



**磐鼎轴承**  
PANDING BEARINGS

Wafangdian Panding Bearing Co., Ltd

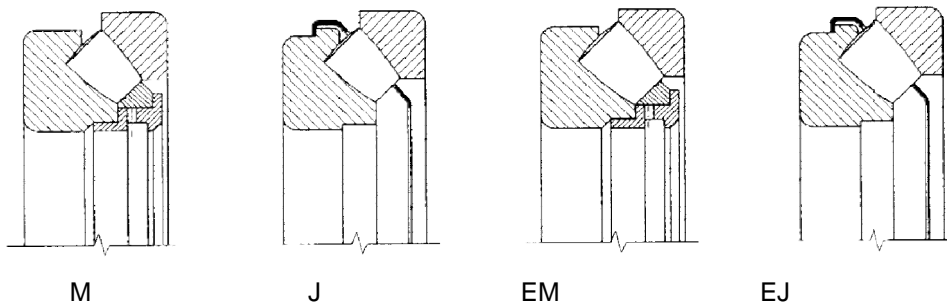
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## Spherical Roller Thrust Bearing



Spherical roller thrust bearings are separable bearings, as there are a large number of asymmetrical barrel-shaped rollers, this bearing can accommodate high axial loads in addition to considerable radial loads at relatively high rotational speeds. The spherical-shaped raceway of the housing washer accommodates misalignment between the shaft and housing.

P&D spherical roller thrust bearings are available in the "E" design with both pressed steel cage and solid brass cage. This design can make the rollers larger and longer, which can increase the basic dynamic and static load ratings of the bearings. See the below fig.



### Cage

Spherical roller thrust bearings are designed and produced with steel and brass cages. Each cage design is designated by "J" for steel and "M" for brass cages. See the picture above for cage design construction. Some applications using the "EJ" design may require the use of shaft spacer.

### Boundary Dimensions

Boundary dimensions of spherical roller thrust bearings comply with standard ISO 104.

### Tolerance

Spherical roller thrust bearings are produced in accordance to ABEC 1 or P0 tolerance class. All of these tolerances comply with standard ISO 492.

## Misalignment

The spherical raceway of the bearing housing washer enables the bearing to accept a considerable amount of misalignment. See the table below for approximate values of misalignment. Please note these values are sufficient for normal operating conditions.

Bearing Type	Permissible Misalignment
292	2°
293	2°30'
294	3°

## Arrangement Design

The abutment and fillet dimensions shown in the dimension tables are suitable for bearings where the load  $P_a < 0.1C_a$ . At higher loads it is suitable to support the bearing's washer along the face surface; i.e.,  $d_a = d_1$  and  $D_a = D_1$ .

## Axial Equivalent Dynamic Load

$$P_a = F_a + 1.2F_r \quad (F_r \leq 0.55F_a) \quad [\text{kN}]$$

## Minimum Axial Load

At high rotational speeds a roller thrust bearing may experience roller element sliding if a minimum load is not applied. For calculation of minimum axial load  $F_{a \min}$  the following equation can be used:

$$\frac{C_{oa}}{2000} \leq F_{a \min} = 1.8 \cdot F_r \cdot M \cdot \left( \frac{n_{\max}}{1000} \right)^2 \quad [\text{kN}]$$

$F_a$  [kN] - minimum axial load  
 $F_r$  [kN] - radial bearing load  
 $C_{oa}$  [kN] - axial basic static load rating  
 $n_{\max}$  [rpm] - maximum rotational speed  
 $M$  - minimum axial load factor

