
	106	141	48	52	M 90×2	8	5,5	3	2,1	92	158	2	0,24	2,8	4,2	2,8
	98,3	143	71	75	M 90×2	12	8,3	4,5	2,1	92	158	2	0,35	1,9	2,9	1,8
80	101	133	52	56	M 95×2	9	5,5	3	2	96	139	2	0,22	3	4,6	2,8
	106	141	52	56	M 95×2	9	5,5	3	3	99	166	2,5	0,24	2,8	4,2	2,8
	108	154	74	78	M 95×2	13	8,3	4,5	3	99	166	2,5	0,33	2	3	2

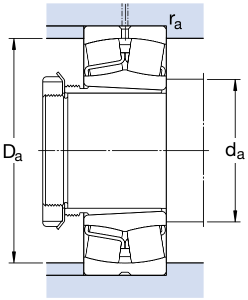
[1)] Width before the sleeve is driven into bearing bore

Spherical roller bearings on withdrawal sleeve
d_1 **85 – 125** 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	–	
85	160	40	325	375	39	3 800	5 300	3,70	* **22218 EK**	**AHX 318**
	160	52,4	355	440	48	2 800	3 800	5,00	* **23218 CCK/W33**	**AHX 3218**
	190	43	380	450	46,5	3 600	4 800	6,40	* **21318 EK**	**AHX 318**
	190	64	610	695	67	2 600	3 600	9,50	* **22318 EK**	**AHX 2318**
90	170	43	380	450	46,5	3 600	4 800	4,60	* **22219 EK**	**AHX 319**
	200	45	425	490	49	3 400	4 500	7,40	* **21319 EK**	**AHX 319**
	200	67	670	765	73,5	2 600	3 400	11,0	* **22319 EK**	**AHX 2319**
95	165	52	365	490	53	3 000	4 000	5,00	* **23120 CCK/W33**	**AHX 3120**
	180	46	425	490	49	3 400	4 500	5,40	* **22220 EK**	**AHX 320**
	180	60,3	475	600	63	2 400	3 400	7,30	* **23220 CCK/W33**	**AHX 3220**
	215	47	425	490	49	3 400	4 500	9,10	* **21320 EK**	**AHX 320**
	215	73	815	950	88	2 400	3 000	14,0	* **22320 EK**	**AHX 2320**
105	170	45	310	440	46,5	3 400	4 300	4,45	* **23022 CCK/W33**	**AHX 3122**
	180	56	430	585	61	2 800	3 600	6,35	* **23122 CCK/W33**	**AHX 3122**
	180	69	520	750	78	2 200	3 000	7,30	* **24122 CCK30/W33**	**AH 24122**
	200	53	560	640	63	3 000	4 000	7,50	* **22222 EK**	**AHX 3122**
	200	69,8	600	765	76,5	2 200	3 200	10,5	* **23222 CCK/W33**	**AHX 3222 G**
	240	80	950	1 120	100	2 000	2 800	19,5	* **22322 EK**	**AHX 2322 G**
115	180	46	355	510	53	3 200	4 000	4,80	* **23024 CCK/W33**	**AHX 3024**
	180	60	430	670	68	2 000	3 400	5,95	* **24024 CCK30/W33**	**AH 24024**
	200	62	510	695	71	2 400	3 400	8,70	* **23124 CCK/W33**	**AHX 3124**
	200	80	655	950	95	1 900	2 600	10,8	* **24124 CCK30/W33**	**AH 24124**
	215	58	630	765	73,5	2 800	3 800	9,55	* **22224 EK**	**AHX 3124**
	215	76	695	930	93	2 000	2 800	13,0	* **23224 CCK/W33**	**AHX 3224 G**
	260	86	965	1 120	100	2 000	2 600	24,0	* **22324 CCK/W33**	**AHX 2324 G**
125	200	52	430	610	62	2 800	3 600	6,75	* **23026 CCK/W33**	**AHX 3026**
	200	69	540	815	81,5	1 900	3 000	8,65	* **24026 CCK30/W33**	**AH 24026**
	210	64	560	780	78	2 400	3 200	9,60	* **23126 CCK/W33**	**AHX 3126**
	210	80	680	1 000	100	1 800	2 400	11,7	* **24126 CCK30/W33**	**AH 24126**
	230	64	735	930	88	2 600	3 600	11,6	* **22226 EK**	**AHX 3126**
	230	80	780	1 060	104	1 900	2 600	15,5	* **23226 CCK/W33**	**AHX 3226 G**
	280	93	1 120	1 320	114	1 700	2 400	30,5	* **22326 CCK/W33**	**AHX 2326 G**

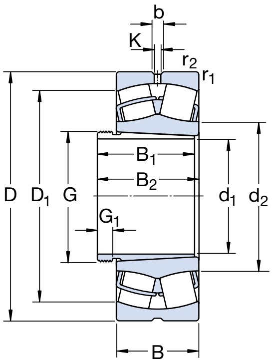
* SKF Explorer bearing



Dimensions										Abutment and fillet dimensions			Calculation factors			
d_1	d_2 ~	D_1 ~	B_1	B_2[1)] ~	G	G_1	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm										mm			–			
85	106	141	53	57	M 100×2	9	5,5	3	2	101	149	2	0,24	2,8	4,2	2,8
	106	137	63	67	M 100×2	10	5,5	3	2	101	149	2	0,31	2,2	3,3	2,2
	112	150	53	57	M 100×2	9	8,3	4,5	3	104	176	2,5	0,24	2,8	4,2	2,8
	113	161	79	83	M 100×2	14	11,1	6	3	104	176	2,5	0,33	2	3	2
90	112	150	57	61	M 105×2	10	8,3	4,5	2,1	107	158	2	0,24	2,8	4,2	2,8
	118	159	57	61	M 105×2	10	8,3	4,5	3	109	186	2,5	0,24	2,8	4,2	2,8
	118	168	85	89	M 105×2	16	11,1	6	3	109	186	2,5	0,33	2	3	2
95	115	144	64	68	M 110×2	11	5,5	3	2	111	154	2	0,30	2,3	3,4	2,2
	118	159	59	63	M 110×2	10	8,3	4,5	2,1	112	168	2	0,24	2,8	4,2	2,8
	117	153	73	77	M 110×2	11	8,3	4,5	2,1	112	168	2	0,33	2	3	2
	118	159	59	63	M 110×2	10	8,3	4,5	3	114	201	2,5	0,24	2,8	4,2	2,8
	130	184	90	94	M 110×2	16	11,1	6	3	114	201	2,5	0,33	2	3	2
105	125	151	68	72	M 120×2	11	5,5	3	2	120	160	2	0,23	2,9	4,4	2,8
	126	157	68	72	M 120×2	11	8,3	4,5	2	121	169	2	0,30	2,3	3,4	2,2
	123	153	82	91	M 115×2	13	5,5	3	2	121	169	2	0,37	1,8	2,7	1,8
	130	178	68	72	M 120×2	11	8,3	4,5	2,1	122	188	2	0,25	2,7	4	2,5
	130	169	82	86	M 120×2	11	8,3	4,5	2,1	122	188	2	0,33	2	3	2
	143	204	98	102	M 120×2	16	13,9	7,5	3	124	226	2,5	0,33	2	3	2
115	135	163	60	64	M 130×2	13	5,5	3	2	130	170	2	0,22	3	4,6	2,8
	132	159	73	82	M 125×2	13	5,5	3	2	130	170	2	0,30	2,3	3,4	2,2
	139	174	75	79	M 130×2	12	8,3	4,5	2	131	189	2	0,28	2,4	3,6	2,5
	135	168	93	102	M 130×2	13	5,5	3	2	131	189	2	0,37	1,8	2,7	1,8
	141	189	75	79	M 130×2	12	11,1	6	2,1	132	203	2	0,26	2,6	3,9	2,5
	141	182	90	94	M 130×2	13	8,3	4,5	2,1	132	203	2	0,35	1,9	2,9	1,8
	152	216	105	109	M 130×2	17	13,9	7,5	3	134	246	2,5	0,35	1,9	2,9	1,8
125	148	180	67	71	M 140×2	14	8,3	4,5	2	140	190	2	0,23	2,9	4,4	2,8
	145	175	83	93	M 135×2	14	5,5	3	2	140	190	2	0,31	2,2	3,3	2,2
	148	184	78	82	M 140×2	12	8,3	4,5	2	141	199	2	0,28	2,4	3,6	2,5
	146	180	94	104	M 140×2	14	5,5	3	2	141	199	2	0,35	1,9	2,9	1,8
	152	201	78	82	M 140×2	12	11,1	6	3	144	216	2,5	0,27	2,5	3,7	2,5
	151	196	98	102	M 140×2	15	8,3	4,5	3	144	216	2,5	0,33	2	3	2
	164	233	115	119	M 140×2	19	16,7	9	4	148	262	3	0,35	1,9	2,9	1,8

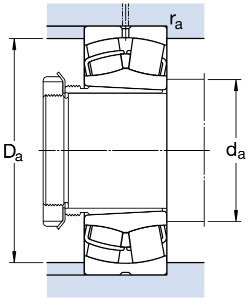
1) Width before the sleeve is driven into bearing bore

Spherical roller bearings on withdrawal sleeve
d$_1$ **135 – 170** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
135	210	53	465	680	68	2 600	3 400	7,35	*** 23028 CCK/W33**	**AHX 3028**
	210	69	570	900	88	1 800	2 800	9,20	*** 24028 CCK30/W33**	**AH 24028**
	225	68	630	900	88	2 200	2 800	11,5	*** 23128 CCK/W33**	**AHX 3128**
	225	85	765	1 160	112	1 700	2 400	14,3	*** 24128 CCK30/W33**	**AH 24128**
	250	68	710	900	86,5	2 400	3 200	15,0	*** 22228 CCK/W33**	**AHX 3128**
	250	88	915	1 250	120	1 600	2 400	20,5	*** 23228 CCK/W33**	**AHX 3228 G**
	300	102	1 290	1 560	132	1 700	2 200	38,0	*** 22328 CCK/W33**	**AHX 2328 G**
145	225	56	510	750	73,5	2 200	3 200	8,85	*** 23030 CCK/W33**	**AHX 3030**
	225	75	655	1 040	100	1 700	2 600	11,3	*** 24030 CCK30/W33**	**AH 24030**
	250	80	830	1 200	114	2 000	2 600	17,0	*** 23130 CCK/W33**	**AHX 3130 G**
	250	100	1 020	1 530	146	1 400	2 200	21,0	*** 24130 CCK30/W33**	**AH 24130**
	270	73	850	1 080	102	2 200	3 000	19,0	*** 22230 CCK/W33**	**AHX 3130 G**
	270	96	1 080	1 460	137	1 500	2 200	26,0	*** 23230 CCK/W33**	**AHX 3230 G**
	320	108	1 460	1 760	146	1 600	2 000	45,5	*** 22330 CCK/W33**	**AHX 2330 G**
150	240	60	585	880	83	2 400	3 000	11,5	*** 23032 CCK/W33**	**AH 3032**
	240	80	750	1 200	114	1 500	2 400	14,8	*** 24032 CCK30/W33**	**AH 24032**
	270	86	980	1 370	129	1 700	2 400	23,0	*** 23132 CCK/W33**	**AH 3132 G**
	270	109	1 180	1 760	163	1 400	1 900	28,5	*** 24132 CCK30/W33**	**AH 24132**
	290	80	1 000	1 290	118	2 000	2 800	25,0	*** 22232 CCK/W33**	**AH 3132 G**
	290	104	1 220	1 660	153	1 500	2 200	34,5	*** 23232 CCK/W33**	**AH 3232 G**
	340	114	1 600	1 960	160	1 500	1 900	56,0	*** 22332 CCK/W33**	**AH 2332 G**
160	260	67	710	1 060	100	2 200	2 800	15,0	*** 23034 CCK/W33**	**AH 3034**
	260	90	930	1 460	137	1 400	2 400	20,0	*** 24034 CCK30/W33**	**AH 24034**
	280	88	1 040	1 500	137	1 800	2 400	25,0	*** 23134 CCK/W33**	**AH 3134 G**
	280	109	1 220	1 860	170	1 300	1 900	30,0	*** 24134 CCK30/W33**	**AH 24134**
	310	86	1 120	1 460	132	1 900	2 600	31,0	*** 22234 CCK/W33**	**AH 3134 G**
	310	110	1 400	1 930	173	1 400	2 000	41,0	*** 23234 CCK/W33**	**AH 3234 G**
	360	120	1 760	2 160	176	1 300	1 800	65,5	*** 22334 CCK/W33**	**AH 2334 G**
170	280	74	830	1 250	114	2 000	2 600	19,3	*** 23036 CCK/W33**	**AH 3036**
	280	100	1 080	1 730	156	1 300	2 200	25,7	*** 24036 CCK30/W33**	**AH 24036**
	300	96	1 200	1 760	160	1 500	2 200	32,0	*** 23136 CCK/W33**	**AH 3136 G**
	300	118	1 400	2 160	196	1 300	1 700	37,0	*** 24136 CCK30/W33**	**AH 24136**

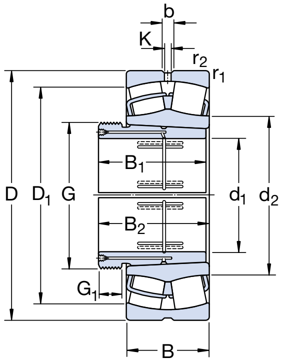
* SKF Explorer bearing



Dimensions										Abutment and fillet dimensions			Calculation factors			
d_1	d_2 ~	D_1 ~	B_1	B_2[1)] ~	G	G_1	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm										mm			–			
135	158	190	68	73	M 150×2	14	8,3	4,5	2	150	200	2	0,22	3	4,6	2,8
	155	185	83	93	M 145×2	14	5,5	3	2	150	200	2	0,30	2,3	3,4	2,2
	159	197	83	88	M 150×2	14	8,3	4,5	2,1	152	213	2	0,28	2,4	3,6	2,5
	156	193	99	109	M 150×2	14	8,3	4,5	2,1	152	213	2	0,35	1,9	2,9	1,8
	166	216	83	88	M 150×2	14	11,1	6	3	154	236	2,5	0,26	2,6	3,9	2,5
	165	212	104	109	M 150×3	15	11,1	6	3	154	236	2,5	0,33	2	3	2
	175	247	125	130	M 150×3	20	16,7	9	4	157	283	3	0,35	1,9	2,9	1,8
145	169	203	72	77	M 160×3	15	8,3	4,5	2,1	161	214	2	0,22	3	4,6	2,8
	165	197	90	101	M 155×3	15	5,5	3	2,1	161	214	2	0,30	2,3	3,4	2,2
	172	216	96	101	M 160×3	15	11,1	6	2,1	162	238	2	0,30	2,3	3,4	2,2
	169	211	115	126	M 160×3	15	8,3	4,5	2,1	162	238	2	0,37	1,8	2,7	1,8
	178	234	96	101	M 160×3	15	13,9	7,5	3	164	256	2,5	0,26	2,6	3,9	2,5
	175	228	114	119	M 160×3	17	11,1	6	3	164	256	2,5	0,35	1,9	2,9	1,8
	188	266	135	140	M 160×3	24	16,7	9	4	167	303	3	0,35	1,9	2,9	1,8
150	180	217	77	82	M 170×3	16	11,1	6	2,1	171	229	2	0,22	3	4,6	2,8
	176	211	95	106	M 170×3	15	8,3	4,5	2,1	171	229	2	0,30	2,3	3,4	2,2
	184	234	103	108	M 170×3	16	13,9	7,5	2,1	172	258	2	0,30	2,3	3,4	2,2
	181	228	124	135	M 170×3	15	8,3	4,5	2,1	172	258	2	0,40	1,7	2,5	1,6
	191	250	103	108	M 170×3	16	13,9	7,5	3	174	276	2,5	0,26	2,6	3,9	2,5
	188	244	124	130	M 170×3	20	13,9	7,5	3	174	276	2,5	0,35	1,9	2,9	1,8
	200	282	140	146	M 170×3	24	16,7	9	4	177	323	3	0,35	1,9	2,9	1,8
160	191	232	85	90	M 180×3	17	11,1	6	2,1	181	249	2	0,23	2,9	4,4	2,8
	188	226	106	117	M 180×3	16	8,3	4,5	2,1	181	249	2	0,33	2	3	2
	195	244	104	109	M 180×3	16	13,9	7,5	2,1	182	268	2	0,30	2,3	3,4	2,2
	190	237	125	136	M 180×3	16	8,3	4,5	2,1	182	268	2	0,37	1,8	2,7	1,8
	203	267	104	109	M 180×3	16	16,7	9	4	187	293	3	0,27	2,5	3,7	2,5
	200	261	134	140	M 180×3	24	13,9	7,5	4	187	293	3	0,35	1,9	2,9	1,8
	213	300	146	152	M 180×3	24	16,7	9	4	187	343	3	0,33	2	3	2
170	204	249	92	98	M 190×3	17	13,9	7,5	2,1	191	269	2	0,24	2,8	4,2	2,8
	201	243	116	127	M 190×3	16	8,3	4,5	2,1	191	269	2	0,33	2	3	2
	207	259	116	122	M 190×3	19	13,9	7,5	3	194	286	2,5	0,30	2,3	3,4	2,2
	203	253	134	145	M 190×3	16	11,1	6	3	194	286	2,5	0,37	1,8	2,7	1,8

