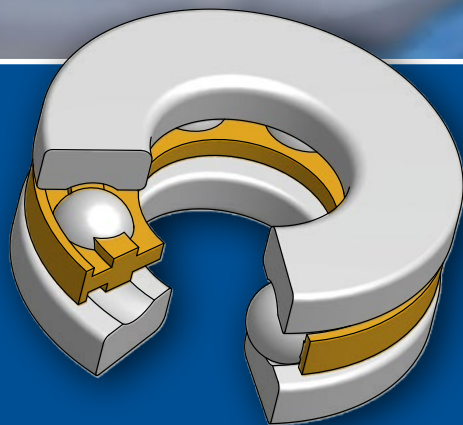
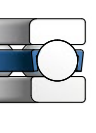




SINGLE DIRECTION  
AND DOUBLE DIRECTION THRUST BALL BEARINGS



## SINGLE DIRECTION AND DOUBLE DIRECTION THRUST BALL BEARINGS

*In terms of construction the thrust ball bearings are divided into single direction and double direction thrust ball bearings.*

### Single Direction Thrust Ball Bearings

consist of two flat washers with raceways, balls and cage. The washers have a flat seating surface therefore they have to be embedded so that all balls are equally loaded.

### Double Direction Thrust Ball Bearings

have two cages with balls between the central shaft washer and both housing washers with flat seating surface. The shaft washer has raceways on both sides and is fixed on a journal.

Single direction and double direction thrust ball bearings can accommodate large axial load, however they must not be subjected to radial load. During operation these bearings must be constantly subjected to a specific axial load.



## DESIGN SPECIFICATIONS

### MAIN DIMENSIONS

Main dimensions of thrust ball bearings specified in the dimension tables are in accordance with the international standards ISO 104.

### DESIGNATION

Designation of standard applications is specified in the dimension tables. Difference from basic application is marked by additional symbols.

### CAGE

Thrust ball bearings have as standard steel cage, where the material and application is not marked. Special construction requests should be discussed with the supplier in advance.

### TOLERANCES

Thrust ball bearings are commonly produced in the tolerance class P0 which is not indicated. For special arrangements requiring high precision the bearings with higher tolerance class P6 or P5 can be supplied. The limit values of deviations in tolerances and the operation of these bearing types are given in tables 17a, 17b and 17c of this catalogue.

### MISALIGNMENT

The seating of thrust ball bearings requires as accurate alignment of seating surfaces as possible, because the misalignment of the seating surfaces causes increased stress in the contact of balls with the raceways. It is not recommended to use thrust ball bearings where the conditions of alignment cannot be met.

### AXIAL EQUIVALENT DYNAMIC LOAD

$$P_a = F_a \quad (\text{kN})$$

### AXIAL EQUIVALENT STATIC LOAD

$$P_{oa} = F_a \quad (\text{kN})$$

### MINIMAL AXIAL LOAD

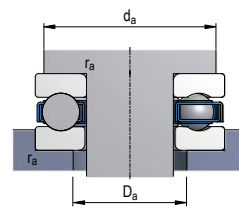
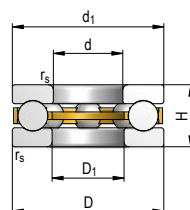
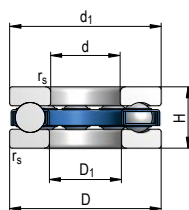
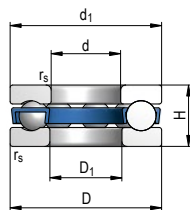
When the axial load  $F_a$  falls under allowed value at higher rotation speed there is a danger of skidding of balls between the raceways of the washers because of the centrifugal force. Allowed value  $F_{a \min}$  is calculated:

$$F_{a \min} = M \left( \frac{n_{\max}}{1000} \right)^2 \quad (\text{kN})$$

- $F_{a \min}$  - minimal axial load
- $n_{\max}$  - limiting rotation speed
- $M$  - minimal load index

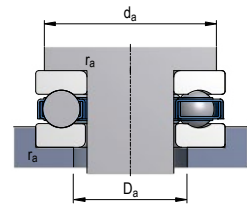
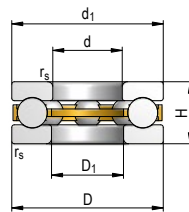
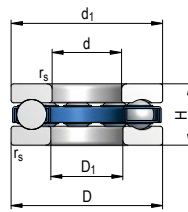
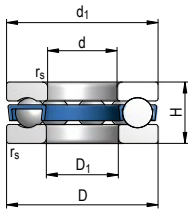
If the axial load is lower than  $F_{a \min}$  or during the operation the bearing is relieved, e.g. one row of balls in a double direction thrust ball bearing or one bearing in the arrangement of a single direction bearing pair is relieved it is necessary to secure the minimal load, e.g. by means of springs.

