SWS Bearings LTD
High Quality Bearing Manufacturer

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----- Your Reliable Bearings Factory



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SWS Bearings LTD is one of the most reliable bearings factoriesand exporters in China. We mainly supply roller and ball bearings.

SWS was founded in 2007, located in Changzhou city,jiangsu Province It just takes around 2 hours from Changzhou to Shanghai by car, and very convenient transportation.

In 2009, SWS has invested three factories in Shandong, and Dalian city. Our products sell worldwide.

Our products and service include:

- ●Miniature and middle-large size deep groove ball bearing
- ●Double-row self-aligning roller bearing
- ●Four-row heavy type cylindrical roller bearing
- ●Self-aligning roller bearing
- ●Axial thrust ball bearing, thrust ball and roller bearing
- ●Single and double taper roller bearing
- ●Needle roller bearing
- ●High precision spindle bearing
- ●Pillow block bearing, bush, steel balls
- ●Technical support
- ●Maintenance
- ●Products training

Bore size range:3mm~6.5m
Weight range:10.5g~2.6ton

SWS bearings are widely used in railway, mining, mechanical equipment, automobile, ship, metallurgy, petrifaction, electric power, agriculture, textile and aviation, etc.

SWS products have sell to Europe, Asia, America, south-east Asia, which are our most important market. We have spent much time on developing new products, and also produce top quality products. We are very popular in domestic and abroad.

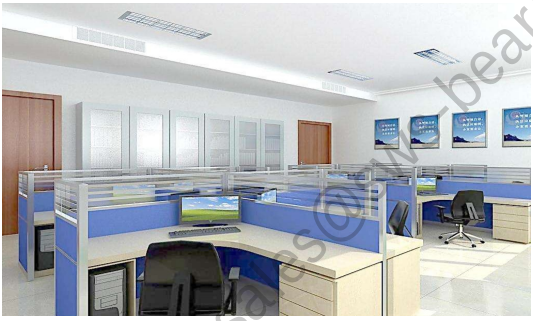
Welcome your inquiry and Look forward our cooperation in the future.

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SWS Bearings LTD
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Factory



Office



Workshop



Equipment



Product



Product

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Single direction thrust ball bearings

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

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

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

Fig. 1

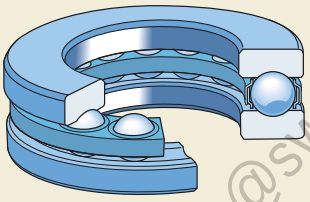


Fig. 2

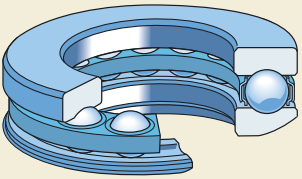
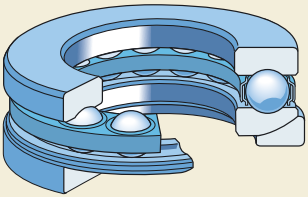


Fig. 3



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Double direction thrust ball bearings

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

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

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

Fig. 4

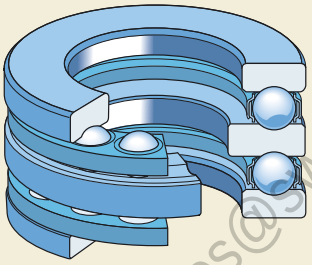


Fig. 5

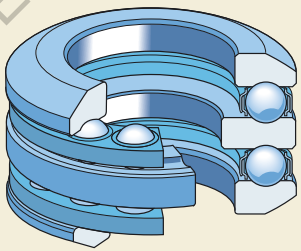
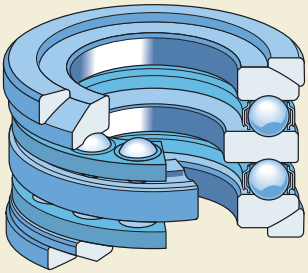


Fig. 6



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Bearing data – general

Dimensions

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

The values given for the height H_1 for bearings with sphered housing washer(s) are valid only for SWS bearings with SWS washers.