If the axial load applied is too small, it is necessary to create an axial load with the use of springs or a similar device. If a radial load is applied simultaneously, the following condition must also be fulfilled:

$$F_r \leq 0.55F_a$$

## Axial Equivalent Static Load

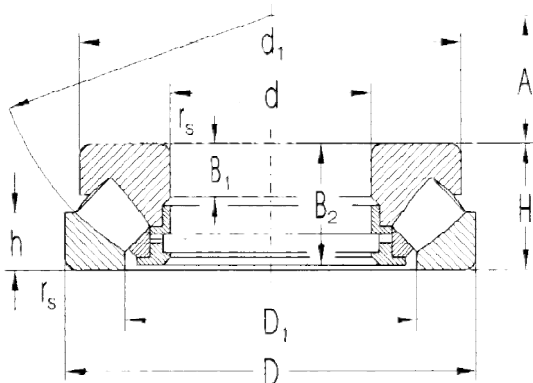
$$P_{oa} = F_a + 2.7F_r \quad (F_r \leq 0.55F_a) \quad [\text{kN}]$$

The static safety factor for spherical roller thrust bearings must be  $s_0 \geq 4$ .

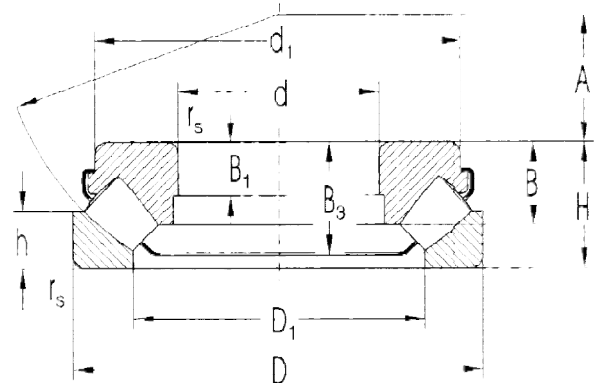
## Designation

Listed below are some common designations for spherical roller thrust bearings.

Spherical Roller Thrust Bearings		
Suffix	Description	Example of Designation
E	Internal design change for enhanced load carrying capacity	29416 EJ
J	Pressed steel cage guided on the rolling elements	29340 J
M	Machined brass cage guided on the rolling elements	29412 M