# SINGLE DIRECTION AND DOUBLE DIRECTION THRUST BALL BEARINGS



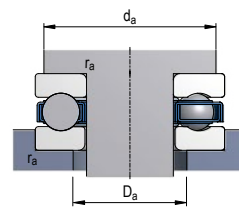
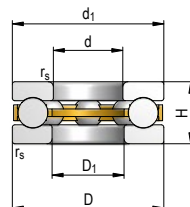
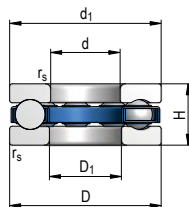
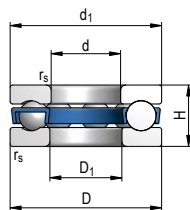
Dimensions mm							Basic Load Rating kN		Limiting Speed for Lubrication min <sup>-1</sup>		Bearing Designation	Weight kg	Minimal Axial Load Index	Abutment and Fillet Dimensions mm		
d	D	d <sub>1</sub>	D <sub>1</sub>	H	r <sub>s</sub>							M	d <sub>a</sub> min	D <sub>a</sub> max	r <sub>a</sub> max	
10	24	24	11	9	0,3	9,32	10,07	7900	10600	51100	0,018	0,001	18	16	0,3	
10	26	26	12	11	0,6	12,66	10,44	7100	9400	51200	0,028	0,002	20	16	0,6	
12	26	26	13	9	0,3	9,88	10,30	7500	10000	51101	0,021	0,002	20	18	0,3	
12	28	28	14	11	0,6	13,16	12,31	6700	8900	51201	0,031	0,002	22	18	0,6	
15	28	28	16	9	0,3	10,52	12,00	7100	9400	51102	0,022	0,002	23	20	0,3	
15	32	32	17	12	0,6	15,44	16,24	6000	7900	51202	0,042	0,004	25	22	0,6	
17	30	30	18	9	0,3	10,83	13,68	7100	9400	51103	0,024	0,003	25	22	0,3	
17	35	35	19	12	0,6	17,16	18,79	5600	7500	51203	0,049	0,004	28	24	0,6	
20	35	35	21	10	0,3	14,25	18,62	6300	8400	51104	0,036	0,004	26	29	0,3	
20	40	40	22	14	0,6	21,28	24,80	5000	6700	51204	0,073	0,008	32	28	0,6	
25	42	42	26	11	0,6	17,20	25,75	5300	7100	51105	0,055	0,006	32	35	0,6	
25	47	47	27	15	0,6	27,79	36,18	4500	6000	51205	0,105	0,015	38	34	0,6	
25	52	52	27	18	1	35,72	42,02	3800	5000	51305	0,160	0,020	41	36	1	
25	60	60	27	24	1	55,54	75,00	3200	4200	51405	0,314	0,035	46	39	1	
30	47	47	32	11	0,6	17,86	30,02	5000	6700	51106	0,061	0,008	40	37	0,6	
30	52	52	32	16	0,6	29,30	43,80	4000	5300	51206	0,127	0,018	43	39	0,6	
30	60	60	32	21	1	43,00	55,20	3300	4500	51306	0,260	0,030	48	42	1	
30	70	70	32	28	1	72,64	118,75	2700	3500	51406	0,520	0,085	54	46	1	
35	52	52	37	12	0,6	20,41	36,39	4700	6300	51107	0,076	0,012	45	42	0,6	