Tolerances

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

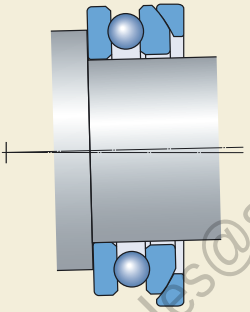
Normal, P6 and P5 tolerances are in accordance with ISO 199:1997. The values can be found in **table 10**

Misalignment

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

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

Fig. 7

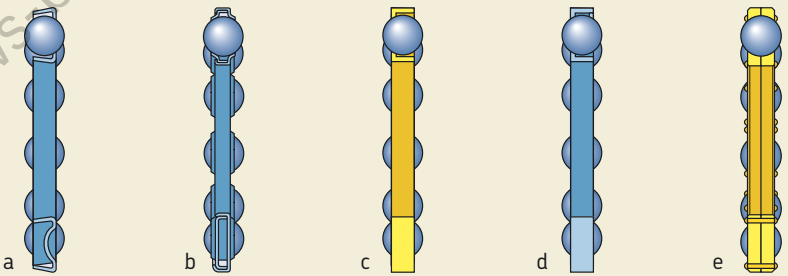


Cages

Depending on the bearing series and size, SWS thrust ball bearings are fitted as standard with one of the following cages (→ **fig. 8**)

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

Fig. 8



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Minimum load

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

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

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

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

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

Equivalent dynamic bearing load

$$P = F_a$$

Equivalent static bearing load

$$P_0 = F_a$$

Supplementary designations

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

F Machined steel cage, ball centred
JR Cage comprising two flat pressed steel washers, ball centred
M Machined brass cage, ball centred
P5 Increased dimensional and running accuracy to ISO tolerance class 5
P6 Increased dimensional and running accuracy to ISO tolerance class 6
TN9 Injection moulded cage of glass fibre reinforced polyamide 6,6, ball centred

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Thrust ball bearings

Single direction thrust ball bearings **1**

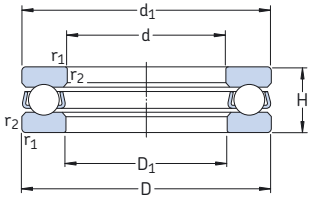
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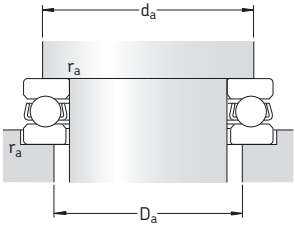
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Principal dimensions			Basic load ratings		Fatigue load limit	Minimum load factor	Speed ratings		Mass	Designation
			dynamic	static			Reference speed	Limiting speed		
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
3	8	3,5	0,806	0,72	0,027	0,000003	26 000	36 000	0,0009	**BA 3**
4	10	4	0,761	0,72	0,027	0,000003	22 000	30 000	0,0015	**BA 4**
5	12	4	0,852	0,965	0,036	0,000005	20 000	28 000	0,0021	**BA 5**
6	14	5	1,78	1,92	0,071	0,000019	17 000	24 000	0,0035	**BA 6**
7	17	6	2,51	2,9	0,108	0,000044	14 000	19 000	0,0065	**BA 7**
8	19	7	3,19	3,8	0,143	0,000075	12 000	17 000	0,0091	**BA 8**
9	20	7	3,12	3,8	0,143	0,000075	12 000	16 000	0,010	**BA 9**
10	24	9	9,95	15,3	0,56	0,0012	9 500	13 000	0,020	**51100**
	26	11	12,7	18,6	0,70	0,0018	8 000	11 000	0,030	**51200**
12	26	9	10,4	16,6	0,62	0,0014	9 000	13 000	0,022	**51101**
	28	11	13,3	20,8	0,77	0,0022	8 000	11 000	0,034	**51201**
15	28	9	10,6	18,3	0,67	0,0017	8 500	12 000	0,023	**51102**
	32	12	16,5	27	1	0,0038	7 000	10 000	0,046	**51202**
17	30	9	11,4	21,2	0,78	0,0023	8 500	12 000	0,025	**51103**
	35	12	17,2	30	1,1	0,0047	6 700	9 500	0,053	**51203**
20	35	10	15,1	29	1,08	0,0044	7 500	10 000	0,037	**51104**
	40	14	22,5	40,5	1,53	0,0085	6 000	8 000	0,083	**51204**
25	42	11	18,2	39	1,43	0,0079	6 300	9 000	0,056	**51105**
	47	15	27,6	55	2,04	0,015	5 300	7 500	0,11	**51205**
	52	18	34,5	60	2,24	0,018	4 500	6 300	0,17	**51305**
	60	24	55,3	96,5	3,6	0,048	3 600	5 000	0,34	**51405**
30	47	11	19	43	1,6	0,0096	6 000	8 500	0,063	**51106**
	52	16	25,5	51	1,9	0,013	4 800	6 700	0,13	**51206**
	60	21	37,7	71	2,65	0,026	3 800	5 300	0,26	**51306**
	70	28	72,8	137	5,1	0,097	3 000	4 300	0,52	**51406**

