

Thrust ball bearings

Definition and capabilities

→ Definition

Thrust ball bearings have a contact angle of 90° and are designed to withstand axial loads only. They must therefore often be associated with a radial bearing.

Single-direction ball thrust bearings withstand the axial load of a shaft in only one direction. Thrust bearings are made of detachable elements: shaft-ring, housing-ring, ball-cage assembly.

■ Cages

Thrust bearings are equipped with a pressed steel cage.

→ Capabilities

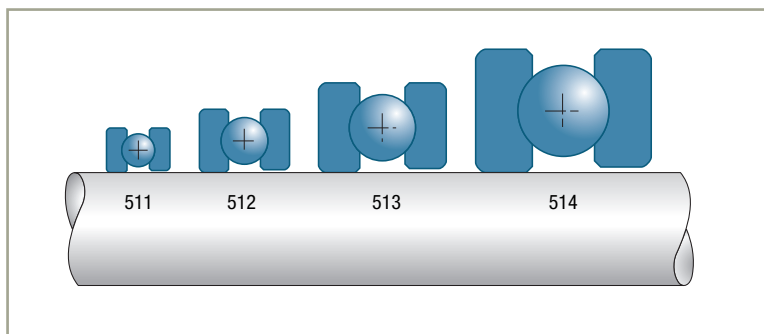
■ Loads and speeds

Can withstand axial loads only in one direction, and low speeds.

■ Misalignment

As the performance of a thrust bearing is related to the distribution of the load over the entire circumference, it is important to have virtually no misalignment between the shaft-ring and the housing-ring (misalignment angle less than 0.03°).

Series



Tolerances

In accordance with ISO 199 Standard, normal tolerance class.

Design criteria

■ Bearing life

■ Minimum dynamic axial load

To compensate for the effects of the centrifugal force being exerted on the balls, it is necessary to permanently exert on the thrusts an axial loading F_a whose minimal value F_{am} (in NR) is determined by the formula:

$$F_{am} = 10^{-14} (N \cdot C_0)^2$$

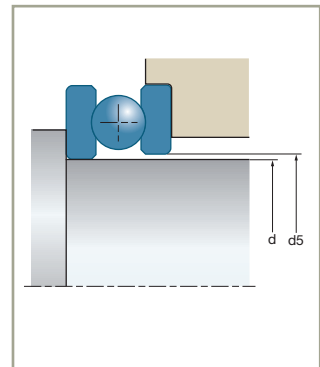
■ Maximum static axial capacity

This is defined by the basic static capacity C_0 .

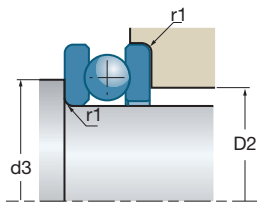
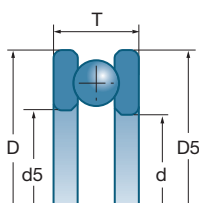
Installation/Assembly criteria

■ Fitting and adjustment

As the elements are detachable they are interchangeable. The shaftring is mounted on its seat with an interference fit. The housing-ring must be free to centre itself. To ease the correct position of the thrust bearing when fitting, the housing-ring has a bore diameter (d_5) greater than that of the shaft-ring (d). If the axial load of the non-loaded thrust bearing is insufficient, a pre-load must be applied using springs to reach the minimum dynamic axial load defined above.



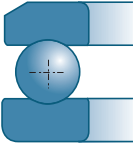
Thrust ball bearings (continued)



d		d5	D	D5	T		
mm	References	mm	mm	mm	mm	10°N	10°N
10	51100	11	24	24	9	10.00	14.00
12	51101	13	26	26	9	10.30	15.40
15	51102	16	28	28	9	10.50	16.80
	51202	17	32	32	12	15.70	24.40
17	51103	18	30	30	9	11.30	19.60
	51203	19	35	35	12	16.20	26.60
20	51104	21	35	35	10	15.00	26.60
	51204	22	40	40	14	22.30	37.70
25	51105	26	42	42	11	18.10	35.50
	51205	27	47	47	15	27.80	50.50
	51305	27	52	52	18	35.70	61.50
	51405	27	60	60	24	55.50	89.40
30	51106	32	47	47	11	18.80	39.90
	51206	32	52	52	16	29.40	58.20
	51306	32	60	60	21	42.70	78.70
	51406	32	70	70	28	72.70	126.00
35	51107	37	52	52	12	20.10	46.60
	51207	37	62	62	18	39.10	78.20
	51307	37	68	68	24	55.50	105.00
	51407	37	80	80	32	86.90	155.00
40	51108	42	60	60	13	26.90	62.90
	51208	42	68	68	19	44.00	92.40
	51308	42	78	78	26	69.30	135.00
45	51109	47	65	65	14	27.90	69.20
	51209	47	73	73	20	46.50	105.00
	51309	47	85	85	28	80.00	164.00
	51409	47	100	100	39	130.00	243.00
50	51110	52	70	70	14	28.80	75.50
	51210	52	78	78	22	47.20	111.00
55	51111	57	78	78	16	34.80	93.20
	51211	57	90	90	25	69.40	159.00
	51311	57	105	105	35	119.00	246.00

