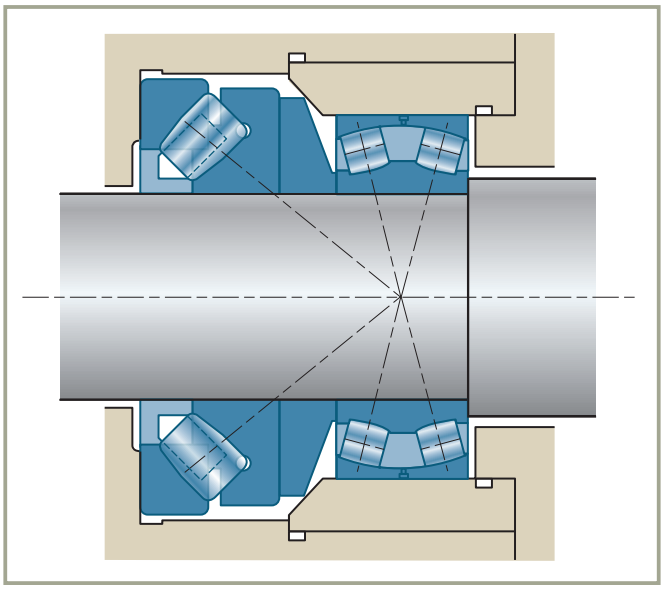
Spherical roller thrust bearings

Definition and capabilities

Definition

Spherical roller thrust bearings are made up of two detachable components: the shaft ring on which are mounted the cage and the spherical-tapered rolling elements, and the housing ring whose spherical raceway enables the bearing to swivel.



SNR Spherical roller thrust bearings are equipped with a a solid brass cage or sheet steel* centred (optimised E series) by a tube crimped in the bore of the shaft-washer. Eventually, SNR thrust bearings will be exclusively equipped with a sheet steel cage optimised E version.

When they are associated with a radial bearing (usually a double-row spherical roller bearing), their point of load application A must coincide with that of the bearing to permit self-alignment.

* Thrust bearings with metal sheet cage are interchangeable with competitors' designs.

Capabilities

Loads and speeds

- Very high axial load capacity
- Possibility of withstanding relatively high radial loads, of about half the value of the axial load, thanks to a high contact angle of about 50°
- Low speeds

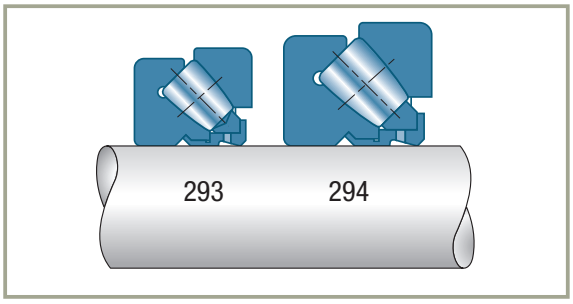
Misalignment

The self-alignment possibility provided by the spherical raceway of the housing-ring enables it to accept misalignment of about 3°. The misalignment may be limited, depending on the sealing system used.

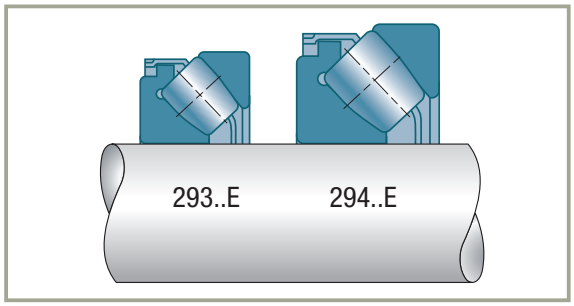
Bearing type	Permitted tilting
292...	2°
293...	2°30'
294...	3°

Series

Solid cage



Sheet steel cage



Tolerances

Spherical roller thrust bearings are manufactured in standard precision to the tolerances fixed for the ball thrust bearings (ISO 199).