35	62	62	37	18	1	39,10	58,40	3500	4700	51207	0,210	0,032	51	46	1	
35	68	68	37	24	1	56,39	99,75	2800	3800	51307	0,370	0,050	55	48	1	
35	80	80	37	32	1,1	86,93	147,25	2200	3000	51407	0,790	0,120	62	53	1	
40	60	60	42	13	0,6	26,91	51,21	4200	5600	51108	0,110	0,018	52	48	0,6	
40	68	68	42	19	1	44,85	93,29	3200	4200	51208	0,250	0,047	57	51	1	
40	78	78	42	26	1	69,26	128,25	2700	3500	51308	0,530	0,095	63	55	1	
40	90	90	42	36	1,1	112,37	185,00	2000	2700	51408	1,150	0,190	70	60	1	
45	65	65	47	14	0,6	27,00	54,44	4000	5300	51109	0,140	0,025	57	53	0,6	
45	73	73	47	20	1	47,75	99,75	3000	4000	51209	0,299	0,060	62	56	1	
45	85	85	47	28	1	75,82	140,00	2400	3200	51309	0,635	0,130	69	61	1	
45	100	100	47	39	1,1	140,66	191,20	1900	2500	51409	1,420	0,350	78	67	1	
50	70	70	52	14	0,6	27,27	59,95	3800	5000	51110	0,150	0,035	62	58	0,6	
50	78	78	52	22	1	48,54	112,00	2800	3800	51210	0,360	0,082	67	61	1	
50	95	95	52	31	1,1	96,56	145,08	2100	2800	51310	0,940	0,190	77	68	1	
50	110	110	52	43	1,5	159,59	196,96	1700	2200	51410	1,890	0,450	86	74	1,5	
55	78	78	57	16	0,6	33,82	75,28	3300	4500	51111	0,220	0,040	69	64	0,6	
55	90	90	57	25	1	69,41	122,94	2500	3300	51211	0,570	0,110	76	69	1	
55	105	105	57	35	1,1	119,25	234,08	1900	2500	51311	1,260	0,270	85	75	1	
55	120	120	57	48	1,5	205,55	251,47	1600	2100	51411	2,520	0,650	94	81	1,5	
55	120	120	57	48	1,5	152,00	251,00	1600	2100	51411M	2,650	0,650	94	81	1,5	
60	85	85	62	17	1	39,33	89,68	3200	4200	51112	0,280	0,066	75	70	1	
60	95	95	62	26	1	73,61	140,78	2400	3200	51212	0,660	0,130	81	74	1	
60	110	110	62	35	1,1	123,44	248,90	1900	2500	51312	1,340	0,350	90	80	1	
60	130	130	62	51	1,5	212,80	272,65	1400	1900	51412	3,100	0,900	102	88	1,5	
65	90	90	67	18	1	40,57	112,00	2800	3800	51113	0,310	0,086	80	75	1	
65	100	100	67	27	1	74,00	150,00	2400	3200	51213	0,737	0,170	86	79	1	
65	115	115	67	36	1,1	130,00	275,00	1800	2400	51313	1,550	0,450	95	85	1	