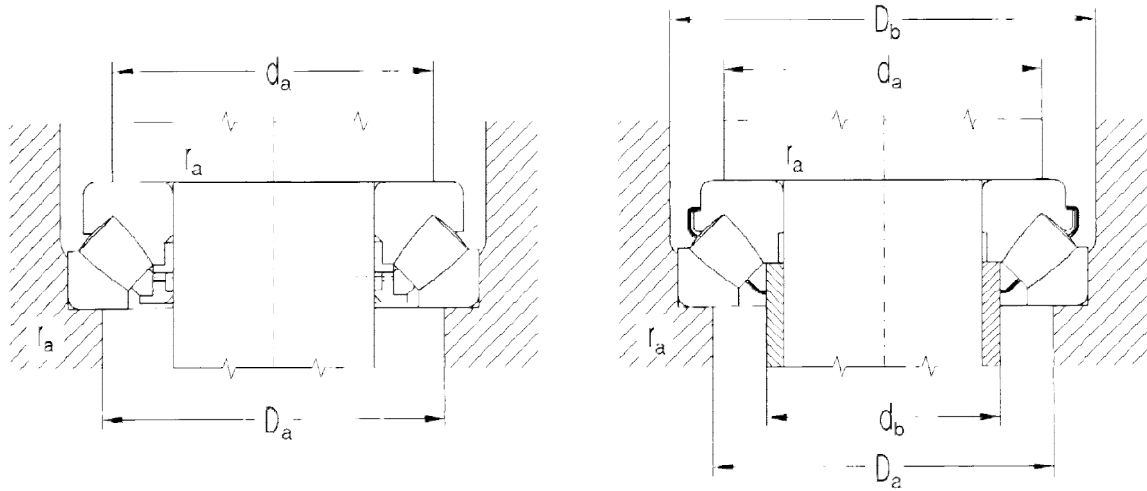


M, EM

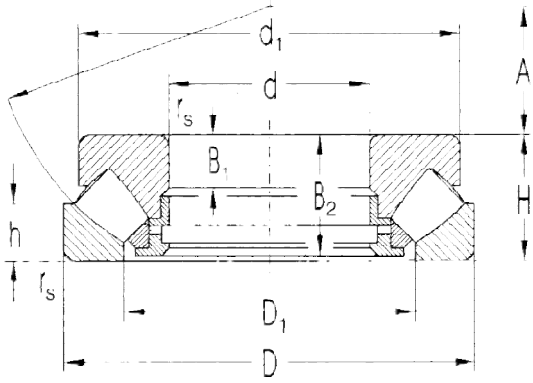


J, EJ

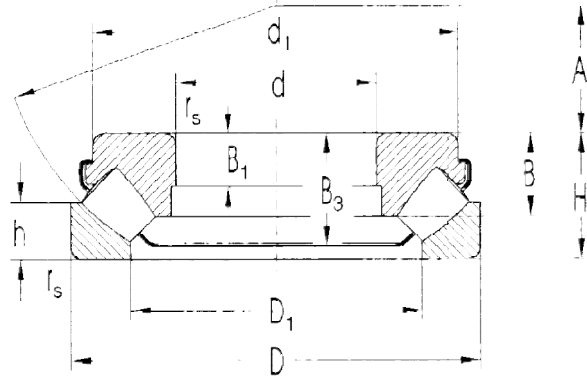
Dimension												Basic Load Rating			
d	D	H	d <sub>1</sub>	D <sub>1</sub>	B	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	h	A	r <sub>s</sub> min	Dynamic C <sub>a</sub>	Static C <sub>0a</sub>	Dynamic C <sub>a</sub>	Static C <sub>0a</sub>
mm												kN	kN	lbs.	lbs.
60	130	42	118	88.0	28.0	15.0	39.5	35.5	20	38	1.5	287	809	64,520	181,870
65	140	45	128	96.5	30.0	16.0	42.5	38.0	21	42	2.0	340	973	76,435	218,739
70	150	48	137	102.0	32.0	17.0	45.5	42.0	23	44	2.0	371	1,071	83,404	240,770
75	160	51	146	109.0	34.5	18.0	48.0	44.5	24	47	2.0	429	1,254	96,443	281,910
80	170	54	155	116.0	36.0	19.0	51.0	46.5	24	50	2.1	464	1,367	104,311	307,313
	170	54	155	116.0	36.0	19.0	-	46.5	24	50	2.1	570	1,430	128,141	321,476
85	180	58	164	125.0	38.0	21.0	55.0	49.0	28	54	2.1	527	1,570	118,474	352,950
90	190	60	174	130.0	-	22.0	57.0	-	29	56	2.1	578	1,784	129,939	401,059
100	210	67	193	144.5	-	24.0	64.0	-	32	62	3.0	705	2,172	158,490	488,285
110	190	48	176	143.0	31.0	16.0	45.5	42.0	23	64	2.0	442	1,415	99,365	318,104
	190	48	176	143.0	31.0	16.0	-	42.0	23	64	2.0	570	1,760	128,141	395,663
	230	73	212	160.0	-	26.0	69.0	-	35	69	3.0	817	2,601	183,668	584,728
120	210	54	194	157.5	-	18.0	51.0	-	26	70	2.1	560	1,831	125,893	411,625
	250	78	229	172.0	-	29.0	74.0	-	37	74	4.0	934	2,996	209,971	673,527
130	225	58	205	170.0	37.0	19.0	55.0	50.5	28	76	2.1	628	2,071	141,180	465,579
	270	85	247	188.0	55.5	31.0	81.0	72.0	41	81	4.0	1,086	3,538	244,142	795,374
140	240	60	219	183.0	-	20.0	57.0	-	29	82	2.1	675	2,311	151,746	519,533
	280	85	257	197.5	-	31.0	81.0	-	41	86	4.0	1,130	3,750	254,034	843,258
150	250	60	229	193.0	-	20.0	57.0	-	29	87	2.1	697	2,425	156,691	545,161
	300	90	276	211.5	-	32.0	86.0	-	44	92	4.0	1,276	4,270	286,856	959,934
160	270	67	248	207.0	-	23.0	64.0	-	32	92	3.0	807	2,812	181,420	632,162
	320	95	306	226.0	-	34.0	91.0	-	45	99	5.0	1,461	4,806	328,445	1,080,431
170	280	67	258	215.0	-	23.0	64.0	-	32	96	3.0	833	2,948	187,265	662,736
	340	103	324	240.0	-	37.0	99.0	-	50	104	5.0	1,624	5,376	365,089	1,208,572
180	300	73	277	231.0	-	25.0	69.0	-	35	103	3.0	984	3,525	221,212	792,451
	360	109	342	255.0	-	39.0	105.0	-	52	110	5.0	1,803	6,011	405,330	1,351,327