Design criteria

Bearing life

Minimum axial load

To ensure smooth and slip-free rotation of the rollers, the thrust bearings must be subjected to a permanent minimum axial load F_{am} (in N) of:

$$F_{am} = 2 \cdot 10^{-16} (N \cdot C_0)^2$$

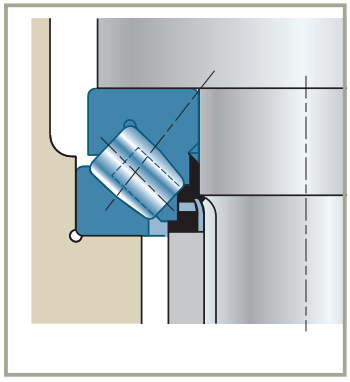
If the operating axial load is less than the minimum axial load, pre-load the thrust bearing with springs.

Installation/Assembly criteria

The elements are detachable and interchangeable.

The shaft-ring is interference-fitted on its seat. The other ring is centred in its housing if the thrust bearing is not associated with another radial bearing.

Conversely, if centring is secured by a radial bearing, the thrust bearing housing-ring must be free to centre itself.



Lubrication

Spherical roller thrust bearings usually have to work under very high loads needing oil lubrication.

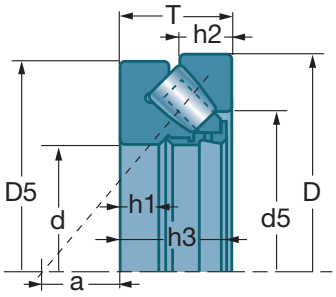
In view of the internal design of this type of thrust bearing, lubrication with grease can only be considered for low speeds of rotation and moderate loads.

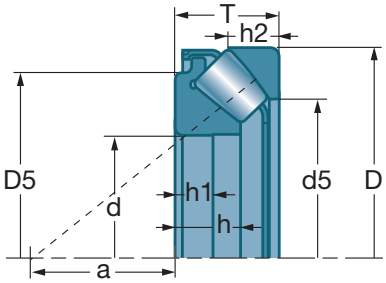
Maximum permissible axial load on the cage centring tube

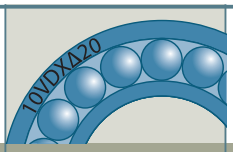
In certain assemblies, because the mild-steel cage centring tube acts as a seat for a spacer-type washer, it must be checked that the axial thrust load does not exceed the values indicated below:

- 0.4 C_0 for thrust bearings 29300
- 0.5 C_0 for thrust bearings 29400

Spherical roller thrust bearings *(continued)*

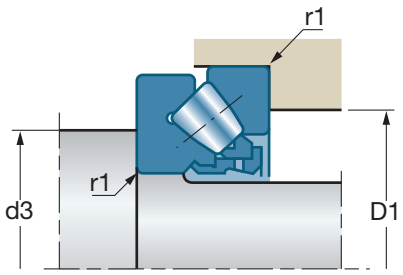


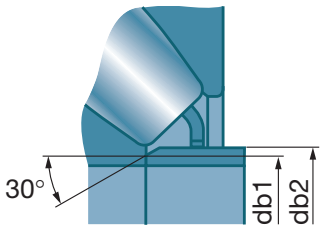


d		D	T	D5	d5	h	h1	h2	h3	a
mm	Références	mm	mm	mm	mm	mm	mm	mm	mm	mm
60	29412 E	130	42	88,0	112,3	27,0	15,0	20,5		38,0
65	29413 E	140	45	96,5	122,8	29,5	16,0	22,0		42,0
70	29414 E	150	48	105,0	131,6	31,0	17,0	23,0		44,0
75	29415 E	160	51	109,0	141,8	33,5	18,0	24,0		47,0
80	29416 E	170	54	117,0	150,8	35,0	19,0	24,0		50,0
85	29417 E	180	58	123,0	160,6	37,0	19,0	28,0		54,0
90	29418 E	190	60	130,0	170,8	39,0	22,0	29,0		56,0
100	29320 E 29420 E	170 210	42 67	128,0 144,5	149,9 189,8	26,2 43,0	15,0 24,0	20,5 32,0		58,0 62,0
110	29322 29322 E 29422 E	190 190 230	48 48 73	143,0 140,5 159,0	176,0 171,0 211,5	 30,3 47,0	16,0 16,0 27,0	23,0 23,0 35,0	45,5	64,0 64,0 69,0
120	29324 29424 E	210 250	54 78	157,5 173,0	194,0 227,8	 50,5	18,0 29,0	26,0 37,0	51,0	70,0 74,0
130	29326 29326 E 29426 E	225 225 270	58 58 85	170,0 165,7 188,0	205,0 199,7 245,4	 36,7 54,0	19,0 21,0 31,0	28,0 30,1 41,0	55,0	76,0 76,0 81,0
140	29328 29328 E 29428 E	240 240 280	60 60 85	183,0 178,8 196,5	219,0 213,7 254,0	 38,5 54,0	20,0 22,0 32,0	29,0 30,0 41,0	57,0	82,0 82,0 86,0
150	29330 29330 E 29430 E	250 250 300	60 60 90	193,0 189,6 209,5	229,0 222,5 273,0	 38,0 58,0	20,0 22,0 34,0	29,0 28,0 44,0	57,0	87,0 87,0 92,0
160	29332 29332 E 29432	270 270 320	67 67 95	207,0 202,3 226,0	248,0 243,6 306,0	 42,0	23,0 24,0 34,0	32,0 33,0 45,0	64,0 91,0	92,0 92,0 99,0