Characteristics

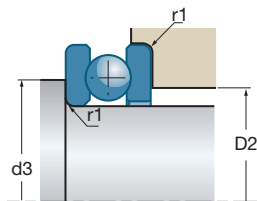
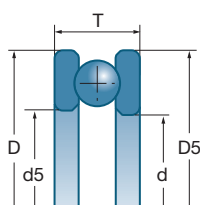
■ Thrust ball bearings with simple effect



			d3 min	D2 max	r1 max	
References	rpm*	rpm*	mm	mm	mm	kg
51100	7900	10600	18	16	0.30	0.021
51101	7500	10000	20	18	0.30	0.023
51102	7100	9400	23	20	0.30	0.025
51202	6000	7900	25	22	0.60	0.042
51103	7100	9400	25	22	0.30	0.025
51203	5600	7500	28	24	0.60	0.050
51104	6300	8400	29	26	0.30	0.038
51204	5000	6700	32	28	0.60	0.078
51105	5300	7100	35	32	0.60	0.058
51205	4500	6000	38	34	0.60	0.110
51305	3800	5000	41	36	1.00	0.167
51405	3200	4200	46	39	1.00	0.340
51106	5000	6700	40	37	0.60	0.065
51206	4000	5300	43	39	0.60	0.133
51306	3300	4500	48	42	1.00	0.270
51406	2700	3500	54	46	1.00	0.530
51107	4700	6300	45	42	0.60	0.081
51207	3500	4700	51	46	1.00	0.203
51307	2800	3800	55	48	1.00	0.377
51407	2200	3000	62	53	1.10	0.790
51108	4200	5600	52	48	0.60	0.110
51208	3200	4200	57	51	1.00	0.260
51308	2700	3500	63	55	1.00	0.540
51109	4000	5300	57	53	0.60	0.128
51209	3000	4000	62	56	1.00	0.283
51309	2400	3200	69	61	1.00	0.662
51409	1900	2500	78	67	1.10	1.450
51110	3800	5000	62	58	0.60	0.139
51210	2800	3800	67	61	1.00	0.380
51111	3300	4500	69	64	0.60	0.220
51211	2500	3300	76	69	1.00	0.590
51311	1900	2500	85	75	1.10	1.350

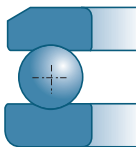
* These are the speed limits according to the SNR concept (see pages 85 to 87).

Thrust ball bearings (continued)



d		d5	D	D5	T		
mm	References	mm	mm	mm	mm	10°N	10°N
60	51112 51312	62 62	85 110	85 110	17 35	41.40 124.00	113.00 270.00
65	51213 51313	67 67	100 115	100 115	27 36	74.90 128.00	189.00 287.00
70	51114 51214	72 72	95 105	95 105	18 27	43.10 76.10	127.00 199.00
75	51115 51215	77 77	100 110	100 110	19 27	44.50 77.30	136.00 209.00
80	51116 51216 51416	82 82 83	105 115 170	105 115 170	19 28 68	44.60 78.50 317.00	141.00 219.00 751.00
85	51117 51217	87 88	110 125	110 125	19 31	46.00 95.40	150.00 264.00
90	51118	92	120	120	22	59.70	190.00
100	51120	102	135	135	25	85.10	268.00
110	51122	112	145	145	25	87.30	288.00
120	51124	122	155	155	25	88.90	308.00
130	51126	132	170	170	30	119.00	406.00
150	51130	152	190	188	31	123.00	448.00
160	51132	162	200	198	31	125.00	476.00

■ Thrust ball bearings with simple effect (*continued*)



			d3 min	D2 max	r1 max	
References	rpm*	rpm*	mm	mm	mm	kg
51112 51312	3200 1900	4200 2500	75 90	70 80	1.00 1.10	0.257 1.450
51213 51313	2400 1800	3200 2400	86 95	79 85	1.00 1.10	0.729 1.550
51114 51214	2800 2200	3800 3000	85 91	80 84	1.00 1.00	0.354 0.783
51115 51215	2700 2200	3500 3000	90 96	85 89	1.00 1.00	0.398 0.827
51116 51216 51416	2700 2000 890	3500 2700 1200	95 101 133	90 94 116	1.00 1.00 2.10	0.430 0.908 7.300
51117 51217	2700 2000	3500 2700	100 109	95 101	1.00 1.00	0.442 1.300
51118	2000	2700	108	102	1.00	0.598
51120	2000	2700	121	114	1.00	0.974
51122	1900	2500	131	124	1.00	1.060
51124	1600	2100	141	134	1.00	1.140
51126	1400	1900	154	146	1.00	1.740
51130	1300	1800	174	166	1.00	2.000
51132	1300	1800	184	176	1.00	2.100

* These are the speed limits according to the SNR concept (see pages 85 to 87).