# SINGLE DIRECTION AND DOUBLE DIRECTION THRUST BALL BEARINGS



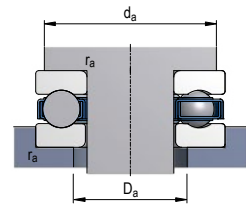
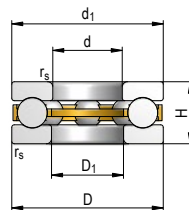
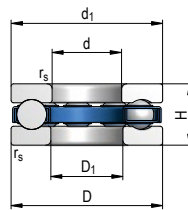
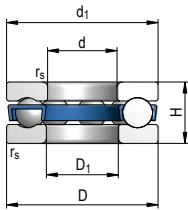
Dimensions mm					Basic Load Rating kN		Limiting Speed for Lubrication min <sup>-1</sup>		Bearing Designation	Weight kg	Minimal Axial Load Index	Abutment and Fillet Dimensions mm			
d	D	d <sub>1</sub>	D <sub>1</sub>	H	r <sub>s</sub>						M	d <sub>a min</sub>	D <sub>a max</sub>	r <sub>a max</sub>	
65	140	140	68	56	2	233,00	329,00	1300	1800	51413	3,900	1,30	110	95	2
70	95	95	75	18	1	40,92	115,00	2800	3800	51114	0,330	0,110	85	80	1
70	105	105	72	27	1	78,00	178,60	2200	3000	51214	0,770	0,210	91	84	1
70	125	125	72	40	1,1	153,26	323,00	1700	2200	51314	1,950	0,540	103	92	1
70	150	150	73	60	2	257,12	365,39	1200	1600	51414	4,860	1,60	118	102	2
75	100	100	77	19	1	48,29	133,00	2700	3500	51115	0,370	0,120	90	85	1
75	110	110	77	27	1	80,00	198,00	2200	3000	51215	0,800	0,270	96	89	1
75	135	135	77	44	1,5	175,12	361,00	1600	2100	51315	2,530	0,760	111	99	1,5
75	160	160	78	65	2	284,05	416,10	1000	1300	51415	6,300	2,10	125	110	2
80	105	105	82	19	1	48,75	137,75	2700	3500	51116	0,390	0,150	95	90	1
80	115	115	82	28	1	83,76	210,90	2000	2700	51216	0,885	0,350	101	94	1
80	140	140	82	44	1,5	181,48	420,00	1500	2000	51316	2,690	0,850	116	104	1,5
80	170	170	83	68	2	300,20	467,23	890	1200	51416	7,120	2,70	133	117	2
85	110	110	87	19	1	49,21	142,50	2700	3500	51117	0,420	0,180	100	95	1
85	125	125	88	31	1	111,25	266,00	1900	2700	51217	1,190	0,430	109	101	1
85	150	150	88	49	1,5	224,12	470,25	1300	1800	51317	3,490	1,20	124	111	1,5
85	180	177	88	72	2,1	335,00	531,00	890	1200	51417	9,310	3,30	141	124	2
90	120	120	92	22	1	64,87	197,70	2200	3000	51118	0,650	0,180	108	102	1
90	135	135	93	35	1,1	128,46	282,00	1700	2200	51218	1,640	0,530	117	108	1
90	155	155	93	50	1,5	232,50	556,40	1100	1500	51318	3,680	1,50	129	116	1,5
90	190	187	93	77	2,1	383,00	619,00	790	1060	51418	11,200	4,10	149	131	2
100	135	135	102	25	1	81,51	216,60	2000	2700	51120	0,930	0,340	121	114	1
100	150	150	103	38	1,1	162,84	346,61	1600	2100	51220	2,180	0,770	130	120	1
100	170	170	103	55	1,5	275,94	560,00	1060	1400	51320	4,840	2,00	142	128	1,5
100	210	205	103	85	3	447,00	779,00	750	1000	51420	15,000	6,20	165	145	2,5
110	145	145	112	25	1	87,40	238,45	1900	2500	51122	0,999	0,420	131	124	1
110	160	160	113	38	1,1	171,00	391,00	1300	1800	51222	2,390	1,10	140	130	1
110	190	187	113	63	2	288,80	569,04	890	1200	51322	7,050	2,80	158	142	2
110	190	187	113	63	2	304,37	587,97	890	1200	51322M	7,850	2,80	158	142	2
110	230	225	113	95	3	467,40	863,55	670	890	51422	17,700	9,00	181	159	2,5
120	155	155	122	25	1	84,65	257,45	1600	2100	51124	1,160	0,530	141	134	1
120	170	170	123	39	1,1	174,00	400,90	1200	1600	51224	2,590	1,40	150	140	1
120	210	205	123	70	2,1	330,60	709,40	790	1060	51324	9,850	4,10	173	157	2
120	210	205	123	70	2,1	347,81	711,44	790	1060	51324M	10,900	4,10	173	157	2
120	250	245	123	102	4	531,00	1 040,00	630	840	51424	25,500	13,0	196	173	3
130	170	170	132	30	1	119,00	355,00	1400	1900	51126	1,640	0,650	154	146	1
130	170	170	132	30	1	85,00	316,00	1400	1900	51126M	2,250	0,650	154	146	1
130	190	187	133	45	1,5	225,15	533,90	1100	1500	51226	3,950	1,70	166	154	1,5
130	225	220	134	75	2,1	369,00	779,00	750	1000	51326	11,600	6,20	186	169	2
130	270	265	134	110	4	631,00	1 280,00	560	750	51426	32,000	18,0	212	188	3
140	180	178	142	31	1	120,00	360,00	1300	1800	51128	1,800	0,800	164	156	1
140	200	197	143	46	1,5	242,00	596,00	1060	1400	51228	4,880	2,00	176	164	1,5
140	200	197	143	46	1,5	233,69	571,53	1400	1900	51228M	4,420	2,00	176	164	1,5
140	240	235	144	80	2,1	414,00	962,00	710	940	51328	14,200	8,00	199	181	2
140	280	275	144	112	4	631,00	1 310,00	670	890	51428	34,500	19,0	222	198	3
150	190	188	152	31	1	123,00	398,00	1300	1800	51130	1,920	0,950	174	166	1