Limiting Speed for Lubrication with Oil rpm	Bearing Designation		Abutment and Fillet Dimensions						Weight		Minimum Axial Load Factor
			d	d <sub>a</sub> min	d <sub>b</sub> max	D <sub>a</sub> max	D <sub>b</sub> min	r <sub>a</sub> max	M	J	
			mm						kg		
2400	29412M	29412J	60	90	67	109	140	1.5	2.60	2.47	0.08
2200	29413M	29413J	65	100	74	118	150	2.0	3.30	3.22	0.10
2000	29414M	29414J	70	105	79	126	160	2.0	4.00	3.98	0.14
2000	2941 5M	2941 5J	75	115	84	134	170	2.0	4.90	4.74	0.18
1900	29416M		80	120	88	141	180	2.0	5.80	5.57	0.25
2000		29416EJ		120	88	141	180	2.0	-	5.80	0.26
1800	2941 7M	29417J	85	130	97	153	190	2.0	6.90	6.64	0.30
1700	29418M		90	135	-	161	-	2.0	8.10	-	0.37
1500	29420M		100	150	-	178	-	2.5	11.80	-	0.60
1600	29322M		110	145	117	165	200	2.0	5.50	5.40	0.25
1800		29322EJ		145	117	165	200	2.0	-	5.40	0.25
1400	29422M			165	-	196	-	2.5	14.50	-	0.80
1400	29324M		120	160	-	184	-	2.0	7.60	-	0.36
1300	29424M			180	-	212	-	3.0	18.10	-	1.10
1300	29326M	29326J	130	170	140	198	235	2.0	9.30	8.65	0.52
1200	29426M			195	148	229	280	3.0	22.50	21.80	1.60
1300	29328M		140	185	-	211	-	2.0	11.00	-	0.68
1200	29428M			205	-	239	-	3.0	24.20	-	2.00
1200	29330M		150	195	-	222	-	2.0	11.50	-	0.90
1100	29430M	29430J		220	-	257	-	3.0	29.40	-	2.50
1100	29332M		160	210	-	239	-	2.5	15.20	-	1.10
1000	29432M			230	-	274	-	4.0	35.50	-	3.00
1100	29334M		170	220	-	248	-	2.5	16.00	-	1.40
940	29434M			245	-	291	-	4.0	43.70	-	3.80
1000	29336M		180	235	-	266	-	2.5	20.30	-	1.60
890	29436M			260	-	307	-	4.0	52.00	-	4.70