Characteristics

Spherical roller thrust bearings

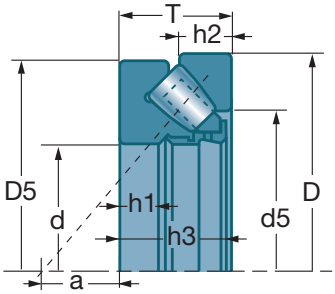


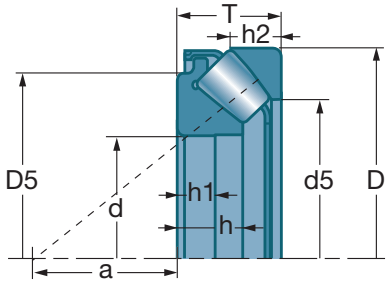


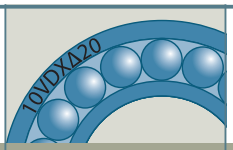
References	10^3N C	10^3N C_0	rpm*	d3 min mm	D1 max mm	r1 max mm	db1 max mm	db2 max mm	kg
29412 E	335	951	2500	90	107	1,5	67	67	2,47
29413 E	405	1157	2300	100	117	2.0	72	72	3.26
29414 E	440	1280	2200	105	125	2.0	77.5	77.5	3.98
29415 E	512	1502	2000	115	133	2.0	82.5	82.5	4.90
29416 E	607	1636	1900	120	141	2.1	88	88	5.68
29417 E	692	1945	1800	130	151	2.1	94	94	6.67
29418 E	703	2172	1700	135	158	2.1	99	99	7.77
29320 E 29420 E	436 865	1402 2578	2100 1500	130 150	147 175	1.5 3.0	107 110	107 110	3.65 10.80
29322 29322 E 29422 E	475 570 1022	1520 1760 3078	1900 1900 1400	145 145 165	166 164 193	2.0 2.0 3.0	 113 120.5	 119.5 129	5.48 5.40 13.50
29324 29424 E	600 1180	1960 3590	1700 1300	160 180	184 209	2.1 4.0	 132	 141	7.58 17.50
29326 29326 E 29426 E	680 765 1395	2230 2950 4300	1600 1500 1200	170 175 195	198 194 227	2.1 2.1 4.0	 138 142.5	 145 153	9.30 9.08 21.60
29328 29328 E 29428 E	750 850 1509	2500 3150 4686	1500 1400 1100	185 185 205	211 208 236	2.1 2.1 4.0	 148 153	 155 162	11.00 10.50 23.00
29330 29330 E 29430 E	770 863 1626	2650 3230 5241	1400 1400 1000	195 195 220	222 219 253	2.1 2.1 4.0	 158 163	 165 175	11.50 10.90 23.00
29332 29332 E 29432	890 1040 1510	3050 3980 5000	1300 1200 1000	210 210 230	239 235 274	3.0 3.0 5.0	 169	 176	15.20 14.40 37.30