# SINGLE DIRECTION AND DOUBLE DIRECTION THRUST BALL BEARINGS



Dimensions mm							Basic Load Rating kN		Limiting Speed for Lubrication min <sup>-1</sup>		Bearing Designation	Weight kg	Minimal Axial Load Index	Abutment and Fillet Dimensions mm		
d	D	d <sub>1</sub>	D <sub>1</sub>	H	r <sub>s</sub>							M	d <sub>a</sub> min	D <sub>a</sub> max	r <sub>a</sub> max	
150	190	188	152	31	1	90,18	325,00	1700	2400	51130M	2,130	1,000	174	166	1	
150	215	212	153	50	1,5	257,45	646,95	1000	1300	51230	5,480	2,80	189	176	1,5	
150	215	212	153	50	1,5	251,00	590,00	1300	1800	51230M	7,350	3,30	189	176	1,5	
150	250	245	154	80	2,1	430,00	1 020,00	710	940	51330	15,000	10,00	209	191	2	
150	300	295	154	120	4	668,00	1 470,00	500	670	51430	42,300	28,0	238	212	3	
160	200	200	162	31	1	125,00	398,00	1300	1800	51132	2,010	1,20	184	176	1	
160	200	200	162	31	1	107,39	389,50	1300	1800	51132M	2,200	1,20	184	176	1	
160	225	225	163	51	1,5	266,26	691,57	890	1200	51232	6,670	3,20	225	186	1,5	
160	225	225	163	51	1,5	266,26	691,57	890	1200	51232M	7,900	3,20	225	186	1,5	
170	215	213	172	34	1,1	150,10	485,45	1200	1600	51134	2,700	1,50	197	188	1	
170	215	213	172	34	1,1	108,38	420,85	1200	1600	51134M	2,960	1,50	197	188	1	
170	240	237	173	55	1,5	280,39	743,91	840	1100	51234	7,190	4,60	212	198	1,5	
170	240	237	173	55	1,5	280,39	743,91	840	1100	51234M	9,200	4,60	212	198	1,5	
180	225	222	182	34	1,1	156,75	533,90	1100	1500	51136	2,720	1,90	207	198	1	
180	225	222	182	34	1,1	151,29	499,37	1100	1500	51136M	3,000	1,90	207	198	1	
180	250	247	183	56	1,5	288,80	815,10	840	1100	51236	8,850	5,50	222	208	1,5	
180	250	247	183	56	1,5	286,00	760,40	1100	1500	51236M	8,090	6,10	222	208	1,5	
180	300	295	184	95	3	526,18	1 418,51	750	1100	51336	27,500	21,0	251	229	2,5	
190	240	237	193	37	1,1	178,49	599,45	1060	1400	51138	3,480	2,40	220	210	1	
190	270	267	194	62	2,1	337,25	969,12	750	1000	51238	11,900	7,50	238	222	2	
200	250	247	203	37	1,1	183,74	635,53	1060	1400	51140	3,760	3,10	230	220	1	
200	250	247	203	37	1,1	168,09	556,09	1400	1900	51140M	4,020	2,60	230	220	1	
200	280	277	204	62	2,1	337,25	1 018,54	750	1000	51240	12,400	9,50	248	232	2	
200	280	277	204	62	2	294,64	848,78	1000	1400	51240M	13,100	9,10	248	232	2	
200	340	335	205	110	5	480,00	1 930,00	480	630	51340	43,500	29,0	282	258	3	
220	270	267	223	37	1,1	186,45	682,08	1000	2000	51144	4,230	4,60	250	240	1	
220	270	267	223	37	1,1	186,21	682,38	1300	1900	51144M	4,850	3,30	250	240	1	
220	300	297	224	63	2,1	369,00	1 140,00	710	940	51244	13,700	14,0	268	252	2	
240	300	297	243	45	1,5	258,87	927,15	840	1100	51148	7,200	6,50	276	264	1,5	
240	300	297	243	45	1,5	258,87	927,15	1100	1600	51148M	7,140	5,60	276	264	1,5	
240	340	335	244	78	2,1	370,00	1 580,00	600	790	51248	22,900	19,0	299	281	2	
240	340	335	244	78	2,1	454,10	1 483,24	800	1100	51248M	23,600	21,0	299	281	2	
260	320	317	263	45	1,5	266,00	1 000,00	840	1100	51152	8,110	8,60	296	284	1,5	
260	320	317	263	45	1,5	263,82	993,57	1100	1500	51152M	7,980	6,30	296	284	1,5	
260	360	355	264	79	3,5	370,00	1 590,00	560	750	51252	25,500	22,0	319	301	2	
280	350	347	283	53	1,5	335,00	1 280,00	750	1000	51156	12,200	11,0	322	308	1,5	
280	380	375	284	80	2,1	370,00	1 600,00	700	950	51256	27,500	30,0	339	321	2	
300	380	376	304	62	2	335,00	1 340,00	630	850	51160	16,900	14,0	348	332	2	
300	380	376	304	62	2	397,27	1 525,02	850	1200	51160M	17,100	16,0	348	332	2	
300	420	415	304	95	3	450,00	2 240,00	500	670	51260	42,800	40,0	371	349	2,5	
300	420	415	304	95	3	589,22	2 245,41	630	850	51260M	43,500	47,0	371	349	2,5	
320	400	396	324	63	2	414,00	1 650,00	630	840	51164	18,500	16,0	368	352	2	
320	400	396	324	63	2	427,00	1 756,26	800	1100	51164M	18,200	18,0	368	352	2	
320	440	435	325	95	3	454,00	2 460,00	470	630	51264	45,500	48,0	391	369	2,5	
340	420	416	344	64	2	414,00	1 780,00	600	790	51168	19,000	19,0	388	372	2	
340	420	416	344	64	2	429,00	1 768,25	800	1100	51168M	19,500	20,0	388	372	2	