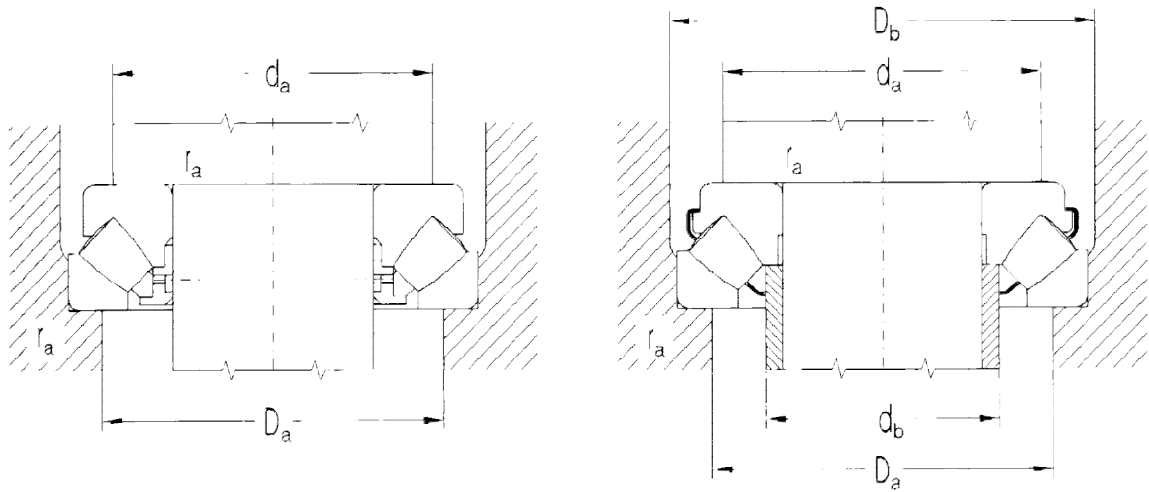


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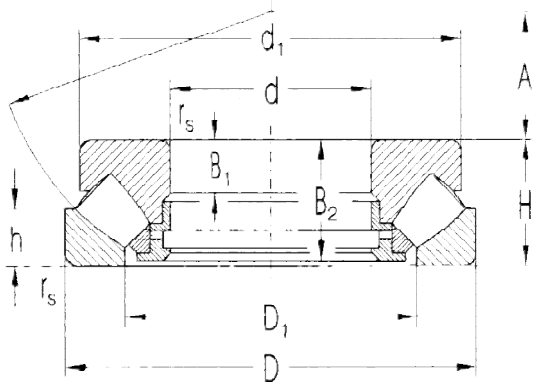