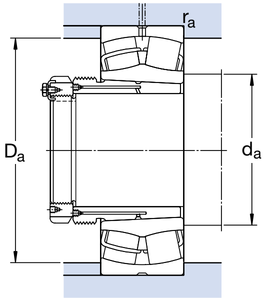
1) Width before the sleeve is driven into bearing bore

Spherical roller bearings on withdrawal sleeve
d_1 **170 – 220** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing + Sleeve	Designations Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
170	320	86	1 180	1 560	140	1 800	2 600	32,5	* **22236 CCK/W33**	**AH 2236 G**
cont.	320	112	1 500	2 120	186	1 300	1 900	43,5	* **23236 CCK/W33**	**AH 3236 G**
	380	126	2 000	2 450	193	1 300	1 700	76,0	* **22336 CCK/W33**	**AH 2336 G**
180	290	75	865	1 340	122	1 900	2 400	21,0	* **23038 CCK/W33**	**AH 3038 G**
	290	100	1 120	1 800	163	1 400	2 000	27,5	* **24038 CCK30/W33**	**AH 24038**
	320	104	1 370	2 080	183	1 500	2 000	38,5	* **23138 CCK/W33**	**AH 3138 G**
	320	128	1 600	2 500	212	1 200	1 600	46,5	* **24138 CCK30/W33**	**AH 24138**
	340	92	1 270	1 700	150	1 700	2 400	39,5	* **22238 CCK/W33**	**AH 2238 G**
	340	120	1 660	2 400	208	1 300	1 800	52,5	* **23238 CCK/W33**	**AH 3238 G**
	400	132	2 120	2 650	208	1 200	1 600	87,5	* **22338 CCK/W33**	**AH 2338 G**
190	310	82	1 000	1 530	137	1 800	2 200	26,3	* **23040 CCK/W33**	**AH 3040 G**
	310	109	1 290	2 120	186	1 200	1 900	34,5	* **24040 CCK30/W33**	**AH 24040**
	340	112	1 600	2 360	204	1 500	1 900	48,5	* **23140 CCK/W33**	**AH 3140**
	340	140	1 800	2 800	232	1 100	1 500	57,5	* **24140 CCK30/W33**	**AH 24140**
	360	98	1 460	1 930	166	1 600	2 200	47,0	* **22240 CCK/W33**	**AH 2240**
	360	128	1 860	2 700	228	1 200	1 700	63,0	* **23240 CCK/W33**	**AH 3240**
	420	138	2 320	2 900	224	1 200	1 500	100	* **22340 CCK/W33**	**AH 2340**
200	340	90	1 220	1 860	163	1 600	2 000	36,5	* **23044 CCK/W33**	**AOH 3044 G**
	340	118	1 560	2 600	212	1 200	1 700	47,5	* **24044 CCK30/W33**	**AOH 24044**
	370	120	1 800	2 750	232	1 300	1 700	61,5	* **23144 CCK/W33**	**AOH 3144**
	370	150	2 120	3 350	285	1 000	1 400	76,0	* **24144 CCK30/W33**	**AOH 24144**
	400	108	1 760	2 360	196	1 500	2 000	68,0	* **22244 CCK/W33**	**AOH 2244**
	400	144	2 360	3 450	285	1 100	1 500	93,0	* **23244 CCK/W33**	**AOH 2344**
	460	145	2 700	3 450	260	1 000	1 400	130	* **22344 CCK/W33**	**AOH 2344**
220	360	92	1 290	2 080	176	1 500	1 900	40,5	* **23048 CCK/W33**	**AOH 3048**
	360	118	1 600	2 700	228	1 100	1 600	50,5	* **24048 CCK30/W33**	**AOH 24048**
	400	128	2 080	3 200	255	1 200	1 600	76,5	* **23148 CCK/W33**	**AOH 3148**
	400	160	2 400	3 900	320	900	1 300	91,5	* **24148 CCK30/W33**	**AOH 24148**
	440	120	2 000	3 000	245	1 300	1 800	95,0	* **22248 CCK/W33**	**AOH 3148**
	440	160	2 900	4 300	345	950	1 300	120	* **23248 CCK/W33**	**AOH 2348**
	500	155	3 100	4 000	290	950	1 300	165	* **22348 CCK/W33**	**AOH 2348**

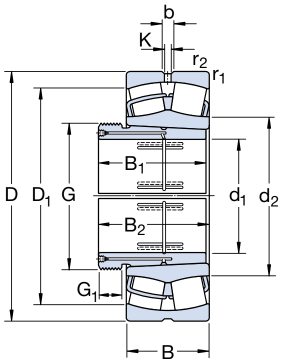
* SKF Explorer bearing



Dimensions										**Abutment and fillet dimensions**			**Calculation factors**			
d_1	d_2 ~	D_1 ~	B_1	B_2[1)] ~	G	G_1	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm										mm			–			
170	213	278	105	110	M 190×3	17	16,7	9	4	197	303	3	0,26	2,6	3,9	2,5
cont.	211	271	140	146	M 190×3	24	13,9	7,5	4	197	303	3	0,35	1,9	2,9	1,8
	224	317	154	160	M 190×3	26	22,3	12	4	197	363	3	0,35	1,9	2,9	1,8
180	216	261	96	102	M 200×3	18	13,9	7,5	2,1	201	279	2	0,23	2,9	4,4	2,8
	210	253	118	131	M 200×3	18	8,3	4,5	2,1	201	279	2	0,31	2,2	3,3	2,2
	220	276	125	131	M 200×3	20	13,9	7,5	3	204	306	2,5	0,31	2,2	3,3	2,2
	215	268	146	159	M 200×3	18	11,1	6	3	204	306	2,5	0,40	1,7	2,5	1,6
	225	294	112	117	M 200×3	18	16,7	9	4	207	323	3	0,26	2,6	3,9	2,5
	222	287	145	152	M 200×3	25	16,7	9	4	207	323	3	0,35	1,9	2,9	1,8
	236	333	160	167	M 200×3	26	22,3	12	5	210	380	4	0,35	1,9	2,9	1,8
190	228	278	102	108	Tr 210×4	19	13,9	7,5	2,1	211	299	2	0,24	2,8	4,2	2,8
	223	268	127	140	Tr 210×4	18	11,1	6	2,1	211	299	2	0,33	2	3	2
	231	293	134	140	Tr 220×4	21	16,7	9	3	214	326	2,5	0,31	2,2	3,3	2,2
	226	284	158	171	Tr 210×4	18	11,1	6	3	214	326	2,5	0,40	1,7	2,5	1,6
	238	313	118	123	Tr 220×4	21	16,7	9	4	217	343	3	0,26	2,6	3,9	2,5
	235	304	153	160	Tr 220×4	25	16,7	9	4	217	343	3	0,35	1,9	2,9	1,8
	249	351	170	177	Tr 220×4	30	22,3	12	5	220	400	4	0,33	2	3	2
200	250	306	111	117	Tr 230×4	20	13,9	7,5	3	233	327	2,5	0,24	2,8	4,2	2,8
	244	295	138	152	Tr 230×4	20	11,1	6	3	233	327	2,5	0,33	2	3	2
	255	320	145	151	Tr 240×4	23	16,7	9	4	237	353	3	0,30	2,3	3,4	2,2
	248	310	170	184	Tr 230×4	20	11,1	6	4	237	353	3	0,40	1,7	2,5	1,6
	263	346	130	136	Tr 240×4	20	16,7	9	4	237	383	3	0,27	2,5	3,7	2,5
	259	338	181	189	Tr 240×4	30	16,7	9	4	237	383	3	0,35	1,9	2,9	1,8
	279	389	181	189	Tr 240×4	30	22,3	12	5	240	440	4	0,31	2,2	3,3	2,2
220	271	326	116	123	Tr 260×4	21	13,9	7,5	3	253	347	2,5	0,23	2,9	4,4	2,8
	265	316	138	153	Tr 250×4	20	11,1	6	3	253	347	2,5	0,30	2,3	3,4	2,2
	277	348	154	161	Tr 260×4	25	16,7	9	4	257	383	3	0,30	2,3	3,4	2,2
	271	336	180	195	Tr 260×4	20	11,1	6	4	257	383	3	0,40	1,7	2,5	1,6
	290	683	154	161	Tr 260×4	25	22,3	12	4	257	423	3	0,27	2,5	3,7	2,5
	287	374	189	197	Tr 260×4	30	22,3	12	4	257	423	3	0,35	1,9	2,9	1,8
	304	422	189	197	Tr 260×4	30	22,3	12	5	260	480	4	0,31	2,2	3,3	2,2

[1)] Width before the sleeve is driven into bearing bore

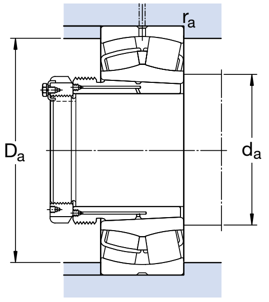
Spherical roller bearings on withdrawal sleeve
d_1 **240 – 320** mm



Principal dimensions d_1	D	B	Basic load ratings dynamic C	static C_0	Fatigue load limit P_u	Speed ratings Reference speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Withdrawal sleeve
mm			kN		kN	r/min		kg	–	
240	400	104	1 600	2 550	212	1 300	1 700	56,5	*** 23052 CCK/W33**	**AOH 3052**
	400	140	2 040	3 450	285	1 000	1 400	75,0	*** 24052 CCK30/W33**	**AOH 24052 G**
	440	144	2 550	3 900	290	1 100	1 400	105	*** 23152 CCK/W33**	**AOH 3152 G**
	440	180	3 000	4 800	380	850	1 200	110	*** 24152 CCK30/W33**	**AOH 24152**
	480	130	2 650	3 550	285	1 200	1 600	120	*** 22252 CCK/W33**	**AOH 2252 G**
	480	174	3 250	4 750	360	850	1 200	155	*** 23252 CCK/W33**	**AOH 2352 G**
	540	165	3 550	4 550	325	850	1 100	205	*** 22352 CCK/W33**	**AOH 2352 G**
260	420	106	1 730	2 850	224	1 300	1 600	62,0	*** 23056 CCK/W33**	**AOH 3056**
	420	140	2 160	3 800	285	950	1 400	79,0	*** 24056 CCK30/W33**	**AOH 24056 G**
	460	146	2 650	4 250	335	1 000	1 300	110	*** 23156 CCK/W33**	**AOH 3156 G**
	460	180	3 100	5 100	415	800	1 100	130	*** 24156 CCK30/W33**	**AOH 24156**
	500	130	2 700	3 750	300	1 100	1 500	125	*** 22256 CCK/W33**	**AOH 2256 G**
	500	176	3 250	4 900	365	800	1 100	160	*** 23256 CCK/W33**	**AOH 2356 G**
	580	175	4 000	5 200	365	800	1 100	245	*** 22356 CCK/W33**	**AOH 2356 G**
280	460	118	2 120	3 450	265	1 200	1 500	82,5	*** 23060 CCK/W33**	**AOH 3060**
	460	160	2 700	4 750	355	850	1 200	110	*** 24060 CCK30/W33**	**AOH 24060 G**
	500	160	3 200	5 100	380	950	1 200	140	*** 23160 CCK/W33**	**AOH 3160 G**
	500	200	3 750	6 300	465	700	1 000	180	*** 24160 CCK30/W33**	**AOH 24160**
	540	140	3 150	4 250	325	1 000	1 400	155	*** 22260 CCK/W33**	**AOH 2260 G**
	540	192	3 900	5 850	425	750	1 000	200	*** 23260 CCK/W33**	**AOH 3260 G**
300	480	121	2 240	3 800	285	1 100	1 400	89,0	*** 23064 CCK/W33**	**AOH 3064 G**
	480	160	2 850	5 100	400	800	1 200	110	*** 24064 CCK30/W33**	**AOH 24064 G**
	540	176	3 750	6 000	440	850	1 100	175	*** 23164 CCK/W33**	**AOH 3164 G**
	540	218	4 250	7 100	510	670	900	225	*** 24164 CCK30/W33**	**AOH 24164**
	580	150	3 600	4 900	375	950	1 300	185	*** 22264 CCK/W33**	**AOH 2264 G**
	580	208	4 400	6 700	480	700	950	250	*** 23264 CCK/W33**	**AOH 3264 G**
320	520	133	2 700	4 550	335	1 000	1 300	120	*** 23068 CCK/W33**	**AOH 3068 G**
	520	180	3 450	6 200	475	750	1 100	150	*** 24068 CCK30/W33**	**AOH 24068**
	580	190	4 250	6 800	480	800	1 000	225	*** 23168 CCK/W33**	**AOH 3168 G**
	580	243	5 300	8 650	640	600	850	295	*** 24168 ECCK30J/W33**	**AOH 24168**
	620	224	5 100	7 800	550	560	800	315	*** 23268 CAK/W33**	**AOH 3268 G**

* SKF Explorer bearing

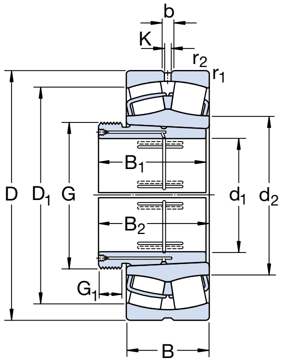
SKF



Dimensions										Abutment and fillet dimensions			Calculation factors			
d_1	d_2 ~	D_1 ~	B_1	B_2[1)] ~	G	G_1	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm										mm			–			
240	295	360	128	135	Tr 280×4	23	16,7	9	4	275	385	3	0,23	2,9	4,4	2,8
	289	347	162	178	Tr 280×4	22	11,1	6	4	275	385	3	0,33	2	3	2
	301	380	172	179	Tr 280×4	26	16,7	9	4	277	423	3	0,31	2,2	3,3	2,2
	294	368	202	218	Tr 280×4	22	13,9	7,5	4	277	423	3	0,40	1,7	2,5	1,6
	311	421	172	179	Tr 280×4	26	22,3	12	5	280	460	4	0,27	2,5	3,7	2,5
	312	408	205	213	Tr 280×4	30	22,3	12	5	280	460	4	0,35	1,9	2,9	1,8
	329	457	205	213	Tr 280×4	30	22,3	12	6	286	514	5	0,31	2,2	3,3	2,2
260	315	380	131	139	Tr 300×4	24	16,7	9	4	295	405	3	0,23	2,9	4,4	2,8
	309	368	162	179	Tr 300×4	22	11,1	6	4	295	405	3	0,31	2,2	3,3	2,2
	321	400	175	183	Tr 300×5	28	16,7	9	5	300	440	4	0,30	2,3	3,4	2,2
	315	390	202	219	Tr 300×4	22	13,9	7,5	5	300	440	4	0,40	1,7	2,5	1,6
	333	441	175	183	Tr 300×5	28	22,3	12	5	300	480	4	0,26	2,6	3,9	2,5
	332	429	212	220	Tr 300×5	30	22,3	12	5	300	480	4	0,35	1,9	2,9	1,8
	354	492	212	220	Tr 300×5	30	22,3	12	6	306	554	5	0,30	2,3	3,4	2,2
280	340	413	145	153	Tr 320×5	26	16,7	9	4	315	445	3	0,23	2,9	4,4	2,8
	331	400	184	202	Tr 320×5	24	13,9	7,5	4	315	445	3	0,33	2	3	2
	345	434	192	200	Tr 320×5	30	16,7	9	5	320	480	4	0,30	2,3	3,4	2,2
	339	422	224	242	Tr 320×5	24	13,9	7,5	5	320	480	4	0,40	1,7	2,5	1,6
	354	477	192	200	Tr 320×5	30	22,3	12	5	320	520	4	0,26	2,6	3,9	2,5
	356	461	228	236	Tr 320×5	34	22,3	12	5	320	520	4	0,35	1,9	2,9	1,8
300	360	433	149	157	Tr 340×5	27	16,7	9	4	335	465	3	0,23	2,9	4,4	2,8
	354	423	184	202	Tr 340×5	24	13,9	7,5	4	335	465	3	0,31	2,2	3,3	2,2
	370	465	209	217	Tr 340×5	31	22,3	12	5	340	520	4	0,31	2,2	3,3	2,2
	364	455	242	260	Tr 340×5	24	16,7	9	5	340	520	4	0,40	1,7	2,5	1,6
	379	513	209	217	Tr 340×5	31	22,3	12	5	340	560	4	0,26	2,6	3,9	2,5
	382	494	246	254	Tr 340×5	36	22,3	12	5	340	560	4	0,35	1,9	2,9	1,8
320	385	467	162	171	Tr 360×5	28	22,3	12	5	358	502	4	0,24	2,8	4,2	2,8
	377	453	206	225	Tr 360×5	26	16,7	9	5	358	502	4	0,33	2	3	2
	394	498	225	234	Tr 360×5	33	22,3	12	5	360	560	4	0,31	2,2	3,3	2,2
	383	491	269	288	Tr 360×5	26	16,7	9	5	360	560	4	0,40	1,7	2,5	1,6
	426	528	264	273	Tr 360×5	38	22,3	12	6	366	594	5	0,35	1,9	2,9	1,8