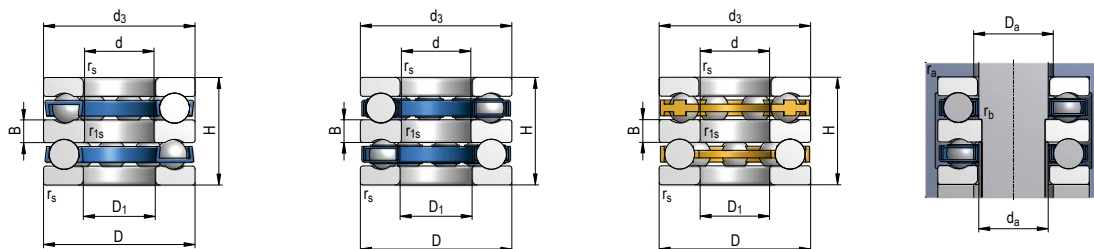
# SINGLE DIRECTION AND DOUBLE DIRECTION THRUST BALL BEARINGS



Dimensions mm							Basic Load Rating kN		Limiting Speed for Lubrication min <sup>-1</sup>		Bearing Designation	Weight kg	Minimal Axial Load Index	Abutment and Fillet Dimensions mm		
d	D	d <sub>1</sub>	D <sub>1</sub>	H	r <sub>s</sub>							M	d <sub>a min</sub>	D <sub>a max</sub>	r <sub>a max</sub>	
340	440	435	324	95	4	455,00	2 850,00	450	600	51268	48,500	53,0	411	389	2,5	
360	440	436	364	65	2	416,00	1 880,00	560	750	51172	21,500	22,0	408	392	2	
360	440	436	364	65	2	430,45	1 890,21	750	1100	51172M	21,800	22,0	408	392	2	
360	500	495	365	110	5	570,00	3 100,00	400	530	51272	70,000	69,0	442	418	3	
360	500	495	365	110	4	830,44	3 495,78	530	750	51272M	71,200	90,0	443	417	3	
380	460	456	384	65	2	430,00	2 240,00	560	750	51176	22,000	22,0	428	412	2	
380	460	456	384	65	2	432,00	1 900,58	750	1100	51176M	22,500	25,0	428	412	2	
380	520	515	385	112	5	575,00	3 200,00	380	500	51276	73,000	81,0	463	437	3	
400	480	476	404	65	2	439,00	2 350,00	530	710	51180	22,570	28,0	448	432	2	
400	480	476	404	65	2	434,42	2 022,36	700	1000	51180M	23,000	27,0	448	432	2	
420	500	496	424	65	2	447,00	2 630,00	530	710	51184	24,900	30,0	470	450	2	
420	500	495	424	65	2	444,48	2 144,32	700	1000	51184M	25,100	30,0	468	452	2	
440	540	536	444	80	2,1	530,00	3 000,00	450	600	51188	42,000	48,0	499	481	2	
460	560	535	444	80	2,1	530,00	3 100,00	430	560	51192	43,500	50,0	519	501	2	
480	580	575	484	80	2,1	540,00	3 250,00	400	530	51196	45,500	53,0	539	521	2	
500	600	596	504	80	3	553,00	3 500,00	400	530	511500	47,000	59,0	559	541	2	
530	640	636	534	85	4	620,00	4 000,00	370	500	511530	58,500	59,5	595	575	2,5	