J, EJ

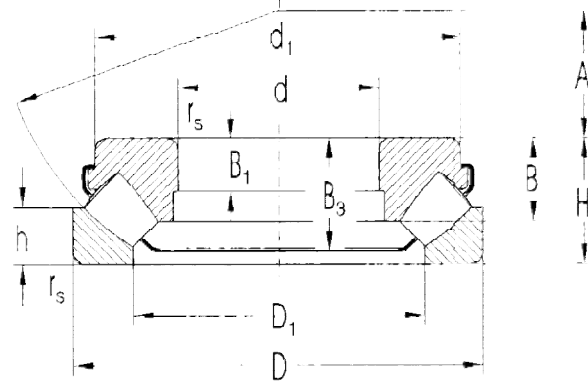
Dimension												Basic Load Rating			
d	D	H	d <sub>1</sub>	D <sub>1</sub>	B	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>	h	A	r <sub>s</sub> min	Dynamic C <sub>d</sub>	Static C <sub>0a</sub>	Dynamic C <sub>a</sub>	Static C <sub>0a</sub>
mm												kN		lbs.	
190	320	78	308.0	246.0	-	27.0	74.0	-	38	110	4.0	1,115	4,013	250,661	902,158
	320	78	284.4	239.5	49.0	28.0	-	68.0	36	110	4.0	1,440	4,840	323,725	1,088,075
	380	115	360.0	270.0	-	41.0	111.0	-	55	117	5.0	1,960	6,607	440,625	1,485,312
200	340	85	325.0	261.0	-	29.0	81.0	-	41	116	4.0	1,299	4,740	292,028	1,065,594
	340	85	302.8	253.6	53.5	29.0	-	73.0	40	116	4.0	1,620	5,480	364,190	1,231,953
	340	85	325.0	261.0	54.5	29.0	-	77.4	41	116	4.0	1,340	4,969	301,245	1,117,081
220	400	122	380.0	284.0	-	43.0	117.0	-	59	122	5.0	2,208	7,508	496,378	1,687,865
	360	85	345.0	280.0	-	29.0	81.0	-	41	125	4.0	1,340	4,969	301,243	1,117,075
	360	85	324.4	273.0	55.0	29.0	-	74.0	41	125	4.0	1,740	6,300	391,168	1,416,296
240	420	122	400.0	305.0	-	43.0	117.0	-	58	132	6.0	2,257	7,968	507,395	1,791,277
	340	60	330.0	283.0	-	19.0	57.0	-	30	130	2.1	770	3,454	173,102	776,490
	380	85	365.0	300.0	-	29.0	81.0	-	41	135	4.0	1,341	5,185	301,468	1,165,634
260	380	85	343.7	294.8	54.0	29.0	-	75.0	40.5	135	4.0	1,790	6,490	402,408	1,459,010
	440	122	420.0	321.0	-	43.0	117.0	-	59	142	6.0	2,340	8,416	526,052	1,891,992
	360	60	350.0	302.0	-	19.0	57.0	-	30	139	2.1	801	3,654	180,071	821,451
280	420	95	405.0	325.0	-	32.0	91.0	-	45	148	5.0	1,777	6,820	399,485	1,533,196
	420	95	380.3	320.4	61.0	32.0	-	84.0	46	148	5.0	2,240	8,310	503,572	1,868,162
	480	132	460.0	346.0	-	48.0	127.0	-	64	154	6.0	2,730	9,871	613,728	2,219,089
300	380	60	370.0	323.0	-	19.0	57.0	-	30	150	2.1	847	3,952	190,413	888,444
	440	95	423.0	345.0	-	32.0	91.0	-	46	158	5.0	1,778	7,103	399,710	1,596,817
	440	95	401.7	342.1	62.0	32.0	-	84.0	45	158	5.0	2,310	8,490	519,309	1,908,628
320	520	145	495.0	380.0	-	52.0	140.0	-	68	166	6.0	3,227	11,844	725,458	2,662,637
	520	145	468.9	370.0	95.0	52.0	-	125.0	70	166	6.0	4,470	15,750	1,004,896	3,540,741
	480	109	460.0	375.0	-	21.0	69.0	-	38	162	3.0	1,025	4,665	230,429	1,048,733
340	480	109	431.9	366.7	70.0	36.0	-	95.0	51	168	5.0	2,182	8,504	490,533	1,911,775
	540	145	515.0	398.0	-	52.0	140.0	-	70	175	6.0	2,650	11,000	595,744	2,472,898
	540	145	489.2	370.0	95.0	55.0	-	125.0	70	175	6.0	3,217	11,854	723,210	2,664,885
360	440	73	430.0	375.0	-	21.0	69.0	-	38	172	3.0	1,065	4,925	239,421	1,107,184
	500	109	482.0	395.0	-	37.0	105.0	-	53	180	5.0	2,183	8,854	490,757	1,990,458
	500	109	456.1	387.0	68.0	37.0	-	95.0	53	180	5.0	2,850	10,920	640,705	2,454,914
380	580	155	555.0	430.0	-	55.0	149.0	-	75	191	7.5	3,889	14,694	874,281	3,303,342
	580	155	525.6	422.0	102.0	55.0	-	134.0	74.5	191	7.5	5,010	21,200	1,126,293	4,765,950
	620	170	590.0	452.0	-	61.0	164.0	-	82	201	7.5	4,346	16,413	977,019	3,689,789
380	520	85	485.0	420.0	-	25.0	81.0	-	44	194	4.0	1,402	6,596	315,182	1,482,839
	560	122	540.0	444.0	-	41.0	117.0	-	59	202	5.0	2,654	11,031	596,642	2,479,867
	670	175	640.0	510.0	-	63.0	168.0	-	85	222	7.5	4,600	18,300	1,034,121	4,114,003
380	670	175	622.0	504.0	-	63.0	168.0	-	85	222	7.5	4,700	19,100	1,056,602	4,293,850