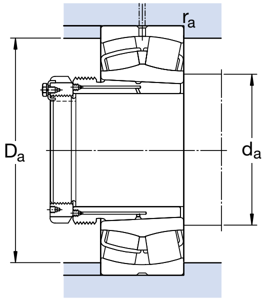
1) Width before the sleeve is driven into bearing bore

Spherical roller bearings on withdrawal sleeve
d$_1$ **340 – 440** mm



Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Reference speed	Limiting speed	**Mass** Bearing + sleeve	**Designations** Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
340	540	134	2 750	4 800	345	950	1 200	125	*** 23072 CCK/W33**	**AOH 3072 G**
	540	180	3 550	6 550	490	700	1 000	160	*** 24072 CCK30/W33**	**AOH 24072**
	600	192	4 300	6 950	490	750	1 000	235	*** 23172 CCK/W33**	**AOH 3172 G**
	600	243	5 600	9 300	670	560	800	285	*** 24172 ECCK30J/W33**	**AOH 24172**
	650	170	4 300	6 200	440	630	850	275	*** 22272 CAK/W33**	**AOH 3172 G**
	650	232	5 400	8 300	570	530	750	345	*** 23272 CAK/W33**	**AOH 3272 G**
360	560	135	2 900	5 000	360	900	1 200	132	*** 23076 CCK/W33**	**AOH 3076 G**
	560	180	3 600	6 800	480	670	950	166	*** 24076 CCK30/W33**	**AOH 24076**
	620	194	4 400	7 100	500	560	1 000	250	*** 23176 CAK/W33**	**AOH 3176 G**
	620	243	5 700	9 800	710	480	850	325	*** 24176 ECAK30/W33**	**AOH 24176**
	680	240	5 850	9 150	620	500	700	390	*** 23276 CAK/W33**	**AOH 3276 G**
380	600	148	3 250	5 700	400	850	1 100	165	*** 23080 CCK/W33**	**AOH 3080 G**
	600	200	4 300	8 150	560	630	900	220	*** 24080 ECCK30J/W33**	**AOH 24080**
	650	200	4 650	7 650	530	530	950	290	*** 23180 CAK/W33**	**AOH 3180 G**
	650	250	6 200	10 600	735	430	800	365	*** 24180 ECAK30/W33**	**AOH 24180**
	720	256	6 550	10 400	680	480	670	470	*** 23280 CAK/W33**	**AOH 3280 G**
	820	243	7 500	10 400	670	430	750	675	*** 22380 CAK/W33**	**AOH 3280 G**
400	620	150	3 400	6 000	415	600	1 100	175	*** 23084 CAK/W33**	**AOH 3084 G**
	620	200	4 400	8 300	585	530	900	230	*** 24084 ECAK30/W33**	**AOH 24084**
	700	224	5 600	9 300	620	480	900	375	*** 23184 CKJ/W33**	**AOH 3184 G**
	700	280	7 350	12 600	850	400	750	470	*** 24184 ECAK30/W33**	**AOH 24184**
	760	272	7 350	11 600	765	450	630	550	*** 23284 CAK/W33**	**AOH 3284 G**
420	650	157	3 650	6 550	450	560	1 000	200	*** 23088 CAK/W33**	**AOHX 3088 G**
	650	212	4 800	9 150	630	500	850	260	*** 24088 ECAK30/W33**	**AOH 24088**
	720	226	6 000	10 000	670	450	850	380	*** 23188 CAK/W33**	**AOHX 3188 G**
	720	280	7 500	13 200	900	380	700	490	*** 24188 ECAK30/W33**	**AOH 24188**
	790	280	7 800	12 500	800	430	600	620	*** 23288 CAK/W33**	**AOHX 3288 G**
440	680	163	3 900	6 950	465	560	950	225	*** 23092 CAK/W33**	**AOHX 3092 G**
	680	218	5 200	10 000	670	480	800	300	*** 24092 ECAK30/W33**	**AOH 24092**
	760	240	6 400	10 800	680	430	800	465	*** 23192 CAK/W33**	**AOHX 3192 G**
	760	300	8 300	14 600	1 000	360	670	590	*** 24192 ECAK30/W33**	**AOH 24192**
	830	296	8 500	13 700	880	400	560	725	*** 23292 CAK/W33**	**AOHX 3292 G**

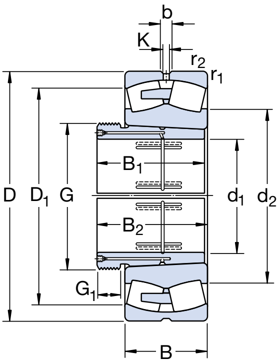
* SKF Explorer bearing



Dimensions										Abutment and fillet dimensions			Calculation factors			
d_1	d_2 ~	D_1 ~	B_1	B_2[1)] ~	G	G_1	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm										mm			–			
340	404	482	167	176	Tr 380×5	30	22,3	12	5	378	522	4	0,23	2,9	4,4	2,8
	398	474	206	226	Tr 380×5	26	16,7	9	5	378	522	4	0,31	2,2	3,3	2,2
	418	524	229	238	Tr 380×5	35	22,3	12	5	380	580	4	0,30	2,3	3,4	2,2
	406	506	269	289	Tr 380×5	26	16,7	9	5	380	580	4	0,37	1,8	2,7	1,8
	453	566	229	238	Tr 380×5	35	22,3	12	6	386	624	5	0,26	2,6	3,9	2,5
	447	552	274	283	Tr 380×5	40	22,3	12	6	386	624	5	0,35	1,9	2,9	1,8
360	425	508	170	180	Tr 400×5	31	22,3	12	5	398	542	4	0,22	3	4,6	2,8
	420	496	208	228	Tr 400×5	28	16,7	9	5	398	542	4	0,30	2,3	3,4	2,2
	452	541	232	242	Tr 400×5	36	22,3	12	5	400	600	4	0,30	2,3	3,4	2,2
	446	529	271	291	Tr 400×5	28	16,7	9	5	400	600	4	0,37	1,8	2,7	1,8
	471	581	284	294	Tr 400×5	42	22,3	12	6	406	654	5	0,35	1,9	2,9	1,8
380	450	541	183	193	Tr 420×5	33	22,3	12	5	418	582	4	0,23	2,9	4,4	2,8
	443	526	228	248	Tr 420×5	28	22,3	12	5	418	582	4	0,30	2,3	3,4	2,2
	474	566	240	250	Tr 420×5	38	22,3	12	6	426	624	5	0,28	2,4	3,6	2,5
	468	554	278	298	Tr 420×5	28	22,3	12	6	426	624	5	0,37	1,8	2,7	1,8
	499	615	302	312	Tr 420×5	44	22,3	12	6	426	694	5	0,35	1,9	2,9	1,8
	534	697	302	312	Tr 420×5	44	22,3	12	7,5	432	788	6	0,30	2,3	3,4	2,2
400	485	562	186	196	Tr 440×5	34	22,3	12	5	438	602	4	0,22	3	4,6	2,8
	476	547	230	252	Tr 440×5	30	22,3	12	5	438	602	4	0,30	2,3	3,4	2,2
	483	607	266	276	Tr 440×5	40	22,3	12	6	446	674	5	0,30	2,3	3,4	2,2
	496	590	310	332	Tr 440×5	30	22,3	12	6	446	674	5	0,37	1,8	2,7	1,8
	525	649	321	331	Tr 440×5	46	22,3	12	7,5	452	726	6	0,35	1,9	2,9	1,8
420	509	589	194	205	Tr 460×5	35	22,3	12	6	463	627	5	0,22	3	4,6	2,8
	498	572	242	264	Tr 460×5	30	22,3	12	6	463	627	5	0,30	2,3	3,4	2,2
	528	632	270	281	Tr 460×5	48	22,3	12	6	466	694	5	0,30	2,3	3,4	2,2
	516	610	310	332	Tr 460×5	30	22,3	12	6	466	694	5	0,37	1,8	2,7	1,8
	547	676	330	341	Tr 460×5	48	22,3	12	7,5	472	758	6	0,35	1,9	2,9	1,8
440	531	616	202	213	Tr 480×5	37	22,3	12	6	483	657	5	0,22	3	4,6	2,8
	523	601	250	273	Tr 480×5	32	22,3	12	6	483	657	5	0,28	2,4	3,6	2,5
	553	665	285	296	Tr 480×6	43	22,3	12	7,5	492	728	6	0,30	2,3	3,4	2,2
	544	649	332	355	Tr 480×5	32	22,3	12	7,5	492	728	6	0,37	1,8	2,7	1,8
	572	706	349	360	Tr 480×6	50	22,3	12	7,5	492	798	6	0,35	1,9	2,9	1,8

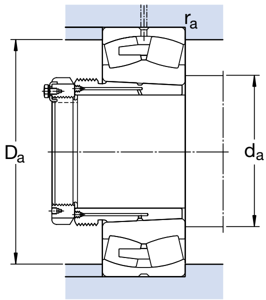
1) Width before the sleeve is driven into bearing bore

Spherical roller bearings on withdrawal sleeve
d$_1$ **460 – 630** 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	–	
460	700	165	3 900	6 800	450	530	950	235	*** 23096 CAK/W33**	**AOHX 3096 G**
	700	218	5 300	10 400	695	450	750	310	*** 24096 ECAK30/W33**	**AOH 24096**
	790	248	6 950	12 000	780	400	750	515	*** 23196 CAK/W33**	**AOHX 3196 G**
	790	308	9 000	15 600	1 040	370	630	635	*** 24196 ECAK30/W33**	**AOH 24196**
	870	310	9 300	15 000	950	380	530	860	*** 23296 CAK/W33**	**AOHX 3296 G**
480	720	167	4 150	7 800	510	500	900	250	*** 230/500 CAK/W33**	**AOHX 30/500 G**
	720	218	5 500	11 000	735	430	700	325	*** 240/500 ECAK30/W33**	**AOH 240/500**
	830	264	7 650	12 900	830	380	700	610	*** 231/500 CAK/W33**	**AOHX 31/500 G**
	830	325	9 800	17 000	1 120	320	600	780	*** 241/500 ECAK30/W33**	**AOH 241/500**
	920	336	10 600	17 300	1 060	360	500	1 020	*** 232/500 CAK/W33**	**AOHX 32/500 G**
500	780	185	5 100	9 300	630	450	800	455	*** 230/530 CAK/W33**	**AOH 30/530**
	780	250	6 700	13 200	830	400	670	455	*** 240/530 ECAK30/W33**	**AOH 240/530 G**
	870	272	8 150	14 000	915	360	670	885	*** 231/530 CAK/W33**	**AOH 31/530**
	870	335	10 600	19 000	1 220	300	560	885	*** 241/530 ECAK30/W33**	**AOH 241/530 G**
	980	355	11 100	20 400	1 220	300	480	885	**232/530 CAK/W33**	**AOH 32/530 G**
530	820	195	5 600	10 200	680	430	750	430	*** 230/560 CAK/W33**	**AOHX 30/560**
	820	258	7 350	14 600	960	380	630	515	*** 240/560 ECAK30/W33**	**AOH 240/560 G**
	920	280	9 150	16 000	980	340	630	850	*** 231/560 CAK/W33**	**AOH 31/560**
	920	355	12 000	21 600	1 340	280	500	1 060	*** 241/560 ECK30J/W33**	**AOH 241/560 G**
	1 030	365	11 500	22 000	1 400	280	430	1 500	**232/560 CAK/W33**	**AOHX 32/560**
570	870	200	6 000	11 400	750	400	700	480	*** 230/600 CAK/W33**	**AOHX 30/600**
	870	272	8 150	17 000	1 100	340	560	625	*** 240/600 ECAK30/W33**	**AOHX 240/600**
	980	300	10 200	18 000	1 100	320	560	1 010	*** 231/600 CAK/W33**	**AOHX 31/600**
	980	375	11 500	23 600	1 460	240	480	1 290	**241/600 ECAK30/W33**	**AOHX 241/600**
	1 090	388	13 100	25 500	1 560	260	400	1 760	**232/600 CAK/W33**	**AOHX 32/600 G**
600	920	212	6 700	12 500	800	380	670	575	*** 230/630 CAK/W33**	**AOH 30/630**
	920	290	8 800	18 000	1 140	320	530	730	*** 240/630 ECK30J/W33**	**AOH 240/630 G**
	1 030	315	10 500	20 800	1 220	260	530	1 190	**231/630 CAK/W33**	**AOH 31/630**
	1 030	400	12 700	27 000	1 630	220	450	1 500	**241/630 ECAK30/W33**	**AOH 241/630 G**
630	980	230	7 650	14 600	915	340	600	720	*** 230/670 CAK/W33**	**AOH 30/670**
	980	308	10 000	20 400	1 320	300	500	900	*** 240/670 ECAK30/W33**	**AOH 240/670 G**
	1 090	336	10 900	22 400	1 370	240	500	1 430	**231/670 CAK/W33**	**AOHX 31/670**
	1 090	412	13 800	29 000	1 760	200	400	1 730	**241/670 ECAK30/W33**	**AOH 241/670**
	1 220	438	15 400	30 500	1 700	220	360	2 500	**232/670 CAK/W33**	**AOH 32/670 G**

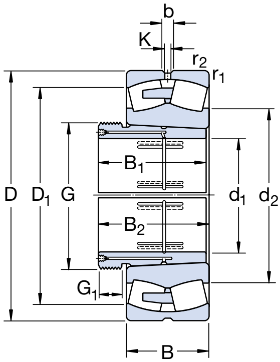
* SKF Explorer bearing



Dimensions										Abutment and fillet dimensions			Calculation factors			
d_1	d_2 ~	D_1 ~	B_1	B_2[1] ~	G	G_1	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm										mm			–			
460	547	632	205	217	Tr 500×6	38	22,3	12	6	503	677	5	0,21	3,2	4,8	3,2
	541	619	250	273	Tr 500×5	32	22,3	12	6	503	677	5	0,28	2,4	3,6	2,5
	577	692	295	307	Tr 500×6	45	22,3	12	7,5	512	758	6	0,30	2,3	3,4	2,2
	564	678	340	363	Tr 500×5	32	22,3	12	7,5	512	758	6	0,37	1,8	2,7	1,8
	600	741	364	376	Tr 500×5	52	22,3	12	7,5	512	838	6	0,35	1,9	2,9	1,8
480	571	656	209	221	Tr 530×6	40	22,3	12	6	523	697	5	0,21	3,2	4,8	3,2
	565	643	253	276	Tr 530×6	35	22,3	12	6	523	697	5	0,26	2,6	3,9	2,5
	603	726	313	325	Tr 530×6	47	22,3	12	7,5	532	798	6	0,30	2,3	3,4	2,2
	589	713	360	383	Tr 530×6	35	22,3	12	7,5	532	798	6	0,37	1,8	2,7	1,8
	631	779	393	405	Tr 530×6	54	22,3	12	7,5	532	888	6	0,35	1,9	2,9	1,8
500	611	708	230	242	Tr 560×6	45	22,3	12	6	553	757	5	0,22	3	4,6	2,8
	600	687	285	309	Tr 560×6	35	22,3	12	6	553	757	5	0,28	2,4	3,6	2,5
	636	763	325	337	Tr 560×6	53	22,3	12	7,5	562	838	6	0,30	2,3	3,4	2,2
	623	748	370	394	Tr 560×6	35	22,3	12	7,5	562	838	6	0,37	1,8	2,7	1,8
	668	836	412	424	Tr 560×6	57	22,3	12	9,5	570	940	8	0,35	1,9	2,9	1,8
530	644	745	240	252	Tr 600×6	45	22,3	12	6	583	797	5	0,22	3	4,6	2,8
	635	728	296	320	Tr 600×6	38	22,3	12	6	583	797	5	0,28	2,4	3,6	2,5
	673	808	335	347	Tr 600×6	55	22,3	12	7,5	592	888	6	0,30	2,3	3,4	2,2
	634	796	393	417	Tr 600×6	38	22,3	12	7,5	592	888	6	0,37	1,8	2,7	1,8
	704	877	422	434	Tr 600×6	57	22,3	12	9,5	600	990	8	0,35	1,9	2,9	1,8
570	683	786	245	259	Tr 630×6	45	22,3	12	6	623	847	5	0,22	3	4,6	2,8
	675	774	310	336	Tr 630×6	38	22,3	12	6	623	847	5	0,30	2,3	3,4	2,2
	720	862	355	369	Tr 630×6	55	22,3	12	7,5	632	948	6	0,30	2,3	3,4	2,2
	702	845	413	439	Tr 630×6	38	22,3	12	7,5	632	948	6	0,35	1,9	2,9	1,8
	752	928	445	459	Tr 630×6	57	22,3	12	9,5	640	1 050	8	0,37	1,8	2,7	1,8
600	725	837	258	272	Tr 670×6	46	22,3	12	7,5	658	892	6	0,21	3,2	4,8	3,2
	697	823	330	356	Tr 670×6	40	22,3	12	7,5	658	892	6	0,28	2,4	3,6	2,5
	757	908	375	389	Tr 670×6	60	22,3	12	7,5	662	998	6	0,30	2,3	3,4	2,2
	738	885	440	466	Tr 670×6	40	22,3	12	7,5	662	998	6	0,37	1,8	2,7	1,8
630	770	890	280	294	Tr 710×7	50	22,3	12	7,5	698	952	6	0,21	3,2	4,8	3,2
	756	866	348	374	Tr 710×7	40	22,3	12	7,5	698	952	6	0,28	2,4	3,6	2,5
	802	958	395	409	Tr 710×7	59	22,3	12	7,5	702	1 058	6	0,30	2,3	3,4	2,2
	782	942	452	478	Tr 710×7	40	22,3	12	7,5	702	1 058	6	0,37	1,8	2,7	1,8
	830	1 027	500	514	Tr 710×7	62	22,3	12	12	718	1 172	10	0,35	1,9	2,9	1,8