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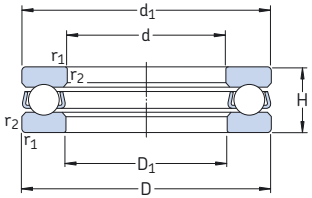
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Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
3	7,8	3,2	0,15	5,8	5	0,15
4	9,8	4,2	0,15	7,5	6,5	0,15
5	11,8	5,2	0,15	8	9	0,15
6	13,8	6,2	0,2	11	9,5	0,2
7	16,8	7,2	0,2	12,5	11	0,2
8	18,8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

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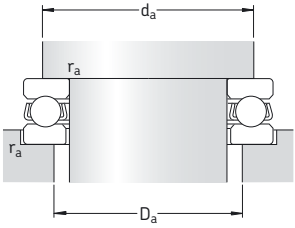
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Principal dimensions			Basic load ratings		Fatigue load limit	Minimum load factor	Speed ratings		Mass	Designation
			dynamic	static			Reference speed	Limiting speed		
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
35	52	12	19,9	51	1,86	0,013	5 600	7 500	0,080	**51107**
	62	18	35,1	73,5	2,7	0,028	4 000	5 600	0,22	**51207**
	68	24	49,4	96,5	3,55	0,048	3 200	4 500	0,39	**51307**
	80	32	87,1	170	6,2	0,15	2 600	3 800	0,79	**51407**
40	60	13	26	63	2,32	0,02	5 000	7 000	0,12	**51108**
	68	19	46,8	106	4	0,058	3 800	5 300	0,28	**51208**
	78	26	61,8	122	4,5	0,077	3 000	4 300	0,53	**51308**
	90	36	112	224	8,3	0,26	2 400	3 400	1,10	**51408**
45	65	14	26,5	69,5	2,55	0,025	4 500	6 300	0,14	**51109**
	73	20	39	86,5	3,2	0,038	3 600	5 000	0,30	**51209**
	85	28	76,1	153	5,6	0,12	2 800	4 000	0,66	**51309**
	100	39	130	265	9,8	0,37	2 200	3 000	1,40	**51409**
50	70	14	27	75	2,8	0,029	4 300	6 300	0,16	**51110**
	78	22	49,4	116	4,3	0,069	3 400	4 500	0,37	**51210**
	95	31	88,4	190	6,95	0,19	2 600	3 600	0,94	**51310**
	110	43	159	340	12,5	0,60	2 000	2 800	2,00	**51410**
55	78	16	30,7	85	3,1	0,039	3 800	5 300	0,23	**51111**
	90	25	61,8	146	5,4	0,11	2 800	4 000	0,59	**51211**
	105	35	104	224	8,3	0,26	2 200	3 200	1,30	**51311**
	120	48	178	390	14,3	0,79	1 800	2 400	2,55	**51411**
60	85	17	41,6	122	4,55	0,077	3 600	5 000	0,20	**51112**
	95	26	62,4	150	5,6	0,12	2 800	3 800	0,65	**51212**
	110	35	101	224	8,3	0,26	2 200	3 000	1,35	**51312**
	130	51	199	430	16	0,96	1 600	2 200	3,10	**51412 M**
65	90	18	37,7	108	4	0,06	3 400	4 800	0,33	**51113**
	100	27	63,7	163	6	0,14	2 600	3 600	0,78	**51213**
	115	36	106	240	8,8	0,30	2 000	3 000	1,50	**51313**
	140	56	216	490	18	1,2	1 500	2 200	4,00	**51413 M**
70	95	18	40,3	120	4,4	0,074	3 400	4 500	0,35	**51114**
	105	27	65	173	6,4	0,16	2 600	3 600	0,79	**51214**
	125	40	135	320	11,8	0,53	1 900	2 600	2,00	**51314**
	150	60	234	550	19,3	1,6	1 400	2 000	5,00	**51414 M**