Limiting Speed for Lubrication with Oil rpm	Bearing Designation	Abutment and Fillet Dimensions						Weight		Minimum Axial Load Factor
		d	d <sub>a</sub> min	d <sub>b</sub> max	D <sub>a</sub> max	D <sub>b</sub> min	r <sub>a</sub> max	M	J	
mm										
kg										
940	29338M	190	250	-	-	283	3.0	24.8	-	2.0
1100	29338EJ	250	-	-	-	383	3.0	-	23.3	2.0
840		29438M	275	-	-	-	325	4.0	60.0	-
890	29340M	200	265	-	-	300	3.0	30.8	-	2.4
950	29340EJ	265	-	-	-	300	3.0	-	29.0	2.4
890		29340J	265	224	350	300	3.0	-	28.9	2.4
790	29440M	290	-	-	-	343	4.0	69.0	-	6.8
840	29344M	220	285	-	-	320	3.0	32.8	-	3.1
950	29344EJ	285	-	-	-	320	3.0	-	31.6	3.1
750		29444M	310	-	-	-	364	5.0	74.0	-
890	29248M	240	285	-	-	311	2.0	16.7	-	1.3
790	29348M	300	-	-	-	340	3.0	35.3	-	4.4
900	29348EJ	300	-	-	-	340	3.0	-	33.4	4.4
750		29448M	330	-	-	-	383	5.0	79.0	-
890	29252M	260	305	-	-	331	2.0	18.5	-	1.5
750	29352M	330	-	-	-	374	3.0	48.5	-	5.7
800	29352EJ	330	-	-	-	374	3.0	-	46.9	5.7
670		29452M	360	-	-	-	419	5.0	105.0	-
840	29256M	280	325	-	-	351	2.0	19.5	-	1.7
710	29356M	350	-	-	-	394	4.0	52.5	-	7.0
800	29356EJ	350	-	-	-	394	4.0	-	49.5	7.0
630		29456M	390	-	-	-	453	5.0	132.0	-
630	29456EJ	390	-	-	-	453	5.0	-	127.0	18.0
750	29260M	300	355	-	-	386	2.5	30.5	-	2.6
630	29360M	380	-	-	-	429	4.0	74.0	-	8.5
700	29360EJ	380	-	-	-	429	4.0	-	68.7	8.5
600		29460M	410	-	-	-	471	5.0	140.0	-
600	29460EJ	410	-	-	-	471	5.0	-	133.0	20.0
710	29264M	320	375	-	-	406	2.5	32.9	-	2.8
630	29364M	400	-	-	-	449	4.0	77.0	-	10.0
670	29364EJ	400	-	-	-	449	4.0	-	72.1	10.0
560		29464M	435	-	-	-	507	6.0	175.0	-
560	29464EJ	435	-	-	-	507	6.0	-	164.0	28.0
500	29368M	340	430	-	-	484	4.0	103.0	-	14.0
500	29468M	465	-	-	-	451	6.0	218.0	-	34.0
630	29272M	360	420	-	-	461	3.0	51.8	-	4.9
560	29372M	450	-	-	-	504	4.0	107.0	-	15.0
600	29276M	380	440	-	-	480	3.0	52.8	-	6.2
470	29476M	510	-	-	-	587	6.0	254.0	-	44.0
470	29476EM	504	-	-	-	570	6.0	254.0	-	44.0