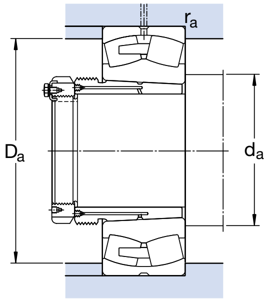
[1] Width before the sleeve is driven into bearing bore

Spherical roller bearings on withdrawal sleeve
d₁ **670 – 1 000** mm



Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Speed ratings Reference speed	Limiting speed	Mass Bearing + sleeve	Designations Bearing	Withdrawal sleeve
d_1	D	B	C	C_0	P_u					
mm			kN		kN	r/min		kg	–	
670	1 030	236	8 300	16 300	1 000	320	560	800	* **230/710 CAK/W33**	**AOHX 30/710**
	1 030	315	9 370	22 800	1 370	260	450	1 010	**240/710 ECAK30/W33**	**AOH 240/710 G**
	1 150	345	12 200	26 000	1 530	240	450	1 650	**231/710 CAK/W33**	**AOHX 31/710**
	1 150	438	15 200	32 500	1 900	190	380	2 040	**241/710 ECAK30/W33**	**AOH 241/710**
	1 280	450	17 600	34 500	2 000	200	320	1 720	**232/710 CAK/W33**	**AOH 32/710 G**
710	1 090	250	9 650	18 600	1 100	300	530	950	* **230/750 CAK/W33**	**AOH 30/750**
	1 090	335	10 100	25 000	1 460	240	430	1 200	**240/750 ECAK30/W33**	**AOH 240/750 G**
	1 220	365	13 600	29 000	1 660	220	430	1 930	**231/750 CAK/W33**	**AOH 31/750**
	1 220	475	17 300	37 500	2 160	180	360	2 280	**241/750 ECAK30/W33**	**AOH 241/750 G**
	1 360	475	18 700	36 500	2 120	190	300	1 770	**232/750 CAKF/W33**	**AOH 32/750**
750	1 150	258	10 000	20 000	1 160	280	480	1 100	* **230/800 CAK/W33**	**AOH 30/800**
	1 150	345	11 100	28 500	1 730	220	400	1 380	**240/800 ECAK30/W33**	**AOH 240/800 G**
	1 280	375	14 800	31 500	1 800	200	400	2 200	**231/800 CAK/W33**	**AOH 31/800**
	1 280	475	18 400	40 500	2 320	170	320	2 540	**241/800 ECAK30/W33**	**AOH 241/800 G**
800	1 220	272	9 370	21 600	1 270	240	450	1 250	**230/850 CAK/W33**	**AOH 30/850**
	1 220	365	12 700	31 500	1 900	200	360	1 670	**240/850 ECAK30/W33**	**AOH 240/850 G**
	1 360	400	16 100	34 500	2 000	180	360	2 500	**231/850 CAK/W33**	**AOH 31/850**
	1 360	500	20 200	45 000	2 550	150	300	3 050	**241/850 ECAK30F/W33**	**AOH 241/850**
850	1 280	280	10 100	23 200	1 340	220	400	1 450	**230/900 CAK/W33**	**AOH 30/900**
	1 280	375	13 600	34 500	2 040	190	340	1 850	**240/900 ECAK30/W33**	**AOH 240/900**
	1 420	515	21 400	49 000	2 700	140	280	3 700	**241/900 ECAK30F/W33**	**AOH 31/900**
900	1 360	300	12 000	28 500	1 600	200	380	1 720	**230/950 CAK/W33**	**AOH 30/950**
	1 360	412	14 800	39 000	2 320	170	300	2 300	**240/950 CAK30F/W33**	**AOH 240/950**
	1 500	545	23 900	55 000	3 000	130	260	3 950	**241/950 ECAK30F/W33**	**AOH 31/950**
950	1 420	308	12 700	30 500	1 700	180	360	1 900	**230/1000 CAKF/W33**	**AOH 30/1000**
	1 420	412	15 400	40 500	2 240	160	280	2 500	**240/1000 CAK/W33**	**AOH 240/1000**
	1 580	462	21 400	48 000	2 550	140	280	3 950	**231/1000 CAKF/W33**	**AOH 31/1000**
	1 580	580	26 700	62 000	3 350	120	240	4 800	**241/1000 CAKF/W33**	**AOH 241/1000**
1 000	1 500	325	13 800	34 000	1 830	170	320	2 600	**230/1060 CAKF/W33**	**AOH 30/1060**
	1 500	438	17 300	45 500	2 500	150	260	2 950	**240/1060 CAKF/W33**	**AOH 240/1060**

* SKF Explorer bearing



Dimensions										Abutment and fillet dimensions			Calculation factors			
d_1	d_2 ~	D_1 ~	B_1	B_2[1] ~	G	G_1	b	K	$r_{1,2}$ min	d_a min	D_a max	r_a max	e	Y_1	Y_2	Y_0
mm										mm			–			
670	814	939	286	302	Tr 750×7	50	22,3	12	7,5	738	1 002	6	0,21	3,2	4,8	3,2
	807	917	360	389	Tr 750×7	45	22,3	12	7,5	738	1 002	6	0,27	2,5	3,7	2,5
	850	1 017	405	421	Tr 750×7	60	22,3	12	9,5	750	1 110	8	0,28	2,4	3,6	2,5
	838	982	483	509	Tr 750×7	45	22,3	12	9,5	750	1 110	8	0,37	1,8	2,7	1,8
	851	1 017	515	531	Tr 750×7	65	22,3	12	12	758	1 232	10	0,35	1,9	2,9	1,8
710	860	996	300	316	Tr 800×7	50	22,3	12	7,5	778	1 062	6	0,21	3,2	4,8	3,2
	853	969	380	408	Tr 800×7	45	22,3	12	7,5	778	1 062	6	0,28	2,4	3,6	2,5
	900	1 080	425	441	Tr 800×7	60	22,3	12	9,5	790	1 180	8	0,28	2,4	3,6	2,5
	875	1 050	520	548	Tr 800×7	45	22,3	12	9,5	790	1 180	8	0,37	1,8	2,7	1,8
	938	1 163	540	556	Tr 800×7	65	22,3	12	15	808	1 302	12	0,35	1,9	2,9	1,8
750	915	1 051	308	326	Tr 850×7	50	22,3	12	7,5	828	1 122	6	0,20	3,4	5	3,2
	908	1 027	395	423	Tr 850×7	50	22,3	12	7,5	828	1 122	6	0,27	2,5	3,7	2,5
	950	1 141	438	456	Tr 850×7	63	22,3	12	9,5	840	1 240	8	0,28	2,4	3,6	2,5
	930	1 111	525	553	Tr 850×7	50	22,3	12	9,5	840	1 240	8	0,35	1,9	2,9	1,8
800	969	1 114	325	343	Tr 900×7	53	22,3	12	7,5	878	1 192	6	0,20	3,4	5	3,2
	954	1 087	415	445	Tr 900×7	50	22,3	12	7,5	878	1 192	6	0,27	2,5	3,7	2,5
	1 010	1 203	462	480	Tr 900×7	62	22,3	12	12	898	1 312	10	0,28	2,4	3,6	2,5
	988	1 182	560	600	Tr 900×7	60	22,3	12	12	898	1 312	10	0,35	1,9	2,9	1,8
850	1 023	1 177	335	355	Tr 950×8	55	22,3	12	7,5	928	1 252	6	0,20	3,4	5	3,2
	1 012	1 147	430	475	Tr 950×8	55	22,3	12	7,5	928	1 252	6	0,26	2,6	3,9	2,5
	1 043	1 235	575	620	Tr 950×8	60	22,3	12	12	948	1 372	10	0,35	1,9	2,9	1,8
900	1 083	1 242	355	375	Tr 1000×8	55	22,3	12	7,5	978	1 332	6	0,20	3,4	5	3,2
	1 074	1 212	467	512	Tr 1000×8	55	22,3	12	7,5	978	1 332	6	0,27	2,5	3,7	2,5
	1 102	1 305	605	650	Tr 1000×8	60	22,3	12	12	998	1 452	10	0,35	1,9	2,9	1,8
950	1 139	1 305	365	387	Tr 1060×8	57	22,3	12	7,5	1 028	1 392	6	0,19	3,6	5,3	3,6
	1 133	1 275	469	519	Tr 1060×8	57	22,3	12	7,5	1 028	1 392	6	0,26	2,6	3,9	2,5
	1 182	1 399	525	547	Tr 1060×8	63	22,3	12	12	1 048	1 532	10	0,28	2,4	3,6	2,5
	1 159	1 373	645	695	Tr 1060×8	65	22,3	12	12	1 048	1 532	10	0,35	1,9	2,9	1,8
1 000	1 202	1 373	385	407	Tr 1120×8	60	22,3	12	9,5	1 094	1 466	8	0,19	3,6	5,3	3,6
	1 196	1 347	498	548	Tr 1120×8	60	22,3	12	9,5	1 094	1 466	8	0,26	2,6	3,9	2,5

[1] Width before the sleeve is driven into bearing bore

CARB® toroidal roller bearings

Designs

The CARB® toroidal roller bearing is a completely new type of radial roller bearing (➔ **fig** 1). This compact self-aligning roller bearing was developed by SKF and introduced on the market in 1995. In a unique design, it combines the self-aligning capability of the spherical roller bearing with the unconstrained axial alignment ability of the cylindrical roller bearing. It can also have the compact cross section normally associated with the needle roller bearing.

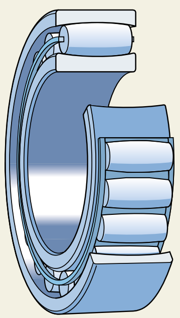
The applicability of CARB bearings covers a wide range with regard to radial loads. They are intended exclusively as non-locating bearings and as such they are ideal with their combination of self-aligning and axial alignment properties, opening up completely new opportunities to save space, weight and production costs. By deliberately displacing the rings axially with respect to each other it is possible to accurately set the radial internal clearance in the bearing. These bearings permit smaller and lighter bearing arrangement designs offering the same or improved performance in a particularly impressive manner, e.g. in planetary gearboxes. They simplify the bearing arrangement design for long shafts that are subjected to temperature variations. The vibration levels using CARB bearings have also proven to be reduced, e.g. in paper machines or fans.

The CARB bearing is a single row bearing with long, slightly crowned symmetrical rollers. The raceways of both the inner and outer rings are concave and situated symmetrically about the bearing centre. The attained optimal combination of both raceway profiles provides a favourable load distribution in the bearing as well as low frictional running.

The rollers of the CARB bearing are self-guiding, i.e. they will always adopt the position where the load is evenly distributed over the roller length – irrespective of whether the inner ring is axially displaced and/or misaligned with respect to the outer ring.

The load carrying capacity of the CARB bearing is very high even when it has to compensate for angular misalignment or axial displacement. This results in an operationally reliable bearing arrangement with long service life.

Fig 1



Open bearings

CARB toroidal roller bearings are produced in two basic designs (➔ **fig** 2), depending on bearing size and series as:

- bearings with cage (**a**),
- full complement bearings (**b**).

The load carrying capacity of the full complement CARB bearing is appreciably higher than that of the caged bearing. Both designs are available with a cylindrical bore as well as with a tapered bore. Depending on bearing width the tapered bore has a taper of either 1:12 (designation suffix K) or 1:30 (designation suffix K30).

Sealed bearings

Today, the range of sealed bearings (➔ **fig** 3) consists of small and medium size full complement bearings for low speeds. These bearings with seals on both sides are filled with a high temperature long life grease and are maintenance-free.

The double lip seal suitable for high temperature operations is sheet steel reinforced and made of hydrogenated acrylonitrile butadiene rubber (HNBR). It seals against the inner ring raceway. The outside diameter of the seal is retained in an outer ring recess and provides proper sealing also in applications with outer ring rotation. The seals can withstand operating temperatures in the range of –40 and +150 °C.

The sealed bearings are filled with a polyurea soap high temperature grease with very good pressure capacity and a synthetic mineral base oil. This grease has good corrosion inhibiting properties and can be used at temperatures between –25 and +180 °C. The base oil viscosity is 440 mm^2/s at 40 °C and 38 mm^2/s at 100 °C.

The grease fill is 70 to 100 % of the free space in the bearing. Sealed bearings with other lubricating greases or degrees of greasefill can be supplied on request.

Bearings for vibratory applications

For non-locating bearings in vibratory applications SKF manufactures CARB bearings with a surface hardened pressed steel cage in the C 23/C4VG114 series with a cylindrical bore. These bearings have the same dimensions and product data as the bearings in the C 23 series. They allow a press fit on the shaft to eliminate any possible fretting corrosion caused by a loose fit on the shaft. Using CARB bearings in vibratory applications on the non-locating side of the bearing arrangement will result in a self-aligning bearing system with better performance and reliability.

For additional information on CARB bearings in the C 23/C4VG114 series, please consult the SKF application engineering service.

SKF Explorer class bearings

All CARB bearings are manufactured to the SKF Explorer performance class.

Fig 2

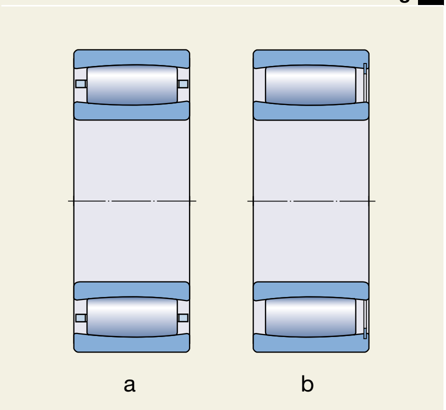
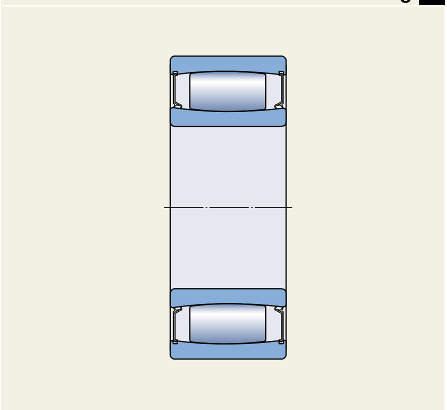


Fig 3



Bearings on sleeves

CARB bearings with a tapered bore can be mounted on smooth or stepped shafts using

- an adapter sleeve (➔ **fig** 4), see product table starting on **page 812**, or
- a withdrawal sleeve (➔ **fig** 5), see product table starting on **page 822**.

Where appropriate, modified adapter sleeves (➔ **fig** 6) of the E, L and TL designs are available for CARB bearings, to prevent the locking device from chafing the adjacent cage:

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

Where larger axial displacements can occur, it is recommended to observe the information in the section “Free space on the sides of the bearing” on **page 788**.