# SINGLE DIRECTION AND DOUBLE DIRECTION THRUST BALL BEARINGS



Dimensions mm										Basic Load Rating kN		Limiting Speed for Lubrication min <sup>-1</sup>		Bearing Designation	Weight kg	Minimal Axial Load Index	Abutment and Fillet Dimensions mm		
d	D	d <sub>3</sub>	D <sub>1</sub>	H	B	r <sub>s</sub>	r <sub>fs</sub>							M	D <sub>a</sub>	d <sub>s</sub>	r <sub>s</sub>		
10	32	32	17	22	5	0,6	0,3	15,97	23,09	6000	7900	52202	0,090	0,004	15	22	0,3		
15	40	40	22	26	6	0,6	0,3	21,61	24,80	5000	6700	52204	0,139	0,008	20	30	0,3		
15	60	60	27	45	11	1	0,6	55,20	55,20	3200	4600	52405	0,630	0,63	0,63	0,63	0,6		
20	47	47	27	28	7	0,6	0,3	28,41	35,18	4500	6000	52205	0,204	0,015	25	36	0,3		
20	52	52	27	34	8	1	0,3	36,46	40,80	3800	5000	52305	0,310	0,02	25	36	0,3		
20	70	70	32	52	12	1	0,6	72,10	81,00	2700	3500	52406	0,952	0,085	30	50	0,6		
25	52	52	32	29	7	0,6	0,3	28,61	41,61	4000	5300	52206	0,239	0,018	30	42	0,3		
25	60	60	32	38	9	1	0,3	47,96	55,83	3300	4500	52306	0,490	0,03	30	45	0,3		
25	80	80	37	59	14	1,1	0,6	87,40	100,00	2200	3000	52407	1,440	0,12	35	58	0,6		
30	62	62	37	34	8	1	0,3	39,77	57,42	3500	4700	52207	0,420	0,032	35	48	0,3		
30	68	68	37	44	10	1	0,3	57,21	73,11	2800	3800	52307	0,667	0,05	35	52	0,3		
30	68	68	42	36	9	1	0,6	67,00	67,26	3200	4200	52208	0,510	0,047	40	55	0,6		
30	78	78	42	49	12	1	0,6	71,07	91,57	2700	3500	52308	1,060	0,095	40	60	0,6		
30	90	90	42	65	15	1,1	0,6	112,00	204,00	2000	2700	52408	2,030	0,12	40	65	0,6		
35	73	73	47	37	9	1	0,6	71,00	81,00	3000	4000	52209	0,620	0,06	45	60	0,6		
35	85	85	47	52	12	1	0,6	77,70	111,15	2400	3200	52309	1,210	0,13	45	65	0,6		
35	100	100	47	72	17	1,1	0,6	131,00	235,00	1900	2500	52409	2,710	0,35	45	72	0,6		
40	78	78	52	39	9	1	0,6	73,00	95,57	2800	3800	52210	0,675	0,082	50	61	0,6		
40	95	95	52	58	14	1,1	0,6	98,70	141,16	2100	2800	52310	1,850	0,19	50	72	0,6		
45	90	90	57	45	10	1	0,6	74,00	120,38	2500	3300	52211	1,120	0,11	55	72	0,6		
45	105	105	57	64	15	1,1	0,6	112,41	174,00	1900	2500	52311	2,510	0,27	55	80	0,6		
45	120	120	57	87	20	1,5	0,6	156,00	251,00	1600	2100	52411	4,700	0,65	55	88	0,6		
50	95	95	62	46	10	1	0,6	75,00	141,00	2400	3200	52212	1,250	0,13	60	78	0,6		