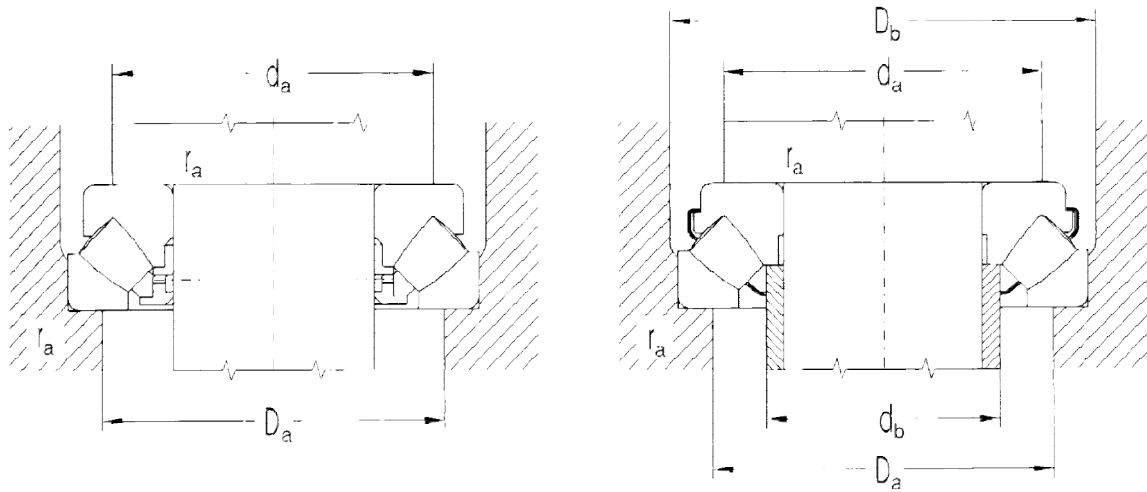


M, EM



J, EJ

Dimension										Basic Load Rating			
d	D	H	d <sub>1</sub>	D <sub>1</sub>	B <sub>1</sub>	B <sub>2</sub>	h	A	r <sub>s</sub> min	Dynamic C <sub>a</sub>	Static C <sub>0a</sub>	Dynamic C <sub>a</sub>	Static C <sub>0a</sub>
mm										kN	kN	lbs.	lbs.
400	540	85	526	460.0	27.0	81.0	42	212	4.0	1,602	7,899	360,143	1,775,705
	620	132	596	494.0	44.0	127.0	64	225	6.0	2,573	11,055	578,433	2,485,262
	710	185	680	530.0	67.0	178.0	89	236	7.5	6,810	26,500	1,530,949	5,957,437
420	650	140	626	520.0	48.0	135.0	68	235	6.0	3,142	13,146	706,349	2,955,338
	730	185	700	546.0	67.0	178.0	89	244	7.5	5,649	22,400	1,269,945	5,035,720
440	680	145	655	546.0	49.0	140.0	70	245	6.0	3,772	13,368	847,979	3,005,245
	780	206	745	576.0	74.0	199.0	100	260	9.5	6,278	24,649	1,411,350	5,541,315
480	650	103	635	554.0	33.0	99.0	55	259	6.0	1,920	11,000	431,633	2,472,898
500	670	103	654	574.0	33.0	99.0	55	268	5.0	2,404	12,124	540,440	2,725,583
	750	150	725	611.0	51.0	144.0	74	280	6.0	4,216	18,655	947,794	4,193,810
530	800	160	772	648.0	54.0	154.0	76	295	7.5	5,130	22,730	1,153,269	5,109,907
600	900	180	850	731.0	64.5	171.0	87	335	7.5	6,800	31,500	1,528,700	7,081,481
630	850	132	820	724.0	42.0	127.0	67	338	6.0	4,250	22,500	955,438	5,058,201
800	1360	335	1300	1040.0	120.0	324.0	162	462	15.0	16,340	72,364	3,678,378	16,268,074



Limiting Speed for Lubrication with Oil	Bearing Designation	Abutment and Fillet Dimensions						Weight	Minimum Axial Load Factor
		d	d <sub>a</sub> min	d <sub>b</sub> max	D <sub>a</sub> max	D <sub>b</sub> min	r <sub>a</sub> max	M	
rpm		mm						kg	
600	29280M	400	460	-	500	-	3.0	55.3	7.0
500	29380M		498	-	557	-	5.0	150.0	24.0
450	29480EM		550	-	615	-	6.0	306.0	88.0
450	29384M	420	523	-	585	-	5.0	170.0	26.0
400	29484M		592	-	684	-	8.0	323.0	64.0
450	29388M	440	548	-	614	-	5.0	190.0	34.0
400	29488M		592	-	684	-	8.0	407.0	83.0
500	29296M	480	558	-	603	-	4.0	96.5	15.0
470	292/500M	500	578	-	622	-	4.0	101.0	16.0
400	293/500M		613	-	680	-	5.0	220.0	46.0
380	293/530M	530	651	-	724	-	6.0	286.0	64.0
330	293/600M	600	735	-	815	-	6.0	390.0	120.0
350	292/630M	630	730	-	789	-	5.0	211.0	44.0
220	294/800M	800	1055	-	1200	-	12.0	2010.0	740.0