Fig 4

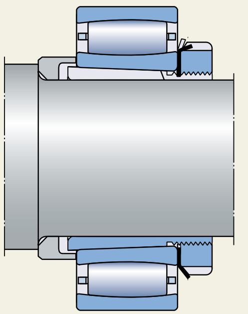
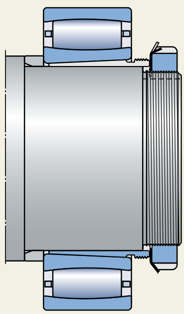
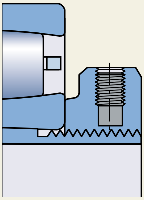


Fig 5

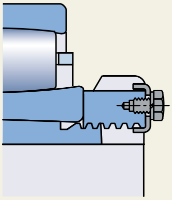


SKF

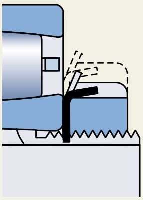
Fig 6



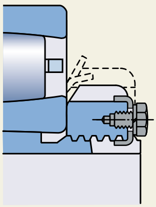
a



b



c



d

Appropriate bearing housings

The combination of a CARB bearing and an appropriate bearing housing constitutes an economic, interchangeable and reliable non-locating bearing arrangement, which fulfils the demands for easy maintenance. SKF standard housings are available for almost all CARB bearings of diameter series 0, 1, 2 and 3. Two mounting methods are possible without requiring special measures:

- mounting on an adapter sleeve on a smooth shaft, or
- mounting on a cylindrical seating on a stepped shaft.

Detailed information on SNL plummer (pillow) block housings in the 2, 3, 5 and 6 series can be found in the section “Bearing housings”, starting on **page 1027**.

A brief description of all the SKF housings is also provided in the section “Bearing housings” where main design features are presented. Publications for detailed information are listed.

Bearing data – general

Dimensions
The boundary dimensions of CARB bearings are in accordance with ISO 15:1998. The dimensions of the adapter and withdrawal sleeves correspond to ISO 2982-1:1995.

Tolerances
SKF CARB bearings are manufactured as standard to Normal tolerances.

SKF CARB bearings up to 315 mm bore diameter with a cylindrical or a tapered bore are produced to higher precision than the ISO Normal tolerances. For example

- the width tolerance is considerably tighter than the ISO Normal tolerance; the tolerance is the same as for spherical roller bearings (➔ **table** 2 on **page 700**),
- the running accuracy is to tolerance class P5 as standard.

For larger bearing arrangements where running accuracy is a key operational factor, SKF CARB bearings with P5 running accuracy are also available. These bearings are identified by the suffix C08. Their availability should be checked.

The values of the tolerances conform to ISO 492:2002 and can be found in **tables** 3 to 5 on **pages 125** to **127**.

Internal clearance
CARB bearings are produced as standard with Normal radial internal clearance and most are also available with a larger C3 clearance. Many bearings can also be supplied with a smaller C2 clearance or with a much greater C4 or C5 clearance.

The radial internal clearance limits are listed for bearings with

- cylindrical bore in **table** 1, and with
- tapered bore in **table** 2.

The limits are valid for bearings before mounting under zero measuring load, and with no axial displacement of one ring in relation to the other.

Axial displacement of one ring in relation to the other will gradually reduce the radial internal clearance in a CARB bearing. The amount of axial displacement encountered in cases without external heating of the shaft or foundation will have little effect on the radial internal clearance (➔ section "Axial displacement").

CARB bearings are often used together with spherical roller bearings. The clearance is slightly larger than that of the corresponding spherical roller bearing having the same clearance class. An axial displacement of the inner ring relative to the outer ring of 6 to 8 % of the bearing width will reduce the operational clearance to approximately the same value as a spherical roller bearing of the same size.

Misalignment
An angular misalignment of 0,5° between the inner and outer rings (➔ **fig** 7) can be accommodated by the CARB bearing without any negative consequences for the bearing. This value will be reduced for large axial displacements, see below.

Greater misalignments gradually increase friction and shorten bearing life. For misalignment above 0,5° please consult the SKF application engineering service. The ability to compensate for misalignment when the bearing is stationary is also limited. For CARB bearings with an MB type cage, the misalignment must never exceed 0,5°.

Misalignment will result in a certain axial displacement of the rollers, causing them to approach the side face of one of the bearing rings. A certain misalignment may, therefore,

Fig 7

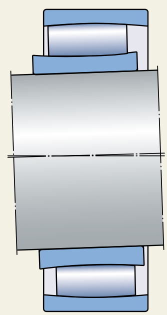
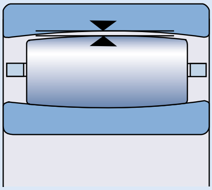


Table 1

Radial internal clearance of CARB bearings with cylindrical bore

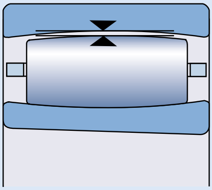


Bore diameter d over	incl.	Radial internal clearance C2 min	max	Normal min	max	C3 min	max	C4 min	max	C5 min	max
mm		µm									
18	**24**	15	27	27	39	39	51	51	65	65	81
24	**30**	18	32	32	46	46	60	60	76	76	94
30	**40**	21	39	39	55	55	73	73	93	93	117
40	**50**	25	45	45	65	65	85	85	109	109	137
50	**65**	33	54	54	79	79	104	104	139	139	174
65	**80**	40	66	66	96	96	124	124	164	164	208
80	**100**	52	82	82	120	120	158	158	206	206	258
100	**120**	64	100	100	144	144	186	186	244	244	306
120	**140**	76	119	119	166	166	215	215	280	280	349
140	**160**	87	138	138	195	195	252	252	321	321	398
160	**180**	97	152	152	217	217	280	280	361	361	448
180	**200**	108	171	171	238	238	307	307	394	394	495
200	**225**	118	187	187	262	262	337	337	434	434	545
225	**250**	128	202	202	282	282	368	368	478	478	602
250	**280**	137	221	221	307	307	407	407	519	519	655
280	**315**	152	236	236	330	330	434	434	570	570	714
315	**355**	164	259	259	360	360	483	483	620	620	789
355	**400**	175	280	280	395	395	528	528	675	675	850
400	**450**	191	307	307	435	435	577	577	745	745	929
450	**500**	205	335	335	475	475	633	633	811	811	1 015
500	**560**	220	360	360	518	518	688	688	890	890	1 110
560	**630**	245	395	395	567	567	751	751	975	975	1 215
630	**710**	267	435	435	617	617	831	831	1 075	1 075	1 335
710	**800**	300	494	494	680	680	920	920	1 200	1 200	1 480
800	**900**	329	535	535	755	755	1 015	1 015	1 325	1 325	1 655
900	**1 000**	370	594	594	830	830	1 120	1 120	1 460	1 460	1 830
1 000	**1 120**	410	660	660	930	930	1 260	1 260	1 640	1 640	2 040
1 120	**1 250**	450	720	720	1 020	1 020	1 380	1 380	1 800	1 800	2 240

Please refer to **page 137** for definition of radial internal clearance

Table 2

Radial internal clearance of CARB bearings with tapered bore



Bore diameter d over	incl.	Radial internal clearance C2 min	max	Normal min	max	C3 min	max	C4 min	max	C5 min	max
mm		µm									
18	**24**	19	31	31	43	43	55	55	69	69	85
24	**30**	23	37	37	51	51	65	65	81	81	99
30	**40**	28	46	46	62	62	80	80	100	100	124
40	**50**	33	53	53	73	73	93	93	117	117	145
50	**65**	42	63	63	88	88	113	113	148	148	183
65	**80**	52	78	78	108	108	136	136	176	176	220
80	**100**	64	96	96	132	132	172	172	218	218	272
100	**120**	75	115	115	155	155	201	201	255	255	321
120	**140**	90	135	135	180	180	231	231	294	294	365
140	**160**	104	155	155	212	212	269	269	338	338	415
160	**180**	118	173	173	238	238	301	301	382	382	469
180	**200**	130	193	193	260	260	329	329	416	416	517
200	**225**	144	213	213	288	288	363	363	460	460	571
225	**250**	161	235	235	315	315	401	401	511	511	635
250	**280**	174	258	258	344	344	444	444	556	556	692
280	**315**	199	283	283	377	377	481	481	617	617	761
315	**355**	223	318	318	419	419	542	542	679	679	848
355	**400**	251	350	350	471	471	598	598	751	751	920
400	**450**	281	383	383	525	525	653	653	835	835	1 005
450	**500**	305	435	435	575	575	733	733	911	911	1 115
500	**560**	335	475	475	633	633	803	803	1 005	1 005	1 225
560	**630**	380	530	530	702	702	886	886	1 110	1 110	1 350
630	**710**	422	590	590	772	772	986	986	1 230	1 230	1 490
710	**800**	480	674	674	860	860	1 100	1 100	1 380	1 380	1 660
800	**900**	529	735	735	955	955	1 215	1 215	1 525	1 525	1 855
900	**1 000**	580	814	814	1 040	1 040	1 340	1 340	1 670	1 670	2 050
1 000	**1 120**	645	895	895	1 165	1 165	1 495	1 495	1 875	1 875	2 275
1 120	**1 250**	705	975	975	1 275	1 275	1 635	1 635	2 055	2 055	2 495

Please refer to **page 137** for definition of radial internal clearance

reduce the permissible axial displacement (➔ section “Axial displacement”).

Axial displacement

CARB bearings are able to accommodate thermal elongation of the shaft within certain limits. The guideline values for axial displacement given in the product tables are valid provided there is

- a sufficiently large operational radial clearance in the bearing, and that
- the rings are not misaligned.

This means that the rollers (➔ **fig** 8) will not protrude from the bearing rings (**a**) or interfere with the retaining ring (**b**) or with the seal, if any.

If the axial movement exceeds 50 % of the axial displaceability s_1 or s_2, or the misalignment exceeds 0,5°, it is recommended, that the permissible axial displacement is checked with reference to the influence of roller complement displacement and the influence of internal clearance reduction. It should be observed that these two parameters are independent of each other.

The maximum permissible axial displacement is obtained from the smaller of the minimum values of the

- permissible axial displacement s_{lim} depending on roller complement displacement, and the
- permissible axial displacement s_{cle} depending on the clearance reduction,

calculated as explained in the following part.

Influence of roller displacement on the axial displacement capability

The axial displacement, as well as the misalignment of one ring with respect to the other, changes the position of the roller complement in the bearing.

The reduction in the permissible axial displacement caused by the misalignment can be estimated using

$$s_{mis} = k_1 B \alpha$$

where

s_{mis} = reduction in permissible axial displacement caused by misalignment, mm

k_1 = misalignment factor (➔ product tables)

B = bearing width, mm

α = misalignment, degrees

Assuming a sufficiently large operational clearance, the maximum permissible axial displacement is obtained from

$$s_{lim} = s_1 - s_{mis}$$

or

$$s_{lim} = s_2 - s_{mis}$$

where

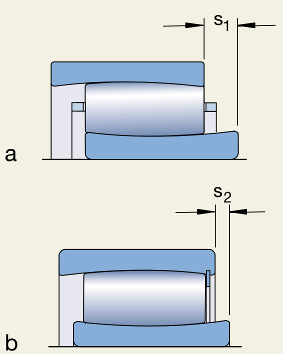
s_{lim} = permissible axial displacement with respect to roller complement movement caused by misalignment, mm

s_1 = guideline value for the axial displaceability in bearings without snap ring or when displacing away from the snap ring in bearings with snap ring (➔ product tables)

s_2 = guideline value for the axial displaceability in bearings with snap ring when displacing towards the snap ring (➔ product tables)

s_{mis} = reduction in permissible axial displacement caused by misalignment, mm

Fig 8



Influence of radial operating clearance on the axial displacement capability

Axial displacement from a centred position of one bearing ring in relation to the other reduces the radial clearance. The radial clearance reduction corresponding to a certain axial displacement from a centred position can be calculated using

$$C_{red} = \frac{k_2\, s_{cle}^{\;2}}{B}$$

The clearance reduction cannot be larger than the bearing operating radial clearance.

If instead a certain permissible radial clearance reduction is known, the corresponding permissible axial displacement from a centred position can be calculated using

$$s_{cle} = \sqrt{\frac{B\, C_{red}}{k_2}}$$

where

s_{cle} = axial displacement from a centred position giving a certain radial clearance reduction C_{red}, mm
C_{red} = reduction of radial clearance as a result of an axial displacement from a centred position, mm
k_2 = operating clearance factor (➔ product tables)
B = bearing width, mm

The axial displacement capability can also be obtained using **diagram 1**, which is valid for all CARB bearings. The axial displacement and operational clearance are shown as functions of the bearing width.

From **diagram 1** it can be seen (dotted line) that for a bearing C 3052 K/HA3C4, for an operational clearance of 0,15 mm which corresponds to approximately 0,15 % of the bearing width, an axial displacement of approximately 12,5 % of the bearing width is possible. Thus, when an axial displacement of approximately $0{,}125 \times 104 = 13$ mm has taken place, the operational clearance will be zero.

It should be remembered that the distance between the dotted line and the curve represents the residual radial operating clearance in the bearing arrangement.

Diagram 1 also illustrates how it is possible, simply by axially displacing the bearing rings relative to each other, to achieve a given radial internal clearance in a CARB bearing.

Calculation example 1

For bearing C 3052, having

- a width B = 104 mm,
- a misalignment factor $k_1 = 0{,}122$,
- a value for the axial displacement $s_1 = 19{,}3$,

with an angular misalignment of $\alpha = 0{,}3°$ between the inner and outer ring, the permissible axial displacement can be obtained from

$$\begin{aligned}
s_{lim} &= s_1 - s_{mis} \\
s_{lim} &= s_1 - k_1\, B\, \alpha \\
s_{lim} &= 19{,}3 - 0{,}122 \times 104 \times 0{,}3 = 19{,}3 - 3{,}8 \\
s_{lim} &= 15{,}5 \text{ mm}
\end{aligned}$$

Calculation example 2

For bearing C 3052 K/HA3C4 having

- a width B = 104 mm,
- an operating clearance factor $k_2 = 0{,}096$,
- an operational clearance of 0,15 mm,

the possible axial displacement from the central position of one ring to the other until the operational clearance equals zero can be obtained from

$$s_{cle} = \sqrt{\frac{B\, C_{red}}{k_2}}$$

$$s_{cle} = \sqrt{\frac{104 \times 0{,}15}{0{,}096}}$$

$$s_{cle} = 12{,}7 \text{ mm}$$

The axial displacement of 12,7 mm is below the limiting value s_1 = 19,3 mm, shown in the product table. An operating misalignment of 0,3° is also permissible, see also example 1.

Calculation example 3

For bearing C 3052, which has a width B = 104 mm and an operating clearance factor k_2 = 0,096, the reduction in operational clearance caused by an axial displacement s_{cle} = 6,5 mm from the central position is calculated using

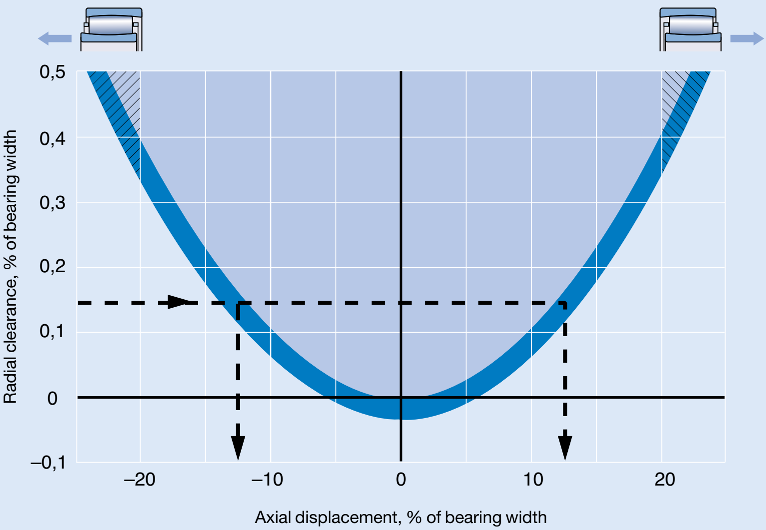
$$C_{red} = \frac{k_2\ s_{cle}^2}{B}$$

$$C_{red} = \frac{0,096 \times 6,5^2}{104}$$

$$C_{red} = 0,039 \text{ mm}$$

Diagram 1

Axial displacement in % of the bearing width



Influence of operating temperature on bearing material

All CARB 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, provided the permissible operating temperature of the cage is not exceeded, for example, a temperature of +200 °C for 2 500 h, or for short periods at even higher temperatures.