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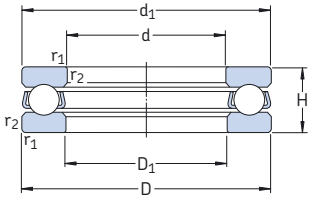
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Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
35	52	37	0,6	45	42	0,6
	62	37	1	51	46	1
	68	37	1	55	48	1
	80	37	1,1	62	53	1
40	60	42	0,6	52	48	0,6
	68	42	1	57	51	1
	78	42	1	63	55	1
	90	42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

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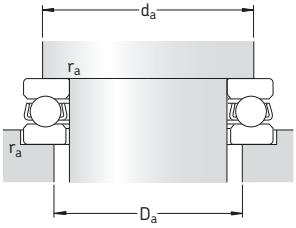
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Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
75	100	19	44,2	146	5,5	0,11	3 200	4 300	0,40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

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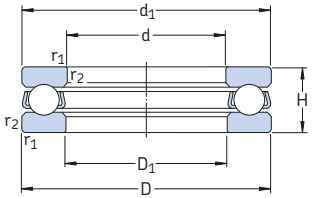
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Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
75	100	77	1	90	85	1
	110	77	1	96	89	1
	135	77	1,5	111	99	1,5
	160	78	2	126	109	2
80	105	82	1	95	90	1
	115	82	1	101	94	1
	140	82	1,5	116	104	1,5
	170	83	2,1	133	117	2
85	110	87	1	100	95	1
	125	88	1	109	101	1
	150	88	1,5	124	111	1,5
	177	88	2,1	141	124	2
90	120	92	1	108	102	1
	135	93	1,1	117	108	1
	155	93	1,5	129	116	1,5
	187	93	2,1	149	131	2
100	135	102	1	121	114	1
	150	103	1,1	130	120	1
	170	103	1,5	142	128	1,5
	205	103	3	165	145	2,5
110	145	112	1	131	124	1
	160	113	1,1	140	130	1
	187	113	2	158	142	2
	225	113	3	181	159	2,5
120	155	122	1	141	134	1
	170	123	1,1	150	140	1
	205	123	2,1	173	157	2
	245	123	4	197	173	3
130	170	132	1	154	146	1
	187	133	1,5	166	154	1,5
	220	134	2,1	186	169	2
	265	134	4	213	187	3

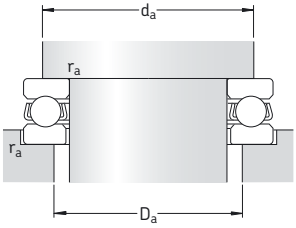
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Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Reference speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
140	180	31	111	440	12,9	1	1 800	2 600	2,05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

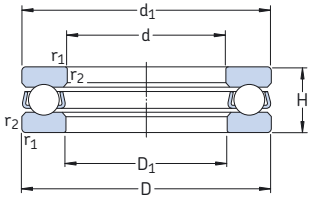
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Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
140	178	142	1	164	156	1
	197	143	1,5	176	164	1,5
	235	144	2,1	199	181	2
	275	144	4	223	197	3
150	188	152	1	174	166	1
	212	153	1,5	189	176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

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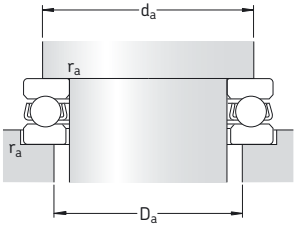
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Principal dimensions			Basic load ratings		Fatigue load limit	Minimum load factor	Speed ratings		Mass	Designation
			dynamic	static			Reference speed	Limiting speed		
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
300	380	62	364	1 760	35,5	16	850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

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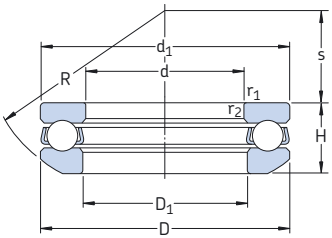
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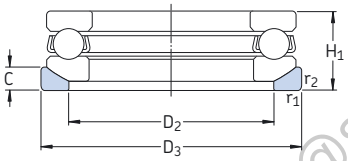


Dimensions				Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	$r_{1,2}$ min	d_a min	D_a max	r_a max
mm				mm		
300	376	304	2	348	332	2
	415	304	3	371	349	2,5
320	396	324	2	368	352	2
	435	325	3	391	369	2,5
340	416	344	2	388	372	2
	455	345	3	411	389	2,5
360	436	364	2	408	392	2
	495	365	4	443	417	3
380	456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