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

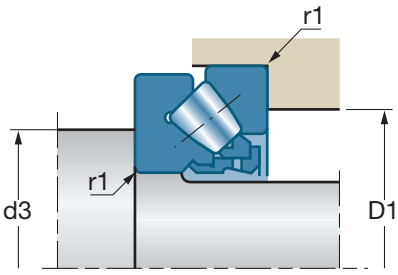
Spherical roller thrust bearings *(continued)*

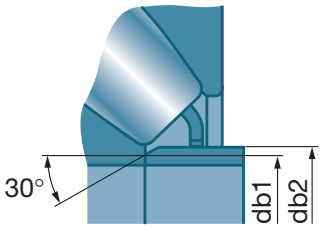




d		D	T	D5	d5	h	h1	h2	h3	a
mm	Références	mm	mm	mm	mm	mm	mm	mm	mm	mm
170	29334 29334 E 29434	280 280 340	67 67 103	215,0 214,6 240,0	258,0 253,6 324,0	42,2	23,0 24,0 37,0	32,0 32,0 50,0	64,0 99,0	96,0 96,0 104,0
180	29336 29336 E 29436	300 300 360	73 73 109	231,0 228,3 255,0	277,0 270,4 342,0	46,0	25,0 26,0 39,0	35,0 35,5 52,0	69,0 105,0	103,0 103,0 110,0
190	29338 E 29438	320 380	78 115	239,5 270,0	284,4 360,0	49,0	28,0 41,0	36,0 55,0	 111,0	110,0 117,0
200	29340 E 29440	340 400	85 122	253,6 284,0	302,8 380,0	53,5	29,0 43,0	40,0 59,0	 117,0	110,0 122,0
220	29344 E 29444	360 420	85 122	273,0 305,0	324,4 400,0	55,0	29,0 43,0	41,0 58,0	 117,0	125,0 132,0
240	29348 E 29448	380 440	85 122	294,8 321,0	343,7 420,0	54,0	29,0 43,0	40,5 59,0	 117,0	135,0 142,0
260	29352 E 29452	420 480	95 132	320,4 346,0	380,3 460,0	61,0	32,0 48,0	46,0 64,0	 127,0	148,0 154,0
280	29356 E 29456 E	440 520	95 145	342,1 370,0	401,7 468,9	62,0 95,0	32,0 52,0	45,0 70,0		158,0 166,0
300	29360 E 29460 E	480 540	109 145	366,7 370,0	431,9 489,2	70,0 95,0	36,0 55,0	51,0 70,5		168,0 175,0
320	29364 E 29464 E	500 580	109 155	387,0 422,0	456,1 525,6	68,0 102,0	37,0 55,0	53,0 74,5		180,0 191,0

Spherical roller thrust bearings *(continued)*





References	10^3N	10^3N	rpm*	d3 min mm	D1 max mm	r1 max mm	db1 max mm	db2 max mm	kg
29334	910	3200	1300	220	248	3.0			16.00
29334 E	1060	4100	1200	220	245	3.0	178	188	15.10
29434	1670	5500	950	245	291	5.0			43.70
29336	990	3500	1200	235	266	3.0			20.30
29336 E	1240	4810	1100	235	262	3.0	189	196	19.10
29436	1870	6300	900	260	307	5.0			52.00
29338 E	1437	4835	1100	250	280	4.0	200	209	23.30
29438	2030	6900	850	275	325	5.0			63.10
29340 E	1621	5475	1000	265	297	4.0	211	222	29.00
29440	2280	7800	800	290	343	5.0			69.00
29344 E	1744	6298	980	285	316	4.0	229	238	31.60
29444	2350	8300	750	310	364	6.0			74.00
29348 E	1786	6487	910	305	336	4.0	249	257	33.40
29448	2420	8700	700	330	383	6.0			83.00
29352 E	2238	8305	830	335	370	5.0	273	284	46.90
29452	2850	10300	660	360	419	6.0			105.00
29356 E	2211	8486	780	355	390	5.0	293	303	49.50
29456 E	4472	15751	620	395	446	6.0	300	319	127.00
29360 E	2650	11000	730	385	423	5.0	313	327	68.70
29460 E	4512	16458	580	415	465	6.0	319	339	133.00
29364 E	2850	10923	690	405	442	5.0	332	346	72.10
29464 E	5005	21200	540	450	500	7.5	344	366	164.00

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