Cages

When the bearing is not of the full complement design, depending upon size, CARB bearings are fitted with one of the following cages as standard (➔ **fig** 9)

- glass fibre reinforced polyamide 4,6 cage, designation suffix TN9 (**a**),
- window-type sheet steel cage (**b**), no designation suffix,
- window-type brass cage, inner ring centred, designation suffix M (**c**), or
- machined brass cage, inner ring centred, designation suffix MB (**d**).

Note:

CARB bearings with polyamide cages can be operated continuously at temperatures up to +120 °C. The lubricants generally used for rolling bearings do not have a detrimental effect on cage properties, with the exception of a few synthetic oils and greases with a synthetic oil base, and lubricants containing a high proportion of EP additives when used at high temperatures.

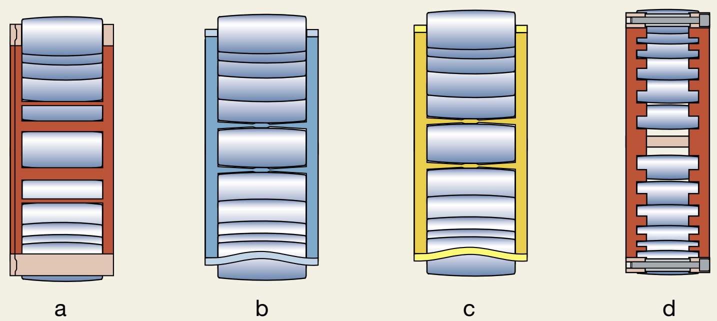
For bearing arrangements, which are to be operated at continuously high temperatures above 120 °C or under arduous conditions, it is recommended to use bearings with pressed steel or machined brass cage. Full complement bearings might also be a possible alternative.

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, CARB 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 effect on the rolling conditions in the bearing arrangement and may cause damaging sliding movements to occur between the rollers and raceways.

Fig 9



The requisite minimum load to be applied to a CARB bearing with cage can be estimated using

$$P_{0m} = 0{,}007\ C_0$$

and for a full complement bearing using

$$P_{0m} = 0{,}01\ C_0$$

where
P_{0m} = minimum equivalent static bearing load, kN
C_0 = basic static load rating, kN (➔ product tables)

In some applications it is not possible to reach or exceed the requisite minimum load. However, for caged bearings that are oil lubricated, lower minimum loads are permissible. These loads can be calculated when $n/n_r \leq 0{,}3$ from

$$P_{0m} = 0{,}002\ C_0$$

and when $0{,}3 < n/n_r \leq 2$ from

$$P_{0m} = 0{,}002\ C_0 \left(1 + 2\sqrt{\frac{n}{n_r} - 0{,}3}\right)$$

where
P_{0m} = minimum equivalent static bearing load, kN
C_0 = basic static load rating, kN (➔ product tables)
n = rotational speed, r/min
n_r = reference speed, r/min (➔ product tables)

When starting up at low temperatures or when the lubricant is highly viscous, even greater minimum loads than $P_{0m} = 0{,}007\ C_0$ and $0{,}01\ C_0$ respectively 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 CARB bearing must be subjected to an additional radial load.

Equivalent dynamic bearing load
As the CARB bearing can only accommodate radial loads

$$P = F_r$$

Equivalent static bearing load
As the CARB bearing can only accommodate radial loads

$$P_0 = F_r$$

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

C2	Radial internal clearance smaller than Normal
C3	Radial internal clearance larger than Normal
C4	Radial internal clearance larger than C3
C5	Radial internal clearance larger than C4
CS5	Sheet steel reinforced contact seal of hydrogenated acrylonitrile butadiene rubber (HNBR) on one side
2CS5	Sheet steel reinforced contact seal of hydrogenated acrylonitrile butadiene rubber (HNBR) on both sides. Free space in the bearing filled between 70 and 100 % with a high temperature grease.
HA3	Inner ring of case-hardening steel
K	Tapered bore, taper 1:12
K30	Tapered bore, taper 1:30
M	Machined roller centred brass cage
MB	Machined inner ring centred brass cage
TN9	Injection moulded cage of glass fibre reinforced polyamide 4,6
V	Full complement of rollers (no cage)
VE240	Bearing modified for greater axial displacement
VG114	Surface hardened pressed steel cage

Free space at the sides of the bearing

To enable axial displacement of the shaft with respect to the housing it is necessary to provide free space at both sides of the bearing as indicated in **fig 10**. The value for the width of this free space is based on

- the value C_a from the product tables,
- the axial displacement of the bearing rings from the central position expected in operation, and
- the displacement of the rings caused by misalignment.

It can be obtained from

$$C_{areq} = C_a + 0{,}5\,(s + s_{mis})$$

or

$$C_{areq} = C_a + 0{,}5\,(s + k_1\,B\,\alpha)$$

where

C_{areq} = width of space required on each side of bearing, mm

C_a = minimum width of space required on each side of the bearing, mm (➔ product tables)

s = relative axial displacement of rings, e.g. thermal elongation of shaft, mm

s_{mis} = axial displacement of roller complement caused by misalignment, mm

k_1 = misalignment factor (➔ product tables)

B = bearing width, mm

α = misalignment, degrees

See also the section “Axial displacement” on **page 783**.

Normally the bearing rings are mounted so that they are not displaced with respect to each other.

However, if considerable thermal changes in shaft length can be expected, the inner ring can be mounted offset with respect to the outer ring up to the permissible axial displacement s_1 or s_2 in the direction opposite to the expected thermal elongation (➔ **fig 11**). In this way, the permissible axial displacement can be appreciably extended, an advantage that is made use of for example in the bearing arrangements of drying cylinders in paper machines.

Fig 10

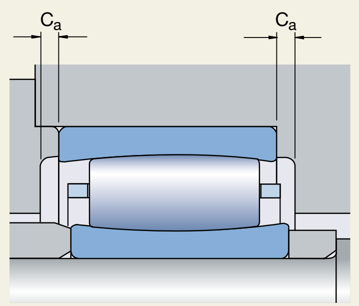
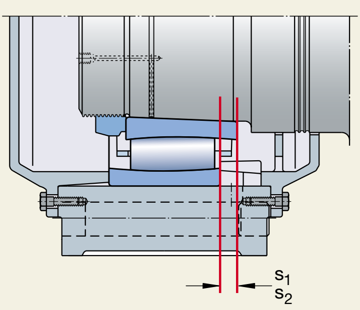


Fig 11



Mounting bearings with tapered bore

Bearings with a tapered bore are always mounted with an interference fit. The reduction in radial internal clearance, or the axial displacement of the inner ring on its tapered seating is used as a measure of the degree of interference.

Suitable methods for mounting CARB bearings with a tapered bore are:

- measuring the clearance reduction,
- measuring the lock nut tightening angle,
- measuring the axial drive-up,
- measuring the inner ring expansion.

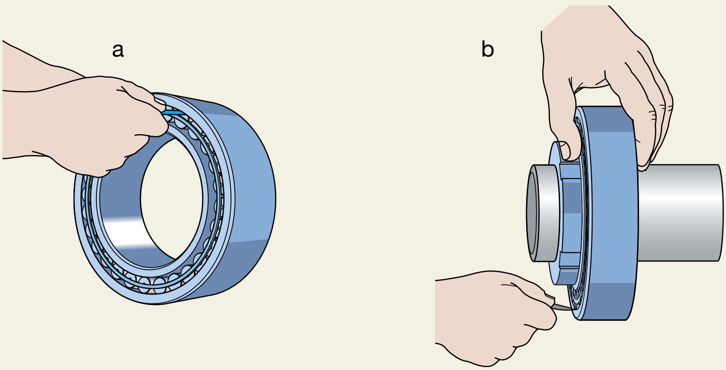
Small bearings with bore diameter up to 100 mm can be properly mounted by measuring the lock nut tightening angle.

For larger bearings the SKF Drive-up Method is recommended. This method is more accurate and takes less time than the procedure based on clearance reduction or the lock nut tightening angle. Measuring the inner ring expansion i.e. applying the SKF SensorMount® Method, allows large size bearings to be mounted simply, quickly and accurately, since a sensor is integrated with the bearing inner ring.

Measuring the clearance reduction
This method which uses feeler gauges for measuring the radial internal clearance before and after mounting bearings, is applicable for medium and large-sized bearings. The clearance should always be measured between the outer ring and an unloaded roller (➔ **fig 12**). Before measuring, rotate the outer ring a few times. Care must be taken to see that both bearing rings and the roller complement are centrically arranged with respect to each other. For the first measurement, a blade should be selected which is slightly thinner than the minimum value for the clearance. The procedure should be repeated using slightly thicker blades each time until a certain resistance is felt when moving between

- outer ring and uppermost roller (**a**) – before mounting
- inner or outer ring and lowest roller depending on the cage (**b**) – after mounting.

Fig 12



Measuring the lock nut tightening angle
Mounting a small to medium-size bearing on a tapered seating is easy when the tightening angle α of the locking nut (➔ **fig 13**) and the method that is described in the following is used. Guideline values for the tightening angle α are given in **table 3**.

Before starting the final tightening procedure, the bearing should always be pushed up on the tapered seating until the bore of the bearing is in contact with the seating on the shaft or sleeve around its whole circumference. By turning the nut through the given angle α, the bearing will then be pressed up the tapered seating. The residual clearance of the bearing should be checked, if possible.

Then unscrew the nut, place the locking washer in position and tighten the nut firmly again. Lock the nut by bending one of the locking washer tabs into the nut slot or by attaching a locking clip to the nut.

Measuring the axial drive-up
Mounting bearings with a tapered bore can be done by measuring the axial drive-up s of the inner ring on its seating. Guideline values for the required axial drive-up s for general applications are given in **table 3**.

The most suitable method in this case is the SKF Drive-up Method. This mounting method provides a very reliable and easy way to determine the starting position for a bearing from which the axial displacement is to be measured. For that, the following mounting tools (➔ **fig 14**) must be used:

- an SKF hydraulic nut of the HMV .. E design (**a**),
- a hydraulic pump (**b**) with
- a pressure gauge (**c**), appropriate to the mounting conditions, and
- a dial gauge (**d**).

Fig 13

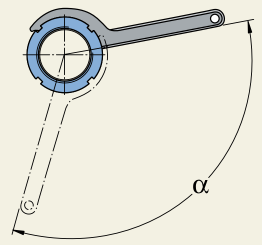


Fig 14

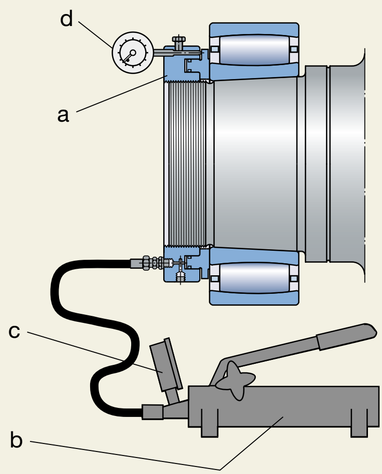
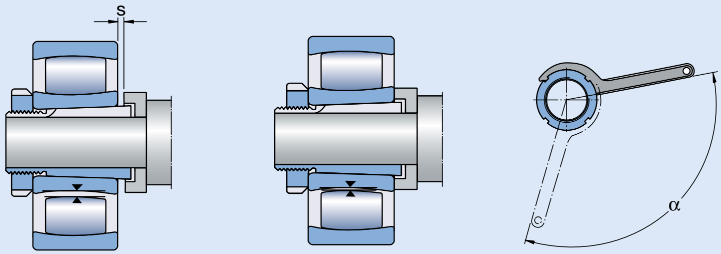


Table 3

Guideline values for reduction of radial internal clearance, axial drive-up and lock nut tightening angle



Bore diameter d		Reduction of radial internal clearance		Axial drive-up[1) s				Permissible residual[2) radial clearance after mounting bearings with initial clearance			Lock nut tightening angle α
				Taper 1:12		Taper 1:30					
over	incl.	min	max	min	max	min	max	Normal	C3	C4	
mm		mm		mm				mm			degrees
24	**30**	0,012	0,018	0,25	0,34	0,64	0,85	0,025	0,033	0,047	100
30	**40**	0,015	0,024	0,30	0,42	0,74	1,06	0,031	0,038	0,056	115
40	**50**	0,020	0,030	0,37	0,51	0,92	1,27	0,033	0,043	0,063	130
50	**65**	0,025	0,039	0,44	0,64	1,09	1,59	0,038	0,049	0,074	115
65	**80**	0,033	0,048	0,54	0,76	1,36	1,91	0,041	0,055	0,088	135
80	**100**	0,040	0,060	0,65	0,93	1,62	2,33	0,056	0,072	0,112	150
100	**120**	0,050	0,072	0,79	1,10	1,98	2,75	0,065	0,083	0,129	–
120	**140**	0,060	0,084	0,93	1,27	2,33	3,18	0,075	0,106	0,147	–
140	**160**	0,070	0,096	1,07	1,44	2,68	3,60	0,085	0,126	0,173	–
160	**180**	0,080	0,108	1,21	1,61	3,04	4,02	0,093	0,140	0,193	–
180	**200**	0,090	0,120	1,36	1,78	3,39	4,45	0,100	0,150	0,210	–
200	**225**	0,100	0,135	1,50	1,99	3,74	4,98	0,113	0,163	0,230	–
225	**250**	0,115	0,150	1,67	2,20	4,18	5,51	0,123	0,175	0,250	–
250	**280**	0,125	0,170	1,85	2,46	4,62	6,14	0,133	0,186	0,275	–
280	**315**	0,140	0,190	2,06	2,75	5,15	6,88	0,143	0,200	0,290	–
315	**355**	0,160	0,215	2,31	3,09	5,77	7,73	0,161	0,225	0,330	–
355	**400**	0,175	0,240	2,59	3,47	6,48	8,68	0,173	0,250	0,360	–
400	**450**	0,200	0,270	2,91	3,90	7,27	9,74	0,183	0,275	0,385	–
450	**500**	0,225	0,300	3,26	4,32	8,15	10,8	0,210	0,295	0,435	–
500	**560**	0,250	0,335	3,61	4,83	9,04	12,1	0,225	0,325	0,465	–
560	**630**	0,280	0,380	4,04	5,42	10,1	13,6	0,250	0,365	0,510	–
630	**710**	0,315	0,425	4,53	6,10	11,3	15,3	0,275	0,385	0,560	–
710	**800**	0,355	0,480	5,10	6,86	12,7	17,2	0,320	0,430	0,620	–
800	**900**	0,400	0,540	5,73	7,71	14,3	19,3	0,335	0,465	0,675	–
900	**1 000**	0,450	0,600	6,44	8,56	16,1	21,4	0,365	0,490	0,740	–
1 000	**1 120**	0,500	0,670	7,14	9,57	17,9	23,9	0,395	0,545	0,825	–
1 120	**1 250**	0,560	0,750	8	10,7	20	26,7	0,415	0,595	0,885	–

1) Valid only for solid steel shafts and general application. Not valid for the SKF Drive-up Method
2) The residual clearance must be checked in cases where the initial radial internal clearance is in the lower half of the tolerance range, and where large temperature differentials between the bearing rings can arise in operation. The residual clearance must not be less than the minimum values quoted above. When measuring, make sure that the rings and roller assembly are aligned and centred

Using the SKF Drive-up Method the bearing is pushed up its seat to a defined starting position (➔ **fig** 15) using a given oil pressure (corresponding to a given drive-up force) in the hydraulic nut. In this way, part of the desired reduction in radial internal clearance is achieved. The oil pressure is monitored by the pressure gauge. The bearing is then driven up from the defined starting position through a given distance to its final position. The axial displacement s_s is accurately determined using the dial gauge mounted on the hydraulic nut.

SKF has determined values of the requisite oil pressure and the axial displacement for the individual bearings. These values apply to bearing arrangements (➔ **fig** 16) with

- one sliding interface (**a** and **b**) or
- two sliding interfaces (**c**).

Fig 15

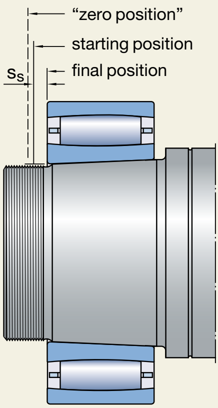
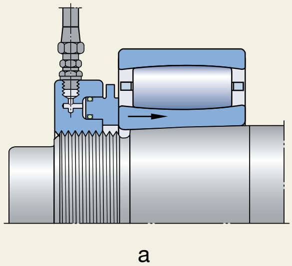
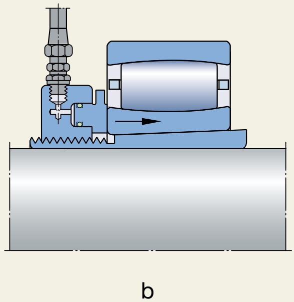
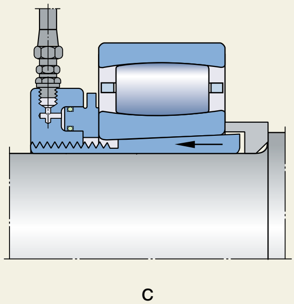


Fig 16







Measuring the inner ring expansion

Measuring inner ring expansion allows large size CARB bearings with a tapered bore to be mounted simply, quickly and accurately without measuring the radial internal clearance before and after mounting. The SKF SensorMount Method uses a sensor, integrated into the CARB bearing inner ring, and a dedicated hand-held indicator (➔ **fig** 17).