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Single direction thrust ball bearings with sphered housing washer
d **12 – 70** mm

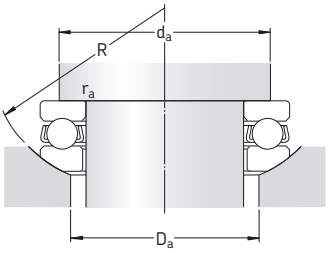




Principal dimensions			Basic load ratings		Fatigue load limit	Minimum load factor	Speed ratings		Mass	Designations	
			dynamic	static			Reference speed	Limiting speed	Bearing + washer	Bearing	Seating washer
d	D	H_1	C	C_0	P_u	A					
mm			kN		kN	–	r/min		kg	–	
12	28	13	13,3	20,8	0,77	0,0022	8 000	11 000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

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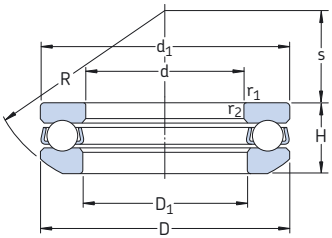


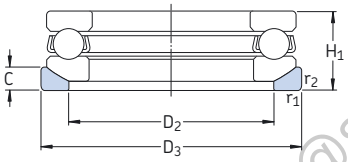


Dimensions										Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	D_2	D_3	H	C	R	s	$r_{1,2}$ min	d_a max	D_a max	r_a max
mm										mm		
12	28	14	20	30	11,4	3,5	25	11,5	0,6	22	20	0,6
15	32	17	24	35	13,3	4	28	12	0,6	25	24	0,6
17	35	19	26	38	13,2	4	32	16	0,6	28	26	0,6
20	40	22	30	42	14,73	5	36	18	0,6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

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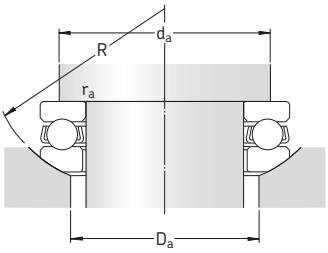
Single direction thrust ball bearings with sphered housing washer
d **75 – 140** mm





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

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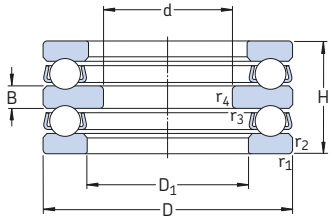




Dimensions										Abutment and fillet dimensions		
d	d_1 ~	D_1 ~	D_2	D_3	H	C	R	s	$r_{1,2}$ min	d_a max	D_a max	r_a max
mm										mm		
75	110	77	92	115	28,3	9,5	90	49	1	96	92	1
	135	77	105	140	48,1	15	100	37	1,5	111	105	1,5
	160	78	115	165	69	21	125	42	2	126	115	2
80	115	82	98	120	29,5	10	90	46	1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

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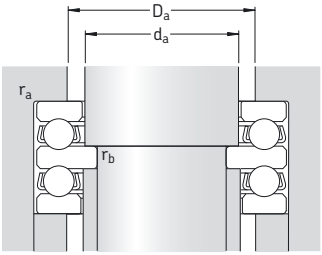
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Principal dimensions			Basic load ratings		Fatigue load limit	Minimum load factor	Speed ratings		Mass	Designation
			dynamic	static			Reference speed	Limiting speed		
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
10	32	22	16,5	27	1	0,0038	7 000	10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

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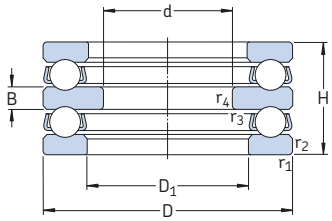
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Dimensions					Abutment and fillet dimensions			
d	D_1 ~	B	$r_{1,2}$ min	$r_{3,4}$ min	d_a	D_a max	r_a max	r_b max
mm					mm			
10	17	5	0,6	0,3	15	22	0,6	0,3
15	22	6	0,6	0,3	20	28	0,6	0,3
20	27	7	0,6	0,3	25	34	0,6	0,3
	27	8	1	0,3	25	36	1	0,3
	32	12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