50	110	110	62	64	15	1,1	0,6	125,78	189,02	1900	2500	52312	2,680	0,35	60	85	0,6		
50	130	130	62	93	21	1,5	0,6	170,00	272,65	1400	1900	52412	5,590	0,9	60	95	0,6		
55	100	100	67	47	10	1	0,6	75,00	150,00	2400	3200	52213	1,360	0,17	65	82	0,6		
55	115	115	67	65	15	1,1	0,6	128,00	211,00	1800	2400	52313	2,900	0,45	65	90	0,6		
55	105	105	72	47	10	1	1	76,40	162,00	2200	3000	52214	1,480	0,21	70	88	1		
55	125	125	72	72	16	1,1	1	147,00	251,00	1700	2200	52314	3,900	0,54	70	98	1		
60	110	110	77	47	10	1	1	77,90	171,00	2200	3000	52215	1,570	0,27	75	90	1		
60	135	135	77	79	18	1,5	1	185,00	310,00	1600	2100	52315	4,830	0,76	75	105	1		
65	115	115	82	48	10	1	1	79,40	181,00	2000	2700	52216	1,690	0,35	80	98	1		
65	140	140	82	79	18	1,5	1	190,00	340,00	1500	2000	52316	4,890	0,85	80	110	1		
70	125	125	88	55	12	1	1	113,83	232,59	1900	2500	52217	2,340	0,43	85	105	1		
70	150	150	88	87	19	1,5	1	224,00	376,00	1300	1800	52317	6,430	1,2	85	115	1		
75	135	135	93	62	14	1,1	1	133,00	282,00	1700	2200	52218	3,220	0,53	90	110	1		
75	155	155	93	88	19	1,5	1	233,00	406,00	1100	1500	52318	6,600	1,5	90	120	1		
85	150	150	103	67	15	1,1	1	153,90	330,60	1600	2100	52220	4,290	0,77	100	125	1		
85	170	170	103	97	21	1,5	1	251,00	464,00	1060	1400	52320	8,900	2	100	135	1		
95	160	160	113	67	15	1,1	1	230,00	391,00	1300	1800	52222	4,680	1,1	110	135	1		
95	190	189,5	113	110	24	2,1	1	304,00	584,00	890	1200	52322	13,800	2,8	110	150	1		
100	170	170	123	68	15	1,1	1,1	233,00	400,90	1200	1600	52224	5,240	1,4	120	154	1,1		
100	210	209,5	123	123	27	2,1	1,1	348,00	708,00	790	1060	52324	17,200	4,1	120	165	1,1		
110	190	189,5	133	80	18	1,5	1,1	237,00	562,00	1100	1500	52226	7,440	1,7	130	160	1,1		
120	200	199,5	143	81	18	1,5	1,1	242,00	596,00	1060	1400	52228	8,950	2	140	170	1,1		
130	215	214,5	153	89	20	1,5	1,1	271,00	681,00	1000	1300	52230	10,600	2,8	150	180	1,1		
130	250	249,5	154	140	31	3	2,1	455,00	980,00	670	900	52330	27,000	2,8	150	191	1,1		
140	225	224,5	163	90	20	1,5	1,1	276,00	722,00	890	1200	52232	12,200	3,2	160	190	1,1		
150	240	239,5	173	97	21	3	2,1	285,00	985,00	800	1100	52234M	15,000	4,1	170	200	1,1		
150	250	248	183	98	21	3	2,1	288,00	1 060,00	750	1050	52236M	16,000	4,2	180	208	2		