The bearing is driven up the tapered seating using common SKF mounting tools. The information from the sensor is processed by the indicator. Inner ring expansion is displayed as the relationship between the clearance reduction (mm) and the bearing bore diameter (m).

Aspects like bearing size, smoothness, shaft material or design – solid or hollow – do not need to be considered.

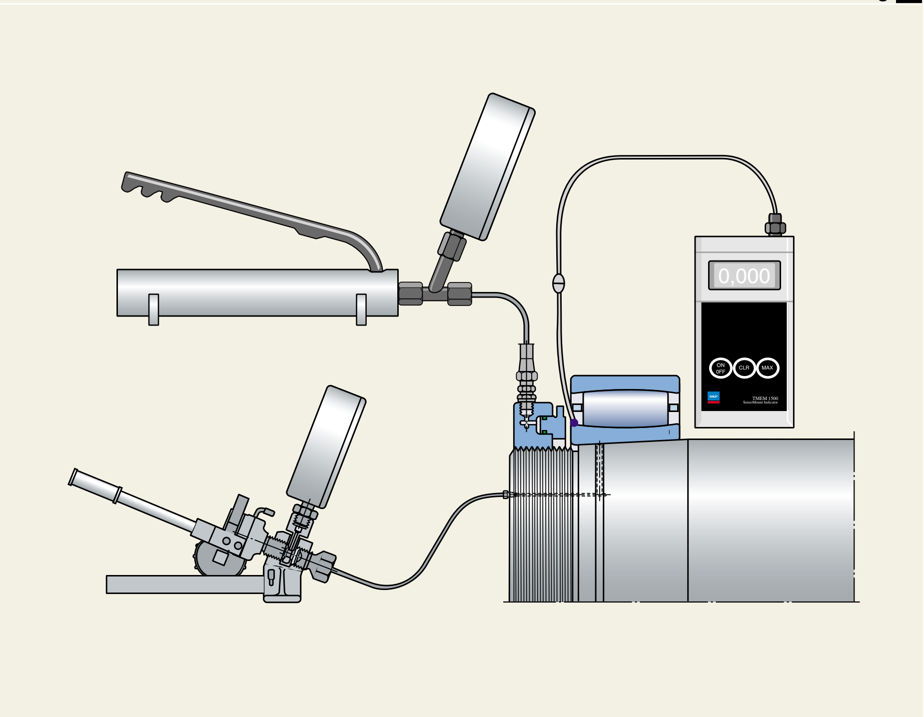
For detailed information about the SKF SensorMount Method please contact the SKF application engineering service.

Additional mounting information

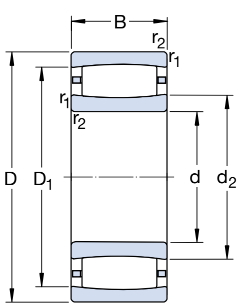
Additional information on mounting CARB bearings in general or with the aid of the SKF Drive-up Method can be found

- in the handbook “SKF Drive-up Method” on CD-ROM,
- in the “SKF Interactive Engineering Catalogue” on CD-ROM or online at www.skf.com or
- online at www.skf.com/mount.

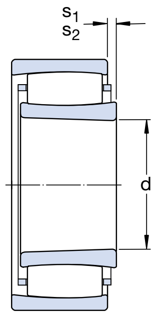
Fig 17



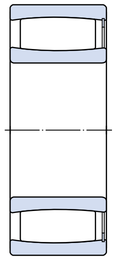
CARB toroidal roller bearings
d **25 – 55** mm



Cylindrical bore



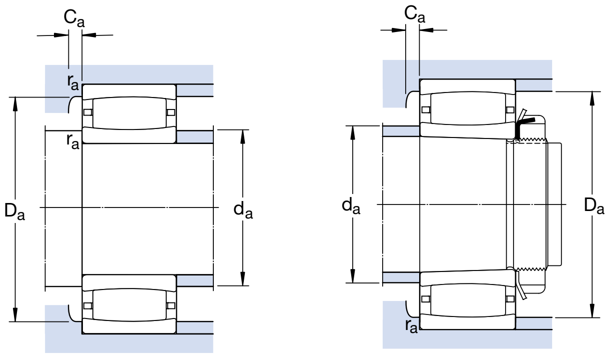
Tapered bore



Full complement

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	–	
25	52	18	44	40	4,55	13 000	18 000	0,17	* **C 2205 TN9**[1)]	* **C 2205 KTN9**[1)]
	52	18	58,5	48	5,6	–	7 000	0,18	* **C 2205 V**[1)]	* **C 2205 KV**[1)]
30	55	45	134	180	21,2	–	3 000	0,50	* **C 6006 V**	–
	62	20	65,5	62	7,2	11 000	15 000	0,27	* **C 2206 TN9**	* **C 2206 KTN9**
	62	20	76,5	71	8	–	6 000	0,29	* **C 2206 V**	* **C 2206 KV**
35	72	23	83	80	9, 3	9 500	13 000	0,43	* **C 2207 TN9**	* **C 2207 KTN9**
	72	23	95	96	11,2	–	5 000	0,45	* **C 2207 V**	* **C 2207 KV**
40	62	22	76,5	100	11,8	–	4 300	0,25	* **C 4908 V**	* **C 4908 K30V**
	62	30	104	143	16	–	3 400	0,35	* **C 5908 V**[1)]	–
	62	40	122	180	19,3	–	2 800	0,47	* **C 6908 V**[1)]	–
	80	23	90	86,5	10,2	8 000	11 000	0,50	* **C 2208 TN9**	* **C 2208 KTN9**
	80	23	102	104	12	–	4 500	0,53	* **C 2208 V**	* **C 2208 KV**
45	68	22	81,5	112	12,9	–	3 800	0,30	* **C 4909 V**[1)]	* **C 4909 K30V**[1)]
	68	30	110	163	18,3	–	3 200	0,41	* **C 5909 V**[1)]	–
	68	40	132	200	22	–	2 600	0,55	* **C 6909 V**[1)]	–
	85	23	93	93	10,8	8 000	11 000	0,55	* **C 2209 TN9**	* **C 2209 KTN9**
	85	23	106	110	12,9	–	4 300	0,58	* **C 2209 V**	* **C 2209 KV**
50	72	22	86,5	125	14,6	–	3 600	0,29	* **C 4910 V**	* **C 4910 K30V**
	72	30	118	180	20,4	–	2 800	0,42	* **C 5910 V**[1)]	–
	72	40	140	224	26	–	2 200	0,54	* **C 6910 V**	–
	80	30	116	140	16	5 000	7 500	0,55	* **C 4010 TN9**	* **C 4010 K30TN9**
	80	30	137	176	20	–	3 000	0,59	* **C 4010 V**	* **C 4010 K30V**
	90	23	98	100	11,8	7 000	9 500	0,59	* **C 2210 TN9**	* **C 2210 KTN9**
	90	23	114	122	14,3	–	3 800	0,62	* **C 2210 V**	* **C 2210 KV**
55	80	25	106	153	18	–	3 200	0,43	* **C 4911 V**[1)]	* **C 4911 K30V**[1)]
	80	34	143	224	25	–	2 600	0,60	* **C 5911 V**[1)]	–
	80	45	180	300	32,5	–	2 000	0,81	* **C 6911 V**[1)]	–
	100	25	116	114	13,4	6 700	9 000	0,79	* **C 2211 TN9**	* **C 2211 KTN9**
	100	25	132	134	15,6	–	3 400	0,81	* **C 2211 V**	* **C 2211 KV**

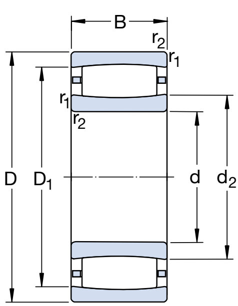
* SKF Explorer bearing
[1)] Please check availability of the bearing before incorporating it in a bearing arrangement design



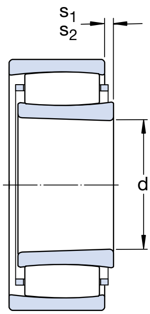
Dimensions						**Abutment and fillet dimensions**						**Calculation factors**	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1[1] ~	s_2[1] ~	d_a min	d_a max	D_a min	D_a max	C_a[2] min	r_a max	k_1	k_2
mm						mm						–	
25	32,1	43,3	1	5,8	–	30,6	32	42	46,4	0,3	1	0,09	0,126
	32,1	43,3	1	5,8	2,8	30,6	–	–	46,4	–	1	0,09	0,126
30	38,5	47,3	1	7,9	4,9	35,6	–	–	49,4	–	1	0,102	0,096
	37,4	53,1	1	4,5	–	35,6	37	51	56,4	0,3	1	0,101	0,111
	37,4	53,1	1	4,5	1,5	35,6	–	–	56,4	–	1	0,101	0,111
35	44,8	60,7	1,1	5,7	–	42	44	59	65	0,1	1	0,094	0,121
	44,8	60,7	1,1	5,7	2,7	42	–	–	65	–	1	0,094	0,121
40	46,1	55,3	0,6	4,7	1,7	43,2	–	–	58,8	–	0,6	0,099	0,114
	45,8	54,6	0,6	5	2	43,2	–	–	58,8		0,6	0,096	0,106
	46,6	53,8	0,6	9,4	6,4	43,2	–	–	58,8		0,6	0,113	0,088
	52,4	69,9	1,1	7,1	–	47	52	68	73	0,3	1	0,093	0,128
	52,4	69,9	1,1	7,1	4,1	47	–	–	73	–	1	0,093	0,128
45	51,6	60,5	0,6	4,7	1,7	48,2	–	–	64,8	–	0,6	0,114	0,1
	51,3	60,1	0,6	5	2	48,2	–	–	64,8	–	0,6	0,096	0,108
	52,1	59,3	0,6	9,4	6,4	48,2	–	–	64,8	–	0,6	0,113	0,09
	55,6	73,1	1,1	7,1	–	52	55	71	78	0,3	1	0,095	0,128
	55,6	73,1	1,1	7,1	4,1	52	–	–	78	–	1	0,095	0,128
50	56,9	66,1	0,6	4,7	1,7	53,2	–	–	68,8	–	0,6	0,103	0,114
	56,8	65,7	0,6	5	2	53,2	–	–	68,8	–	0,6	0,096	0,11
	57,5	65	0,6	9,4	6,4	53,2	–	–	68,8	–	0,6	0,093	0,113
	57,6	70,8	1	6	–	54,6	57	69	75,4	0,1	1	0,103	0,107
	57,6	70,8	1	6	3	54,6	–	–	75,4	–	1	0,103	0,107
	61,9	79,4	1,1	7,1	–	57	61	77	83	0,8	1	0,097	0,128
	61,9	79,4	1,1	7,1	3,9	57	–	–	83	–	1	0,097	0,128
55	62	72,1	1	5,5	2,5	59,6	–	–	80,4	–	1	0,107	0,105
	62,8	72,4	1	6	3	59,6	–	–	80,4	–	1	0,097	0,109
	62,8	71,3	1	7,9	4,9	59,6	–	–	80,4	–	1	0,096	0,105
	65,8	86,7	1,5	8,6	–	64	65	84	91	0,3	1,5	0,094	0,133
	65,8	86,7	1,5	8,6	5,4	64	–	–	91	–	1,5	0,094	0,133

[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**)

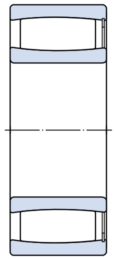
CARB toroidal roller bearings
d **60 – 85** mm



Cylindrical bore



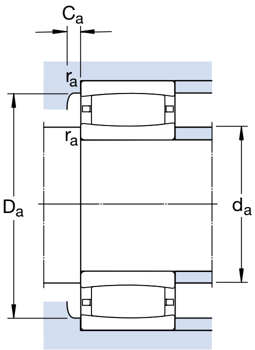
Tapered bore

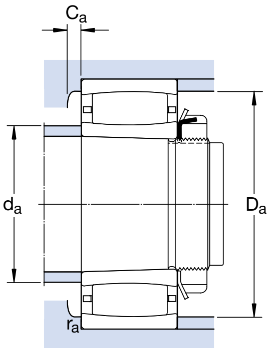


Full complement

Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Refer-ence 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	–	
60	85	25	112	170	19,6	–	3 000	0,46	⋆ **C 4912 V**[1]	⋆ **C 4912 K30V**[1]
	85	34	150	240	26,5	–	2 400	0,64	⋆ **C 5912 V**[1]	**–**
	85	45	190	335	39	–	1 900	0,84	⋆ **C 6912 V**	**–**
	110	28	143	156	18,3	5 600	7 500	1,10	⋆ **C 2212 TN9**	⋆ **C 2212 KTN9**
	110	28	166	190	22,4	–	2 800	1,15	⋆ **C 2212 V**	⋆ **C 2212 KV**
65	90	25	116	180	20,8	–	2 800	0,50	⋆ **C 4913 V**[1]	⋆ **C 4913 K30V**[1]
	90	34	156	260	30	–	2 200	0,70	⋆ **C 5913 V**[1]	**–**
	90	45	196	255	38	–	1 800	0,93	⋆ **C 6913 V**[1]	**–**
	100	35	196	275	32	–	2 400	1,00	⋆ **C 4013 V**[1]	⋆ **C 4013 K30V**[1]
	120	31	180	180	21,2	5 300	7 500	1,40	⋆ **C 2213 TN9**	⋆ **C 2213 KTN9**
	120	31	204	216	25,5	–	2 400	1,47	⋆ **C 2213 V**	⋆ **C 2213 KV**
70	100	30	163	240	28	–	2 600	0,78	⋆ **C 4914 V**[1]	⋆ **C 4914 K30V**[1]
	100	40	196	310	34,5	–	2 000	1,00	⋆ **C 5914 V**[1]	**–**
	100	54	265	455	49	–	1 700	1,40	⋆ **C 6914 V**[1]	**–**
	125	31	186	196	22,8	5 000	7 000	1,45	⋆ **C 2214 TN9**	⋆ **C 2214 KTN9**
	125	31	212	228	26,5	–	2 400	1,50	⋆ **C 2214 V**	⋆ **C 2214 KV**
	150	51	405	430	49	3 800	5 000	4,25	⋆ **C 2314**	⋆ **C 2314 K**
75	105	30	166	255	30	–	2 400	0,82	⋆ **C 4915 V**[1]	⋆ **C 4915 K30V**[1]
	105	40	204	325	37,5	–	1 900	1,10	⋆ **C 5915 V**	**–**
	105	54	204	325	37,5	–	1 600	1,40	⋆ **C 6915 V/VE240**	**–**
	115	40	236	345	40	–	2 000	1,50	⋆ **C 4015 V**[1]	⋆ **C 4015 K30V**[1]
	130	31	196	208	24	4 800	6 700	1,60	⋆ **C 2215**	⋆ **C 2215 K**
	130	31	220	240	28	–	2 200	1,65	⋆ **C 2215 V**	⋆ **C 2215 KV**
	160	55	425	465	52	3 600	4 800	5,20	⋆ **C 2315**	⋆ **C 2315 K**
80	110	30	173	275	31,5	–	2 200	0,87	⋆ **C 4916 V**[1]	⋆ **C 4916 K30V**[1]
	110	40	208	345	40	–	1 800	1,20	⋆ **C 5916 V**[1]	**–**
	140	33	220	250	28,5	4 500	6 000	2,00	⋆ **C 2216**	⋆ **C 2216 K**
	140	33	255	305	34,5	–	2 000	2,10	⋆ **C 2216 V**	⋆ **C 2216 KV**
	170	58	510	550	60	3 400	4 500	6,20	⋆ **C 2316**	⋆ **C 2316 K**
85	120	35	224	355	40,5	–	2 000	1,30	⋆ **C 4917 V**[1]	⋆ **C 4917 K30V**[1]
	120	46	465	275	52	–	1 700	1,70	⋆ **C 5917 V**[1]	**–**
	150	36	275	320	35,5	4 300	5 600	2,60	⋆ **C 2217**	⋆ **C 2217 K**
	150	36	315	390	44	–	1 800	2,80	⋆ **C 2217 V**	⋆ **C 2217 KV**
	180	60	540	600	64	3 200	4 300	7,30	⋆ **C 2317**	⋆ **C 2317 K**