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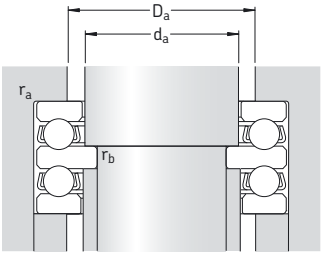
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Principal dimensions			Basic load ratings dynamic	static	Fatigue load limit	Minimum load factor	Speed ratings Refer-ence speed	Limiting speed	Mass	Designation
d	D	H	C	C_0	P_u	A				
mm			kN		kN	–	r/min		kg	–
60	110	47	67,6	183	6,8	0,17	2 400	3 400	1,55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

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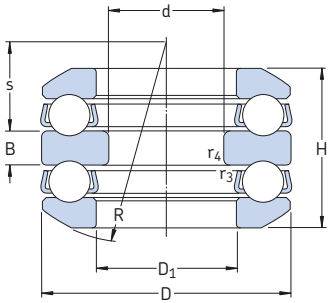


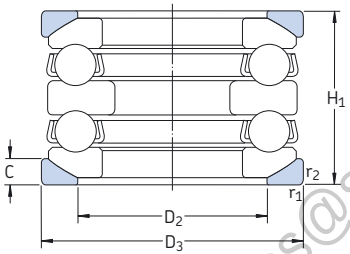
Dimensions					Abutment and fillet dimensions			
d	D_1 ~	B	$r_{1,2}$ min	$r_{3,4}$ min	d_a	D_a max	r_a max	r_b max
mm					mm			
60	77	10	1	1	75	89	1	1
	77	18	1,5	1	75	99	1,5	1
65	82	10	1	1	80	94	1	1
	82	18	1,5	1	80	104	1,5	1
70	88	12	1	1	85	101	1	1
75	93	14	1,1	1	90	108	1	1
85	103	15	1,1	1	100	120	1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

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Double direction thrust ball bearings with sphered housing washers

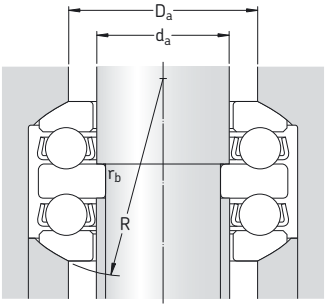
d **25 – 80** mm

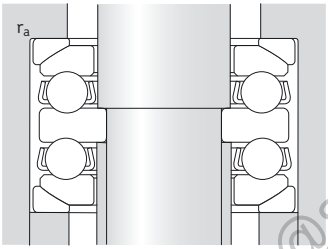




Principal dimensions			Basic load ratings		Fatigue load limit	Minimum load factor	Speed ratings		Mass	Designations	
			dynamic	static			Reference speed	Limiting speed	Bearing + washers	Bearing	Seating washer
d	D	H_1	C	C_0	P_u	A					
mm			kN		kN	–	r/min		kg	–	
25	60	46	37,7	71	2,65	0,026	3 800	5 300	0,58	**54306**	**U 306**
30	62	42	35,1	73,5	2,7	0,028	4 000	5 600	0,53	**54207**	**U 207**
	68	44	46,8	106	4	0,058	3 800	5 300	0,63	**54208**	**U 208**
	68	52	49,4	96,5	3,55	0,048	3 200	4 500	0,85	**54307**	**U 307**
	78	59	61,8	122	4,5	0,077	3 000	4 300	1,17	**54308**	**U 308**
35	73	45	39	86,5	3,2	0,038	3 600	5 000	0,78	**54209**	**U 209**
	85	62	76,1	153	5,6	0,12	2 800	4 000	1,60	**54309**	**U 309**
	100	86	130	265	9,8	0,37	2 200	3 000	3,00	**54409**	**U 409**
40	95	70	88,4	190	6,95	0,19	2 600	3 600	2,30	**54310**	**U 310**
	110	92	159	340	12,5	0,60	2 000	2 800	4,45	**54410**	**U 410**
45	90	55	61,8	146	5,4	0,11	2 800	4 000	1,30	**54211**	**U 211**
50	110	78	101	224	8,3	0,26	2 200	3 000	2,90	**54312**	**U 312**
65	140	95	159	390	13,7	0,79	1 700	2 400	0,57	**54316**	**U 316**
	170	140	270	670	22,4	2,3	1 200	1 700	1,40	**54416 M**	**U 416**
70	150	105	190	465	16	1,1	1 600	2 200	7,95	**54317**	**U 317**
80	210	176	371	1 060	31,5	5,8	950	1 400	29,0	**54420 M**	**U 420**

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

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