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

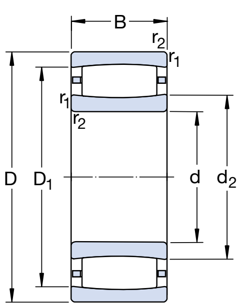




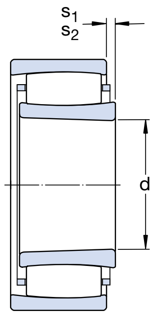
Dimensions						Abutment and fillet dimensions						Calculation factors	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1[1] ~	s_2[1] ~	d_a min	d_a max	D_a min	D_a max	C_a[2] min	r_a max	k_1	k_2
mm						mm						–	
60	68	78,2	1	5,5	2,3	64,6	–	–	80,4	–	1	0,107	0,108
	66,8	76,5	1	6	2,8	64,6	–	–	80,4	–	1	0,097	0,11
	68,7	77,5	1	7.9	4,7	64,6	–	–	80,4	–	1	0,108	0,096
	77,1	97,9	1,5	8,5	–	69	77	95	101	0,3	1,5	0,1	0,123
	77,1	97,9	1,5	8,5	5,3	69	–	–	101	–	1,5	0,1	0,123
65	72,1	82,2	1	5,5	2,3	69,6	–	–	85,4	–	1	0,107	0,109
	72,9	82,6	1	6	2,8	69,6	–	–	85,4	–	1	0,097	0,111
	72,9	81,4	1	7,9	4,7	69,6	–	–	85,4	–	1	0,096	0,107
	74,2	89,1	1,1	6	2,8	71	–	–	94	–	1	0,1	0,108
	79	106	1,5	9,6	–	74	79	102	111	0,2	1,5	0,097	0,127
	79	106	1,5	9,6	5,3	74	–	–	111	–	1,5	0,097	0,127
70	78	91	1	6	2,8	74,6	–	–	95,4	–	1	0,107	0,107
	78,7	90,3	1	9,4	6,2	74,6	–	–	95,4	–	1	0,114	0,095
	79,1	89,8	1	9	5,8	74,6	–	–	95,4	–	1	0,102	0,1
	83,7	111	1,5	9,6	–	79	83	107	116	0,4	1,5	0.098	0,127
	83,7	111	1,5	9,6	5,3	79	–	–	116	–	1,5	0,098	0,127
	91,4	130	2,1	9,1	–	82	91	120	138	2,2	2	0,11	0,099
75	83,1	96,1	1	6	2,8	79,6	–	–	100	–	1	0,107	0,108
	83,6	95,5	1	9,4	6,2	79,6	–	–	100	–	1	0,098	0,114
	83,6	95,5	1	9,2	9,2	79,6	–	–	100	–	1	0,073	0,154
	87,6	104	1,1	9,4	5,1	81	–	–	109	–	1	0,115	0,097
	88,5	115	1,5	9,6	–	84	98	110	121	1,2	1,5	0,099	0,127
	88,5	115	1,5	9,6	5,3	84	–	–	121	–	1,5	0,099	0,127
	98,5	135	2,1	13,1	–	87	110	130	148	2,2	2	0,103	0,107
80	88,2	101	1	6	1,7	84,6	–	–	105	–	1	0,107	0,11
	88,8	101	1	9,4	5,1	84,6	–	–	105	–	1	0,114	0,098
	98,1	125	2	9,1	–	91	105	120	129	1,2	2	0,104	0,121
	98,1	125	2	9,1	4,8	91	–	–	129	–	2	0,104	0,121
	102	145	2,1	10,1	–	92	115	135	158	2,4	2	0,107	0,101
85	94,5	109	1,1	6	1,7	91	–	–	114	–	1	0,1	0,114
	95	109	1,1	8,9	4,6	91	–	–	114	–	1	0,098	0,109
	104	133	2	7,1	–	96	110	125	139	1,3	2	0,114	0,105
	104	133	2	7,1	1,7	96	–	–	139	–	2	0,114	0,105
	110	153	3	12,1	–	99	125	145	166	2,4	2,5	0,105	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**)

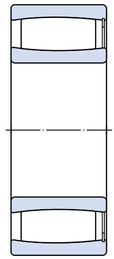
CARB toroidal roller bearings
d **90 – 130** mm



Cylindrical bore

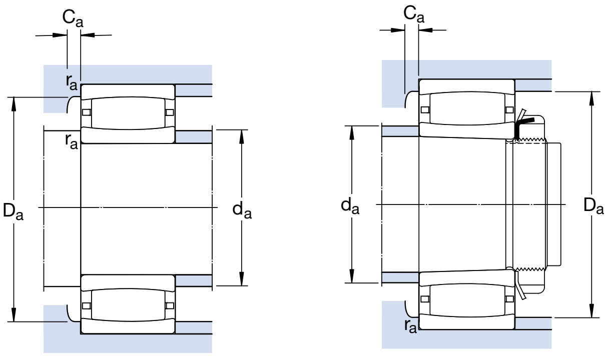


Tapered bore


Full complement

Principal dimensions			**Basic load ratings** dynamic	static	**Fatigue load limit**	**Speed ratings** Refer-ence 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	–	
90	125	35	186	315	35,5	–	2000	1,30	⋆ **C 4918 V**[1]	⋆ **C 4918 K30V**[1]
	125	46	224	400	45,5	–	1 600	1,75	⋆ **C 5918 V**	**–**
	150	72	455	670	73,5	–	1 100	5,10	⋆ **BSC-2039 V**	**–**
	160	40	325	380	41,5	3 800	5 300	3,30	⋆ **C 2218**	⋆ **C 2218 K**
	160	40	365	440	49	–	1 500	3,40	⋆ **C 2218 V**	⋆ **C 2218 KV**
	190	64	610	695	73,5	2 800	4 000	8,50	⋆ **C 2318**	⋆ **C 2318 K**
95	170	43	360	400	44	3 800	5 000	4,00	⋆ **C 2219**[1]	⋆ **C 2219 K**[1]
	200	67	610	695	73,5	2 800	4 000	10,0	⋆ **C 2319**	⋆ **C 2319 K**
100	140	40	275	450	49	–	1 700	1,90	⋆ **C 4920 V**[1]	⋆ **C 4920 K30V**[1]
	140	54	375	640	68	–	1 400	2,70	⋆ **C 5920 V**[1]	**–**
	150	50	355	530	58,5	–	1 400	3,05	⋆ **C 4020 V**	⋆ **C 4020 K30V**
	150	67	510	865	95	–	1 100	4,30	⋆ **C 5020 V**	**–**
	165	52	415	540	58,5	3 200	4 300	4,40	⋆ **C 3120**[1]	⋆ **C 3120 K**[1]
	165	52	475	655	69,5	–	1 300	4,40	⋆ **C 3120 V**	**–**
	165	52	475	655	69,5	–	1 000	5,25	⋆ **C 4120 V/VE240**	⋆ **C 4120 K30V/VE240**
	180	46	415	465	49	3 600	4 800	4,85	⋆ **C 2220**	⋆ **C 2220 K**
	215	73	800	880	90	2 600	3 600	12,5	⋆ **C 2320**	⋆ **C 2320 K**
110	170	45	355	480	51	3 200	4 500	3,50	⋆ **C 3022**[1]	⋆ **C 3022 K**[1]
	170	60	540	800	85	–	1 200	5,15	⋆ **C 4022 V**	⋆ **C 4022 K30V**
	180	69	670	1 000	104	–	900	7,05	⋆ **C 4122 V**	⋆ **C 4122 K30V**
	200	53	530	620	64	3 200	4 300	6,90	⋆ **C 2222**	⋆ **C 2222 K**
120	180	46	375	530	55	3 000	4 000	3,90	⋆ **C 3024**	⋆ **C 3024 K**
	180	46	430	640	65,5	–	1 400	4,05	⋆ **C 3024 V**	⋆ **C 3024 KV**
	180	60	530	880	91,5	–	1 100	5,50	⋆ **C 4024 V**	⋆ **C 4024 K30V**
	200	80	780	1 120	114	–	750	10,5	⋆ **C 4124 V**[1]	⋆ **C 4124 K30V**[1]
	215	58	610	710	72	3 000	4 000	8,60	⋆ **C 2224**[1]	⋆ **C 2224 K**[1]
	215	76	750	980	98	2 400	3 200	11,5	⋆ **C 3224**	⋆ **C 3224 K**
130	200	52	390	585	58,5	2 800	3 800	5,90	⋆ **C 3026**[1]	⋆ **C 3026 K**[1]
	200	69	620	930	91,5	1 900	2 800	7,84	⋆ **C 4026**	⋆ **C 4026 K30**
	200	69	720	1 120	112	–	850	8,05	⋆ **C 4026 V**	⋆ **C 4026 K30V**
	210	80	750	1 100	108	–	670	10,5	⋆ **C 4126 V/VE240**	⋆ **C 4126 K30V/VE240**
	230	64	735	930	91,5	2 800	3 800	11,0	⋆ **C 2226**	⋆ **C 2226 K**

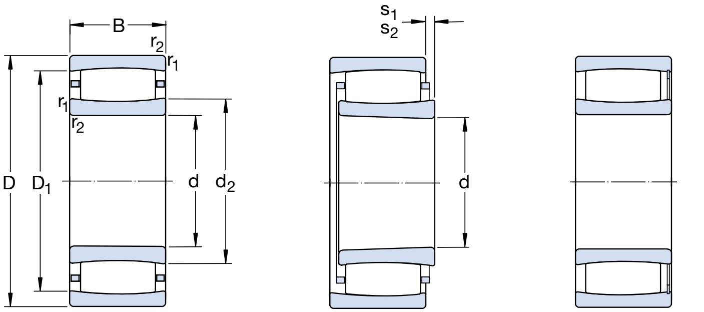
⋆ SKF Explorer bearing
[1] Please check availability of the bearing before incorporating it in a bearing arrangement design



Dimensions						Abutment and fillet dimensions						Calculation factors	
d	d_2 ~	D_1 ~	$r_{1,2}$ min	s_1[1)] ~	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						–	
90	102	113	1,1	11	6,7	96	–	–	119	–	1	0,125	0,098
	102	113	1,1	15,4	11,1	96	–	–	119	–	1	0,089	0,131
	109	131	2	19,7	19,7	101	–	–	139	–	2	0,087	0,123
	112	144	2	9,5	–	101	120	130	149	1,4	2	0,104	0,117
	112	144	2	9,5	5,4	101	–	–	149	–	2	0,104	0,117
	119	166	3	9,6	–	104	135	155	176	2	2,5	0,108	0,101
95	113	149	2,1	10,5	–	107	112	149	158	4,2	2	0,114	0,104
	120	166	3	12,6	–	109	135	155	186	2,1	2,5	0,103	0,106
100	113	130	1,1	9,4	5,1	106	–	–	134	–	1	0,115	0,103
	110	127	1,1	9	4,7	106	–	–	134	–	1	0,103	0,105
	113	135	1,5	14	9,7	109	–	–	141	–	1,5	0,098	0,118
	114	136	1,5	9,3	5	109	–	–	141	–	1,5	0,112	0,094
	119	150	2	10	–	111	119	150	154	4,5	2	0,1	0,112
	119	150	2	10	4,7	111	–	–	154	–	2	0,1	0,112
	120	148	2	17,7	17,7	111	–	–	154	–	2	0,09	0,125
	118	157	2,1	10,1	–	112	130	150	168	0.9	2	0,108	0,11
	126	185	3	11.2	–	114	150	170	201	3,2	2,5	0,113	0,096
110	128	156	2	9,5	–	119	127	157	161	4	2	0,107	0,11
	126	150	2	12	6,6	119	–	–	161	–	2	0,107	0,103
	132	163	2	11,4	4,6	120	–	–	170	–	2	0,111	0,097
	132	176	2,1	11,1	–	122	150	165	188	1,9	2	0,113	0,103
120	138	166	2	10,6	–	129	145	160	171	0,9	2	0,111	0,109
	138	166	2	10,6	3,8	129	–	–	171	–	2	0,111	0,109
	140	164	2	12	5,2	129	–	–	171	–	2	0,109	0,103
	140	176	2	18	11,2	131	–	–	189	–	2	0,103	0,103
	144	191	2,1	13	–	132	143	192	203	5,4	2	0,113	0,103
	149	190	2,1	17,1	–	132	160	180	203	2,4	2	0,103	0,108
130	154	180	2	16,5	–	139	152	182	191	4,4	2	0,123	0,1
	149	181	2	11,4	–	139	155	175	191	1,9	2	0,113	0,097
	149	181	2	11,4	4,6	139	–	–	191	–	2	0,113	0,097
	153	190	2	9,7	9,7	141	–	–	199	–	2	0,09	0,126
	152	199	3	9,6	–	144	170	185	216	1,1	2,5	0,113	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
d **140 – 190** mm



Cylindrical bore   Tapered bore   Full complement

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	–	
140	210	53	490	735	72	2 600	3 400	6,30	★ **C 3028**[1)]	★ **C 3028 K**[1)]
	210	69	750	1 220	120	–	800	8,55	★ **C 4028 V**	★ **C 4028 K30V**
	225	85	1 000	1 600	153	–	630	14,2	★ **C 4128 V**	★ **C 4128 K30V**
	250	68	830	1 060	102	2 400	3 400	13,8	★ **C 2228**	★ **C 2228 K**
150	225	56	540	850	83	2 400	3 200	8,30	★ **C 3030 MB**	★ **C 3030 KMB**
	225	75	780	1 320	127	–	750	10,5	★ **C 4030 V**	★ **C 4030 K30V**
	250	80	880	1 290	122	2 000	2 800	15,0	★ **C 3130**	★ **C 3130 K**
	250	100	1 220	1 860	173	–	450	20,5	★ **C 4130 V**[1)]	★ **C 4130 K30V**[1)]
	270	73	980	1 220	114	2 400	3 200	17,5	★ **C 2230**	★ **C 2230 K**
160	240	60	570	915	86,5	2 200	3 000	9,60	★ **C 3032**[1)]	★ **C 3032 K**[1)]
	240	80	795	1 160	110	1 600	2 400	12,3	★ **C 4032**	★ **C 4032 K30**
	240	80	915	1 460	140	–	600	12,6	★ **C 4032 V**	★ **C 4032 K30V**
	270	86	1 000	1 400	132	2 000	2 600	20,0	★ **C 3132**[1)]	★ **C 3132 K**[1)]
	270	109	1 460	2 160	200	–	300	26,0	★ **C 4132 V**[1)]	★ **C 4132 K30V**[1)]
	290	104	1 370	1 830	170	1 700	2 400	28,5	★ **C 3232**	★ **C 3232 K**
170	260	67	750	1 160	108	2 000	2 800	12,5	★ **C 3034**[1)]	★ **C 3034 K**[1)]
	260	90	1 140	1 860	173	–	480	17,5	★ **C 4034 V**	★ **C 4034 K30V**
	280	88	1 040	1 460	137	1 900	2 600	21,0	★ **C 3134**[1)]	★ **C 3134 K**[1)]
	280	109	1 530	2 280	208	–	280	27,0	★ **C 4134 V**[1)]	★ **C 4134 K30V**[1)]
	310	86	1 270	1 630	146	2 000	2 600	28,0	★ **C 2234**	★ **C 2234 K**
180	280	74	880	1 340	122	1 900	2 600	16,5	★ **C 3036**	★ **C 3036 K**[2)]
	280	100	1 320	2 120	196	–	430	23,0	★ **C 4036 V**	★ **C 4036 K30V**
	300	96	1 250	1 730	156	1 800	2 400	26,0	★ **C 3136**	★ **C 3136 K**[2)]
	300	118	1 760	2 700	240	–	220	34,5	★ **C 4136 V**[1)]	★ **C 4136 K30V**[1)]
	320	112	1 530	2 200	193	1 500	2 000	37,0	★ **C 3236**	★ **C 3236 K**
190	290	75	930	1 460	132	1 800	2 400	17,5	★ **C 3038**	★ **C 3038 K**[2)]
	290	100	1 370	2 320	204	–	380	24,5	★ **C 4038 V**[1)]	★ **C 4038 K30V**[1)]
	320	104	1 530	2 200	196	1 600	2 200	33,5	★ **C 3138**[1)]	★ **C 3138 K**[1)]
	320	128	2 040	3 150	275	–	130	43,0	★ **C 4138 V**[1)]	★ **C 4138 K30V**[1)]
	340	92	1 370	1 730	153	1 800	2 400	34,0	★ **C 2238**	★ **C 2238 K**[2)]

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